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Design Analysis Cover Sheet

Complete only applicable items.

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1. Purpose

This analysis is prepared by the Mined Geologic Disposal System (MGDS) Waste Package Development Department (WPDD) to provide boiling water reactor (BWR) assembly radiation source term data for use during Waste Package (WP) design. The BWR assembly radiation source terms are to be used for evaluation of radiolysis effects at the WP surface, and for personnel shielding requirements during assembly or WP handling operations. The objectives of this evaluation are to generate BWR assembly radiation source terms that bound selected groupings of BWR assemblies, with regard to assembly average burnup and cooling time, which comprise the anticipated MGDS BWR commercial spent nuclear fuel (SNF) waste stream. The source term data is to be provided in a form which can easily be utilized in subsequent shielding/radiation dose calculations. Since these calculations may also be used for Total System Performance Assessment (TSPA), with appropriate justification provided by TSPA, or radionuclide release rate analysis, the grams of each element and additional cooling times out to 25 years will also be calculated and the data included in the output files.

2. Quality Assurance

The Quality Assurance (QA) program applies to this analysis. The work reported in this document is part of the preliminary WP design analysis that will eventually support the License Application Design phase. This activity, when appropriately confirmed, can impact the proper functioning of the Mined Geologic Disposal System (MGDS) waste package; the waste package has been identified as an MGDS Q-List item important to safety and waste isolation (pp. 5, 16, Ref. 5.1). The waste package is on the Q-List by direct inclusion by the Department of Energy (DOE), without conducting a QAP-2-3 evaluation. As determined by an evaluation performed in accordance with QAP-2-0, *Conduct of Activities*, the work performed for this analysis is subject to *Quality Assurance Requirements and Description* (QARD; Ref. 5.3) requirements. As specified in NLP-3-18, this activity is subject to QA controls. Although a documented evaluation is not required by the current revision of QAP-2-0, the WPDD Responsible Manager has selected the applicable procedural controls for this activity commensurate with the work control activity evaluation entitled "Perform Criticality, Thermal, Structural, and Shielding Analyses" (Ref. 5.2).

All design inputs which are identified in this document are for the preliminary stage of the WP design process; all of these design inputs will require subsequent confirmation (or superseding inputs) as the waste package design proceeds. This document will not directly support any construction, fabrication, or procurement activity and, therefore, is not required to be procedurally controlled as TBV (to be verified). In addition, the inputs associated with this analysis are not required to be procedurally controlled as TBV. However, use of any data from this analysis for input into documents supporting construction, fabrication, or procurement is required to be controlled as TBV in accordance with the appropriate procedures.

3. Method

The ORIGEN-S code in the SCALE 4.2 (Ref. 5.4, see Section 6) is used to calculate the radiation source terms for the selected design basis fuel assembly as a function of specified assembly average burnups and cooling times. The prime module of the SCALE 4.2 code system sequence utilized is the ORIGEN-S code to perform the fuel irradiation, the hardware activation, and the radionuclide decay. This code does a point depletion of a selected fuel type with user specified irradiation conditions. At the completion of the depletion/activation calculation, decay of the irradiated fuel with user specified time intervals is computed.

4. Design Inputs

All design inputs which are identified in this document are for the preliminary stage of the design process; all of these design inputs, excluding the codes and standards, will require subsequent confirmation (or superseding inputs) as the waste package design proceeds. This document will not directly support any construction, fabrication, or procurement activity and, therefore, is not required to be procedurally controlled as TBV (to be verified). In addition, the inputs associated with this analysis are not required to be procedurally controlled as TBV. However, use of any data from this analysis for input into documents supporting construction, fabrication, or procurement is required to be controlled as TBV in accordance with the appropriate procedures.

4.1 Design Parameters

The selected design basis fuel assembly upon which this calculation is based is the ANF 9x9 fuel assembly (see assumption 4.3.2). The typical operating parameters and mechanical parameters for this assembly type are shown in Tables 4.1-1, 4.1-2, and 4.1-3.

The values listed in Table 4.1-1 were copied from reference 5.8, Appendix E. The values provided in Table 4.1-1 are representative of the LaSalle BWR/5 reactor operation and are reasonable for use in this analysis (see assumption 4.3.3).

The theoretical density of UO_2 is 10.96 g/cm^3 as indicated in Table M8.2.1 of the SCALE 4.2 manual (Ref. 5.4).

Table 4.1-3 provides the typical weights and material specification for top and bottom end fittings, fuel rods, and other types of hardware of the fuel assembly. Tables 4.1-4 through 4.1-7 provide the isotopic composition for each of the material types identified in Table 4.1-3 (see assumption 4.3.4). This information is required to perform the activation analysis for the top end fitting, bottom end fitting, fuel rod plenum region, and active fuel rod region sections of a fuel assembly in order to generate a source term for each of these sections of the fuel assembly.

Table 4.1-1 Typical Assembly/Core Operating Parameters for a BWR 9x9 Assembly (Parameters are for a typical GE /5 plant; e.g., LaSalle)

Parameter	Value	Units	Reference
Number of assemblies in the core	764		Ref. 5.8
Total core thermal power	3323	MWth	Ref. 5.8
Average assembly power	4.35	MW/assembly	Ref. 5.8
Average specific power MW/MTU	25.145	MW/MTU	Ref. 5.8

Table 4.1-2 Mechanical Parameters of a ANF 9x9 JP-4,5 BWR Fuel Assembly

Assembly Parameter	Value	Units	Metric	Units	Reference
Total number of fuel rods	79	/assbly			p. 2A-141, Ref. 5.5
Number of rods on a lattice side	9	/side			p. 2A-143, Ref. 5.5
Number of water rods	2	/assbly			p. 2A-141, Ref. 5.5
Fuel channel material	Zirc-4				p. 6-9, Ref. 5.8
Clad/water rod material	Zirc-2				p. 2A-141, Ref. 5.5
Fuel rod length	163.84	inches	416.154	cm	p. 2A-24, Ref. 5.6
Fuel stack height	150.0	inches	381.0	cm	p. 2A-24, Ref. 5.6
Fuel channel height	166.906	inches	423.941	cm	p. 6-10, Ref. 5.8
Mass of U	381.35	lb	172.978	kg	p. 2A-139, Ref. 5.5
Mass of UO_2 [$]	432.63	lb	196.24	kg	Calculated
% of Theoretical Density (Pellet)	94.5	%			p. 2A-142, Ref. 5.5
Mass of fuel channel*	99.207	lb	45.0	kg	p. 2.1.2.3-1, Ref. 5.7
Fuel assembly envelope	6.0	inches	15.24	cm	p. 2-7, Ref. 5.15
Bottom end fitting length	6.94	inches	17.628	cm	p. 2A-143, Ref. 5.5
Fuel rod plenum length	9.578	inches	24.328	cm	p. 2A-143, Ref. 5.5
Top end fitting length**	9.54	inches	24.232	cm	p. 2A-143, Ref. 5.5
Total assembly length	176.058	inches	447.187	cm	p. 2A-139, Ref. 5.5

[$] UO_2 weight was calculated by: Given Uranium mass × ratio of UO_2 amu to U amu; all amu data is from Appendix C of reference 5.16; U wt% from Table 7.2.1-1.

* Fuel channel mass is for a 120 mil channel thickness, other channel designs are thinner at 80 and 100 mils (p. 6-10, Ref. 5.8).

** Rod end caps are included in the top end fitting length.

Table 4.1-3 Composition and Weights of Assembly Hardware for a ANF 9x9 JP-4,5 BWR Assembly (All data from pp. 2A-140, 2A-141, and 2A-142 of Reference 5.5)

Top Hardware Components			Bottom Hardware Components		
Part Name	kg/Assembly	Material Id.	Part Name	kg/Assembly	Material Id.
Comp. Springs	0.3400	Inconel X-750	Bottom Tie Plate	4.5300	St. Steel CF-3
Top Tie Plate	1.6100	St. Steel CF-3			

Fuel/Plenum Region Components			Fuel Rod/Plenum Components		
Part Name	kg/Assembly	Material Id.	Part Name	lbs/Assembly	Material Id.
Water Rods[$]	1.3000	Zircaloy-2	Plenum Springs	0.047	Inconel X-750
Spacers-Incore	1.5400	84wt% Zircaloy 16wt% Inco-718			
Channel	45.0 **	Zircaloy	Part Name	lbs/Rod	Material Id.
			Pellet Weight*	5.476	UO_2
			Rod Weight	7.010	Zirc/UO_2

[$] Water rods are spacer capture rods and inert rod locations in reference 5.5.
[*] UO_2 mass provided in Table 4.1-2 divided by the number of fuel rods.
[**] From Ref. 5.7, p. 2.1.2.3-1.

Table 4.1-4 Composition of Zircaloy for Activation/Source Term Analysis (Composition Data from pp. 665, 666, Ref. 5.9)

Element	Reference Range Wt%	Wt% Used in Calculation
O	0.12 (Max.)	0.12
Cr	0.10 (Max.)	0.10
Fe	0.20 (Max.)	0.20
Sn	1.40 (Max.)	1.40
Zr	Balance	98.18

Table 4.1-5 Composition of Inconel-718 for Activation/Source Term Analysis
(Composition Data from p. 436, Ref. 5.9 and p. 11, Ref. 5.10)

Element	Reference Range Wt%	Wt% Used in Calculation
Ni*	50.0 - 55.0	54.00
Cr	17.0 - 21.0	19.00
Fe	Balance	15.79
Nb/Ta**	4.75 - 5.50	5.00
Mo	2.80 - 3.30	3.05
Ti	0.65 - 1.15	0.80
Al	0.20 - 0.80	0.60
Co	1.00 (Max.)	1.00
Mn	0.35 (Max.)	0.25
Si	0.35 (Max.)	0.25
Cu	0.30 (Max.)	0.20
C	0.08 (Max.)	0.06
S	0.015 (Max.)	0.00
P	0.015 (Max.)	0.00
B	0.006 (Max.)	0.00

* Ni composition includes any Co in the composition as specified in Ref. 5.9 and 5.10 (i.e., Ni + Co must be in the 50 to 55 wt% range).
** Nb and Ta are together in the manufacture specification (Ref. 5.9 and 5.10). This analysis models the entire amount as Nb.

Table 4.1-6 Composition of Inconel X-750 for Activation/Source Term Analysis
(Composition Data from p. 11, Ref. 5.10)

Element	Reference Range Wt%	Wt% Used in Calculation
Ni*	70.0 (Min.)	70.23
Cr	14.0 - 17.0	15.00
Fe	5.0 - 9.0	8.00
Nb/Ta**	0.70 - 1.20	1.00
Ti	2.25 - 2.75	2.40
Al	0.40 - 1.00	0.70
Co	1.00 (Max.)	1.00
Mn	1.00 (Max.)	0.80
Si	0.50 (Max.)	0.40
Cu	0.50 (Max.)	0.40
C	0.08 (Max.)	0.06
S	0.01 (Max.)	0.01

* Ni composition includes any Co in the composition as specified in Ref. 5.10 (i.e., Ni + Co must be in the 70 wt% minimum value).
** Nb and Ta are together in the manufacture specification (Ref. 5.10). This analysis models the entire amount as Nb.

Table 4.1-7 Composition of Stainless Steel CF-3 for Activation/Source Term Analysis
(Composition Data from p. 909, Ref. 5.11)

Element	Reference Range Wt%	Wt% Used in Calculation
C	0.03 (Max.)	0.02
Mn	1.50 (Max.)	1.25
Si	2.00 (Max.)	1.75
Cr	17.0 - 21.0	19.00
Ni	8.0 - 12.0	12.00
Fe	Balance	65.98

4.2 Criteria

The design of the shielding required for handling BWR SNF assemblies will depend on development of design basis source terms with which to evaluate the effectiveness of proposed shield designs. Criteria that relate to the development and design of repository components are derived from the applicable requirements and planning documents. Upper-level systems requirements are provided in the Mined Geologic Repository System Requirements Document (MGDSRD, Ref. 5.25). The requirements flow down to the Engineered Barrier Design Requirements Document (EBDRD, Ref. 5.13) as specific requirements for engineered barrier segment design and the Repository Design Requirements Document (RDRD, Ref. 5.12). The Controlled Design Assumptions Document (Ref. 5.14) provides guidance for requirements listed in the EBDRD which have unqualified or unconfirmed data associated with the requirement. The criteria applicable to the development of radiation source terms for the design of repository shielding and components are equivalent to the applicable requirements, interface requirements, and criteria cited in the EBDRD and they are listed in this section.

The "TBD", "TBV", and "TBR" items identified in the applicable criteria in this section will not be carried to the conclusions of this analysis based on the rationale that the conclusions derived by this analysis are for preliminary design and will not be used as input into documents supporting construction, fabrication, or procurement.

The EBDRD provides the following requirements which relate to the development of BWR SNF radiation source terms. The listing is provided here to identify the non-fuel components for which source terms data is needed and to indicate the minimum cooling times for repository emplacement (see assumption list in Section 4.3).

EBDRD 3.2.3.4.C (pp. 3-26, 3-27, Ref. 5.13):
"WA [Waste Acceptance] will provide standard SNF meeting the following criteria:

...

1. Spent fuel waste form will be the high level radioactive waste and any encapsulating matrix, such as cladding that is associated with spent fuel.

...

   c. Nonfuel Components: Nonfuel components including, but not limited to, control spiders, burnable poison rod assemblies, control rod assemblies, control rod elements, thimble plugs, fission chambers, and primary and secondary neutron sources, that are contained within the fuel assembly, or BWR channels that are an integral part of the fuel assembly, which do not require special handling, may be included as part of the SNF delivered for disposal.

   d. Cooling: The minimum cooling time for fuel is five (5) years.

...

4. Estimated inventory of radionuclides will be (TBD)."

MGDS Management has mandated that the CDA (Ref. 5.14) be used when it applies. EBDRD 3.2.3.4.C.4 is applicable to CDA assumption identifier EBDRD 3.2.3.4.C.4: SNF Reference Radionuclide Inventory, which states, "Inventory of radionuclides will be based on the Characteristics Data Base".

However, this design analysis will not determine compliance with the referenced requirements because this analysis is for the preliminary stage of WP design. The determination of compliance with the RDRD and EBDRD requirements will be performed in another design analysis when the WP design is beyond the preliminary design phase.

4.3 Assumptions

Based on the rationale that the conclusions derived by this analysis are for preliminary design and will not be used as input into documents supporting construction, fabrication, or procurement a TBD or TBV will not be carried to the conclusions of this analysis.

4.3.1 The assembly parameters provided in Table 4.3.1 are assumed to provide a reasonable data set of radiation source terms with which to evaluate shielding designs and operations which may require additional shielding material due to handling of nonstandard fuel assemblies. Data set 1 is the design basis fuel as specified during the advanced conceptual design (p. 5-7, Ref. 5.15). Data sets 2 through 4 represent bounding design parameters for various assembly average burnups which are encountered in the waste stream.

Table 4.3-1 BWR Assembly Parameters for which Radiation Source Terms are Calculated

Data Set	Initial U235 wt%	Initial U Mass (kg)	Assembly Average Burnup (MWd/MTU)	Cooling Time for Data (Years)
1	3.74	200	49,000	5 & 10
2	5.05	200	50,000	5 & 10
3	5.05	200	55,000	5 & 10
4	5.05	200	60,000	5 & 10

Radiation source term strength for long cooling times (i.e., 5 years or longer) is most sensitive to assembly burnup. Source term strength is relatively insensitive to initial U235 wt% and initial uranium mass provided these parameters are realistically matched to the assembly burnup which the initial assembly loading is capable of supporting. Thus, selecting a bounding initial enrichment of 5.05% (assembly manufacturer license limit of 5.00% plus the vendor enrichment tolerance 0.05%) and a bounding initial uranium mass loading of 200

kg for BWR assemblies is not excessive and will only slightly increase the source strengths. However, the enrichment selected for data set 1 is slightly too low to realistically support an average assembly burnup of 49,000 MWd/MTU. This will cause the ORIGEN-S depletion to calculate a higher neutron flux than an assembly with this loading will actually experience. This in turn will slightly over-predict the activation source in the top, bottom, and plenum regions since the level of activation is directly dependent upon the neutron flux magnitude. Thus, data set 1 has a greater level of conservatism by design than the other data sets. However, the data generated is not excessively conservative if assembly average burnups in the 55,000 to 60,000 MWd/MTU range are to be included in the waste package design basis. This assumption is used throughout Section 7.

4.3.2 The design parameters of the ANF 9x9 JP-4,5 BWR assembly provided in reference 5.5, Table 4.1-2, and Table 4.1-3 are assumed to reasonably bound both the fission product and activation product radiation source term generation for BWR SNF designs. A review of the range of assembly parameters in reference 5.5 shows that the ANF 9x9 JP-4,5 BWR assembly can have a high uranium loading to support a larger fission product generation and is in the highest end of the range of assembly hardware mass for activation components. Source term strength is very insensitive to the size of the assembly array (i.e., 7x7, 8x8, 9x9, 10x10, etc.) given the long cooling times before the repository will handle the fuel. Shielding/dose rate analysis will use bounding conditions, as the minor differences between different assembly array sizes are negligible. Thus, the ANF 9x9 JP-4,5 BWR assembly will be reasonably bounding with regards to both fission product and activation product source terms for shielding calculations. This assumption is used through out Section 7.

4.3.3 The reactor operating parameters specified in Table 4.1-1 are assumed to be representative of a GE BWR/5 reactor, and that burning the assembly at the average assembly power for these reactor conditions to the desired assembly average burnup will provide representative values for the radiation source terms. Section 4.2 provides the requirement that Waste Acceptance (WA) will provide BWR SNF which has a cooling time of 5 years or more. For this analysis, the cooling time is longer than the assembly irradiation time. This means that all short half life radionuclides which have saturation concentrations set by the reactor power level and/or reactor operating history are of no concern and will not affect the results calculated in this analysis. The medium and long half life radionuclides concentrations are dependent upon both reactor power level and time of irradiation (i.e., burnup). Thus, for a selected assembly burnup, the selection of reactor power dictates the irradiation time. A higher reactor power means a shorter irradiation time, but the quantity of medium and long half life radionuclides generated is equivalent. A more detailed discussion of radionuclide generation during reactor operation is provided on pages 352 through 363 of reference 5.16. Finally, radiation fluence/dose rate analysis for shielding or release evaluations are bounding analysis which makes them very insensitive to the perturbations in moderator temperatures, pellet temperatures, pellet densities, etc. as long as representative reactor conditions are selected (Ref. 5.23). Pages S2.3.1 through S2.3.8 of reference 5.4 provides a detailed discussion which shows that for long cooling times the variation in source strength due to

perturbations in moderator temperatures, pellet temperatures, pellet density, etc. is small relative to the uncertainty in the SAS2H methods and isotopic data. These uncertainties are addressed typically with the bounding assumptions used in the shielding analysis. Thus, using the reactor parameters provided in Table 4.1-1 is reasonable for this analysis. This assumption is used throughout Section 7.

4.3.4 The material composition of Inconel-718, Inconel X-750, Zircaloy, and Stainless Steel CF-3 (304L based) are assumed to be representative of material used in the manufacture of BWR nuclear fuel assemblies and will generate slightly conservative activation source terms. Specifically, the composition of Zircaloy-4 is assumed to be representative of Zircaloy-2. Also, Stainless Steel ANF referred to in reference 5.5 is a Stainless Steel CF-3 (304L based) based material used for castings with a specification for impurities which is slightly different from the ASM specifications (Ref. 5.11). The ASM specification is used in this analysis and is assumed to have a negligible impact upon the results of this analysis. Finally, the indicated compositions used for this calculation have been biased towards the maximum amounts of Co and Ni which is the major precursor for Co60. Co60 is the major activation product dictating the radiation source strength in the end fittings on SNF assemblies which have long cooling times. The balance of elements are representative of the material compositions for each material. Thus, the activation source terms should be slightly conservative using the indicated values. This assumption is used throughout Section 7.

4.4 Codes and Standards

Not Applicable.

5. References

5.1 *Yucca Mountain Site Characterization Project Q-List*, YMP/90-55Q, REV 3, U.S. Department of Energy (DOE) Office of Civilian Radioactive Waste Management (OCRWM)

5.2 "Perform Criticality, Thermal, Structural, and Shielding Analyses," Document Identifier (DI) Number: BB0000000-01717-2200-00025 REV 02, Civilian Radioactive Waste Management System (CRWMS) Management and Operating Contractor (M&O).

5.3 *Quality Assurance Requirements and Description* (QARD), DOE/RW-0333P REV 5, U.S. DOE OCRWM.

5.4 *SCALE 4.2*, RSIC Computer Code Collection, CCC-545, Oak Ridge National Laboratory, September 1994.

5.5 *Characteristics of Spent Fuel, High-Level Waste, and Other Radioactive Wastes Which May Require Long-Term Isolation*, DOE/RW-0184, Volume 3, U.S. DOE OCRWM, December, 1987.

5.6 *Characteristics of Potential Repository Wastes*, DOE/RW-0184-R1, Volume 1, U.S. DOE OCRWM, July, 1992.

5.7 *Preliminary Waste Form Characteristics Report Version 1.0*, UCRL-ID-108314 Rev 1, Lawrence Livermore National Laboratory (LLNL), December, 1994.

5.8 Station Nuclear Engineering Manual, GE Mechanical & Nuclear Engineering Training, General Electric Co., NEDO-24810 / 80NED032, September 1980.

5.9 ASM Metals Handbook, Volume 2, Properties Selection: Nonferrous Alloys and Special Purpose Materials, American Society for Metals Handbook Committee, Metals Park, Ohio, 1990.

5.10 Product Handbook, INCO Alloys International, INCO Alloys International, Inc., Huntington, West Virginia, 1993.

5.11 ASM Metals Handbook, Volume 1, Properties Selection: Irons, Steels, and High Performance Alloys, American Society for Metals Handbook Committee, Metals Park, Ohio, 1990.

5.12 *Repository Design Requirements Document*, YMP/CM-0023, REV 0, ICN 1, Yucca Mountain Site Characterization Project.

5.13 *Engineered Barrier Design Requirements Document*, YMP/CM-0024, REV 0, ICN 1, Yucca Mountain Site Characterization Project.

5.14 *Controlled Design Assumptions (CDA) Document*, DI Number: B00000000-01717-4600-00032 REV 04, CRWMS M&O.

5.15 *Mined Geologic Disposal System Advanced Conceptual Design Report, Volume III of IV, Engineered Barrier Segment/Waste Package*, DI Number: B00000000-01717-5705-00027 REV 00, CRWMS M&O.

5.16 Pigford, T. H., et. al., Nuclear Chemical Engineering, Second Edition, McGraw-Hill Book Company, New York, New York, 1981.

5.17 "BUGLE-93, Coupled 47 Neutron, 20 Gamma-Ray Group Cross Section Library Derived from ENDF/B-VI for LWR Shielding and Pressure Vessel Dosimetry Applications," RSIC Computer Code Collection, DLC-175, Oak Ridge National Laboratory, May, 1984.

5.18 Jacks, G. M., "General Shielding Calculation Constar", Framatome Technologies Incorporated Document Number: 86-1200977-00, February, 1992.

5.19 Software Qualification Report for the SCALE Modular Code System (CSCI: 30004 V1.0), DI Number: 30004-2002 REV 00, CRWMS M&O.

5.20 Software Life Cycle Plan for the SCALE Modular Code System (CSCI: 30004 V1.0), DI Number: 30004-2000 REV 00, CRWMS M&O.

5.21 Luksic, A., et. al., *Spent Fuel Assembly Hardware: Characterization and 10 CFR 61 Classification for Waste Disposal*, Volumes I, II, and III, PNL-6909 / UC-85, Pacific Northwest Laboratory (PNL), June, 1989.

5.22 Bowman, S. M., and O. W. Hermann, *SCALE-4 Analysis of Pressurized Water Reactor Critical Configurations: Volume 3 - Surry Unit 1 Cycle 2*, ORNL/TM-12294/V2, Oak Ridge National Laboratory, March, 1995.

5.23 King, S. Q., "Decay Heat Power for SBL Calculations", Framatome Technologies Incorporated Document Number: 32-1219162-00, October, 1992.

5.24 Mined Geological Disposal System Requirements Document, DOE/RW-0404P (DI Number: B00000000-00811-1708-00002 REV 02), U.S. DOE OCRWM.

6. Use of Computer Software

6.1 Scientific and Engineering Software

The ORIGEN-S module of the SAS2H sequence in the SCALE 4.2 code system (Ref. 5.19) version (V) 1.0 (CSCI: 30004 V1.0) is used in this analysis. SAS2H is designed for LWR fuel depletion calculations to determine spent fuel isotopic content, decay heat rates, and radioactive source terms and is appropriate for the generation of radioactive source terms to evaluate waste package, waste package emplacement, and the SNF assembly handling as utilized in this analysis. The analyses using the ORIGEN-S module of the SAS2H software were executed on a Hewlett-Packard 9000 Series 735 workstation. The software qualification of the SAS2H software, including problems of the type analyzed in this report, is summarized in the Software Qualification Report for the SCALE Modular Code System (Ref. 5.19). The ORIGEN-S evaluations performed for this design analysis are fully within the range of the validation for the SAS2H software used. The associated BWR specific cross section libraries were used for these calculations as specified in reference 5.4. Access to and use of the SAS2H software for this analysis was granted by software configuration management and performed in accordance with the Life Cycle Plan for the SCALE Modular Code System (Ref. 5.20) and the QAP-SI series procedures. Inputs and outputs to the SAS2H software are included as attachments as described in the following design analysis.

6.2 Computational Support Software

Microsoft's EXCEL Version 5.0 for Windows was used to rescale the radiation source terms from the energy scale used in the SAS2H software to the energy scale of the BUGLE-93 cross section library (Ref. 5.17). The gamma radiation source term was rescaled using the process documented in the CONVERT Version 1.0 for MS-DOS documentation (Ref. 5.18). This calculation is easily checked by hand with the data in the attachments. The total neutron radiation source term was rescaled using the process documented in the CONVERT 1.0 for MS-DOS documentation (Ref. 5.18) for the ORIGEN-S energy groups 2 through 27. However, the spontaneous fission neutron radiation source term for the group 1 ORIGEN-S energy group was rescaled using the process documented in the NEUTRSR Version 1.0 for MS-DOS documentation (Ref. 5.18) in order to avoid developing an excessively conservative neutron radiation source term. This is consistent with the original ORIGEN-S treatment as presented on page S2.2.16 in reference 5.4. This calculation is easily checked by hand with the data in the attachments.

7. Design Analysis

This analysis is performed to provide the radiation source terms for four distinct regions of a BWR SNF assembly: 1) Top End Fitting, 2) Fuel Rod Plenum, 3) Active Fuel Length, and 4) Bottom End Fitting. Radiation source terms are to be determined for bounding BWR assembly uranium loadings (see assumption 4.3.1) for a range of assembly burnups and cooling times such that shielding/radiolysis requirements for both standard and nonstandard intact fuel assemblies can be evaluated. Since these calculations may also be used for TSPA or radionuclide release rate analysis, the grams of each element and additional cooling times out to 25 years have also been calculated and the data included in the output files.

The radiation source terms are calculated on a per assembly basis. Since shielding codes usually require source term input on a per cc basis, the data for each assembly region has been normalized to the assembly region volume. The subsequent analysis will be responsible to re-normalize the source terms if a different volumetric normalization is required. Also, subsequent analysis must account for the subcritical multiplication factor for the neutron source terms. A subcritical multiplication factor has not been applied in this analysis, since it is system dependent, and the neutron source terms reported do not account for any fission source other than spontaneous fission. The data reported here for the Active Fuel Length of the assembly is the assembly average source term and it will be the left to the subsequent analysis to account for any axial burnup distributions (i.e., axial peaking factors) either by applying an axial burnup distribution to the average values or by assuming a bounding peaking factor applied to the whole Active Fuel Length.

7.1 Evaluation Procedure

The SAS2H software was run to generate the source term for each specified region of a BWR fuel assembly. The main calculational module of SAS2H for the depletion/activation calculation is ORIGEN-S which will provide an 18 group photon spectrum and a 27 group neutron spectrum for each burnup, cooling time, fuel region combination on a per assembly basis. The ORIGEN-S source term is usually not directly input to shielding calculations for the following reasons: 1) Shielding codes usually require that the radiation source term be input on a per cc basis. 2) The shielding analysis for the MGDS repository is expected to utilize the BUGLE-93 (Ref. 5.17) cross section library which has 47 neutron energy groups and 20 gamma energy groups. Thus, the ORIGEN-S radiation source terms will be re-normalized to the BUGLE-93 energy group structure and for the volume of an assembly.

The evaluation procedure is broken into three major tasks, with subtasks in each. The general procedure is as follows:

1) Parameter (input) Identification
    a) Develop representative fuel description - mechanical/material parameters (see assumptions 4.3.2 and 4.3.4)
    b) Obtain representative reactor operating parameters

2) Run SCALE 4.2
   a) Calculate/determine input parameters from task 1 for burnup calculation
   b) Determine decay time steps desired after assembly discharge

3) Process Output
   a) Using spreadsheet, normalize source terms for shielding analysis
   b) Address limits/specifications for the use of the radiation source term results

The results of task 1 are listed in Section 4.1. Details of tasks 2 and 3 are presented in Sections 7.2 and 7.3, respectively.

7.2 ORIGEN-S Module of SAS2H Code Input Calculations

All ORIGEN-S input decks are provided in the attachments itemized in Section 9. For specific examples of the ORIGEN-S input deck, please refer to the attachments. The ORIGEN-S input consists of 4 major data inputs: the print/control inputs, the material composition information, the irradiation/depletion information, and the decay/source term information. The first, print/control inputs, simply specify the type of calculation, the FORTRAN unit numbers to find the ORIGEN-S data libraries, scratch files, etc., and the amount/type of data to print in the output files. These inputs are simple and explained in great detail in the SCALE manual, reference 5.4. The remaining three data items are discussed in the following sections.

A separate execution is performed for each BWR fuel assembly region, since the SCALE 4.2 code package does not have the ORIGEN2 option of "flux irradiation using the preceding power irradiation flux values". Thus, separate executions are required to obtain radiation source terms for the plenum and end fitting regions of the assembly.

7.2.1 UO_2 Material Composition Data

The ORIGEN-S input data arrays which control the material compositions are the 73$$, 74**, and 75$$ arrays. The input data for the 73$$ array consists of the ORIGEN-S numeric id (p. F7.6.6, Ref. 5.4) of each element, the 74** array provides the effective mass per assembly in grams for each element, and the 75$$ array indicates whether the element is a actinide, fission product, or light element for each element which is to be included in the calculation. The grams of uranium and oxygen are required for the active fuel region in order to perform a depletion analysis, this means that both the isotopic composition of uranium and the mass of each element must be calculated.

The isotopic composition of uranium for commercially available enriched uranium is determined by the given initial U_{235} enrichment and the following empirical relationship (p. 18, Ref. 5.22).

$$wt_{234} = 0.007731(wt_{235})^{1.0837},$$
$$wt_{236} = 0.0046wt_{235},$$
$$wt_{238} = 100 - wt_{234} - wt_{235} - wt_{236}$$

Using this formulation, the fresh fuel isotopics for 3.74% and 5.05% initial U_{235} enrichments (see assumption 4.3.1) were calculated as shown in the Table 7.2.1-1.

Table 7.2.1-1 Isotopic Composition of Uranium for 3.75% and 5.05% U_{235} Enrichments

Uranium Isotope	3.74% U_{235} (wt%)	5.05% U_{235} (wt%)
U-234	0.03229	0.04471
U-235	3.74000	5.05000
U-236	0.01720	0.02323
U-238	96.21051	94.88206

The uranium mass per assembly to be used in the calculations is 200 kg uranium loading as specified in assumption 4.3.1. The UO_2 mass for this uranium loading is determined by ratio: the molecular atomic weight of UO_2 to the element atomic weight (use the data in Table 7.2.1-1) and multiply the uranium mass loading by this ratio. All element/isotope atomic weights were from Appendix C of reference 5.16. Thus, the UO_2 mass for a 200 kg uranium loading for 3.74% U_{235} enrichment is 226.8969 and for 5.05% U_{235} enrichment is 226.9014. Then using the uranium data provided in Table 7.2.1-1, the grams of each isotope is determined and provided in Table 7.2.1-2.

Table 7.2.1-2 ORIGEN-S Isotopic Input for UO_2 with 3.75% and 5.05% U_{235} Enrichments

Uranium Isotope	3.74% U_{235} (grams)	5.05% U_{235} (grams)
U-234	64.6	89.4
U-235	7480.0	10100.0
U-236	34.4	46.5
U-238	192421.0	189764.1
O	26896.9	26901.4

7.2.2 BWR Assembly Light Element Materials for Activation Source Terms

Activation of the materials in the top and bottom end fittings, the plenum region, and the fuel region for long cooling times has been shown to be a major contributor to radiation source terms. Thus, these elements need to be included as part of the depletion/activation analysis. However, the end fittings and the plenum region are outside the fuel region and the ORIGEN-S neutron flux calculations are representative of the average fuel region only. Use of the neutron flux calculated by ORIGEN-S would greatly over-estimate the activation products in regions outside the active fuel length. A method for determining the activation of material outside the fuel region has been presented and benchmarked in reference 5.21. Section S2.5.4.4 of reference 5.4 also recommends this method to calculate the activation source terms in the end fittings and plenum regions using ORIGEN-S.

The method presented in reference 5.21 developed scaling factors that relate the activation rate in a reactor's fuel region to the activation rate in regions outside the active fuel region. These factors are presented on page vi of reference 5.21 and are summarized in Table 7.2.2-1. These factors are applied to ORIGEN2 or ORIGEN-S results by multiplying the assembly radionuclide inventories, either as input or as-calculated, by the appropriate scaling factor for the region in which the material is located. The material activation calculation is performed as if it is irradiated in the fuel region. Since ORIGEN-S does not have the same "flux irradiation using the preceding power irradiation flux values" feature which is in ORIGEN2, each assembly region will be performed as a separate ORIGEN-S execution repeating the fuel region depletion with the appropriate light elements as input. This calculation will apply the scaling factors to the light element input mass in order to use the ORIGEN-S output directly for the radiation source term data.

The scaling factors in reference 5.21 have a documented uncertainty of 50%. In order to provide a reasonable bound for the activation products in the end fitting and plenum assembly regions, the scaling factors will be increased by 50% and these values used in this calculation. This analysis will use the General Electric fuel assembly scaling factors which are applicable to all BWR fuel vendor's fuel assemblies (i.e., ANF, ABB, etc.) since the basic dimensions are very similar (see assumption 4.3.2). Thus, the activation products calculated in this analysis will be bounding for all BWR fuel assemblies.

Table 7.2.2-1 Scaling Factors for Light Element Inputs for End Fittings and Plenum Regions

Assembly Region	Scaling Factor (Ref. 5.21)	Scaling Factor Used in Calculations (Increase 50%)
Top End Fitting	0.100	0.150
Gas Plenum	0.200	0.300
Bottom End Fitting	0.150	0.225

The input data for the 73$$ array consists of the ORIGEN-S numeric id (p. F7.6.6, Ref. 5.4) of each element, the 74** array provides the effective mass per assembly in grams for each element, and the 75$$ array indicates whether the element is a actinide, fission product, or light element for each element which is to be included in the calculation. Each light element mass is easily calculated given the assembly region material compositions and material weights provided in Table 4.1-3, the material elemental compositions provided in Tables 4.1-4 through 4.1-7 (see assumption 4.3.4), and the scaling factors in Table 7.2.2-1. The mass of each element for each material in each fuel assembly region specified in Table 4.1-3 is calculated by multiplying the element wt% for that material (Tables 4.1-4 through 4.1-7) by the mass of that material indicated in the selected fuel assembly region specified in Table 4.1-3 (see assumption 4.3.4). Then, for each fuel assembly region, the individual element masses are totaled. Each element mass for each region is then multiplied by the selected fuel assembly region scaling factor from Table 7.2.2-1. The results of these calculations are provided in Attachment I for each of the four fuel assembly regions. This data is then entered into the appropriate ORIGEN-S input deck.

7.2.3 Assembly Power & Irradiation Time for Depletion Input

The calculated average assembly specific power is provided in Table 4.1-1 and is 4.35 MW/assembly. As stated in assumption 4.3.3, the assembly will be irradiated at this assembly power for the required number of days to achieve the desired assembly average burnup. The Effective Full Power Day (EFPD) input is calculated for the desired burnup assuming the assembly power and an assembly uranium loading: EFPD = Burnup (MWd/MTU) x uranium loading (MTU/assembly) / assembly power (MW/assembly). Table 7.2.3-1 shows this result for each of the desired assembly conditions specified in assumption 4.3.1.

Table 7.2.3-1 BWR Assembly Parameters for which Radiation Source Terms are Calculated

Data Set	Assembly Power (MW)	Initial U Mass (kg)	Assembly Average Burnup (MWd/MTU)	Irradiation Time (Days)
1	4.35	200	49,000	2252.8736
2	4.35	200	50,000	2298.8506
3	4.35	200	55,000	2528.7356
4	4.35	200	60,000	2758.6207

The burnup calculation was divided into substeps corresponding to the burnup steps of the ORIGENS BWR cross section library and to avoid any calculational errors which have been documented with the use of large time steps during the depletion analysis. The ORIGEN-S BWR

cross section libraries for stand-alone ORIGEN-S depletion calculations are listed in Table F7.A.3 of reference 5.4. The best cross section library for this analysis is the BWR library for assemblies with an initial U235 enrichment of 3.8wt% (this is the highest enrichment available with these cross section libraries) and a specific power of 20 MW/MTU. Table 4.1-1 states the average specific power is 25.145 MW/MTU, but this value is for a 0.172978 MTU assembly loading. The analysis is using a 0.200 MTU assembly loading which is gives an average specific power of 21.75 MW/MTU. Thus, the cross section for the 20 MW/MTU specific power level is the best choice for this analysis. The use of the bounding 0.200 MTU assembly loading also significantly increases the irradiation time to obtain the desired assembly burnup values. However, as stated in assumption 4.3.3, the power history effects do not significantly affect the radiation source term results since the cooling time for the assembly is long. The most important parameters are the assembly burnup value, having a bounding uranium mass loading, and an initial U_{235} enrichment value which is capable of supporting the assembly burnup value.

7.2.4 Decay Input

Radionuclide decay to the desired assembly cooling times (e.g., 5 and 10 years) and beyond to 25 years was run as a separate subcase from the depletion calculation. Executing ORIGEN-S in this fashion allows the specific decay times and the specific source term data to be generated with the least amount of output and data handling.

The master photon database was selected as the best library with which gamma radiation source terms are to be calculated for each execution of ORIGEN-S. Also, for the top end fitting, plenum, and bottom end fitting regions only the light element gamma radiation source is required since the neutron production in these regions is negligible and the fuel neutron and gamma source is accounted for by the fuel region ORIGEN-S execution. Additionally, the grams and curies for each nuclide have been printed to the output file for any TSPA data requirements or other analysis which may require this type of data. Each input deck is provided in the attachments listed in Section 9.

7.3 Radiation Source Term Data

This analysis is performed to provide the radiation source terms for four distinct regions of a BWR SNF assembly: 1) Top End Fitting, 2) Fuel Rod Plenum, 3) Active Fuel Length, and 4) Bottom End Fitting. Radiation source terms have been determined for bounding BWR assembly uranium loadings (see assumption 4.3.1) for a range of assembly burnups and cooling times such that shielding/radiolysis requirements for both standard and nonstandard intact fuel assemblies can be evaluated. Since these calculations may also be used for TSPA or radionuclide release rate analysis, the grams of each element and additional cooling times out to 25 years have also been calculated and the data included in the output files. The data is reported in the as-calculated ORIGEN-S format in case a different shielding cross section library and/or volumetric normalization is desired rather than the BUGLE-93 format data which is provided in this analysis.

7.3.1 Source Terms: Per Assembly Basis/ORIGEN-S Group Structure

The SAS2H software generates the source term for each specified region of a BWR fuel assembly. The main calculational module of SAS2H for the depletion/activation calculation is ORIGEN-S which provides an 18 group photon spectrum and a 27 group neutron spectrum for each burnup, cooling time, fuel region combination on a per assembly basis. See reference 5.4 for a detailed description of the SAS2H/ORIGEN-S libraries.

7.3.1.1 Neutron Source Terms

Only the fuel region has a significant neutron source and, therefore, only the fuel region values are reported. The individual isotope contributions and source summaries are provided in Attachments II through XVII listed in Section 9. Tables provided in Attachments II through XVII provide a summary of the energy group structure and total source strength on a per assembly basis for each assembly option listed in assumption 4.3.1. The neutron source reported is consistent with assumption 4.3.1. Table 7.3.1-1 provides an easy index to the data in the attachments to locate the specific neutron source data which is to be used in future analysis and in Section 7.3.3. The data in this section is for the total (alpha,n) and spontaneous fission neutron sources only.

Table 7.3.1-1 Index for ORIGEN-S Neutron Source Terms

Data Set Number	Assembly Region	Attachment Number	Attachment Page
1	Active Fuel	II	44 - 45
2	Active Fuel	VI	44 - 45
3	Active Fuel	X	44 - 45
4	Active Fuel	XIV	44 - 45

7.3.1.2 Gamma Source Terms

The individual isotope contributions and source summaries are provided in Attachments II through XVII listed in Section 9. Tables provided in Attachments II through XVII provide a summary of the energy group structure and total source strength on a per assembly basis for each assembly option listed in assumption 4.3.1. Table 7.3.1-2 provides an easy index to the data in the attachments to locate the specific gamma source data which is to be used in future analysis and in Section 7.3.3. The gamma source reported is consistent with assumption 4.3.1.

Table 7.3.1-2 Index for ORIGEN-S Gamma Source Terms

Data Set Number	Assembly Region	Attachment Number	Attachment Page
1	Active Fuel	II	47 - 48
1	Bottom End Fitting	III	27 - 28
1	Plenum	IV	27 - 28
1	Top End Fitting	V	27 - 28
2	Active Fuel	VI	47 - 48
2	Bottom End Fitting	VII	27 - 28
2	Plenum	VIII	27 - 28
2	Top End Fitting	IX	27 - 28
3	Active Fuel	X	47 - 48
3	Bottom End Fitting	XI	27 - 28
3	Plenum	XII	27 - 28
3	Top End Fitting	XIII	27 - 28
4	Active Fuel	XIV	47 - 48
4	Bottom End Fitting	XV	27 - 28
4	Plenum	XVI	27 - 28
4	Top End Fitting	XVII	27 - 28

7.3.2 Normalization Factors to Convert Data to per cc Basis

The radiation source terms are calculated on a per assembly basis using the SAS2H software and are reported in Section 7.3.1. Since shielding codes usually require source term input on a per cc basis, the data for each assembly region will need be normalized to the assembly region volume. The subsequent analysis will be responsible to re-normalize the source terms if a different volumetric normalization is required. Also, subsequent analysis must account for the subcritical multiplication factor for the neutron source terms. A subcritical multiplication factor has not been applied in this analysis, since it is system dependent, and the neutron source terms reported do not account for any fission source other than spontaneous fission. The data reported here for the active fuel region of the assembly is the assembly average source term and it will be the left to the subsequent analysis to account for any axial burnup distributions (i.e., axial peaking factors) either by applying an axial burnup distribution to the average values or by assuming a bounding peaking factor applied to the whole active fuel length.

Reference 5.15 states that the waste package design envelop for BWR SNF is a cross sectional area of 6.0 inches (15.24 cm) square. Thus, the volumetric normalization factor is simply the reciprocal of this cross sectional area times the length of the selected assembly region. The length of each region is provided in Table 4.1-2. The ANF 9x9 JP-4,5 assembly is representative of all standard BWR SNF assemblies with regard to the lengths of each region of the fuel assembly and, therefore, its dimensions are applied for the general problem. In this manner the radiation source term is distributed in the volume allocated to the BWR SNF with no gaps to model. Thus, the following volumetric normalization factors are applied:

For the bottom end fitting:

Cross Sectional area	= $(15.24\ cm)^2$	= $232.2576\ cm^2$	
Length of Region	= 6.94 in	= 17.628 cm	
NF	= 1.0/Volume	= 1.0/(232.2576 x 17.628)	= 2.4425E-4 cm^{-3}

For the active fuel length:

Cross Sectional area	= $(15.24\ cm)^2$	= $232.2576\ cm^2$	
Length of Region	= 150.0 in	= 381.0 cm	
NF	= 1.0/Volume	= 1.0/(232.2576 x 381.0)	= 1.1301E-5 cm^{-3}

For the plenum region:

Cross Sectional area	= $(15.24\ cm)^2$	= $232.2576\ cm^2$	
Length of Region	= 9.578 in	= 24.328 cm	
NF	= 1.0/Volume	= 1.0/(232.2576 x 24.328)	= 1.7698E-4 cm^{-3}

For the top end fitting:

Cross Sectional area	= $(15.24\ cm)^2$	= $232.2576\ cm^2$	
Length of Region	= 9.54 in	= 24.232 cm	
NF	= 1.0/Volume	= 1.0/(232.2576 x 24.232)	= 1.7768E-4 cm^{-3}

7.3.3 Source Terms: Per cc Basis/BUGLE-93 Group Structure

The ORIGEN-S source term is usually not directly input to shielding calculations for the following reasons: 1) Shielding codes require that the radiation source term be input on a per cc basis. 2) The shielding analysis for the MGDS repository will utilize the BUGLE-93 (Ref. 5.17) cross section library which has 47 neutron energy groups and 20 gamma energy groups. Thus, the ORIGEN-S radiation source terms have been re-normalized to the BUGLE-93 energy group structure and for the volume of a assembly using the normalization factors calculated in Section 7.3.2.

The neutron source term rescaling for each burnup/cooling time combination is documented in Attachment XVIII for the active fuel region of the design basis BWR fuel assembly. Only the fuel region has a significant neutron source and, therefore, only the fuel region values are reported. The individual isotope contributions and source summaries are provided in Attachments II through XVII listed in Section 9. The neutron source data was then normalized to represent the active fuel region volume of the selected design basis BWR fuel assembly and scaled to the 47 neutron energy groups for BUGLE-93 from the standard 27 energy group structure used in ORIGEN-S. The neutron source rescaling method is documented in reference 5.18 and summarized in Section 6.2. Tables in Attachment XVIII summarize the neutron source term data for cooling times of 5 years and 10 years respectively for the fuel region of the BWR SNF. The data in column 11 of the desired table listed in Attachment XVIII should be used for the input to shielding codes/analysis.

The gamma source term rescaling for each burnup/cooling time combination is documented in Attachments XIX, XX, XXI, and XXII for the bottom end fitting, active fuel, plenum, and top end fitting regions respectively of the design basis BWR fuel assembly. The individual isotope contributions and source summaries are provided in Attachments II through XVII listed in Section 9. The gamma source data for each fuel assembly region was then normalized to represent each respective region's volume of the selected design basis BWR fuel assembly and scaled to the 20 gamma energy groups for BUGLE-93 from the standard 18 energy groups used in the ORIGEN-S master library. The gamma source rescaling method is documented in reference 5.18 and summarized in Section 6.2. Tables in Attachments XIX, XX, XXI, and XXII summarize the neutron source term data for cooling times of 5 years and 10 years for each specific region of the BWR SNF assembly. The data in column 11 of the desired table listed in Attachments XIX, XX, XXI, and XXII should be used for the input to shielding codes/analysis.

8. Conclusions

As identified in Sections 2 and 4, this analysis is based on unqualified/unconfirmed input data and use of any data from this analysis for input into documents supporting construction, fabrication, or procurement is required to be controlled as TBV in accordance with the appropriate procedures.

The objectives of this evaluation are to generate BWR assembly radiation source terms that bound selected groupings of BWR assemblies, with regard to assembly average burnup and cooling time, which comprise the anticipated MGDS BWR commercial spent nuclear fuel waste stream. Reasonable and bounding BWR assembly radiation source terms to be used for evaluation of radiolysis effects at the WP surface, and for personnel shielding requirements during assembly or WP handling operations have been calculated, and documented in this analysis. The source term data is documented in Section 7.3 and is provided in a form which can easily be utilized in subsequent shielding/radiation dose calculations. Since these calculations may also be used for TSPA, with appropriate justification provided by TSPA, or radionuclide release rate analysis, the grams of each element and additional cooling times out to 25 years will also be calculated and the data included in the output files.

The radiation source term data presented in Attachments XVIII through XXII is to be used in the follow-on analysis and its use is to be consistent with the normalization factors documented in Section 7.3.2. Also, subsequent analysis must account for the subcritical multiplication factor for the neutron source terms. A subcritical multiplication factor has not been applied in this analysis, since it is system dependent, and the neutron source terms reported do not account for any fission source other than spontaneous fission. The data reported here for the active fuel region of the assembly is the assembly average source term and it will be the left to the subsequent analysis to account for any axial burnup distributions (i.e., axial peaking factors) either by applying an axial burnup distribution to the average values or by assuming a bounding peaking factor applied to the whole active fuel length.

9. Attachments

Attachments to this design analysis are summarized in Table 9-1. Each attachment is identified by it's specific number, file name, date of file, and number of pages.

Table 9-1 List of Attachments

Attachment	Description	Date	Pages
I	Light element comp. for each assembly region (File Name: LEMASS.XLS)	12/03/96	4
II	Input and selected output for case ds1f (File Name: bd1f.out)	12/06/96	56
III	Input and selected output for case ds1b (File Name: bd1b.prt)	12/06/96	36
IV	Input and selected output for case ds1p (File Name: bd1p.prt)	12/06/96	36
V	Input and selected output for case ds1t (File Name: bd1t.prt)	12/06/96	36
VI	Input and selected output for case ds2f (File Name: bd2f.out)	12/06/96	56
VII	Input and selected output for case ds2b (File Name: bd2b.prt)	12/06/96	36
VIII	Input and selected output for case ds2p (File Name: bd2p.prt)	12/06/96	36
IX	Input and selected output for case ds2t (File Name: bd2t.prt)	12/06/96	36
X	Input and selected output for case ds3f (File Name: bd3f.out)	12/06/96	56
XI	Input and selected output for case ds3b (File Name: bd3b.prt)	12/06/96	36
XII	Input and selected output for case ds3p (File Name: bd3p.prt)	12/06/96	36
XIII	Input and selected output for case ds3t (File Name: bd3t.prt)	12/06/96	36
XIV	Input and selected output for case ds4f (File Name: bd4f.out)	12/06/96	56
XV	Input and selected output for case ds4b (File Name: bd4b.prt)	12/06/96	36
XVI	Input and selected output for case ds4p (File Name: bd4p.prt)	12/06/96	36
XVII	Input and selected output for case ds4t (File Name: bd4t.prt)	12/06/96	36
XVIII	Spreadsheets; convert neutron sources to BUGLE-93/Shielding code format (File Name: NEUTSOR.XLS)	12/06/96	8
XIX	Spreadsheets; convert bottom end fitting region gamma sources to BUGLE-93/Shielding code format (File Name: GAMBE.XLS)	12/06/96	8
XX	Spreadsheets; convert fuel region gamma sources to BUGLE-93/Shielding code format (File Name: GAMAF.XLS)	12/06/96	8
XXI	Spreadsheets; convert plenum region gamma sources to BUGLE-93/Shielding code format (File Name: GAMPL.XLS)	12/09/96	8
XXII	Spreadsheets; convert top end fitting region gamma sources to BUGLE-93/Shielding code format (File Name: GAMTP.XLS)	12/09/96	8

Composition of Bottom End Fitting

Mass of SS CF3

Component	Mass (lb)	Mass (kg)
Bottom Nozzle	9.9869	4.5300
Total	9.9869	4.5300

Composition of Stainless Steel CF3

Element	Ref. Range Wt%	Calculation Wt%	kg
C	0.03 Max	0.0200	0.0009
Mn	1.50 Max	1.2500	0.0566
Si	2.00 Max	1.7500	0.0793
Cr	17.0 - 21.0	19.0000	0.8607
Ni	8.0 - 12.0	12.0000	0.5436
Fe	Balance	65.9800	2.9889
	Total:	100.0000	4.5300

Scaling Factor: 0.225

Element/Isotope	As Built kg	Calculation kg
Ni	0.5436	0.1223
Cr	0.8615	0.1938
C	0.0009	0.0002
Mn	0.0566	0.0127
Si	0.0793	0.0178
Fe	2.9905	0.6729
O	0.0009	0.0002
Sn	0.0109	0.0025
Zr	0.7642	0.1719
Total Mass:	5.3084	1.1944

Mass of Zircaloy

Component	Mass (lb)	Mass (kg)
Channel*	1.7160	0.7784
Total	1.7160	0.7784

Composition of Zircaloy

Element	Allowable wt%	Calculation Wt%	kg
O	0.12 (max)	0.12	0.0009
Cr	0.10 (max)	0.10	0.0008
Fe	0.20 (max)	0.20	0.0016
Sn	1.40 (max)	1.40	0.0109
Zr	98.18 (min)	98.18	0.7642
	Total	100.00	0.7784

* Channel mass is calculated from the mass of the tube per assembly multiplied by the fraction of the tube in the bottom end fitting region.

Composition of Active Fuel Region

Mass of Inconel-718

	Total Component Mass	
Component	Mass (lb)	Mass (kg)
Spacer-Incore	3.395	1.540
Total	3.395	1.540

16wt% Inconel Material Mass

Component	Mass (lb)	Mass (kg)
Spacer-Incore	0.5432	0.2464
Total	0.5432	0.2464

84wt% Zircaloy Material Mass

Component	Mass (lb)	Mass (kg)
Spacer-Incore	2.8519	1.2936
Total	2.8519	1.2936

Composition of Inconel-718

Element	Ref. Range Wt%	Calculation Wt%	kg
Ni	50.0 - 55.0	54.0000	0.1331
Cr	17.0 - 21.0	19.0000	0.0468
Co	1.0 Max	1.0000	0.0025
Mo	2.8 - 3.3	3.0500	0.0075
Nb	4.75 - 5.50	5.0000	0.0123
Ti	0.65 - 1.15	0.8000	0.0020
Al	0.20 - 0.80	0.6000	0.0015
C	0.08 Max	0.0600	0.0001
Mn	0.35 Max	0.2500	0.0006
Si	0.35 Max	0.2500	0.0006
Cu	0.30 Max	0.2000	0.0005
Fe	Balance	15.7900	0.0389
	Total:	100.0000	0.2464

Scaling Factor: 1.00

Element/Isotope	As Built kg	Calculation kg
Ni	0.1331	0.1331
Cr	0.1400	0.1400
Co	0.0025	0.0025
Mo	0.0075	0.0075
Nb	0.0123	0.0123
Ti	0.0020	0.0020
Al	0.0015	0.0015
C	0.0001	0.0001
Mn	0.0006	0.0006
Si	0.0006	0.0006
Cu	0.0005	0.0005
Fe	0.2254	0.2254
O	0.1119	0.1119
Sn	1.3052	1.3052
Zr	91.5350	91.5350
Total Mass:	93.4782	93.4782

Mass of Zircaloy

Component	Mass (lb)	Mass (kg)
Water Rods*	2.6239	1.1902
Channel*	89.1593	40.4419
Cladding**	110.9061	50.3061
Spacer-Incore	2.8519	1.2936
Total	205.5411	93.2318

Composition of Zircaloy

Element	Allowable wt%	Calculation Wt%	kg
O	0.12 (max)	0.12	0.1119
Cr	0.10 (max)	0.10	0.0932
Fe	0.20 (max)	0.20	0.1865
Sn	1.40 (max)	1.40	1.3052
Zr	98.18 (min)	98.18	91.5350
	Total	100.00	93.2318

* Water rod/Channel mass is calculated from the mass of the tube per assembly multiplied by the fraction of the tube in the fuel region.

** Cladding mass is calculated from the mass of a single rod minus the rod UO2 mass times the number of fuel rods minus the mass of the plenum springs. This value is then multiplied by the fraction of the rod in the fuel region.

i.e., Clad mass in fuel region = ((79*(7.010-5.476))-0.047)*(150.0/163.84)

Composition of Plenum Region

Mass of Inconel X-750

Component	Mass (lb)	Mass (kg)
Plenum Springs	0.0470	0.0213
Total	0.0470	0.0213

Composition of Inconel X-750

Element	Ref. Range Wt%	Calculation Wt%	kg
Ni	70.0 Min. w/Co	70.2300	0.0150
Cr	14.0 - 17.0	15.0000	0.0032
Co	1.0 Max	1.0000	0.0002
Nb	0.70 - 1.20	1.0000	0.0002
Ti	2.25 - 2.75	2.4000	0.0005
Al	0.40 - 1.00	0.7000	0.0001
C	0.08 Max	0.0600	0.0000
Mn	1.00 Max	0.8000	0.0002
Si	0.50 Max	0.4000	0.0001
Cu	0.50 Max	0.4000	0.0001
S	0.01 Max	0.0100	0.0000
Fe	5.0 - 9.0	8.0000	0.0017
	Total:	100.0000	0.0213

Scaling Factor: 0.30

Element/Isotope	As Built kg	Calculation kg
Ni	0.0150	0.0045
Cr	0.0105	0.0032
Co	0.0002	0.0001
Nb	0.0002	0.0001
Ti	0.0005	0.0002
Al	0.0001	0.0000
C	0.0000	0.0000
Mn	0.0002	0.0001
Si	0.0001	0.0000
Cu	0.0001	0.0000
Fe	0.0164	0.0049
S	0.0000	0.0000
O	0.0088	0.0026
Sn	0.1027	0.0308
Zr	7.2003	2.1601
Total Mass:	7.3551	2.2065

Mass of Zircaloy

Component	Mass (lb)	Mass (kg)
Water Rods*	0.2421	0.1098
Channel*	5.6931	2.5824
Cladding**	10.2329	4.6416
Total	16.1681	7.3337

Composition of Zircaloy

Element	Allowable wt%	Calculation Wt%	kg
O	0.12 (max)	0.12	0.0088
Cr	0.10 (max)	0.10	0.0073
Fe	0.20 (max)	0.20	0.0147
Sn	1.40 (max)	1.40	0.1027
Zr	98.18 (min)	98.18	7.2003
	Total	100.00	7.3337

* Water rod/Channel mass is calculated from the mass of the tube per assembly multiplied by the fraction of the tube in the fuel region.

** Cladding mass is calculated from the mass of a single rod minus the rod UO2 mass times the number of fuel rods minus the mass of the plenum springs. This value is then multiplied by the fraction of the rod in the fuel region.

i.e., Clad mass in fuel region = ((79*(7.010-5.476))-0.047)*((163.84-150.00)/163.84)

Composition of Top End Fitting

Mass of Inconel X-750

Component	Mass (lb)	Mass (kg)
Comp. Springs	0.7496	0.3400
Total	0.7496	0.3400

Composition of Inconel X-750

Element	Ref. Range Wt%	Calculation Wt%	kg
Ni	70.0 Min. w/Co	70.2300	0.2388
Cr	14.0 - 17.0	15.0000	0.0510
Co	1.0 Max	1.0000	0.0034
Nb	0.70 - 1.20	1.0000	0.0034
Ti	2.25 - 2.75	2.4000	0.0082
Al	0.40 - 1.00	0.7000	0.0024
C	0.08 Max	0.0600	0.0002
Mn	1.00 Max	0.8000	0.0027
Si	0.50 Max	0.4000	0.0014
Cu	0.50 Max	0.4000	0.0014
S	0.01 Max	0.0100	0.0000
Fe	5.0 - 9.0	8.0000	0.0272
	Total:	100.0000	0.3400

Scaling Factor: 0.15

Element/Isotope	As Built kg	Calculation kg
Ni	0.4320	0.0648
Cr	0.3581	0.0537
Co	0.0034	0.0005
Nb	0.0034	0.0005
Ti	0.0082	0.0012
Al	0.0024	0.0004
C	0.0005	0.0001
Mn	0.0228	0.0034
Si	0.0295	0.0044
Cu	0.0014	0.0002
Fe	1.0919	0.1638
S	0.0000	0.0000
O	0.0014	0.0002
Sn	0.0168	0.0025
Zr	1.1756	0.1763
Total Mass:	3.1474	0.4721

Mass of SS CF3M

Component	Mass (lb)	Mass (kg)
Top Tie Plate	3.5494	1.6100
Total	3.5494	1.6100

Composition of Stainless Steel CF3M

Element	Ref. Range Wt%	Calculation Wt%	kg
C	0.03 Max	0.0200	0.0003
Mn	1.50 Max	1.2500	0.0201
Si	2.00 Max	1.7500	0.0282
Cr	17.0 - 21.0	19.0000	0.3059
Ni	8.0 - 12.0	12.0000	0.1932
Fe	Balance	65.9800	1.0623
	Total:	100.0000	1.6100

Mass of Zircaloy

Component	Mass (lb)	Mass (kg)
Channel*	2.6397	1.1974
Total	2.6397	1.1974

Composition of Zircaloy

Element	Allowable wt%	Calculation Wt%	kg
O	0.12 (max)	0.12	0.0014
Cr	0.10 (max)	0.10	0.0012
Fe	0.20 (max)	0.20	0.0024
Sn	1.40 (max)	1.40	0.0168
Zr	98.18 (min)	98.18	1.1756
	Total	100.00	1.1974

* Channel mass is calculated from the mass of the tube per assembly multiplied by the fraction of the tube in the top end fitting region.

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1         primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     80000    130000     140000
       220000    240000    250000     260000
       270000    280000    290000     400000
       410000    420000    500000
74**     64.6     7480.0      34.4  192421.0
          0.1    27008.8       1.5       0.6
          2.0      140.0       0.6     225.4
          2.5      133.1       0.5   91535.0
         12.3        7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
```

```
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 49000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.0816335 e
   5t
BWR SNF Assembly - Fuel - deplete to 49000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Fuel - decay
per ONE BWR Fuel Assembly - Fuel Region - ds1f
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
81$$ 2 0 26 1 e
82$$ f2
   6t
  decay step for BWR source term - fuel ds1 - discharge
  decay step for BWR source term - fuel ds1 - 0.25 year
  decay step for BWR source term - fuel ds1 - 0.50 year
  decay step for BWR source term - fuel ds1 - 1 year
  decay step for BWR source term - fuel ds1 - 2 year
  decay step for BWR source term - fuel ds1 - 5 year
  decay step for BWR source term - fuel ds1 - 10 year
  decay step for BWR source term - fuel ds1 - 15 year
  decay step for BWR source term - fuel ds1 - 20 year
  decay step for BWR source term - fuel ds1 - 25 year
```

```
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooo   rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nnn         nn  ssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggg    eeeeeeeee       nn    nn    nn  ssssssssssss
    oo         oo   rrrrrrrrrrrr         ii         gg    gggggg    eeeeeeeee       nn     nn   nn   ssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooo   rr          rr  iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nn         nnn  ssssssssssss
     ooooooooooo   rr          rr  iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooo   tttttttttttt    zzzzzzzzzzzz
    ll             oo         oo        tt                   zz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    llllllllllll   oooooooooooo        tt           zzzzzzzzzzzz
    llllllllllll    ooooooooooo        tt          zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666                //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666               //   9999999999999  6666666666666
       1111       22         22              //    00        00   66                         //   99         99  66
         11                  22             //    00         00   66                        //    99         99  66
         11                  22            //     00         00   66                       //     99         99  66
         11                22             //      00         00   666666666666           //      9999999999999  666666666666
         11               22             //       00         00   6666666666666         //       999999999999  6666666666666
         11              22             //        00         00   66         66        //                   99  66         66
         11             22             //         00         00   66         66       //                    99  66         66
         11            22             //          00        00   66         66      //                     99  66         66
      11111111    2222222222222     //             000000000    6666666666666     //           9999999999999  6666666666666
      11111111    2222222222222    //               0000000      66666666666     //            999999999999    66666666666
0

      0000000      88888888888                    22222222222    33333333333                    22222222222    666666666666
     000000000    8888888888888                  2222222222222  3333333333333                  2222222222222  6666666666666
    00       00   88         88        :::       22         22  33         33        :::       22         22  66
   00         00  88         88        :::                  22             33        :::                  22  66
   00         00  88         88        :::                  22             33        :::                  22  66
   00         00   88888888888                             22             333                          22    666666666666
   00         00   88888888888                           22               333                        22      6666666666666
   00         00  88         88        :::            22                   33        :::           22        66         66
   00         00  88         88        :::          22                     33        :::         22          66         66
    00       00   88         88        :::        22             33         33        :::        22           66         66
     000000000    8888888888888                  2222222222222  3333333333333                  2222222222222  6666666666666
      0000000      88888888888                   2222222222222   33333333333                   2222222222222   66666666666
1
0                                 sssssssssss    cccccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                 ssssssssssssss  cccccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
```

```
ss         ss   cc         cc   aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
            ss   cc              aa         aa   ll              ee
            ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccccc  aa         aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  08:23:26                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0-------------------only this is used as input data.-------------------          comment or title end
0.............................columns 1-72.............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    420000    500000
74**     64.6     7480.0      34.4  192421.0
          0.1    27008.8       1.5       0.6
          2.0      140.0       0.6     225.4
          2.5      133.1       0.5   91535.0
         12.3        7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds1f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1836733 e
    5t
 BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds1f
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 49000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.0816335 e
    5t
 BWR SNF Assembly - Fuel - deplete to 49000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds1f
 58** 10r4.35
 60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Fuel - decay
 per ONE BWR Fuel Assembly - Fuel Region - ds1f
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
 81$$ 2 0 26 1 e
 82$$ f2
    6t
   decay step for BWR source term - fuel ds1 - discharge
   decay step for BWR source term - fuel ds1 - 0.25 year
   decay step for BWR source term - fuel ds1 - 0.50 year
   decay step for BWR source term - fuel ds1 - 1 year
   decay step for BWR source term - fuel ds1 - 2 year
   decay step for BWR source term - fuel ds1 - 5 year
   decay step for BWR source term - fuel ds1 - 10 year
   decay step for BWR source term - fuel ds1 - 15 year
   decay step for BWR source term - fuel ds1 - 20 year
   decay step for BWR source term - fuel ds1 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                   fission product yields are from endf/b-v                   *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  5 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *            prelim lwr origen-s binary working library--id = 1143           *
         *         made from modified card-image origen-s libraries of scale 4.2      *
         *      data from the light element, actinide, and fission product libraries  *
         *        decay data, including gamma and total energy, are from endf/b-vi    *
         *                                                                            *
         *      neutron flux spectrum factors and cross sections were produced from   *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                            *
         *                  fission product yields are from endf/b-v                  *
         *                                                                            *
         *              photon libraries use an 18-energy-group structure             *
         *             the photon data are from the master photon data base,          *
         *              produced to include bremsstrahlung from uo2 matrix            *
         *                                                                            *
         *        see information above this box (if present) for later updates       *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
1
    BWR SNF Assembly - Fuel - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Fuel Region
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	1.08E-02	1.08E-02	1.08E-02	1.08E-02	1.08E-02	1.08E-02	1.08E-02	1.08E-02	1.08E-02	1.08E-02	1.08E-02
h 2	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04
h 3	2.68E-09	2.68E-09	2.65E-09	2.61E-09	2.54E-09	2.40E-09	2.03E-09	1.53E-09	1.15E-09	8.72E-10	6.58E-10
he 3	4.33E-11	4.37E-11	8.02E-11	1.18E-10	1.90E-10	3.29E-10	7.01E-10	1.20E-09	1.57E-09	1.85E-09	2.07E-09
he 4	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01	7.78E-01
li 6	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10
li 7	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11
be 9	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06	1.53E-06
be 10	3.44E-05	3.44E-05	3.44E-05	3.44E-05	3.44E-05	3.44E-05	3.44E-05	3.44E-05	3.44E-05	3.44E-05	3.44E-05
b 10	4.26E-12	4.30E-12	7.93E-12	1.17E-11	1.92E-11	3.41E-11	7.88E-11	1.53E-10	2.28E-10	3.02E-10	3.77E-10
b 11	6.97E-10	6.97E-10	6.97E-10	6.97E-10	6.97E-10	6.97E-10	6.97E-10	6.97E-10	6.97E-10	6.97E-10	6.97E-10
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00	2.49E+00
c 14	6.49E-03	6.49E-03	6.49E-03	6.49E-03	6.49E-03	6.49E-03	6.49E-03	6.49E-03	6.48E-03	6.48E-03	6.48E-03
n 14	2.21E-06	2.22E-06	2.41E-06	2.61E-06	3.00E-06	3.79E-06	6.14E-06	1.01E-05	1.40E-05	1.79E-05	2.18E-05
n 15	2.98E-03	2.98E-03	2.98E-03	2.98E-03	2.98E-03	2.98E-03	2.98E-03	2.98E-03	2.98E-03	2.98E-03	2.98E-03
o 16	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04
o 17	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01
o 18	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01
f 19	1.22E-04	1.22E-04	1.22E-04	1.22E-04	1.22E-04	1.22E-04	1.22E-04	1.22E-04	1.22E-04	1.22E-04	1.22E-04
ne 20	2.91E-09	2.91E-09	2.91E-09	2.91E-09	2.91E-09	2.91E-09	2.91E-09	2.91E-09	2.91E-09	2.91E-09	2.91E-09
ne 21	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10	1.43E-10
ne 22	5.37E-10	5.37E-10	5.37E-10	5.37E-10	5.37E-10	5.37E-10	5.37E-10	5.37E-10	5.37E-10	5.37E-10	5.37E-10
na 23	4.98E-11	4.98E-11	4.98E-11	4.98E-11	4.98E-11	4.98E-11	4.98E-11	4.98E-11	4.98E-11	4.98E-11	4.98E-11
na 24	7.36E-09	2.37E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05	1.56E-05
mg 25	5.11E-06	5.11E-06	5.11E-06	5.11E-06	5.11E-06	5.11E-06	5.11E-06	5.11E-06	5.11E-06	5.11E-06	5.11E-06
mg 26	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06	2.68E-06
al 27	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
si 28	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01
si 29	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02
si 30	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02
si 31	7.88E-10	1.38E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	7.07E-13	7.07E-13	7.07E-13	7.06E-13	7.04E-13	7.02E-13	6.93E-13	6.79E-13	6.66E-13	6.52E-13	6.39E-13
p 31	8.96E-06	8.96E-06	8.96E-06	8.96E-06	8.96E-06	8.96E-06	8.96E-06	8.96E-06	8.96E-06	8.96E-06	8.96E-06
p 32	9.17E-11	8.74E-11	1.15E-12	1.30E-14	1.62E-16	1.59E-16	1.57E-16	1.54E-16	1.51E-16	1.48E-16	1.45E-16
p 33	2.20E-14	2.14E-14	1.88E-15	1.50E-16	1.01E-18	4.61E-23	4.41E-36	.00E+00	.00E+00	.00E+00	.00E+00
s 32	3.93E-09	3.94E-09	4.02E-09	4.03E-09	4.03E-09	4.03E-09	4.03E-09	4.03E-09	4.03E-09	4.03E-09	4.03E-09
s 33	1.31E-12	1.31E-12	1.33E-12	1.33E-12	1.33E-12	1.33E-12	1.33E-12	1.33E-12	1.33E-12	1.33E-12	1.33E-12
ar 40	7.46E-11	7.46E-11	7.46E-11	7.46E-11	7.46E-11	7.46E-11	7.46E-11	7.46E-11	7.46E-11	7.46E-11	7.46E-11
k 41	2.46E-12	2.46E-12	2.46E-12	2.46E-12	2.46E-12	2.46E-12	2.46E-12	2.46E-12	2.46E-12	2.46E-12	2.46E-12
k 43	4.65E-14	2.20E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	4.82E-14	4.82E-14	4.82E-14	4.82E-14	4.82E-14	4.82E-14	4.82E-14	4.82E-14	4.82E-14	4.82E-14	4.82E-14
ca 43	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06
ca 44	1.05E-05	1.05E-05	1.05E-05	1.05E-05	1.05E-05	1.05E-05	1.05E-05	1.05E-05	1.05E-05	1.05E-05	1.05E-05
ca 45	2.95E-08	2.94E-08	2.02E-08	1.36E-08	6.29E-09	1.34E-09	1.30E-11	5.71E-15	2.51E-18	1.10E-21	4.85E-25
ca 46	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06	1.36E-06
ca 47	1.31E-11	1.13E-11	1.40E-17	1.02E-23	7.56E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.93E-07	1.94E-07	2.03E-07	2.09E-07	2.17E-07	2.22E-07	2.23E-07	2.23E-07	2.23E-07	2.23E-07	2.23E-07
sc 46	1.81E-06	1.79E-06	8.59E-07	3.99E-07	8.81E-08	4.30E-09	4.98E-13	1.37E-19	3.78E-26	1.04E-32	2.87E-39
sc 47	1.16E-07	9.45E-08	9.63E-16	3.29E-23	2.12E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	6.12E-09	4.18E-09	8.04E-24	4.08E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 2

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01
ti 47	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01

ti 48	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00
ti 49	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
ti 50	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
v 50	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03
v 51	2.82E-01	2.82E-01	2.87E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01	2.88E-01
cr 50	5.56E+00	5.56E+00	5.56E+00	5.56E+00	5.56E+00	5.56E+00	5.56E+00	5.56E+00	5.56E+00	5.56E+00	5.56E+00
cr 51	6.37E-03	6.21E-03	6.70E-04	6.63E-05	6.85E-07	7.38E-11	9.19E-23	1.36E-42	.00E+00	.00E+00	.00E+00
cr 52	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
cr 53	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01
cr 54	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00
mn 54	2.57E-03	2.57E-03	2.11E-03	1.72E-03	1.14E-03	5.08E-04	4.46E-05	7.73E-07	1.34E-08	2.32E-10	4.03E-12
mn 55	6.11E-01	6.11E-01	6.14E-01	6.17E-01	6.23E-01	6.31E-01	6.48E-01	6.58E-01	6.61E-01	6.61E-01	6.62E-01
mn 56	3.50E-06	5.53E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01
fe 55	5.04E-02	5.03E-02	4.73E-02	4.44E-02	3.91E-02	3.03E-02	1.42E-02	3.98E-03	1.12E-03	3.14E-04	8.82E-05
fe 56	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02
fe 57	6.68E+00	6.68E+00	6.68E+00	6.68E+00	6.68E+00	6.68E+00	6.68E+00	6.68E+00	6.68E+00	6.68E+00	6.68E+00
fe 58	7.98E-01	7.98E-01	8.01E-01	8.02E-01	8.02E-01	8.02E-01	8.02E-01	8.02E-01	8.02E-01	8.02E-01	8.02E-01
fe 59	1.40E-04	1.38E-04	3.44E-05	8.15E-06	4.73E-07	1.60E-09	6.20E-17	2.75E-29	1.22E-41	.00E+00	.00E+00
co 58m	9.96E-10	1.61E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.89E-03	3.85E-03	1.61E-03	6.54E-04	1.10E-04	3.08E-06	6.88E-11	1.22E-18	2.15E-26	3.81E-34	6.75E-42
co 59	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00	2.09E+00
co 60	3.31E-01	3.31E-01	3.21E-01	3.10E-01	2.90E-01	2.55E-01	1.72E-01	8.89E-02	4.60E-02	2.38E-02	1.24E-02
co 61	2.31E-07	9.65E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01
ni 59	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00	1.03E+00
ni 60	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.57E+01	3.58E+01	3.58E+01	3.59E+01	3.59E+01
ni 61	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00	1.88E+00
ni 62	4.84E+00	4.84E+00	4.84E+00	4.84E+00	4.84E+00	4.84E+00	4.84E+00	4.84E+00	4.84E+00	4.84E+00	4.84E+00
ni 63	2.14E-01	2.14E-01	2.13E-01	2.13E-01	2.12E-01	2.11E-01	2.06E-01	1.99E-01	1.92E-01	1.86E-01	1.80E-01
ni 64	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00
ni 65	6.15E-07	8.35E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	8.64E-11	6.37E-11	1.07E-22	6.20E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	3.40E-01	3.40E-01	3.41E-01	3.41E-01	3.42E-01	3.43E-01	3.48E-01	3.55E-01	3.61E-01	3.68E-01	3.74E-01
cu 64	2.82E-06	7.61E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
cu 66	4.39E-09	9.93E-14	1.67E-25	9.67E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.91E-12	2.22E-12	8.86E-23	1.38E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03
zn 65	1.63E-06	1.63E-06	1.26E-06	9.73E-07	5.79E-07	2.05E-07	9.10E-09	5.06E-11	2.82E-13	1.57E-15	8.74E-18
zn 66	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03
zn 67	2.55E-06	2.55E-06	2.55E-06	2.55E-06	2.55E-06	2.55E-06	2.55E-06	2.55E-06	2.55E-06	2.55E-06	2.55E-06
zn 68	4.47E-08	4.47E-08	4.47E-08	4.47E-08	4.47E-08	4.47E-08	4.47E-08	4.47E-08	4.47E-08	4.47E-08	4.47E-08
zn 69m	1.17E-14	3.50E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 70	2.54E-15	2.54E-15	2.54E-15	2.54E-15	2.54E-15	2.54E-15	2.54E-15	2.54E-15	2.54E-15	2.54E-15	2.54E-15
ga 69	9.52E-11	9.52E-11	9.52E-11	9.52E-11	9.52E-11	9.52E-11	9.52E-11	9.52E-11	9.52E-11	9.52E-11	9.52E-11
ga 71	1.22E-15	1.23E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15
ge 70	6.16E-13	6.16E-13	6.16E-13	6.16E-13	6.16E-13	6.16E-13	6.16E-13	6.16E-13	6.16E-13	6.16E-13	6.16E-13
sr 87	2.11E-03	2.11E-03	2.11E-03	2.11E-03	2.11E-03	2.11E-03	2.11E-03	2.11E-03	2.11E-03	2.11E-03	2.11E-03
sr 88	2.08E-01	2.08E-01	2.08E-01	2.08E-01	2.08E-01	2.08E-01	2.08E-01	2.08E-01	2.08E-01	2.08E-01	2.08E-01

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BWR SNF Assembly - Fuel - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 89	6.15E-04	6.07E-04	1.79E-04	5.04E-05	4.11E-06	2.75E-08	8.22E-15	1.10E-25	1.47E-36	.00E+00	.00E+00
sr 90	1.13E-05	1.13E-05	1.12E-05	1.12E-05	1.10E-05	1.08E-05	9.99E-06	8.83E-06	7.81E-06	6.91E-06	6.11E-06
sr 91	9.55E-07	1.66E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	1.52E-02	1.52E-02	1.57E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02
y 89m	2.75E-13	2.60E-13	6.12E-14	1.72E-14	1.41E-15	9.40E-18	2.81E-24	3.75E-35	.00E+00	.00E+00	.00E+00

y 90	1.21E-03	9.35E-04	2.92E-09	2.90E-09	2.87E-09	2.80E-09	2.60E-09	2.30E-09	2.03E-09	1.79E-09	1.59E-09
y 90m	5.58E-12	3.03E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.84E-03	1.82E-03	6.32E-04	2.11E-04	2.43E-05	3.20E-07	7.37E-13	2.96E-22	1.19E-31	4.77E-41	.00E+00
y 92	4.06E-06	3.69E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	2.32E-09	4.53E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	1.14E-09	9.18E-10	5.84E-18	1.77E-26	2.49E-43	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04
zr 91	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04
zr 92	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04
zr 93	3.22E+01	3.22E+01	3.22E+01	3.22E+01	3.22E+01	3.22E+01	3.22E+01	3.22E+01	3.22E+01	3.22E+01	3.22E+01
zr 94	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04
zr 95	6.41E-01	6.34E-01	2.42E-01	8.88E-02	1.23E-02	2.35E-04	1.65E-09	4.28E-18	1.10E-26	2.85E-35	1.33E-43
zr 96	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03
zr 97	1.10E-02	4.12E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.35E-07	1.34E-07	1.33E-07	1.33E-07	1.32E-07	1.31E-07
nb 92	3.52E-04	3.52E-04	3.52E-04	3.52E-04	3.52E-04	3.52E-04	3.52E-04	3.52E-04	3.52E-04	3.52E-04	3.52E-04
nb 93	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
nb 93m	5.93E-03	5.93E-03	5.87E-03	5.81E-03	5.70E-03	5.47E-03	4.85E-03	3.98E-03	3.28E-03	2.71E-03	2.25E-03
nb 94	1.88E-01	1.88E-01	1.88E-01	1.88E-01	1.88E-01	1.88E-01	1.88E-01	1.88E-01	1.88E-01	1.88E-01	1.88E-01
nb 95	3.47E-01	3.47E-01	2.20E-01	9.54E-02	1.45E-02	2.92E-04	1.99E-09	5.15E-18	1.33E-26	3.49E-35	.00E+00
nb 95m	4.01E-04	4.00E-04	1.60E-04	5.89E-05	8.14E-06	1.56E-07	1.10E-12	2.84E-21	7.33E-30	.00E+00	.00E+00
nb 96	9.44E-06	4.63E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	7.85E-04	2.95E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.03E-05	3.86E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 92	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
mo 93	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03	1.14E-03
mo 94	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01
mo 95	1.22E+01	1.22E+01	1.27E+01	1.30E+01	1.31E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01
mo 96	2.31E+00	2.31E+00	2.31E+00	2.31E+00	2.31E+00	2.31E+00	2.31E+00	2.31E+00	2.31E+00	2.31E+00	2.31E+00
mo 97	2.09E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01	2.10E+01
mo 98	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00
mo 99	4.56E-05	3.54E-05	6.29E-15	4.62E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01
tc 98	2.70E-08	2.70E-08	2.70E-08	2.70E-08	2.70E-08	2.70E-08	2.70E-08	2.70E-08	2.70E-08	2.70E-08	2.70E-08
tc 99	1.98E-03	1.98E-03	1.99E-03	1.99E-03	1.99E-03	1.99E-03	1.99E-03	1.99E-03	1.99E-03	1.99E-03	1.99E-03
ru 98	8.37E-15	8.38E-15	9.46E-15	1.06E-14	1.28E-14	1.73E-14	3.06E-14	5.29E-14	7.52E-14	9.75E-14	1.20E-13
ru 99	1.84E-08	1.84E-08	2.00E-08	2.17E-08	2.49E-08	3.15E-08	5.11E-08	8.37E-08	1.16E-07	1.49E-07	1.82E-07
ru100	3.72E-04	3.72E-04	3.72E-04	3.72E-04	3.72E-04	3.72E-04	3.72E-04	3.72E-04	3.72E-04	3.72E-04	3.72E-04
ru101	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03	4.35E-03
ru102	2.71E-04	2.71E-04	2.71E-04	2.71E-04	2.71E-04	2.71E-04	2.71E-04	2.71E-04	2.71E-04	2.71E-04	2.71E-04
ru103	7.76E-08	7.63E-08	1.58E-08	3.09E-09	1.23E-10	1.94E-13	7.70E-22	7.64E-36	.00E+00	.00E+00	.00E+00
ru104	2.51E-09	2.51E-09	2.51E-09	2.51E-09	2.51E-09	2.51E-09	2.51E-09	2.51E-09	2.51E-09	2.51E-09	2.51E-09
rh102	3.25E-15	3.24E-15	3.06E-15	2.88E-15	2.56E-15	2.01E-15	9.82E-16	2.97E-16	9.00E-17	2.72E-17	8.25E-18
rh103	1.65E-09	1.65E-09	1.81E-09	1.85E-09	1.85E-09	1.86E-09	1.86E-09	1.86E-09	1.86E-09	1.86E-09	1.86E-09
rh105	2.99E-14	2.14E-14	1.41E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd104	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10	6.03E-10
pd105	9.22E-12	9.23E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12	9.25E-12

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BWR SNF Assembly - Fuel - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pd106	4.85E-13	4.85E-13	4.85E-13	4.85E-13	4.85E-13	4.85E-13	4.85E-13	4.85E-13	4.85E-13	4.85E-13	4.85E-13
cd111	2.07E-06	2.07E-06	2.07E-06	2.07E-06	2.07E-06	2.07E-06	2.07E-06	2.07E-06	2.07E-06	2.07E-06	2.07E-06
cd112	1.77E-05	1.77E-05	1.77E-05	1.77E-05	1.77E-05	1.77E-05	1.77E-05	1.77E-05	1.77E-05	1.77E-05	1.77E-05
cd113	4.49E-08	4.49E-08	4.49E-08	4.49E-08	4.49E-08	4.49E-08	4.49E-08	4.49E-08	4.49E-08	4.49E-08	4.50E-08
cd113m	6.65E-08	6.65E-08	6.57E-08	6.49E-08	6.33E-08	6.03E-08	5.20E-08	4.07E-08	3.18E-08	2.49E-08	1.95E-08
cd114	2.42E-03	2.42E-03	2.55E-03	2.58E-03	2.59E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03
cd115	1.10E-07	8.09E-08	7.64E-20	2.43E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	2.40E-07	2.37E-07	5.93E-08	1.41E-08	8.22E-10	2.81E-12	1.13E-19	5.31E-32	.00E+00	.00E+00	.00E+00

cd116	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.34E-05
cd117	9.41E-10	1.18E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.31E-12	1.63E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	5.08E-01	5.09E-01	5.30E-01	5.43E-01	5.55E-01	5.60E-01	5.61E-01	5.61E-01	5.61E-01	5.61E-01	5.61E-01
in113m	3.13E-05	3.12E-05	1.82E-05	1.04E-05	3.47E-06	3.85E-07	5.24E-10	8.77E-15	1.47E-19	2.45E-24	4.10E-29
in114	9.31E-08	5.85E-08	1.68E-08	4.61E-09	3.57E-10	2.15E-12	4.68E-19	3.69E-30	3.31E-41	.00E+00	.00E+00
in114m	3.69E-03	3.64E-03	1.05E-03	2.87E-04	2.22E-05	1.34E-07	2.91E-14	2.29E-25	1.81E-36	.00E+00	.00E+00
in115	5.04E-06	5.04E-06	5.22E-06	5.26E-06	5.28E-06	5.28E-06	5.28E-06	5.28E-06	5.28E-06	5.28E-06	5.28E-06
in117	3.10E-09	7.59E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	6.68E-10	3.93E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01
sn113	5.22E-02	5.19E-02	3.04E-02	1.74E-02	5.78E-03	6.41E-04	8.73E-07	1.46E-11	2.44E-16	4.08E-21	6.83E-26
sn114	8.44E+00	8.44E+00	8.45E+00	8.45E+00	8.45E+00	8.45E+00	8.45E+00	8.45E+00	8.45E+00	8.45E+00	8.45E+00
sn115	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00	4.19E+00
sn116	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02
sn117	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01
sn117m	3.26E-02	3.10E-02	3.32E-04	2.97E-06	2.68E-10	2.20E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02
sn119	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02
sn119m	6.44E-01	6.42E-01	5.20E-01	4.18E-01	2.71E-01	1.14E-01	8.56E-03	1.14E-04	1.52E-06	2.02E-08	2.68E-10
sn120	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02
sn121	9.43E-04	5.10E-04	3.22E-07	3.21E-07	3.19E-07	3.15E-07	3.04E-07	2.85E-07	2.68E-07	2.51E-07	2.36E-07
sn121m	7.43E-03	7.43E-03	7.40E-03	7.38E-03	7.33E-03	7.24E-03	6.97E-03	6.55E-03	6.15E-03	5.77E-03	5.42E-03
sn122	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01
sn123	1.02E-02	1.02E-02	6.30E-03	3.83E-03	1.44E-03	2.03E-04	5.66E-07	3.14E-11	1.74E-15	9.64E-20	5.35E-24
sn124	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01
sn125	1.56E-04	1.45E-04	2.42E-07	3.13E-10	6.14E-16	2.41E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	9.59E-01	9.60E-01	9.60E-01	9.60E-01	9.60E-01	9.60E-01	9.61E-01	9.61E-01	9.62E-01	9.62E-01	9.62E-01
sb122	4.73E-04	3.66E-04	4.38E-14	2.13E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	8.80E-02	8.81E-02	9.19E-02	9.44E-02	9.68E-02	9.80E-02	9.82E-02	9.82E-02	9.82E-02	9.82E-02	9.82E-02
sb124	6.16E-04	6.09E-04	2.18E-04	7.53E-05	9.18E-06	1.37E-07	4.54E-13	3.34E-22	2.46E-31	1.81E-40	.00E+00
sb125	3.69E-01	3.69E-01	3.47E-01	3.25E-01	2.86E-01	2.22E-01	1.04E-01	2.91E-02	8.19E-03	2.30E-03	6.46E-04
sb126	5.84E-05	5.52E-05	3.81E-07	2.16E-09	7.88E-14	1.06E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
te123	1.03E-03	1.03E-03	1.16E-03	1.24E-03	1.32E-03	1.35E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03
te123m	3.33E-04	3.31E-04	1.98E-04	1.16E-04	4.02E-05	4.84E-06	8.49E-09	2.16E-13	5.51E-18	1.40E-22	3.58E-27
te124	8.53E-03	8.54E-03	8.93E-03	9.07E-03	9.14E-03	9.14E-03	9.14E-03	9.14E-03	9.14E-03	9.14E-03	9.14E-03
te125	3.23E-01	3.24E-01	3.46E-01	3.68E-01	4.07E-01	4.72E-01	5.92E-01	6.68E-01	6.89E-01	6.95E-01	6.97E-01
te125m	4.81E-03	4.81E-03	4.78E-03	4.57E-03	4.06E-03	3.16E-03	1.47E-03	4.14E-04	1.16E-04	3.27E-05	9.18E-06
te126	1.10E-02	1.10E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02
te127	5.63E-08	1.45E-08	3.43E-09	1.90E-09	5.95E-10	5.84E-11	5.50E-14	4.97E-19	4.50E-24	4.07E-29	3.68E-34
te127m	1.74E-06	1.72E-06	9.79E-07	5.44E-07	1.70E-07	1.67E-08	1.57E-11	1.42E-16	1.29E-21	1.16E-26	1.05E-31
te128	2.47E-07	2.47E-07	2.47E-07	2.47E-07	2.47E-07	2.47E-07	2.47E-07	2.47E-07	2.47E-07	2.47E-07	2.47E-07
te129	4.27E-14	1.74E-15	2.77E-16	4.11E-17	9.46E-19	5.05E-22	7.70E-32	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 5

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te129m	1.92E-12	1.88E-12	3.00E-13	4.45E-14	1.03E-15	5.48E-19	8.35E-29	.00E+00	.00E+00	.00E+00	.00E+00
te130	4.11E-15	4.11E-15	4.11E-15	4.11E-15	4.11E-15	4.11E-15	4.11E-15	4.11E-15	4.11E-15	4.11E-15	4.11E-15
i127	5.82E-05	5.82E-05	5.90E-05	5.94E-05	5.98E-05	5.99E-05	6.00E-05	6.00E-05	6.00E-05	6.00E-05	6.00E-05
i129	2.31E-10	2.32E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10
i130	9.38E-15	2.46E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe126	1.07E-14	1.07E-14	1.07E-14	1.07E-14	1.07E-14	1.07E-14	1.07E-14	1.07E-14	1.07E-14	1.07E-14	1.07E-14
xe127	1.51E-12	1.48E-12	2.72E-13	4.67E-14	1.44E-15	1.37E-18	1.19E-27	8.90E-43	.00E+00	.00E+00	.00E+00
xe128	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06
xe129	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08	1.31E-08
xe129m	3.13E-11	2.89E-11	2.80E-14	2.07E-17	1.34E-23	5.74E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	6.67E-10	6.67E-10	6.68E-10	6.68E-10	6.68E-10	6.68E-10	6.68E-10	6.68E-10	6.68E-10	6.68E-10	6.68E-10

xe131	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12	1.78E-12
xe131m	8.01E-15	7.56E-15	4.23E-17	1.93E-19	4.60E-24	2.64E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	2.20E-13	2.20E-13	2.20E-13	2.20E-13	2.20E-13	2.20E-13	2.20E-13	2.20E-13	2.20E-13	2.20E-13	2.20E-13
total	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05

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BWR SNF Assembly - Fuel - decay light elements page 6

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	2.59E-05	2.59E-05	2.56E-05	2.52E-05	2.45E-05	2.32E-05	1.96E-05	1.48E-05	1.12E-05	8.43E-06	6.36E-06
be 10	7.69E-07	7.69E-07	7.69E-07	7.69E-07	7.69E-07	7.69E-07	7.69E-07	7.69E-07	7.69E-07	7.69E-07	7.69E-07
c 14	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.90E-02	2.89E-02	2.89E-02	2.89E-02	2.89E-02	2.89E-02
na 24	6.56E-02	2.11E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.50E-10	6.75E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	5.23E+00	6.76E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	3.04E-02	5.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	4.59E-11	4.59E-11	4.59E-11	4.58E-11	4.58E-11	4.56E-11	4.50E-11	4.41E-11	4.32E-11	4.24E-11	4.15E-11
p 32	2.63E-05	2.50E-05	3.31E-07	3.73E-09	4.63E-11	4.56E-11	4.50E-11	4.41E-11	4.33E-11	4.24E-11	4.15E-11
p 33	3.44E-09	3.35E-09	2.93E-10	2.34E-11	1.57E-13	7.20E-18	6.85E-31	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	1.23E-08	1.37E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	2.64E-10	6.87E-11	3.84E-17	3.82E-17	3.78E-17	3.70E-17	3.47E-17	3.13E-17	2.81E-17	2.53E-17	2.28E-17
k 43	1.52E-07	7.21E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	5.23E-04	5.21E-04	3.57E-04	2.42E-04	1.11E-04	2.38E-05	2.30E-07	1.01E-10	4.45E-14	1.96E-17	8.60E-21
ca 47	8.06E-06	6.92E-06	8.57E-12	6.23E-18	4.63E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	6.12E-02	6.07E-02	2.91E-02	1.35E-02	2.99E-03	1.46E-04	1.69E-08	4.65E-15	1.28E-21	3.53E-28	.00E+00
sc 47	9.66E-02	7.85E-02	8.00E-10	2.73E-17	1.76E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	9.15E-03	6.25E-03	1.20E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	9.71E-03	2.56E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	5.89E+02	5.74E+02	6.20E+01	6.13E+00	6.34E-02	6.82E-06	8.49E-18	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	2.00E+01	1.99E+01	1.63E+01	1.33E+01	8.87E+00	3.94E+00	3.46E-01	5.99E-03	1.04E-04	1.80E-06	3.12E-08
mn 56	7.60E+01	1.20E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	1.20E+02	1.20E+02	1.13E+02	1.06E+02	9.31E+01	7.22E+01	3.37E+01	9.47E+00	2.66E+00	7.48E-01	2.10E-01
fe 59	6.96E+00	6.85E+00	1.71E+00	4.06E-01	2.35E-02	7.96E-05	3.08E-12	1.37E-24	.00E+00	.00E+00	.00E+00
co 58m	5.89E-03	9.55E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.24E+02	1.22E+02	5.13E+01	2.08E+01	3.48E+00	9.79E-02	2.19E-06	3.86E-14	6.83E-22	1.21E-29	.00E+00
co 60	3.75E+02	3.74E+02	3.63E+02	3.51E+02	3.28E+02	2.88E+02	1.94E+02	1.01E+02	5.21E+01	2.70E+01	1.40E+01
co 61	7.19E+00	3.01E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	8.35E-02	8.35E-02	8.35E-02	8.35E-02	8.35E-02	8.35E-02	8.35E-02	8.35E-02	8.35E-02	8.35E-02	8.35E-02
ni 63	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.20E+01	1.19E+01	1.17E+01	1.13E+01	1.09E+01	1.05E+01	1.02E+01
ni 65	1.18E+01	1.60E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	7.51E-05	5.54E-05	9.32E-17	5.40E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	1.09E+01	2.94E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	2.45E+00	5.55E-05	9.33E-17	5.41E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.20E-06	1.68E-06	6.71E-17	1.04E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	1.35E-02	1.34E-02	1.04E-02	8.01E-03	4.77E-03	1.69E-03	7.50E-05	4.17E-07	2.32E-09	1.29E-11	7.20E-14
zn 69	5.76E-07	1.24E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	3.87E-08	1.16E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	1.20E-13	3.70E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	1.08E-11	1.02E-11	4.62E-14	1.70E-16	2.62E-21	6.39E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	1.79E+01	1.76E+01	5.20E+00	1.46E+00	1.19E-01	7.98E-04	2.39E-10	3.19E-21	4.56E-32	.00E+00	.00E+00
sr 90	1.60E-03	1.60E-03	1.59E-03	1.58E-03	1.56E-03	1.52E-03	1.41E-03	1.25E-03	1.10E-03	9.75E-04	8.62E-04
sr 91	3.46E+00	6.02E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	2.17E-03	2.05E-03	4.84E-04	1.36E-04	1.11E-05	7.42E-08	2.22E-14	2.96E-25	.00E+00	.00E+00	.00E+00
y 90	6.58E+02	5.08E+02	1.59E-03	1.58E-03	1.56E-03	1.52E-03	1.41E-03	1.25E-03	1.10E-03	9.75E-04	8.62E-04
y 90m	6.10E-05	3.31E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	4.51E+01	4.45E+01	1.55E+01	5.19E+00	5.95E-01	7.86E-03	1.81E-08	7.26E-18	2.91E-27	.00E+00	.00E+00
y 92	3.91E+01	3.55E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	7.76E-03	1.51E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	5.10E-04	4.12E-04	2.62E-12	7.93E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	8.09E-02	8.09E-02	8.09E-02	8.09E-02	8.09E-02	8.09E-02	8.09E-02	8.09E-02	8.09E-02	8.09E-02	8.09E-02

zr 95	1.38E+04	1.36E+04	5.19E+03	1.91E+03	2.64E+02	5.05E+00	3.55E-05	9.18E-14	2.37E-22	6.16E-31	.00E+00

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 97	2.11E+04	7.89E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	7.79E-07	7.79E-07	7.79E-07	7.79E-07	7.78E-07	7.77E-07	7.75E-07	7.71E-07	7.67E-07	7.63E-07	7.59E-07
nb 92	3.91E-08	3.91E-08	3.91E-08	3.91E-08	3.91E-08	3.91E-08	3.91E-08	3.91E-08	3.91E-08	3.91E-08	3.91E-08
nb 93m	1.41E+00	1.41E+00	1.40E+00	1.39E+00	1.36E+00	1.30E+00	1.16E+00	9.49E-01	7.81E-01	6.46E-01	5.37E-01
nb 94	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02	3.52E-02
nb 95	1.36E+04	1.36E+04	8.64E+03	3.75E+03	5.69E+02	1.15E+01	7.83E-05	2.02E-13	5.23E-22	1.37E-30	.00E+00
nb 95m	1.53E+02	1.52E+02	6.11E+01	2.24E+01	3.10E+00	5.94E-02	4.18E-07	1.08E-15	2.79E-24	.00E+00	.00E+00
nb 96	1.32E+01	6.48E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	2.11E+04	7.93E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	2.00E+04	7.49E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 93	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.25E-03	1.25E-03	1.25E-03	1.25E-03
mo 99	2.19E+01	1.70E+01	3.02E-09	2.22E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	2.35E-11	2.35E-11	2.35E-11	2.35E-11	2.35E-11	2.35E-11	2.35E-11	2.35E-11	2.35E-11	2.35E-11	2.35E-11
tc 99	3.39E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05	3.40E-05
ru103	2.51E-03	2.46E-03	5.12E-04	1.00E-04	3.97E-06	6.28E-09	2.49E-17	2.51E-31	.00E+00	.00E+00	.00E+00
ru105	2.63E-08	6.19E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	2.02E-14	2.02E-14	1.71E-14	1.44E-14	1.02E-14	5.18E-15	6.71E-16	2.22E-17	7.38E-19	2.45E-20	8.12E-22
rh102	3.92E-12	3.92E-12	3.70E-12	3.48E-12	3.09E-12	2.43E-12	1.19E-12	3.60E-13	1.09E-13	3.29E-14	9.97E-15
rh105	2.52E-08	1.80E-08	1.19E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	7.46E-09	1.76E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	7.30E-10	2.02E-14	1.71E-14	1.44E-14	1.02E-14	5.18E-15	6.71E-16	2.22E-17	7.38E-19	2.45E-20	8.12E-22
rh106m	3.04E-10	1.41E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd109	3.95E-15	1.17E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109m	3.95E-15	1.17E-15	4.16E-24	3.63E-24	2.76E-24	1.59E-24	3.09E-25	2.00E-26	1.30E-27	8.41E-29	5.45E-30
ag111	3.43E-15	3.14E-15	7.96E-19	1.46E-22	6.02E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	1.49E-05	1.49E-05	1.47E-05	1.46E-05	1.42E-05	1.35E-05	1.17E-05	9.13E-06	7.14E-06	5.58E-06	4.37E-06
cd115	5.63E-02	4.12E-02	3.89E-14	1.24E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	6.12E-03	6.02E-03	1.51E-03	3.59E-04	2.09E-05	7.17E-08	2.88E-15	1.35E-27	.00E+00	.00E+00	.00E+00
cd117	1.01E-02	1.27E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	1.84E-05	1.30E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	5.25E+02	5.21E+02	3.05E+02	1.75E+02	5.81E+01	6.44E+00	8.77E-03	1.47E-07	2.45E-12	4.10E-17	6.86E-22
in114	1.28E+02	8.05E+01	2.32E+01	6.35E+00	4.91E-01	2.96E-03	6.44E-10	5.08E-21	4.56E-32	.00E+00	.00E+00
in114m	8.54E+01	8.42E+01	2.42E+01	6.63E+00	5.14E-01	3.09E-03	6.73E-10	5.31E-21	4.56E-32	.00E+00	.00E+00
in116m	1.53E-02	1.51E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	1.14E-01	2.78E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	9.22E-03	5.43E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	5.24E+02	5.21E+02	3.05E+02	1.75E+02	5.81E+01	6.44E+00	8.77E-03	1.47E-07	2.45E-12	4.10E-17	6.86E-22
sn117m	2.67E+03	2.54E+03	2.72E+01	2.44E-01	2.20E-05	1.81E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	2.41E+03	2.41E+03	1.95E+03	1.57E+03	1.02E+03	4.28E+02	3.21E+01	4.27E-01	5.68E-03	7.56E-05	1.01E-06
sn121	9.03E+02	4.88E+02	3.09E-01	3.08E-01	3.06E-01	3.02E-01	2.91E-01	2.73E-01	2.56E-01	2.41E-01	2.26E-01
sn121m	3.99E-01	3.99E-01	3.98E-01	3.96E-01	3.94E-01	3.89E-01	3.75E-01	3.52E-01	3.30E-01	3.10E-01	2.91E-01
sn123	8.40E+01	8.35E+01	5.18E+01	3.15E+01	1.18E+01	1.67E+00	4.65E-03	2.58E-07	1.43E-11	7.93E-16	4.40E-20
sn123m	4.80E-01	7.36E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	1.69E+01	1.58E+01	2.62E-02	3.39E-05	6.66E-11	2.62E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	1.88E+02	1.45E+02	1.74E-08	8.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	1.08E+01	1.07E+01	3.82E+00	1.32E+00	1.61E-01	2.39E-03	7.94E-09	5.85E-18	4.31E-27	.00E+00	.00E+00
sb125	3.87E+02	3.86E+02	3.63E+02	3.41E+02	3.00E+02	2.33E+02	1.09E+02	3.05E+01	8.58E+00	2.41E+00	6.77E-01
sb126	4.88E+00	4.62E+00	3.19E-02	1.81E-04	6.59E-09	8.89E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	2.41E-13	2.41E-13	2.72E-13	2.92E-13	3.09E-13	3.18E-13	3.19E-13	3.19E-13	3.19E-13	3.19E-13	3.19E-13
te123m	2.96E+00	2.94E+00	1.76E+00	1.03E+00	3.56E-01	4.30E-02	7.53E-05	1.92E-09	4.89E-14	1.25E-18	3.18E-23
te125m	8.66E+01	8.66E+01	8.61E+01	8.23E+01	7.32E+01	5.69E+01	2.65E+01	7.46E+00	2.10E+00	5.89E-01	1.65E-01
te127	1.49E-01	3.83E-02	9.05E-03	5.02E-03	1.57E-03	1.54E-04	1.45E-07	1.31E-12	1.19E-17	1.07E-22	9.73E-28

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0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te127m	1.64E-02	1.63E-02	9.24E-03	5.13E-03	1.60E-03	1.57E-04	1.48E-07	1.34E-12	1.21E-17	1.10E-22	9.93E-28
te129	8.94E-07	3.64E-08	5.80E-09	8.60E-10	1.98E-11	1.06E-14	1.61E-24	.00E+00	.00E+00	.00E+00	.00E+00
te129m	5.79E-08	5.67E-08	9.05E-09	1.34E-09	3.09E-11	1.65E-14	2.52E-24	.00E+00	.00E+00	.00E+00	.00E+00
i126	7.08E-13	6.71E-13	5.88E-15	4.27E-17	2.55E-21	9.15E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i129	4.09E-14	4.09E-14	4.12E-14	4.12E-14	4.12E-14	4.12E-14	4.12E-14	4.12E-14	4.12E-14	4.12E-14	4.12E-14
i130	1.83E-08	4.80E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.85E-12	1.70E-12	7.91E-16	2.72E-19	3.92E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	4.26E-08	4.18E-08	7.68E-09	1.32E-09	4.06E-11	3.88E-14	3.36E-23	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	3.56E-06	3.30E-06	3.19E-09	2.35E-12	1.53E-18	6.62E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	6.71E-10	6.33E-10	3.55E-12	1.62E-14	3.85E-19	2.21E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	6.50E-13	5.74E-13	4.63E-18	2.26E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	4.32E-14	3.15E-14	1.83E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.93E-15	3.93E-15	3.62E-15	3.32E-15	2.81E-15	2.01E-15	7.32E-16	1.36E-16	2.54E-17	4.73E-18	8.80E-19
total	1.01E+05	5.99E+04	1.77E+04	8.59E+03	2.80E+03	1.13E+03	4.09E+02	1.62E+02	7.79E+01	4.27E+01	2.65E+01

1 BWR SNF Assembly - Fuel - decay actinides page 9

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
he 4	3.37E-01	3.38E-01	3.73E-01	3.99E-01	4.35E-01	4.76E-01	5.58E-01	6.84E-01	8.06E-01	9.25E-01	1.04E+00
tl207	6.41E-15	6.41E-15	6.94E-15	7.48E-15	8.65E-15	1.09E-14	1.68E-14	2.56E-14	3.33E-14	4.01E-14	4.60E-14
tl208	4.88E-12	4.99E-12	5.65E-12	6.45E-12	8.15E-12	1.18E-11	2.19E-11	3.10E-11	3.34E-11	3.31E-11	3.19E-11
pb206	1.87E-12	1.88E-12	2.26E-12	2.71E-12	3.68E-12	5.82E-12	1.35E-11	3.46E-11	7.58E-11	1.53E-10	2.86E-10
pb207	9.21E-10	9.23E-10	1.05E-09	1.19E-09	1.52E-09	2.27E-09	5.43E-09	1.35E-08	2.48E-08	3.89E-08	5.54E-08
pb208	2.42E-06	2.42E-06	2.85E-06	3.36E-06	4.56E-06	7.86E-06	2.49E-05	7.02E-05	1.24E-04	1.80E-04	2.34E-04
pb209	8.36E-14	7.97E-14	1.94E-14	1.67E-14	1.67E-14	1.68E-14	1.72E-14	1.81E-14	1.93E-14	2.06E-14	2.22E-14
pb210	6.44E-11	6.45E-11	6.80E-11	6.91E-11	7.13E-11	7.65E-11	1.03E-10	1.95E-10	3.78E-10	6.80E-10	1.13E-09
pb211	4.96E-14	4.96E-14	5.36E-14	5.78E-14	6.69E-14	8.42E-14	1.30E-13	1.98E-13	2.58E-13	3.10E-13	3.56E-13
pb212	2.90E-09	2.90E-09	3.35E-09	3.82E-09	4.83E-09	7.01E-09	1.30E-08	1.84E-08	1.98E-08	1.96E-08	1.89E-08
bi209	2.06E-10	2.07E-10	2.26E-10	2.34E-10	2.50E-10	2.81E-10	3.77E-10	5.41E-10	7.16E-10	9.02E-10	1.10E-09
bi210	3.92E-14	3.93E-14	4.19E-14	4.25E-14	4.39E-14	4.71E-14	6.31E-14	1.20E-13	2.32E-13	4.19E-13	6.97E-13
bi211	2.94E-15	2.94E-15	3.18E-15	3.43E-15	3.97E-15	4.99E-15	7.69E-15	1.17E-14	1.53E-14	1.84E-14	2.11E-14
bi212	2.75E-10	2.81E-10	3.18E-10	3.63E-10	4.58E-10	6.65E-10	1.23E-09	1.74E-09	1.88E-09	1.86E-09	1.79E-09
bi213	1.99E-14	1.99E-14	4.63E-15	3.96E-15	3.97E-15	4.00E-15	4.10E-15	4.32E-15	4.58E-15	4.90E-15	5.28E-15
po210	8.09E-13	8.11E-13	9.21E-13	1.01E-12	1.11E-12	1.23E-12	1.63E-12	3.32E-12	6.42E-12	1.16E-11	1.93E-11
po216	1.12E-14	1.12E-14	1.29E-14	1.47E-14	1.86E-14	2.71E-14	5.02E-14	7.09E-14	7.63E-14	7.56E-14	7.29E-14
rn220	4.36E-12	4.37E-12	5.05E-12	5.76E-12	7.28E-12	1.06E-11	1.96E-11	2.77E-11	2.98E-11	2.95E-11	2.85E-11
rn222	8.96E-14	8.96E-14	9.42E-14	9.90E-14	1.09E-13	1.34E-13	2.38E-13	5.20E-13	9.47E-13	1.53E-12	2.28E-12
fr221	2.22E-15	2.22E-15	5.16E-16	4.42E-16	4.43E-16	4.46E-16	4.58E-16	4.82E-16	5.11E-16	5.47E-16	5.89E-16
ra223	2.39E-11	2.39E-11	2.59E-11	2.79E-11	3.23E-11	4.06E-11	6.25E-11	9.54E-11	1.24E-10	1.49E-10	1.72E-10
ra224	2.53E-08	2.53E-08	2.92E-08	3.33E-08	4.22E-08	6.12E-08	1.14E-07	1.60E-07	1.73E-07	1.71E-07	1.65E-07
ra225	1.01E-11	9.69E-12	2.07E-12	1.96E-12	1.96E-12	1.98E-12	2.03E-12	2.13E-12	2.26E-12	2.42E-12	2.61E-12
ra226	1.40E-08	1.40E-08	1.47E-08	1.54E-08	1.70E-08	2.09E-08	3.71E-08	8.09E-08	1.47E-07	2.38E-07	3.55E-07
ra228	1.17E-14	1.18E-14	1.29E-14	1.41E-14	1.67E-14	2.26E-14	4.42E-14	9.03E-14	1.44E-13	2.01E-13	2.61E-13
ac225	6.64E-12	6.64E-12	1.54E-12	1.32E-12	1.33E-12	1.34E-12	1.37E-12	1.44E-12	1.53E-12	1.64E-12	1.76E-12
ac227	1.76E-08	1.76E-08	1.90E-08	2.04E-08	2.32E-08	2.87E-08	4.42E-08	6.74E-08	8.77E-08	1.06E-07	1.21E-07
th226	3.05E-15	2.95E-15	1.52E-16	6.97E-18	1.58E-20	8.17E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	3.98E-11	3.99E-11	4.31E-11	4.64E-11	5.29E-11	6.67E-11	1.03E-10	1.57E-10	2.04E-10	2.45E-10	2.82E-10
th228	4.94E-06	4.95E-06	5.66E-06	6.45E-06	8.16E-06	1.19E-05	2.20E-05	3.11E-05	3.35E-05	3.32E-05	3.20E-05
th229	3.86E-07	3.86E-07	3.86E-07	3.87E-07	3.88E-07	3.91E-07	4.01E-07	4.22E-07	4.48E-07	4.79E-07	5.16E-07
th230	2.97E-04	2.97E-04	3.17E-04	3.39E-04	3.81E-04	4.67E-04	7.36E-04	1.22E-03	1.74E-03	2.30E-03	2.90E-03
th231	4.70E-07	2.47E-07	4.42E-09	4.42E-09	4.42E-09	4.42E-09	4.42E-09	4.42E-09	4.42E-09	4.42E-09	4.42E-09
th232	1.22E-04	1.22E-04	1.30E-04	1.38E-04	1.53E-04	1.84E-04	2.78E-04	4.33E-04	5.88E-04	7.44E-04	8.99E-04
th234	2.69E-06	2.69E-06	2.69E-06	2.69E-06	2.69E-06	2.69E-06	2.69E-06	2.69E-06	2.69E-06	2.69E-06	2.69E-06
pa231	3.01E-04	3.01E-04	3.02E-04	3.02E-04	3.02E-04	3.04E-04	3.07E-04	3.12E-04	3.17E-04	3.22E-04	3.28E-04
pa232	4.20E-07	2.47E-07	8.79E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pa233	5.17E-06	5.16E-06	5.12E-06	5.12E-06	5.12E-06	5.12E-06	5.13E-06	5.16E-06	5.21E-06	5.27E-06	5.33E-06

pa234m	9.25E-11	9.07E-11	9.06E-11	9.06E-11	9.06E-11	9.06E-11	9.06E-11	9.06E-11	9.06E-11	9.06E-11	9.06E-11
pa234	6.37E-10	9.03E-11	4.05E-11	4.05E-11	4.05E-11	4.05E-11	4.05E-11	4.05E-11	4.05E-11	4.05E-11	4.05E-11
u230	3.01E-12	2.91E-12	1.50E-13	6.87E-15	1.56E-17	8.05E-23	1.11E-38	.00E+00	.00E+00	.00E+00	.00E+00
u231	5.47E-11	4.64E-11	1.95E-17	4.59E-24	3.70E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	4.64E-04	4.65E-04	5.20E-04	5.73E-04	6.68E-04	8.25E-04	1.11E-03	1.26E-03	1.26E-03	1.21E-03	1.16E-03
u233	6.12E-04	6.12E-04	6.24E-04	6.36E-04	6.60E-04	7.13E-04	8.62E-04	1.10E-03	1.35E-03	1.59E-03	1.84E-03
u234	3.01E+01	3.01E+01	3.03E+01	3.04E+01	3.07E+01	3.14E+01	3.32E+01	3.62E+01	3.91E+01	4.19E+01	4.45E+01
u235	1.09E+03	1.09E+03	1.09E+03	1.09E+03	1.09E+03	1.09E+03	1.09E+03	1.09E+03	1.09E+03	1.09E+03	1.09E+03
u236	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03	1.07E+03
u237	1.66E+00	1.50E+00	1.71E-04	1.03E-05	1.00E-05	9.53E-06	8.25E-06	6.48E-06	5.09E-06	4.00E-06	3.14E-06
u238	1.85E+05	1.85E+05	1.85E+05	1.85E+05	1.85E+05	1.85E+05	1.85E+05	1.85E+05	1.85E+05	1.85E+05	1.85E+05
np235	7.41E-06	7.39E-06	6.33E-06	5.38E-06	3.91E-06	2.06E-06	3.03E-07	1.24E-08	5.09E-10	2.08E-11	8.54E-13
np236m	5.00E-06	2.39E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.17E-03	1.17E-03	1.17E-03	1.17E-03	1.17E-03	1.17E-03	1.17E-03	1.17E-03	1.17E-03	1.17E-03	1.17E-03

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BWR SNF Assembly - Fuel - decay actinides page 10

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
np237	1.49E+02	1.49E+02	1.51E+02	1.51E+02	1.51E+02	1.51E+02	1.51E+02	1.52E+02	1.53E+02	1.55E+02	1.57E+02
np238	3.15E-01	2.27E-01	9.11E-08	9.10E-08	9.08E-08	9.03E-08	8.90E-08	8.68E-08	8.47E-08	8.27E-08	8.07E-08
np239	1.17E+01	8.78E+00	4.46E-05	4.46E-05	4.46E-05	4.46E-05	4.46E-05	4.46E-05	4.45E-05	4.45E-05	4.45E-05
np240	3.55E-04	3.53E-11	2.20E-24	2.84E-24	4.10E-24	6.62E-24	1.42E-23	2.68E-23	3.94E-23	5.20E-23	6.47E-23
pu236	9.98E-04	9.99E-04	9.43E-04	8.88E-04	7.88E-04	6.20E-04	3.03E-04	9.17E-05	2.78E-05	8.40E-06	2.55E-06
pu237	2.84E-05	2.80E-05	7.15E-06	1.73E-06	1.05E-07	3.85E-10	1.92E-17	1.30E-29	8.63E-42	.00E+00	.00E+00
pu238	7.61E+01	7.62E+01	7.79E+01	7.90E+01	8.00E+01	8.03E+01	7.86E+01	7.56E+01	7.27E+01	6.99E+01	6.72E+01
pu239	1.14E+03	1.14E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03	1.15E+03
pu240	5.45E+02	5.45E+02	5.45E+02	5.45E+02	5.46E+02	5.46E+02	5.48E+02	5.51E+02	5.53E+02	5.55E+02	5.56E+02
pu241	3.46E+02	3.46E+02	3.42E+02	3.38E+02	3.30E+02	3.14E+02	2.72E+02	2.14E+02	1.68E+02	1.32E+02	1.04E+02
pu242	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02
pu243	3.37E-02	1.17E-03	1.94E-13	1.94E-13	1.94E-13	1.94E-13	1.94E-13	1.94E-13	1.94E-13	1.94E-13	1.94E-13
pu244	9.09E-10	9.13E-10	1.27E-09	1.64E-09	2.36E-09	3.82E-09	8.18E-09	1.55E-08	2.27E-08	3.00E-08	3.73E-08
am239	4.62E-10	1.14E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	2.02E-07	1.46E-07	3.38E-20	2.49E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.73E+01	1.74E+01	2.14E+01	2.56E+01	3.36E+01	4.91E+01	9.12E+01	1.49E+02	1.93E+02	2.27E+02	2.54E+02
am242m	5.01E-01	5.01E-01	5.01E-01	5.00E-01	4.99E-01	4.96E-01	4.89E-01	4.77E-01	4.66E-01	4.54E-01	4.43E-01
am242	3.22E-02	1.14E-02	6.46E-06	6.45E-06	6.44E-06	6.40E-06	6.31E-06	6.16E-06	6.01E-06	5.86E-06	5.72E-06
am243	5.18E+01	5.18E+01	5.18E+01	5.18E+01	5.18E+01	5.18E+01	5.18E+01	5.18E+01	5.18E+01	5.17E+01	5.17E+01
am244	2.96E-02	5.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	5.50E-14	5.47E-14	4.51E-14	3.69E-14	2.48E-14	1.13E-14	1.05E-15	2.01E-17	3.85E-19	7.37E-21	1.41E-22
cm241	3.96E-09	3.88E-09	5.92E-10	8.38E-11	1.76E-12	7.83E-16	6.88E-26	1.35E-42	.00E+00	.00E+00	.00E+00
cm242	5.48E+00	5.47E+00	3.75E+00	2.53E+00	1.16E+00	2.47E-01	3.61E-03	1.24E-03	1.21E-03	1.18E-03	1.16E-03
cm243	2.36E-01	2.36E-01	2.34E-01	2.33E-01	2.30E-01	2.25E-01	2.09E-01	1.85E-01	1.64E-01	1.45E-01	1.28E-01
cm244	2.13E+01	2.13E+01	2.11E+01	2.09E+01	2.05E+01	1.97E+01	1.76E+01	1.45E+01	1.20E+01	9.91E+00	8.18E+00
cm245	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00	1.07E+00
cm246	2.30E-01	2.30E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01	2.29E-01
cm247	5.58E-03	5.58E-03	5.58E-03	5.58E-03	5.58E-03	5.58E-03	5.58E-03	5.58E-03	5.58E-03	5.58E-03	5.58E-03
cm248	7.90E-04	7.90E-04	7.90E-04	7.90E-04	7.90E-04	7.90E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04
cm249	8.78E-09	1.85E-14	5.31E-16	1.45E-17	1.18E-20	7.96E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	6.81E-12	6.81E-12	6.82E-12	6.82E-12	6.82E-12	6.82E-12	6.82E-12	6.82E-12	6.81E-12	6.81E-12	6.81E-12
bk249	1.44E-05	1.44E-05	1.18E-05	9.69E-06	6.52E-06	2.96E-06	2.75E-07	5.28E-09	1.01E-10	1.93E-12	3.70E-14
bk250	8.67E-09	4.93E-11	4.53E-14	3.59E-14	2.27E-14	9.05E-15	5.76E-16	5.86E-18	7.93E-20	2.07E-20	2.01E-20
cf249	3.10E-06	3.13E-06	5.64E-06	7.79E-06	1.09E-05	1.45E-05	1.71E-05	1.72E-05	1.70E-05	1.68E-05	1.67E-05
cf250	2.52E-06	2.53E-06	2.50E-06	2.47E-06	2.40E-06	2.28E-06	1.94E-06	1.49E-06	1.14E-06	8.78E-07	6.73E-07
cf251	1.76E-06	1.76E-06	1.76E-06	1.76E-06	1.76E-06	1.76E-06	1.75E-06	1.75E-06	1.74E-06	1.73E-06	1.73E-06
cf252	1.53E-06	1.53E-06	1.43E-06	1.34E-06	1.17E-06	9.04E-07	4.12E-07	1.11E-07	3.00E-08	8.08E-09	2.18E-09
cf253	2.31E-09	2.22E-09	6.95E-11	1.90E-12	1.55E-15	1.04E-21	3.16E-40	.00E+00	.00E+00	.00E+00	.00E+00
cf254	2.01E-12	1.99E-12	7.17E-13	2.49E-13	3.06E-14	4.66E-16	1.65E-21	1.35E-30	1.10E-39	.00E+00	.00E+00
es253	2.25E-09	2.26E-09	4.14E-10	2.68E-11	7.31E-14	3.54E-19	2.75E-35	.00E+00	.00E+00	.00E+00	.00E+00
es254	1.19E-10	1.18E-10	9.46E-11	7.50E-11	4.74E-11	1.89E-11	1.20E-12	1.22E-14	1.24E-16	1.25E-18	1.27E-20

es255	1.44E-13	1.41E-13	2.91E-14	5.62E-15	2.18E-16	3.31E-1[illegible]	1.15E-27	9.29E-42	.00E+00	.00E+00	.00E+00
total	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+0[illegible]	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tl206	6.42E-15	6.44E-15	6.86E-15	6.97E-15	7.19E-15	7.72E-15	1.03E-14	1.97E-14	3.81E-14	6.86E-14	1.14E-13
tl207	1.22E-06	1.22E-06	1.32E-06	1.42E-06	1.65E-06	2.07E-06	3.20E-06	4.87E-06	6.34E-06	7.63E-06	8.77E-06
tl208	1.45E-03	1.48E-03	1.67E-03	1.91E-03	2.41E-03	3.50E-03	6.50E-03	9.18E-03	9.89E-03	9.79E-03	9.44E-03
tl209	8.10E-09	8.10E-09	1.88E-09	1.61E-09	1.62E-09	1.63E-09	1.67E-09	1.76E-09	1.86E-09	1.99E-09	2.15E-09
pb209	3.86E-07	3.68E-07	8.97E-08	7.68E-08	7.70E-08	7.75E-08	7.95E-08	8.36E-08	8.88E-08	9.50E-08	1.02E-07
pb210	4.92E-09	4.93E-09	5.19E-09	5.28E-09	5.44E-09	5.85E-09	7.83E-09	1.49E-08	2.88E-08	5.20E-08	8.65E-08
pb211	1.22E-06	1.23E-06	1.32E-06	1.43E-06	1.65E-06	2.08E-06	3.20E-06	4.89E-06	6.36E-06	7.65E-06	8.79E-06
pb212	4.02E-03	4.03E-03	4.66E-03	5.31E-03	6.72E-03	9.75E-03	1.81E-02	2.56E-02	2.75E-02	2.72E-02	2.63E-02
pb214	1.38E-08	1.38E-08	1.45E-08	1.52E-08	1.68E-08	2.06E-08	3.67E-08	8.00E-08	1.46E-07	2.35E-07	3.51E-07
bi210	4.87E-09	4.87E-09	5.19E-09	5.28E-09	5.45E-09	5.85E-09	7.83E-09	1.49E-08	2.88E-08	5.20E-08	8.65E-08
bi211	1.22E-06	1.23E-06	1.32E-06	1.43E-06	1.65E-06	2.08E-06	3.20E-06	4.89E-06	6.36E-06	7.65E-06	8.79E-06
bi212	4.02E-03	4.11E-03	4.66E-03	5.31E-03	6.72E-03	9.75E-03	1.81E-02	2.56E-02	2.75E-02	2.72E-02	2.63E-02
bi213	3.86E-07	3.86E-07	8.97E-08	7.68E-08	7.70E-08	7.75E-08	7.95E-08	8.36E-08	8.88E-08	9.50E-08	1.02E-07
bi214	1.38E-08	1.38E-08	1.45E-08	1.52E-08	1.68E-08	2.06E-08	3.67E-08	8.00E-08	1.46E-07	2.35E-07	3.51E-07
po210	3.64E-09	3.64E-09	4.14E-09	4.52E-09	4.98E-09	5.52E-09	7.35E-09	1.49E-08	2.88E-08	5.20E-08	8.66E-08
po211	3.37E-09	3.37E-09	3.64E-09	3.93E-09	4.54E-09	5.72E-09	8.81E-09	1.34E-08	1.75E-08	2.10E-08	2.42E-08
po212	2.58E-03	2.64E-03	2.98E-03	3.40E-03	4.30E-03	6.25E-03	1.16E-02	1.64E-02	1.76E-02	1.75E-02	1.68E-02
po213	3.77E-07	3.78E-07	8.78E-08	7.52E-08	7.54E-08	7.59E-08	7.78E-08	8.19E-08	8.69E-08	9.30E-08	1.00E-07
po214	9.60E-08	9.34E-08	1.86E-08	1.54E-08	1.68E-08	2.06E-08	3.67E-08	8.00E-08	1.46E-07	2.35E-07	3.51E-07
po215	1.22E-06	1.23E-06	1.32E-06	1.43E-06	1.65E-06	2.08E-06	3.20E-06	4.89E-06	6.36E-06	7.65E-06	8.79E-06
po216	4.02E-03	4.03E-03	4.66E-03	5.31E-03	6.72E-03	9.75E-03	1.81E-02	2.56E-02	2.75E-02	2.72E-02	2.63E-02
po218	1.38E-08	1.38E-08	1.45E-08	1.52E-08	1.68E-08	2.06E-08	3.67E-08	8.00E-08	1.46E-07	2.35E-07	3.51E-07
at217	3.86E-07	3.86E-07	8.97E-08	7.68E-08	7.70E-08	7.75E-08	7.95E-08	8.36E-08	8.88E-08	9.50E-08	1.02E-07
rn218	8.22E-08	7.96E-08	4.10E-09	1.88E-10	4.25E-13	2.20E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	1.22E-06	1.23E-06	1.32E-06	1.43E-06	1.65E-06	2.08E-06	3.20E-06	4.89E-06	6.36E-06	7.65E-06	8.79E-06
rn220	4.02E-03	4.03E-03	4.66E-03	5.31E-03	6.72E-03	9.75E-03	1.81E-02	2.56E-02	2.75E-02	2.72E-02	2.63E-02
rn222	1.38E-08	1.38E-08	1.45E-08	1.52E-08	1.68E-08	2.06E-08	3.67E-08	8.00E-08	1.46E-07	2.35E-07	3.51E-07
fr221	3.86E-07	3.86E-07	8.97E-08	7.68E-08	7.70E-08	7.75E-08	7.95E-08	8.36E-08	8.88E-08	9.50E-08	1.02E-07
fr223	1.76E-08	1.76E-08	1.90E-08	2.04E-08	2.32E-08	2.86E-08	4.42E-08	6.74E-08	8.76E-08	1.05E-07	1.21E-07
ra222	8.22E-08	7.96E-08	4.10E-09	1.88E-10	4.25E-13	2.20E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	1.22E-06	1.23E-06	1.32E-06	1.43E-06	1.65E-06	2.08E-06	3.20E-06	4.89E-06	6.36E-06	7.65E-06	8.79E-06
ra224	4.02E-03	4.03E-03	4.66E-03	5.31E-03	6.72E-03	9.75E-03	1.81E-02	2.56E-02	2.75E-02	2.72E-02	2.63E-02
ra225	3.95E-07	3.80E-07	8.12E-08	7.67E-08	7.69E-08	7.75E-08	7.95E-08	8.36E-08	8.88E-08	9.50E-08	1.02E-07
ra226	1.38E-08	1.38E-08	1.45E-08	1.52E-08	1.68E-08	2.06E-08	3.67E-08	8.00E-08	1.46E-07	2.35E-07	3.51E-07
ra228	3.21E-12	3.21E-12	3.52E-12	3.85E-12	4.56E-12	6.15E-12	1.21E-11	2.46E-11	3.92E-11	5.49E-11	7.13E-11
ac225	3.86E-07	3.86E-07	8.97E-08	7.68E-08	7.70E-08	7.75E-08	7.95E-08	8.36E-08	8.88E-08	9.50E-08	1.02E-07
ac227	1.27E-06	1.27E-06	1.37E-06	1.48E-06	1.68E-06	2.08E-06	3.20E-06	4.88E-06	6.35E-06	7.64E-06	8.78E-06
ac228	3.21E-12	3.21E-12	3.52E-12	3.85E-12	4.56E-12	6.15E-12	1.21E-11	2.46E-11	3.92E-11	5.49E-11	7.13E-11
th226	8.22E-08	7.96E-08	4.10E-09	1.88E-10	4.25E-13	2.20E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	1.22E-06	1.23E-06	1.32E-06	1.43E-06	1.63E-06	2.05E-06	3.16E-06	4.82E-06	6.27E-06	7.55E-06	8.67E-06
th228	4.05E-03	4.06E-03	4.64E-03	5.29E-03	6.69E-03	9.73E-03	1.81E-02	2.55E-02	2.75E-02	2.72E-02	2.62E-02
th229	7.64E-08	7.64E-08	7.65E-08	7.67E-08	7.69E-08	7.75E-08	7.95E-08	8.36E-08	8.88E-08	9.50E-08	1.02E-07
th230	6.12E-06	6.13E-06	6.55E-06	6.99E-06	7.86E-06	9.64E-06	1.52E-05	2.51E-05	3.59E-05	4.75E-05	5.98E-05
th231	2.50E-01	1.31E-01	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03
th232	1.34E-11	1.34E-11	1.43E-11	1.51E-11	1.68E-11	2.02E-11	3.05E-11	4.75E-11	6.45E-11	8.16E-11	9.86E-11
th234	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02
pa231	1.42E-05	1.42E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.45E-05	1.47E-05	1.50E-05	1.52E-05	1.55E-05
pa232	1.80E-01	1.06E-01	3.78E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pa233	1.07E-01	1.07E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.07E-01	1.07E-01	1.08E-01	1.09E-01	1.11E-01
pa234m	6.36E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02
pa234	1.27E-03	1.81E-04	8.10E-05	8.10E-05	8.10E-05	8.10E-05	8.10E-05	8.10E-05	8.10E-05	8.10E-05	8.10E-05
u230	8.22E-08	7.95E-08	4.09E-09	1.88E-10	4.25E-13	2.20E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
u231	7.36E-06	6.24E-06	2.62E-12	6.18E-19	4.56E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.03E-02	1.03E-02	1.15E-02	1.26E-02	1.48E-02	1.82E-02	2.45E-02	2.77E-02	2.77E-02	2.68E-02	2.56E-02
u233	5.90E-06	5.90E-06	6.01E-06	6.13E-06	6.36E-06	6.87E-06	8.31E-06	1.06E-05	1.30E-05	1.53E-05	1.77E-05
u234	1.87E-01	1.87E-01	1.88E-01	1.89E-01	1.91E-01	1.95E-01	2.07E-01	2.25E-01	2.43E-01	2.60E-01	2.77E-01
u235	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03
u236	6.91E-02	6.91E-02	6.91E-02	6.91E-02	6.91E-02	6.91E-02	6.91E-02	6.91E-02	6.91E-02	6.91E-02	6.92E-02
u237	1.36E+05	1.22E+05	1.40E+01	8.38E-01	8.17E-01	7.78E-01	6.73E-01	5.29E-01	4.15E-01	3.26E-01	2.56E-01
u238	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02	6.23E-02
u239	2.72E+06	9.18E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u240	1.66E-14	1.67E-14	2.32E-14	2.99E-14	4.32E-14	6.98E-14	1.50E-13	2.83E-13	4.16E-13	5.49E-13	6.82E-13
np235	1.04E-02	1.04E-02	8.88E-03	7.55E-03	5.49E-03	2.90E-03	4.26E-04	1.74E-05	7.14E-07	2.93E-08	1.20E-09
np236m	2.95E+00	1.41E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.54E-05	1.54E-05	1.54E-05	1.54E-05	1.54E-05	1.54E-05	1.54E-05	1.54E-05	1.54E-05	1.54E-05	1.54E-05
np237	1.05E-01	1.05E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.07E-01	1.07E-01	1.08E-01	1.09E-01	1.11E-01
np238	8.16E+04	5.88E+04	2.36E-02	2.36E-02	2.35E-02	2.34E-02	2.31E-02	2.25E-02	2.20E-02	2.14E-02	2.09E-02
np239	2.72E+06	2.04E+06	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
np240m	1.66E-14	1.67E-14	2.32E-14	2.99E-14	4.32E-14	6.98E-14	1.50E-13	2.83E-13	4.16E-13	5.49E-13	6.82E-13
np240	4.50E+03	4.47E-04	2.78E-17	3.59E-17	5.19E-17	8.38E-17	1.80E-16	3.39E-16	4.99E-16	6.59E-16	8.19E-16
pu236	5.22E-01	5.22E-01	4.93E-01	4.64E-01	4.12E-01	3.24E-01	1.58E-01	4.79E-02	1.45E-02	4.39E-03	1.33E-03
pu237	3.47E-01	3.42E-01	8.72E-02	2.11E-02	1.28E-03	4.70E-06	2.35E-13	1.59E-25	.00E+00	.00E+00	.00E+00
pu238	1.30E+03	1.30E+03	1.34E+03	1.35E+03	1.37E+03	1.38E+03	1.35E+03	1.30E+03	1.25E+03	1.20E+03	1.15E+03
pu239	7.05E+01	7.06E+01	7.12E+01	7.12E+01	7.12E+01	7.12E+01	7.12E+01	7.12E+01	7.12E+01	7.12E+01	7.12E+01
pu240	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.25E+02	1.26E+02	1.26E+02	1.26E+02
pu241	3.58E+04	3.58E+04	3.54E+04	3.50E+04	3.41E+04	3.25E+04	2.81E+04	2.21E+04	1.74E+04	1.36E+04	1.07E+04
pu242	6.79E-01	6.79E-01	6.79E-01	6.79E-01	6.79E-01	6.79E-01	6.79E-01	6.79E-01	6.79E-01	6.79E-01	6.79E-01
pu243	8.78E+04	3.06E+03	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07
pu244	1.67E-14	1.67E-14	2.32E-14	3.00E-14	4.33E-14	6.99E-14	1.50E-13	2.83E-13	4.16E-13	5.50E-13	6.83E-13
pu245	1.46E-09	2.99E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	4.35E-13	4.17E-13	1.41E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13
am239	5.10E-04	1.26E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	5.19E-02	3.75E-02	8.67E-15	6.39E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.94E+01	5.96E+01	7.35E+01	8.77E+01	1.15E+02	1.68E+02	3.13E+02	5.10E+02	6.62E+02	7.80E+02	8.71E+02
am242m	5.25E+00	5.25E+00	5.25E+00	5.24E+00	5.23E+00	5.20E+00	5.13E+00	5.00E+00	4.88E+00	4.76E+00	4.65E+00
am242	2.61E+04	9.23E+03	5.22E+00	5.22E+00	5.21E+00	5.18E+00	5.10E+00	4.98E+00	4.86E+00	4.74E+00	4.63E+00
am243	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01	1.03E+01
am244	3.77E+04	7.25E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	3.43E-07	3.42E-07	2.81E-07	2.30E-07	1.55E-07	7.03E-08	6.55E-09	1.25E-10	2.40E-12	4.60E-14	8.81E-16
am246	4.35E-13	4.18E-13	1.41E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13	1.40E-13
cm241	6.55E-05	6.41E-05	9.78E-06	1.38E-06	2.91E-08	1.29E-11	1.14E-21	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.81E+04	1.81E+04	1.24E+04	8.39E+03	3.86E+03	8.19E+02	1.19E+01	4.12E+00	4.02E+00	3.92E+00	3.83E+00
cm243	1.22E+01	1.22E+01	1.21E+01	1.20E+01	1.19E+01	1.16E+01	1.08E+01	9.55E+00	8.45E+00	7.49E+00	6.63E+00
cm244	1.72E+03	1.72E+03	1.71E+03	1.69E+03	1.66E+03	1.60E+03	1.42E+03	1.18E+03	9.71E+02	8.02E+02	6.62E+02
cm245	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01
cm246	7.05E-02	7.05E-02	7.05E-02	7.05E-02	7.05E-02	7.05E-02	7.05E-02	7.04E-02	7.04E-02	7.03E-02	7.03E-02
cm247	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07	5.05E-07
cm248	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.36E-06	3.35E-06
cm249	1.03E-01	2.18E-07	6.26E-09	1.71E-10	1.40E-13	9.37E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	5.60E-13	5.60E-13	5.60E-13	5.61E-13	5.61E-13	5.61E-13	5.61E-13	5.60E-13	5.60E-13	5.60E-13	5.60E-13
bk249	2.36E-02	2.35E-02	1.94E-02	1.59E-02	1.07E-02	4.85E-03	4.52E-04	8.65E-06	1.66E-07	3.17E-09	6.07E-11
bk250	3.38E-02	1.92E-04	1.77E-07	1.40E-07	8.84E-08	3.53E-08	2.24E-09	2.28E-11	3.09E-13	8.08E-14	7.84E-14
bk251	2.98E-06	1.86E-09	3.82E-10	7.38E-11	2.87E-12	4.35E-15	1.52E-23	.00E+00	.00E+00	.00E+00	.00E+00
cf249	1.27E-05	1.28E-05	2.31E-05	3.19E-05	4.49E-05	5.94E-05	7.00E-05	7.04E-05	6.97E-05	6.90E-05	6.83E-05

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BWR SNF Assembly - Fuel - decay actinides page 13

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cf250	2.76E-04	2.77E-04	2.73E-04	2.70E-04	2.63E-04	2.49E-04	2.13E-04	1.63E-04	1.25E-04	9.60E-05	7.37E-05
cf251	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.78E-06	2.77E-06	2.76E-06	2.75E-06	2.74E-06
cf252	8.19E-04	8.19E-04	7.68E-04	7.19E-04	6.30E-04	4.85E-04	2.21E-04	5.96E-05	1.61E-05	4.34E-06	1.17E-06
cf253	6.68E-05	6.43E-05	2.01E-06	5.50E-08	4.49E-11	3.02E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	1.71E-08	1.69E-08	6.10E-09	2.11E-09	2.60E-10	3.96E-12	1.40E-17	1.15E-26	.00E+00	.00E+00	.00E+00
cf255	2.53E-09	3.86E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
es253	5.67E-05	5.70E-05	1.04E-05	6.75E-07	1.84E-09	8.94E-15	6.85E-31	.00E+00	.00E+00	.00E+00	.00E+00
es254	2.21E-07	2.21E-07	1.76E-07	1.40E-07	8.83E-08	3.53E-08	2.24E-09	2.27E-11	2.31E-13	2.34E-15	2.37E-17
es255	1.89E-09	1.86E-09	3.82E-10	7.38E-11	2.87E-12	4.35E-15	1.51E-23	.00E+00	.00E+00	.00E+00	.00E+00
total	5.87E+06	2.30E+06	5.12E+04	4.67E+04	4.14E+04	3.67E+04	3.15E+04	2.53E+04	2.05E+04	1.67E+04	1.36E+04

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BWR SNF Assembly - Fuel - decay fission products page 14

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.37E-02	1.37E-02	1.35E-02	1.33E-02	1.29E-02	1.22E-02	1.03E-02	7.79E-03	5.88E-03	4.44E-03	3.35E-03
li 6	4.01E-05	4.01E-05	4.01E-05	4.01E-05	4.01E-05	4.01E-05	4.01E-05	4.01E-05	4.01E-05	4.01E-05	4.01E-05
li 7	3.00E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06
be 9	5.77E-06	5.77E-06	5.77E-06	5.77E-06	5.77E-06	5.77E-06	5.77E-06	5.77E-06	5.77E-06	5.77E-06	5.77E-06
be 10	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05
c 14	7.78E-06	7.78E-06	7.78E-06	7.78E-06	7.78E-06	7.78E-06	7.78E-06	7.77E-06	7.77E-06	7.76E-06	7.76E-06
ni 66	3.88E-10	2.86E-10	4.82E-22	2.79E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	6.07E-13	4.46E-13	7.51E-25	4.35E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 66	2.12E-07	2.12E-07	2.12E-07	2.12E-07	2.12E-07	2.12E-07	2.12E-07	2.12E-07	2.12E-07	2.12E-07	2.12E-07
cu 67	5.01E-11	3.82E-11	1.53E-21	2.38E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 67	2.64E-08	2.64E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08
zn 68	2.59E-09	2.59E-09	2.59E-09	2.59E-09	2.59E-09	2.59E-09	2.59E-09	2.59E-09	2.59E-09	2.59E-09	2.59E-09
zn 69	3.30E-12	8.57E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	3.92E-11	1.17E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 69	9.70E-08	9.71E-08	9.71E-08	9.71E-08	9.71E-08	9.71E-08	9.71E-08	9.71E-08	9.71E-08	9.71E-08	9.71E-08
zn 70	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06
ge 70	3.69E-09	3.69E-09	3.69E-09	3.69E-09	3.69E-09	3.69E-09	3.69E-09	3.69E-09	3.69E-09	3.69E-09	3.69E-09
zn 71m	2.81E-09	4.22E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 71	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05	2.50E-05
ge 71	5.87E-13	5.53E-13	2.51E-15	9.21E-18	1.42E-22	3.45E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 72	2.25E-06	1.58E-06	2.34E-20	9.95E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	6.86E-07	5.95E-07	1.02E-20	4.33E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 72	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03
ga 73	6.23E-07	2.04E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73	4.28E-03	4.28E-03	4.28E-03	4.28E-03	4.28E-03	4.28E-03	4.28E-03	4.28E-03	4.28E-03	4.28E-03	4.28E-03
ge 73m	1.75E-11	5.73E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 74	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03
ge 75	1.11E-06	6.64E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 75	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02
ge 76	9.93E-02	9.93E-02	9.93E-02	9.93E-02	9.93E-02	9.93E-02	9.93E-02	9.93E-02	9.93E-02	9.93E-02	9.93E-02
as 76	2.50E-06	1.33E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 76	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03
ge 77	1.99E-05	4.58E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.08E-04	1.48E-04	4.26E-21	2.63E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 77	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01
se 77m	9.92E-11	5.89E-11	1.70E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	2.76E-05	3.28E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	2.89E-05	4.90E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 78	7.63E-01	7.63E-01	7.63E-01	7.63E-01	7.63E-01	7.63E-01	7.63E-01	7.63E-01	7.63E-01	7.63E-01	7.63E-01
se 79	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00	1.42E+00
br 79	8.86E-05	8.86E-05	9.59E-05	1.03E-04	1.18E-04	1.48E-04	2.37E-04	3.86E-04	5.35E-04	6.84E-04	8.33E-04
kr 79	9.76E-14	6.07E-14	2.67E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 80	3.89E+00	3.89E+00	3.89E+00	3.89E+00	3.89E+00	3.89E+00	3.89E+00	3.89E+00	3.89E+00	3.89E+00	3.89E+00
br 80	3.89E-10	5.13E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

br 80m	3.10E-09	7.19E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 80	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05	2.33E-05
se 81	4.22E-05	1.24E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81m	9.72E-06	2.62E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 81	5.69E+00	5.69E+00	5.69E+00	5.69E+00	5.69E+00	5.69E+00	5.69E+00	5.69E+00	5.69E+00	5.69E+00	5.69E+00
kr 81	2.01E-06	2.01E-06	2.01E-06	2.01E-06	2.01E-06	2.01E-06	2.01E-06	2.01E-06	2.01E-06	2.01E-06	2.01E-06
se 82	9.28E+00	9.28E+00	9.28E+00	9.28E+00	9.28E+00	9.28E+00	9.28E+00	9.28E+00	9.28E+00	9.28E+00	9.28E+00
br 82	5.38E-04	3.37E-04	2.06E-22	2.44E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 15

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
kr 82	2.56E-01	2.56E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01
br 83	7.59E-04	8.10E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01	1.04E+01
kr 83m	5.79E-04	2.67E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 84	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01	3.39E+01
kr 85	5.74E+00	5.74E+00	5.65E+00	5.56E+00	5.38E+00	5.04E+00	4.15E+00	3.01E+00	2.18E+00	1.57E+00	1.14E+00
kr 85m	2.86E-03	7.07E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 85	2.69E+01	2.69E+01	2.70E+01	2.71E+01	2.72E+01	2.76E+01	2.85E+01	2.96E+01	3.05E+01	3.11E+01	3.15E+01
kr 86	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01
rb 86	3.99E-03	3.84E-03	1.40E-04	4.50E-06	5.02E-09	6.31E-15	1.25E-32	.00E+00	.00E+00	.00E+00	.00E+00
sr 86	1.55E-01	1.55E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
kr 87	1.65E-03	3.48E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	6.79E+01	6.79E+01	6.79E+01	6.79E+01	6.79E+01	6.79E+01	6.79E+01	6.79E+01	6.79E+01	6.79E+01	6.79E+01
sr 87	9.53E-04	9.53E-04	9.53E-04	9.53E-04	9.53E-04	9.53E-04	9.53E-04	9.53E-04	9.53E-04	9.53E-04	9.53E-04
sr 87m	2.08E-07	5.59E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	5.09E-03	1.45E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	5.46E-04	1.69E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 88	9.70E+01	9.70E+01	9.70E+01	9.70E+01	9.70E+01	9.70E+01	9.70E+01	9.70E+01	9.70E+01	9.70E+01	9.70E+01
sr 89	2.99E+00	2.95E+00	8.69E-01	2.45E-01	2.00E-02	1.33E-04	3.99E-11	5.33E-22	7.11E-33	1.25E-43	.00E+00
y 89	1.26E+02	1.26E+02	1.28E+02	1.29E+02	1.29E+02	1.29E+02	1.29E+02	1.29E+02	1.29E+02	1.29E+02	1.29E+02
y 89m	1.03E-09	1.01E-09	2.97E-10	8.36E-11	6.83E-12	4.56E-14	1.36E-20	1.82E-31	2.87E-42	.00E+00	.00E+00
sr 90	1.45E+02	1.45E+02	1.44E+02	1.44E+02	1.42E+02	1.38E+02	1.28E+02	1.14E+02	1.00E+02	8.88E+01	7.85E+01
y 90	3.89E-02	3.86E-02	3.75E-02	3.73E-02	3.68E-02	3.59E-02	3.34E-02	2.95E-02	2.61E-02	2.31E-02	2.04E-02
y 90m	5.93E-08	3.22E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	1.30E+01	1.30E+01	1.39E+01	1.48E+01	1.65E+01	2.00E+01	2.98E+01	4.47E+01	5.79E+01	6.95E+01	7.98E+01
sr 91	3.18E-02	5.55E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	4.79E+00	4.76E+00	1.66E+00	5.55E-01	6.37E-02	8.41E-04	1.94E-09	7.77E-19	3.12E-28	1.25E-37	.00E+00
y 91m	1.61E-03	3.07E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 91	1.64E+02	1.64E+02	1.67E+02	1.68E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02
nb 91	3.28E-10	3.28E-10	3.28E-10	3.28E-10	3.28E-10	3.28E-10	3.27E-10	3.25E-10	3.23E-10	3.22E-10	3.20E-10
sr 92	1.01E-02	2.19E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.33E-02	4.21E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 92	1.82E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02	1.82E+02
nb 92	4.01E-08	4.01E-08	4.01E-08	4.01E-08	4.01E-08	4.01E-08	4.01E-08	4.01E-08	4.01E-08	4.01E-08	4.01E-08
y 93	3.04E-02	5.92E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02	1.33E+02
nb 93	2.04E-05	2.05E-05	2.25E-05	2.47E-05	2.95E-05	4.06E-05	8.62E-05	1.98E-04	3.46E-04	5.24E-04	7.25E-04
nb 93m	1.84E-04	1.84E-04	1.97E-04	2.10E-04	2.35E-04	2.84E-04	4.20E-04	6.10E-04	7.63E-04	8.87E-04	9.87E-04
zr 94	2.23E+02	2.23E+02	2.23E+02	2.23E+02	2.23E+02	2.23E+02	2.23E+02	2.23E+02	2.23E+02	2.23E+02	2.23E+02
nb 94	1.42E-04	1.42E-04	1.42E-04	1.42E-04	1.42E-04	1.42E-04	1.42E-04	1.42E-04	1.42E-04	1.42E-04	1.42E-04
zr 95	8.37E+00	8.29E+00	3.16E+00	1.16E+00	1.60E-01	3.08E-03	2.16E-08	5.59E-17	1.44E-25	3.73E-34	9.32E-43
nb 95	4.59E+00	4.59E+00	2.88E+00	1.25E+00	1.89E-01	3.81E-03	2.60E-08	6.73E-17	1.74E-25	4.49E-34	.00E+00
nb 95m	5.25E-03	5.24E-03	2.10E-03	7.70E-04	1.06E-04	2.04E-06	1.44E-11	3.71E-20	9.58E-29	2.54E-37	.00E+00
mo 95	2.00E+02	2.00E+02	2.07E+02	2.11E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02	2.13E+02
zr 96	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02
nb 96	2.28E-04	1.12E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 96	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01

zr 97	9.47E-02	3.54E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	6.79E-03	2.53E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	8.87E-05	3.31E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 97	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02	2.22E+02
nb 98m	4.66E-05	1.65E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 98	2.44E+02	2.44E+02	2.44E+02	2.44E+02	2.44E+02	2.44E+02	2.44E+02	2.44E+02	2.44E+02	2.44E+02	2.44E+02
tc 98	3.25E-03	3.25E-03	3.25E-03	3.25E-03	3.25E-03	3.25E-03	3.25E-03	3.25E-03	3.25E-03	3.25E-03	3.25E-03
mo 99	4.48E-01	3.49E-01	6.19E-11	4.54E-21	4.33E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	2.16E+02	2.16E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02
tc 99m	3.60E-02	3.05E-02	5.46E-12	4.01E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru 99	9.97E-03	9.97E-03	1.02E-02	1.03E-02	1.07E-02	1.14E-02	1.35E-02	1.71E-02	2.07E-02	2.42E-02	2.78E-02
mo100	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02
ru100	4.47E+01	4.47E+01	4.47E+01	4.47E+01	4.47E+01	4.47E+01	4.47E+01	4.47E+01	4.47E+01	4.47E+01	4.47E+01
ru101	2.24E+02	2.24E+02	2.24E+02	2.24E+02	2.24E+02	2.24E+02	2.24E+02	2.24E+02	2.24E+02	2.24E+02	2.24E+02
ru102	2.37E+02	2.37E+02	2.37E+02	2.37E+02	2.37E+02	2.37E+02	2.37E+02	2.37E+02	2.37E+02	2.37E+02	2.37E+02
rh102	4.16E-04	4.16E-04	3.92E-04	3.69E-04	3.28E-04	2.58E-04	1.26E-04	3.81E-05	1.15E-05	3.49E-06	1.06E-06
ru103	6.31E+00	6.20E+00	1.29E+00	2.52E-01	9.99E-03	1.58E-05	6.27E-14	6.22E-28	6.21E-42	.00E+00	.00E+00
rh103	1.13E+02	1.13E+02	1.18E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02	1.19E+02
rh103m	6.26E-03	6.15E-03	1.28E-03	2.49E-04	9.90E-06	1.57E-08	6.21E-17	6.16E-31	.00E+00	.00E+00	.00E+00
ru104	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02	1.69E+02
pd104	9.35E+01	9.35E+01	9.35E+01	9.35E+01	9.35E+01	9.35E+01	9.35E+01	9.35E+01	9.35E+01	9.35E+01	9.35E+01
ru105	2.28E-02	5.55E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.75E-01	1.25E-01	8.25E-20	1.04E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	1.83E-05	4.45E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd105	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02
ru106	3.19E+01	3.18E+01	2.69E+01	2.27E+01	1.61E+01	8.16E+00	1.06E+00	3.51E-02	1.16E-03	3.86E-05	1.28E-06
rh106	3.07E-05	2.95E-05	2.50E-05	2.10E-05	1.50E-05	7.57E-06	9.81E-07	3.25E-08	1.08E-09	3.58E-11	1.19E-12
rh106m	1.38E-04	6.37E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd106	8.46E+01	8.46E+01	8.95E+01	9.38E+01	1.00E+02	1.08E+02	1.15E+02	1.16E+02	1.16E+02	1.16E+02	1.16E+02
pd107	7.37E+01	7.37E+01	7.37E+01	7.37E+01	7.37E+01	7.37E+01	7.37E+01	7.37E+01	7.37E+01	7.37E+01	7.37E+01
ag107	1.76E-05	1.77E-05	1.96E-05	2.16E-05	2.55E-05	3.33E-05	5.69E-05	9.62E-05	1.35E-04	1.75E-04	2.14E-04
pd108	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01	4.82E+01
ag108	3.84E-10	4.16E-13	4.16E-13	4.15E-13	4.14E-13	4.12E-13	4.05E-13	3.94E-13	3.84E-13	3.73E-13	3.63E-13
ag108m	1.35E-04	1.35E-04	1.35E-04	1.35E-04	1.34E-04	1.33E-04	1.31E-04	1.28E-04	1.24E-04	1.21E-04	1.18E-04
cd108	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.36E-04	1.37E-04	1.37E-04	1.37E-04	1.38E-04
pd109	2.91E-02	8.66E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01
ag109m	2.34E-05	6.95E-06	1.40E-13	1.22E-13	9.29E-14	5.37E-14	1.04E-14	6.74E-16	4.37E-17	2.83E-18	1.84E-19
cd109	1.62E-07	1.62E-07	1.42E-07	1.23E-07	9.37E-08	5.42E-08	1.05E-08	6.81E-10	4.41E-11	2.86E-12	1.85E-13
pd110	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01	1.47E+01
ag110	8.86E-06	3.66E-09	2.86E-09	2.21E-09	1.33E-09	4.84E-10	2.31E-11	1.46E-13	9.16E-16	5.76E-18	3.63E-20
ag110m	2.37E-01	2.36E-01	1.85E-01	1.43E-01	8.60E-02	3.12E-02	1.49E-03	9.39E-06	5.91E-08	3.72E-10	2.34E-12
cd110	1.86E+01	1.86E+01	1.86E+01	1.87E+01	1.87E+01	1.88E+01	1.88E+01	1.88E+01	1.88E+01	1.88E+01	1.88E+01
pd111	1.27E-04	1.99E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	7.37E-05	3.58E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	5.84E-02	5.34E-02	1.35E-05	2.48E-09	1.02E-16	1.78E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	5.88E-06	1.14E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111	7.65E+00	7.65E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00	7.71E+00
cd111m	1.26E-06	1.52E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd112	3.05E-03	1.38E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	4.57E-04	2.42E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd112	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00	3.94E+00
ag113	4.30E-04	1.95E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	2.09E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02	2.13E-02
cd113m	4.36E-02	4.36E-02	4.30E-02	4.25E-02	4.15E-02	3.95E-02	3.41E-02	2.66E-02	2.08E-02	1.63E-02	1.27E-02

in113	4.65E-03	4.66E-03	5.18E-03	5.71E-03	6.74E-03	8.73E-03	1.41E-02	2.15E-02	2.73E-02	3.19E-02	3.54E-02
cd114	3.85E+00	3.85E+00	3.85E+00	3.85E+00	3.85E+00	3.85E+00	3.85E+00	3.85E+00	3.85E+00	3.85E+00	3.85E+00

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
in114	8.21E-10	5.70E-10	1.64E-10	4.49E-11	3.48E-12	2.09E-14	4.56E-21	3.59E-32	.00E+00	.00E+00	.00E+00
in114m	3.59E-05	3.54E-05	1.02E-05	2.79E-06	2.16E-07	1.30E-09	2.83E-16	2.23E-27	1.76E-38	.00E+00	.00E+00
sn114	4.03E-04	4.03E-04	4.27E-04	4.34E-04	4.37E-04	4.37E-04	4.37E-04	4.37E-04	4.37E-04	4.37E-04	4.37E-04
cd115	2.26E-03	1.66E-03	1.57E-15	4.98E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	2.21E-03	2.17E-03	5.45E-04	1.29E-04	7.55E-06	2.59E-08	1.04E-15	4.87E-28	2.29E-40	.00E+00	.00E+00
in115	2.85E-01	2.86E-01	2.89E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01
in115m	1.89E-04	1.52E-04	2.52E-10	5.99E-11	3.50E-12	1.20E-14	4.80E-22	2.26E-34	.00E+00	.00E+00	.00E+00
sn115	5.49E-02	5.49E-02	5.50E-02	5.50E-02	5.50E-02	5.50E-02	5.50E-02	5.50E-02	5.50E-02	5.50E-02	5.50E-02
cd116	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00	1.51E+00
in116m	2.94E-05	2.90E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn116	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01
cd117	1.02E-04	1.29E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.17E-05	2.26E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.24E-05	1.45E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	7.29E-05	4.34E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00
sn117m	1.86E-04	1.77E-04	1.90E-06	1.70E-08	1.53E-12	1.26E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	3.14E-05	7.58E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00	1.15E+00
sn119	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
sn119m	2.98E-03	2.97E-03	2.41E-03	1.94E-03	1.26E-03	5.30E-04	3.97E-05	5.28E-07	7.03E-09	9.35E-11	1.24E-12
sn120	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00
sn121	1.09E-03	5.93E-04	5.73E-07	5.71E-07	5.67E-07	5.60E-07	5.39E-07	5.07E-07	4.76E-07	4.47E-07	4.19E-07
sn121m	1.32E-02	1.32E-02	1.32E-02	1.31E-02	1.30E-02	1.29E-02	1.24E-02	1.16E-02	1.09E-02	1.03E-02	9.63E-03
sb121	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.12E+00	1.13E+00	1.13E+00	1.13E+00	1.13E+00
sn122	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00	1.53E+00
sb122	5.53E-04	4.28E-04	5.12E-14	2.50E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01
sn123	9.49E-03	9.44E-03	5.86E-03	3.56E-03	1.34E-03	1.88E-04	5.26E-07	2.92E-11	1.62E-15	8.96E-20	4.97E-24
sb123	1.34E+00	1.34E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00	1.35E+00
te123	1.18E-03	1.18E-03	1.31E-03	1.39E-03	1.46E-03	1.49E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03	1.50E-03
te123m	3.21E-04	3.19E-04	1.90E-04	1.11E-04	3.87E-05	4.66E-06	8.17E-09	2.08E-13	5.31E-18	1.35E-22	3.45E-27
sn124	2.55E+00	2.55E+00	2.55E+00	2.55E+00	2.55E+00	2.55E+00	2.55E+00	2.55E+00	2.55E+00	2.55E+00	2.55E+00
sb124	9.49E-03	9.38E-03	3.37E-03	1.16E-03	1.41E-04	2.11E-06	6.99E-12	5.15E-21	3.79E-30	2.80E-39	.00E+00
te124	1.02E-01	1.02E-01	1.08E-01	1.10E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
sn125	5.96E-03	5.55E-03	9.23E-06	1.19E-08	2.34E-14	9.20E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb125	1.71E+00	1.71E+00	1.61E+00	1.51E+00	1.33E+00	1.03E+00	4.83E-01	1.36E-01	3.81E-02	1.07E-02	3.01E-03
te125	1.41E+00	1.41E+00	1.51E+00	1.61E+00	1.80E+00	2.10E+00	2.66E+00	3.01E+00	3.11E+00	3.14E+00	3.14E+00
te125m	2.24E-02	2.24E-02	2.22E-02	2.13E-02	1.89E-02	1.47E-02	6.85E-03	1.93E-03	5.41E-04	1.52E-04	4.27E-05
sn126	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00	5.98E+00
sb126	6.80E-04	6.43E-04	4.72E-06	3.09E-07	2.84E-07	2.84E-07	2.84E-07	2.84E-07	2.84E-07	2.84E-07	2.84E-07
sb126m	8.57E-07	2.16E-09	2.16E-09	2.16E-09	2.16E-09	2.16E-09	2.16E-09	2.16E-09	2.16E-09	2.16E-09	2.16E-09
te126	1.28E-01	1.28E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.30E-01
xe126	7.47E-09	7.47E-09	7.47E-09	7.47E-09	7.47E-09	7.47E-09	7.47E-09	7.47E-09	7.47E-09	7.47E-09	7.47E-09
sn127	3.93E-04	1.42E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	4.26E-02	3.59E-02	3.94E-09	2.30E-16	1.18E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te127	4.29E-03	3.98E-03	4.23E-04	2.35E-04	7.35E-05	7.20E-06	6.78E-09	6.14E-14	5.55E-19	5.02E-24	4.55E-29
te127m	2.06E-01	2.06E-01	1.21E-01	6.71E-02	2.10E-02	2.06E-03	1.94E-06	1.75E-11	1.59E-16	1.43E-21	1.30E-26
i127	1.24E+01	1.24E+01	1.26E+01	1.26E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01
xe127	6.63E-07	6.50E-07	1.19E-07	2.05E-08	6.32E-10	6.03E-13	5.23E-22	4.12E-37	.00E+00	.00E+00	.00E+00
sn128	6.90E-04	3.19E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	7.04E-04	1.16E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 18

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sb128m	1.30E-04	6.82E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te128	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01
xe128	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00
sb129	7.13E-03	1.65E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	1.79E-03	2.77E-04	3.64E-05	5.41E-06	1.25E-07	6.66E-11	1.01E-20	4.41E-37	.00E+00	.00E+00	.00E+00
te129m	2.52E-01	2.48E-01	3.95E-02	5.86E-03	1.35E-04	7.22E-08	1.10E-17	4.78E-34	.00E+00	.00E+00	.00E+00
i129	5.32E+01	5.32E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01
xe129	8.62E-03	8.63E-03	8.72E-03	8.72E-03	8.72E-03	8.73E-03	8.73E-03	8.74E-03	8.76E-03	8.77E-03	8.78E-03
xe129m	9.88E-05	9.14E-05	8.85E-08	6.53E-11	4.23E-17	1.81E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	3.58E-04	3.79E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te130	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02	1.08E+02
i130	2.27E-03	5.94E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	3.16E+00	3.16E+00	3.16E+00	3.16E+00	3.16E+00	3.16E+00	3.16E+00	3.16E+00	3.16E+00	3.16E+00	3.16E+00
te131	1.71E-03	5.65E-05	2.08E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	3.13E-02	1.81E-02	6.66E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	9.41E-01	8.79E-01	4.19E-04	1.44E-07	2.08E-14	4.39E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131	1.12E+02	1.12E+02	1.13E+02	1.13E+02	1.13E+02	1.13E+02	1.13E+02	1.13E+02	1.13E+02	1.13E+02	1.13E+02
xe131m	1.60E-02	1.59E-02	2.44E-04	1.17E-06	2.80E-11	1.61E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	5.50E-01	4.45E-01	2.66E-09	7.56E-18	9.84E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.64E-02	1.34E-02	8.00E-11	2.27E-19	2.96E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	3.36E+02	3.36E+02	3.36E+02	3.36E+02	3.36E+02	3.36E+02	3.36E+02	3.36E+02	3.36E+02	3.36E+02	3.36E+02
cs132	5.56E-05	5.00E-05	3.66E-09	1.85E-13	5.96E-22	6.39E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba132	1.16E-04	1.16E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04
te133	1.11E-03	3.09E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	4.02E-03	6.06E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.08E-01	9.61E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	2.02E-06	1.68E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.21E+00	1.17E+00	1.02E-05	4.99E-11	1.60E-21	1.68E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	1.61E-02	1.46E-02	1.12E-14	2.15E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs133	3.15E+02	3.15E+02	3.16E+02	3.16E+02	3.16E+02	3.16E+02	3.16E+02	3.16E+02	3.16E+02	3.16E+02	3.16E+02
ba133	3.12E-08	3.12E-08	3.07E-08	3.02E-08	2.92E-08	2.74E-08	2.25E-08	1.62E-08	1.16E-08	8.36E-09	6.01E-09
te134	5.88E-03	2.51E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	9.66E-03	2.19E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe134	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02	4.44E+02
cs134	3.64E+01	3.63E+01	3.35E+01	3.07E+01	2.60E+01	1.86E+01	6.77E+00	1.26E+00	2.35E-01	4.37E-02	8.14E-03
cs134m	9.16E-04	3.02E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba134	2.89E+01	2.89E+01	3.18E+01	3.45E+01	3.93E+01	4.67E+01	5.85E+01	6.40E+01	6.50E+01	6.52E+01	6.52E+01
i135	6.41E-02	5.10E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	3.20E-02	2.41E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.65E-04	3.23E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02	1.59E+02
cs135m	3.02E-04	2.00E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135	3.26E-01	3.26E-01	3.26E-01	3.26E-01	3.26E-01	3.26E-01	3.26E-01	3.27E-01	3.27E-01	3.27E-01	3.27E-01
ba135m	1.63E-04	9.13E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe136	6.23E+02	6.23E+02	6.23E+02	6.23E+02	6.23E+02	6.23E+02	6.23E+02	6.23E+02	6.23E+02	6.23E+02	6.23E+02
cs136	1.73E-01	1.64E-01	1.51E-03	1.15E-05	7.62E-10	3.36E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136	9.88E+00	9.88E+00	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01	1.00E+01
ba136m	5.24E-09	4.97E-09	4.58E-11	3.51E-13	2.31E-17	1.02E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	3.53E+02	3.53E+02	3.51E+02	3.49E+02	3.45E+02	3.37E+02	3.15E+02	2.80E+02	2.50E+02	2.23E+02	1.98E+02
ba137	2.58E+01	2.59E+01	2.78E+01	2.99E+01	3.39E+01	4.18E+01	6.44E+01	9.87E+01	1.29E+02	1.57E+02	1.81E+02
ba137m	5.42E-05	5.40E-05	5.37E-05	5.33E-05	5.27E-05	5.15E-05	4.81E-05	4.28E-05	3.82E-05	3.40E-05	3.03E-05
ba138	3.77E+02	3.77E+02	3.77E+02	3.77E+02	3.77E+02	3.77E+02	3.77E+02	3.77E+02	3.77E+02	3.77E+02	3.77E+02

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BWR SNF Assembly - Fuel - decay fission products page 19

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la138	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03
ba139	1.27E-02	1.08E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la139	3.53E+02	3.53E+02	3.53E+02	3.53E+02	3.53E+02	3.53E+02	3.53E+02	3.53E+02	3.53E+02	3.53E+02	3.53E+02
ce139	3.24E-06	3.22E-06	2.06E-06	1.29E-06	5.15E-07	8.18E-08	3.28E-10	3.32E-14	3.36E-18	3.40E-22	3.44E-26
pr139	3.34E-10	7.68E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	2.78E+00	2.64E+00	2.09E-02	1.37E-04	6.67E-09	1.60E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	4.00E-01	3.85E-01	3.17E-03	2.08E-05	1.01E-09	2.42E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce140	3.79E+02	3.79E+02	3.82E+02	3.82E+02	3.82E+02	3.82E+02	3.82E+02	3.82E+02	3.82E+02	3.82E+02	3.82E+02
la141	3.26E-02	5.08E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	6.51E+00	6.41E+00	9.60E-01	1.33E-01	2.71E-03	1.12E-06	7.95E-17	9.65E-34	.00E+00	.00E+00	.00E+00
pr141	3.18E+02	3.18E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02	3.24E+02
nd141	6.42E-10	8.02E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.23E-02	2.42E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	3.30E+02	3.30E+02	3.30E+02	3.30E+02	3.30E+02	3.30E+02	3.30E+02	3.30E+02	3.30E+02	3.30E+02	3.30E+02
pr142	1.05E-02	4.39E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd142	8.82E+00	8.82E+00	8.83E+00	8.83E+00	8.83E+00	8.83E+00	8.83E+00	8.83E+00	8.83E+00	8.83E+00	8.83E+00
ce143	2.53E-01	1.54E-01	5.04E-21	2.83E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	2.40E+00	2.38E+00	2.71E-02	2.40E-04	2.11E-08	1.65E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd143	2.03E+02	2.04E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02
ce144	4.87E+01	4.85E+01	3.91E+01	3.12E+01	2.00E+01	8.23E+00	5.73E-01	6.74E-03	7.93E-05	9.33E-07	1.10E-08
pr144	2.06E-03	2.04E-03	1.65E-03	1.31E-03	8.43E-04	3.47E-04	2.41E-05	2.84E-07	3.34E-09	3.93E-11	4.63E-13
pr144m	1.20E-05	1.19E-05	9.60E-06	7.67E-06	4.92E-06	2.02E-06	1.41E-07	1.66E-09	1.95E-11	2.29E-13	2.70E-15
nd144	3.59E+02	3.59E+02	3.68E+02	3.76E+02	3.87E+02	3.99E+02	4.07E+02	4.07E+02	4.07E+02	4.07E+02	4.07E+02
pr145	3.19E-02	2.00E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd145	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.87E+02	1.87E+02
pm145	2.92E-04	2.93E-04	3.19E-04	3.42E-04	3.73E-04	4.02E-04	3.91E-04	3.25E-04	2.67E-04	2.20E-04	1.81E-04
sm145	1.79E-04	1.79E-04	1.49E-04	1.23E-04	8.50E-05	4.04E-05	4.33E-06	1.05E-07	2.53E-09	6.11E-11	1.48E-12
nd146	2.11E+02	2.11E+02	2.11E+02	2.11E+02	2.11E+02	2.11E+02	2.11E+02	2.11E+02	2.11E+02	2.11E+02	2.11E+02
pm146	2.69E-03	2.69E-03	2.61E-03	2.53E-03	2.38E-03	2.10E-03	1.44E-03	7.69E-04	4.11E-04	2.20E-04	1.17E-04
sm146	5.56E-03	5.56E-03	5.58E-03	5.61E-03	5.66E-03	5.76E-03	5.98E-03	6.21E-03	6.33E-03	6.39E-03	6.43E-03
nd147	9.48E-01	8.91E-01	3.23E-03	9.41E-06	9.20E-11	8.91E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	3.12E+01	3.12E+01	3.01E+01	2.82E+01	2.47E+01	1.90E+01	8.58E+00	2.29E+00	6.11E-01	1.63E-01	4.35E-02
sm147	2.78E+01	2.78E+01	2.98E+01	3.17E+01	3.52E+01	4.10E+01	5.13E+01	5.76E+01	5.93E+01	5.98E+01	5.99E+01
nd148	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02	1.07E+02
pm148	1.38E-01	1.21E-01	3.30E-04	6.96E-05	3.24E-06	7.04E-09	7.25E-17	3.53E-30	.00E+00	.00E+00	.00E+00
pm148m	2.16E-01	2.13E-01	4.78E-02	1.01E-02	4.71E-04	1.02E-06	1.05E-14	5.13E-28	2.51E-41	.00E+00	.00E+00
sm148	4.93E+01	4.93E+01	4.96E+01	4.96E+01	4.97E+01	4.97E+01	4.97E+01	4.97E+01	4.97E+01	4.97E+01	4.97E+01
nd149	3.85E-03	2.54E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	1.79E-01	1.34E-01	1.03E-13	2.66E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	4.99E-01	5.48E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01
eu149	2.39E-11	2.37E-11	1.22E-11	6.13E-12	1.57E-12	1.03E-13	2.95E-17	3.65E-23	4.51E-29	5.57E-35	6.89E-41
nd150	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01	5.34E+01
pm150	7.15E-05	1.44E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm150	8.65E+01	8.65E+01	8.65E+01	8.65E+01	8.65E+01	8.65E+01	8.65E+01	8.65E+01	8.65E+01	8.65E+01	8.65E+01
eu150	2.59E-07	2.59E-07	2.58E-07	2.56E-07	2.54E-07	2.49E-07	2.35E-07	2.13E-07	1.94E-07	1.76E-07	1.60E-07
pm151	3.54E-02	1.98E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	3.82E+00	3.84E+00	3.85E+00	3.84E+00	3.83E+00	3.80E+00	3.71E+00	3.57E+00	3.44E+00	3.31E+00	3.18E+00
eu151	5.89E-03	5.97E-03	1.32E-02	2.07E-02	3.55E-02	6.49E-02	1.52E-01	2.92E-01	4.27E-01	5.57E-01	6.82E-01
sm152	3.47E+01	3.47E+01	3.47E+01	3.47E+01	3.47E+01	3.47E+01	3.47E+01	3.47E+01	3.47E+01	3.47E+01	3.47E+01
eu152	1.35E-02	1.35E-02	1.33E-02	1.31E-02	1.28E-02	1.21E-02	1.04E-02	8.00E-03	6.17E-03	4.76E-03	3.67E-03
eu152m	1.65E-05	2.77E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	2.84E-02	2.84E-02	2.85E-02	2.85E-02	2.86E-02	2.88E-02	2.93E-02	3.00E-02	3.05E-02	3.09E-02	3.12E-02

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BWR SNF Assembly - Fuel - decay fission products page 20

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sm153	1.75E-01	1.22E-01	1.56E-15	5.65E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu153	3.27E+01	3.28E+01	3.29E+01	3.29E+01	3.29E+01	3.29E+01	3.29E+01	3.29E+01	3.29E+01	3.29E+01	3.29E+01

gd153	1.80E-03	1.80E-03	1.39E-03	1.07E-03	6.31E-04	2.21E-04	9.54E-06	5.05E-08	2.68E-10	1.42E-12	7.51E-15
sm154	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01
eu154	1.42E+01	1.42E+01	1.39E+01	1.36E+01	1.31E+01	1.20E+01	9.46E+00	6.32E+00	4.22E+00	2.82E+00	1.88E+00
gd154	2.23E+00	2.24E+00	2.51E+00	2.79E+00	3.33E+00	4.34E+00	6.93E+00	1.01E+01	1.22E+01	1.36E+01	1.45E+01
eu155	5.37E+00	5.36E+00	5.17E+00	4.98E+00	4.63E+00	3.99E+00	2.56E+00	1.22E+00	5.82E-01	2.78E-01	1.32E-01
gd155	6.66E-02	6.88E-02	2.59E-01	4.49E-01	8.05E-01	1.44E+00	2.87E+00	4.21E+00	4.85E+00	5.16E+00	5.30E+00
sm156	1.60E-03	2.73E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.71E-01	7.38E-01	1.27E-02	1.86E-04	4.44E-08	2.55E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd156	2.92E+01	2.93E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01	3.00E+01
eu157	2.81E-03	9.45E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd157	2.93E-02	3.11E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02	3.21E-02
eu158	5.05E-05	2.04E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd158	6.19E+00	6.19E+00	6.19E+00	6.19E+00	6.19E+00	6.19E+00	6.19E+00	6.19E+00	6.19E+00	6.19E+00	6.19E+00
gd159	8.67E-04	3.59E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb159	7.38E-01	7.39E-01	7.39E-01	7.39E-01	7.39E-01	7.39E-01	7.39E-01	7.39E-01	7.39E-01	7.39E-01	7.39E-01
gd160	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01	3.44E-01
tb160	2.03E-02	2.01E-02	8.56E-03	3.53E-03	6.11E-04	1.84E-05	5.05E-10	1.26E-17	3.14E-25	7.82E-33	1.95E-40
dy160	8.72E-02	8.74E-02	9.89E-02	1.04E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01	1.07E-01
tb161	1.50E-03	1.35E-03	1.77E-07	1.63E-11	1.74E-19	2.03E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy161	1.14E-01	1.14E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01
tb162m	1.11E-07	6.41E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy162	8.87E-02	8.87E-02	8.87E-02	8.87E-02	8.87E-02	8.87E-02	8.87E-02	8.87E-02	8.87E-02	8.87E-02	8.87E-02
dy163	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02	8.16E-02
dy164	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
dy165	1.10E-05	8.85E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho165	4.05E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02	4.06E-02
dy166	2.26E-06	1.84E-06	2.43E-14	1.58E-22	1.05E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	3.52E-05	1.92E-05	1.19E-14	7.70E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	1.74E-04	1.74E-04	1.74E-04	1.74E-04	1.74E-04	1.74E-04	1.73E-04	1.73E-04	1.72E-04	1.72E-04	1.71E-04
er166	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02
er167	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04	2.31E-04
er168	4.04E-04	4.04E-04	4.04E-04	4.04E-04	4.04E-04	4.04E-04	4.04E-04	4.04E-04	4.04E-04	4.04E-04	4.04E-04
er169	9.35E-09	8.68E-09	1.23E-11	1.34E-14	1.88E-20	3.78E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm169	1.02E-06	1.02E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06
er170	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06
tm170	7.59E-10	7.55E-10	4.67E-10	2.84E-10	1.06E-10	1.48E-11	4.03E-14	2.14E-18	1.13E-22	6.01E-27	3.19E-31
yb170	5.62E-09	5.62E-09	5.91E-09	6.09E-09	6.27E-09	6.36E-09	6.37E-09	6.37E-09	6.37E-09	6.37E-09	6.37E-09
er171	4.45E-10	4.86E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	7.21E-07	7.20E-07	6.60E-07	6.02E-07	5.03E-07	3.50E-07	1.19E-07	1.95E-08	3.21E-09	5.28E-10	8.69E-11
yb171	7.60E-07	7.60E-07	8.21E-07	8.79E-07	9.78E-07	1.13E-06	1.36E-06	1.46E-06	1.48E-06	1.48E-06	1.48E-06
er172	1.93E-09	1.38E-09	1.25E-22	3.50E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm172	2.28E-09	2.24E-09	6.52E-19	2.03E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
yb172	9.78E-07	9.78E-07	9.82E-07	9.82E-07	9.82E-07	9.82E-07	9.82E-07	9.82E-07	9.82E-07	9.82E-07	9.82E-07
total	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.00E+04	1.00E+04

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BWR SNF Assembly - Fuel - decay fission products page 21

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.32E+02	1.32E+02	1.30E+02	1.29E+02	1.25E+02	1.18E+02	9.98E+01	7.54E+01	5.69E+01	4.30E+01	3.24E+01
be 10	8.61E-07	8.61E-07	8.61E-07	8.61E-07	8.61E-07	8.61E-07	8.61E-07	8.61E-07	8.61E-07	8.61E-07	8.61E-07
c 14	3.47E-05	3.47E-05	3.47E-05	3.47E-05	3.47E-05	3.47E-05	3.47E-05	3.47E-05	3.46E-05	3.46E-05	3.46E-05
ni 66	3.38E-04	2.49E-04	4.19E-16	2.43E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	3.39E-04	2.49E-04	4.20E-16	2.43E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	3.79E-05	2.89E-05	1.16E-15	1.80E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69	1.60E-04	4.15E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.30E-04	3.87E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 71m	3.14E-02	4.71E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	9.45E-08	8.89E-08	4.04E-10	1.48E-12	2.29E-17	5.56E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 72	2.11E+00	1.48E+00	2.19E-14	9.32E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ga 72	2.12E+00	1.84E+00	3.15E-14	1.34E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 73	5.51E+00	1.80E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73m	5.43E+00	1.78E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 75	3.37E+01	2.01E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 76	3.92E+00	2.08E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 77	7.18E+01	1.65E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.18E+02	1.55E+02	4.47E-15	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 77m	8.33E-01	4.95E-01	1.43E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	7.57E+02	8.98E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	7.68E+02	1.30E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 79	1.94E-01	1.94E-01	1.94E-01	1.94E-01	1.94E-01	1.94E-01	1.94E-01	1.94E-01	1.94E-01	1.94E-01	1.94E-01
kr 79	1.11E-07	6.88E-08	3.02E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80	5.17E-02	6.83E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80m	2.75E-02	6.37E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81	5.31E+03	1.57E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81m	3.94E+02	1.06E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 81	4.17E-08	4.17E-08	4.17E-08	4.17E-08	4.17E-08	4.17E-08	4.17E-08	4.17E-08	4.17E-08	4.17E-08	4.17E-08
br 82	5.83E+02	3.65E+02	2.24E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 83	1.19E+04	1.28E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83m	1.19E+04	5.50E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 84	2.17E+04	5.63E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 85	2.25E+03	2.25E+03	2.22E+03	2.18E+03	2.11E+03	1.98E+03	1.63E+03	1.18E+03	8.54E+02	6.18E+02	4.47E+02
kr 85m	2.36E+04	5.82E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 86	3.25E+02	3.13E+02	1.14E+01	3.66E-01	4.09E-04	5.14E-10	1.02E-27	.00E+00	.00E+00	.00E+00	.00E+00
kr 87	4.67E+04	9.85E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06	5.81E-06
sr 87m	2.66E+00	7.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	6.38E+04	1.82E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	6.56E+04	2.03E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	8.67E+04	8.55E+04	2.52E+04	7.10E+03	5.80E+02	3.87E+00	1.16E-06	1.55E-17	2.07E-28	.00E+00	.00E+00
y 89m	8.12E+00	7.95E+00	2.35E+00	6.60E-01	5.39E-02	3.60E-04	1.08E-10	1.44E-21	2.28E-32	.00E+00	.00E+00
sr 90	2.05E+04	2.05E+04	2.04E+04	2.03E+04	2.00E+04	1.95E+04	1.81E+04	1.60E+04	1.42E+04	1.25E+04	1.11E+04
y 90	2.11E+04	2.10E+04	2.04E+04	2.03E+04	2.00E+04	1.95E+04	1.81E+04	1.60E+04	1.42E+04	1.25E+04	1.11E+04
y 90m	6.48E-01	3.51E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 91	1.15E+05	2.01E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.18E+05	1.17E+05	4.07E+04	1.36E+04	1.56E+03	2.06E+01	4.75E-05	1.91E-14	7.65E-24	.00E+00	.00E+00
y 91m	6.68E+04	1.28E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.89E-09	1.89E-09	1.88E-09	1.87E-09	1.86E-09	1.85E-09
sr 92	1.27E+05	2.75E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.28E+05	4.05E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	4.46E-12	4.46E-12	4.46E-12	4.46E-12	4.46E-12	4.46E-12	4.46E-12	4.46E-12	4.46E-12	4.46E-12	4.46E-12

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 93	1.01E+05	1.98E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	3.35E-01	3.35E-01	3.35E-01	3.35E-01	3.35E-01	3.35E-01	3.35E-01	3.35E-01	3.35E-01	3.35E-01	3.35E-01
nb 93m	4.39E-02	4.39E-02	4.69E-02	5.01E-02	5.61E-02	6.78E-02	1.00E-01	1.45E-01	1.82E-01	2.12E-01	2.35E-01
nb 94	2.66E-05	2.66E-05	2.66E-05	2.66E-05	2.66E-05	2.66E-05	2.66E-05	2.66E-05	2.66E-05	2.66E-05	2.66E-05
zr 95	1.80E+05	1.78E+05	6.79E+04	2.49E+04	3.45E+03	6.61E+01	4.65E-04	1.20E-12	3.10E-21	8.01E-30	.00E+00
nb 95	1.81E+05	1.81E+05	1.13E+05	4.91E+04	7.44E+03	1.50E+02	1.02E-03	2.65E-12	6.84E-21	1.76E-29	.00E+00
nb 95m	2.00E+03	2.00E+03	7.99E+02	2.93E+02	4.06E+01	7.77E-01	5.47E-06	1.41E-14	3.65E-23	9.13E-32	.00E+00
nb 96	3.19E+02	1.56E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 97	1.81E+05	6.77E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.83E+05	6.80E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.72E+05	6.42E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 98m	1.74E+03	6.19E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	2.83E-06	2.83E-06	2.83E-06	2.83E-06	2.83E-06	2.83E-06	2.83E-06	2.83E-06	2.83E-06	2.83E-06	2.83E-06
mo 99	2.15E+05	1.67E+05	2.97E-05	2.18E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

tc 99	3.70E+00	3.70E+00	3.71E+00	3.71E+00	3.71E+00	3.71E+00	3.71E+00	3.71E+00	3.71E+00	3.71E+00	3.71E+00
tc 99m	1.90E+05	1.61E+05	2.88E-05	2.11E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh102	5.03E-01	5.03E-01	4.74E-01	4.46E-01	3.96E-01	3.12E-01	1.52E-01	4.61E-02	1.40E-02	4.22E-03	1.28E-03
ru103	2.04E+05	2.00E+05	4.16E+04	8.13E+03	3.23E+02	5.11E-01	2.02E-09	2.01E-23	.00E+00	.00E+00	.00E+00
rh103m	2.04E+05	2.00E+05	4.16E+04	8.12E+03	3.22E+02	5.10E-01	2.02E-09	2.01E-23	.00E+00	.00E+00	.00E+00
ru105	1.54E+05	3.73E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.48E+05	1.06E+05	6.97E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	4.36E+04	1.06E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	1.06E+05	1.05E+05	8.93E+04	7.52E+04	5.35E+04	2.70E+04	3.50E+03	1.16E+02	3.86E+00	1.28E-01	4.24E-03
rh106	1.10E+05	1.05E+05	8.93E+04	7.52E+04	5.35E+04	2.70E+04	3.50E+03	1.16E+02	3.86E+00	1.28E-01	4.24E-03
rh106m	1.88E+03	8.69E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh107	9.58E+04	1.24E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd107	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02	3.79E-02
ag108	2.83E-01	3.06E-04	3.06E-04	3.05E-04	3.04E-04	3.03E-04	2.98E-04	2.90E-04	2.82E-04	2.74E-04	2.67E-04
ag108m	3.52E-03	3.52E-03	3.51E-03	3.51E-03	3.50E-03	3.48E-03	3.42E-03	3.33E-03	3.24E-03	3.15E-03	3.07E-03
pd109	6.11E+04	1.82E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109m	6.11E+04	1.82E+04	3.67E-04	3.19E-04	2.43E-04	1.40E-04	2.72E-05	1.76E-06	1.14E-07	7.40E-09	4.80E-10
cd109	4.20E-04	4.19E-04	3.67E-04	3.19E-04	2.43E-04	1.40E-04	2.72E-05	1.76E-06	1.14E-07	7.40E-09	4.80E-10
ag110	3.70E+04	1.53E+01	1.19E+01	9.23E+00	5.56E+00	2.02E+00	9.64E-02	6.07E-04	3.82E-06	2.40E-08	1.51E-10
ag110m	1.13E+03	1.12E+03	8.77E+02	6.79E+02	4.09E+02	1.48E+02	7.09E+00	4.46E-02	2.81E-04	1.77E-06	1.11E-08
pd111	9.21E+03	1.44E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	3.78E+02	1.84E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	9.22E+03	8.43E+03	2.14E+00	3.91E-04	1.61E-11	2.82E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	9.22E+03	1.80E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111m	4.41E+01	5.31E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd112	4.06E+03	1.84E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	4.07E+03	2.16E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag113	2.22E+03	1.01E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	7.11E-15	7.24E-15	7.25E-15	7.25E-15	7.25E-15	7.25E-15	7.25E-15	7.26E-15	7.26E-15	7.26E-15	7.26E-15
cd113m	9.78E+00	9.78E+00	9.66E+00	9.54E+00	9.31E+00	8.86E+00	7.65E+00	5.98E+00	4.68E+00	3.66E+00	2.86E+00
in113m	2.18E-06	9.58E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in114	1.13E+00	7.84E-01	2.26E-01	6.18E-02	4.79E-03	2.88E-05	6.27E-12	4.95E-23	.00E+00	.00E+00	.00E+00
in114m	8.31E-01	8.19E-01	2.36E-01	6.46E-02	5.00E-03	3.01E-05	6.55E-12	5.17E-23	.00E+00	.00E+00	.00E+00
cd115	1.15E+03	8.46E+02	7.99E-10	2.54E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	5.62E+01	5.53E+01	1.39E+01	3.29E+00	1.92E-01	6.58E-04	2.64E-11	1.24E-23	.00E+00	.00E+00	.00E+00
in115	2.01E-12	2.01E-12	2.04E-12	2.04E-12	2.04E-12	2.04E-12	2.04E-12	2.04E-12	2.04E-12	2.04E-12	2.04E-12
in115m	1.15E+03	9.21E+02	1.53E-03	3.64E-04	2.12E-05	7.27E-08	2.92E-15	1.37E-27	.00E+00	.00E+00	.00E+00
in116m	8.81E+02	8.70E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cd117	1.10E+03	1.39E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.53E+02	1.80E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	8.23E+02	5.32E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.01E+03	5.99E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117m	1.53E+01	1.45E+01	1.56E-01	1.40E-03	1.26E-07	1.04E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	9.95E+02	2.40E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in118	9.96E+02	2.41E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	1.12E+01	1.11E+01	9.03E+00	7.25E+00	4.71E+00	1.98E+00	1.49E-01	1.98E-03	2.63E-05	3.50E-07	4.66E-09
sn121	1.05E+03	5.68E+02	5.48E-01	5.47E-01	5.43E-01	5.36E-01	5.17E-01	4.85E-01	4.55E-01	4.28E-01	4.01E-01
sn121m	7.09E-01	7.09E-01	7.07E-01	7.04E-01	7.00E-01	6.91E-01	6.66E-01	6.25E-01	5.87E-01	5.51E-01	5.17E-01
sb122	2.19E+02	1.70E+02	2.03E-08	9.90E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn123	7.80E+01	7.76E+01	4.81E+01	2.93E+01	1.10E+01	1.55E+00	4.33E-03	2.40E-07	1.33E-11	7.37E-16	4.09E-20
sn123m	1.10E+03	1.70E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	2.76E-13	2.76E-13	3.06E-13	3.25E-13	3.42E-13	3.50E-13	3.51E-13	3.51E-13	3.51E-13	3.51E-13	3.51E-13
te123m	2.85E+00	2.83E+00	1.69E+00	9.89E-01	3.43E-01	4.14E-02	7.25E-05	1.85E-09	4.71E-14	1.20E-18	3.06E-23
sb124	1.66E+02	1.64E+02	5.89E+01	2.03E+01	2.48E+00	3.69E-02	1.22E-07	9.01E-17	6.64E-26	.00E+00	.00E+00
sn125	6.46E+02	6.02E+02	1.00E+00	1.29E-03	2.54E-09	9.98E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

sb125	1.79E+03	1.79E+03	1.69E+03	1.59E+03	1.40E+03	1.08E+03	5.06E+02	1.42E+02	3.99E+01	1.12E+01	3.15E+00
te125m	4.03E+02	4.03E+02	4.00E+02	3.83E+02	3.41E+02	2.65E+02	1.24E+02	3.47E+01	9.75E+00	2.74E+00	7.70E-01
sn126	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
sb126	5.69E+01	5.38E+01	3.95E-01	2.59E-02	2.38E-02	2.38E-02	2.38E-02	2.38E-02	2.38E-02	2.38E-02	2.38E-02
sb126m	6.73E+01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01	1.70E-01
sn127	4.61E+03	1.67E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	1.14E+04	9.59E+03	1.05E-03	6.15E-11	3.15E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te127	1.13E+04	1.05E+04	1.12E+03	6.20E+02	1.94E+02	1.90E+01	1.79E-02	1.62E-07	1.47E-12	1.33E-17	1.20E-22
te127m	1.95E+03	1.95E+03	1.14E+03	6.33E+02	1.98E+02	1.94E+01	1.83E-02	1.65E-07	1.50E-12	1.35E-17	1.23E-22
xe127	1.87E-02	1.84E-02	3.37E-03	5.80E-04	1.79E-05	1.70E-08	1.48E-17	2.28E-32	.00E+00	.00E+00	.00E+00
sn128	1.72E+04	7.94E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	1.91E+03	3.16E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128m	1.83E+04	9.63E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i128	2.05E+03	9.13E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb129	3.94E+04	9.10E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	3.75E+04	5.80E+03	7.64E+02	1.13E+02	2.61E+00	1.39E-03	2.12E-13	9.24E-30	.00E+00	.00E+00	.00E+00
te129m	7.59E+03	7.47E+03	1.19E+03	1.77E+02	4.07E+00	2.18E-03	3.31E-13	1.44E-29	.00E+00	.00E+00	.00E+00
i129	9.39E-03	9.39E-03	9.43E-03	9.43E-03	9.44E-03	9.44E-03	9.44E-03	9.44E-03	9.44E-03	9.44E-03	9.44E-03
xe129m	1.13E+01	1.04E+01	1.01E-02	7.44E-06	4.82E-12	2.07E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	1.31E+04	1.39E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	4.43E+03	1.16E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb131	8.95E+04	1.29E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131	9.80E+04	3.24E+03	1.20E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	2.50E+04	1.44E+04	5.31E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.17E+05	1.09E+05	5.20E+01	1.79E-02	2.57E-09	5.44E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.34E+03	1.33E+03	2.04E+01	9.82E-02	2.35E-06	1.35E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	1.67E+05	1.35E+05	8.08E-04	2.29E-12	2.99E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.71E+05	1.39E+05	8.32E-04	2.36E-12	3.08E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs132	8.50E+00	7.63E+00	5.59E-04	2.82E-08	9.10E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133	1.26E+05	3.50E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	1.03E+05	1.55E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.36E+05	1.09E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	1.90E+04	1.58E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	2.27E+05	2.19E+05	1.91E+00	9.34E-06	3.00E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	7.22E+03	6.54E+03	5.01E-09	9.63E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ba133	7.98E-06	7.98E-06	7.85E-06	7.72E-06	7.47E-06	6.99E-06	5.74E-06	4.13E-06	2.97E-06	2.14E-06	1.54E-06
te134	1.97E+05	8.42E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	2.58E+05	5.84E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.71E+04	4.70E+04	4.33E+04	3.98E+04	3.36E+04	2.40E+04	8.77E+03	1.63E+03	3.04E+02	5.66E+01	1.05E+01
cs134m	7.36E+03	2.43E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	2.27E+05	1.80E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	8.13E+04	6.12E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.15E+04	2.94E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01	1.83E-01
cs135m	7.93E+03	5.25E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135m	1.32E+02	7.39E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	1.26E+04	1.20E+04	1.10E+02	8.42E-01	5.56E-05	2.45E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136m	1.41E+03	1.34E+03	1.23E+01	9.43E-02	6.23E-06	2.75E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	3.08E+04	3.08E+04	3.06E+04	3.04E+04	3.01E+04	2.94E+04	2.74E+04	2.44E+04	2.17E+04	1.94E+04	1.73E+04
ba137m	2.91E+04	2.90E+04	2.89E+04	2.87E+04	2.84E+04	2.77E+04	2.59E+04	2.30E+04	2.05E+04	1.83E+04	1.63E+04
cs138	2.14E+05	1.26E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la138	5.77E-11	5.77E-11	5.77E-11	5.77E-11	5.77E-11	5.77E-11	5.77E-11	5.77E-11	5.77E-11	5.77E-11	5.77E-11
ba139	2.03E+05	1.73E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce139	2.21E-02	2.20E-02	1.41E-02	8.83E-03	3.52E-03	5.58E-04	2.24E-06	2.27E-10	2.29E-14	2.32E-18	2.35E-22
pr139	1.71E-03	3.93E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ba140	2.04E+05	1.93E+05	1.53E+03	1.00E+01	4.88E-04	1.17E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.23E+05	2.14E+05	1.76E+03	1.16E+01	5.62E-04	1.35E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la141	1.85E+05	2.88E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.86E+05	1.83E+05	2.74E+04	3.81E+03	7.72E+01	3.20E-02	2.27E-12	2.75E-29	.00E+00	.00E+00	.00E+00
nd141	5.73E-03	7.17E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.79E+05	3.52E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	7.92E-06	7.92E-06	7.92E-06	7.92E-06	7.92E-06	7.92E-06	7.92E-06	7.92E-06	7.92E-06	7.92E-06	7.92E-06
pr142	1.21E+04	5.07E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.68E+05	1.02E+05	3.35E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	1.62E+05	1.60E+05	1.82E+03	1.61E+01	1.42E-03	1.11E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	1.55E+05	1.55E+05	1.24E+05	9.94E+04	6.37E+04	2.62E+04	1.82E+03	2.15E+01	2.52E-01	2.97E-03	3.50E-05
pr144	1.56E+05	1.55E+05	1.24E+05	9.94E+04	6.37E+04	2.62E+04	1.82E+03	2.15E+01	2.52E-01	2.97E-03	3.50E-05
pr144m	2.18E+03	2.16E+03	1.74E+03	1.39E+03	8.92E+02	3.67E+02	2.55E+01	3.00E-01	3.53E-03	4.16E-05	4.89E-07
nd144	4.26E-10	4.26E-10	4.37E-10	4.47E-10	4.60E-10	4.74E-10	4.83E-10	4.84E-10	4.84E-10	4.84E-10	4.84E-10
pr145	1.15E+05	7.23E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm145	4.07E-02	4.08E-02	4.45E-02	4.76E-02	5.20E-02	5.61E-02	5.45E-02	4.53E-02	3.73E-02	3.06E-02	2.52E-02
sm145	4.74E-01	4.73E-01	3.95E-01	3.27E-01	2.25E-01	1.07E-01	1.15E-02	2.77E-04	6.70E-06	1.62E-07	3.91E-09
pr146	9.45E+04	2.41E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm146	1.19E+00	1.19E+00	1.16E+00	1.12E+00	1.05E+00	9.29E-01	6.38E-01	3.41E-01	1.82E-01	9.73E-02	5.20E-02
sm146	1.32E-07	1.32E-07	1.33E-07	1.33E-07	1.35E-07	1.37E-07	1.42E-07	1.48E-07	1.51E-07	1.52E-07	1.53E-07
nd147	7.67E+04	7.21E+04	2.62E+02	7.62E-01	7.44E-06	7.21E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	2.89E+04	2.90E+04	2.79E+04	2.61E+04	2.29E+04	1.76E+04	7.96E+03	2.12E+03	5.67E+02	1.51E+02	4.04E+01
sm147	6.37E-07	6.38E-07	6.84E-07	7.29E-07	8.09E-07	9.40E-07	1.18E-06	1.32E-06	1.36E-06	1.37E-06	1.37E-06
pm148	2.26E+04	1.99E+04	5.42E+01	1.14E+01	5.32E-01	1.16E-03	1.19E-11	5.80E-25	.00E+00	.00E+00	.00E+00
pm148m	4.63E+03	4.55E+03	1.02E+03	2.16E+02	1.01E+01	2.19E-02	2.25E-10	1.10E-23	.00E+00	.00E+00	.00E+00
sm148	1.50E-11	1.50E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11	1.51E-11
nd149	4.69E+04	3.10E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	7.11E+04	5.31E+04	4.10E-08	1.05E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	1.20E-13	1.32E-13	1.64E-13	1.64E-13	1.64E-13	1.64E-13	1.64E-13	1.64E-13	1.64E-13	1.64E-13	1.64E-13
eu149	2.25E-07	2.23E-07	1.15E-07	5.77E-08	1.48E-08	9.74E-10	2.78E-13	3.44E-19	4.25E-25	5.25E-31	.00E+00
pm150	5.58E+02	1.12E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu150	1.72E-05	1.72E-05	1.72E-05	1.71E-05	1.69E-05	1.66E-05	1.57E-05	1.42E-05	1.29E-05	1.17E-05	1.06E-05

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0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pm151	2.59E+04	1.45E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.00E+02	9.77E+01	9.41E+01	9.05E+01	8.71E+01	8.38E+01
eu152	2.38E+00	2.38E+00	2.35E+00	2.32E+00	2.26E+00	2.14E+00	1.83E+00	1.41E+00	1.09E+00	8.40E-01	6.48E-01
eu152m	3.65E+01	6.13E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	6.19E-13	6.19E-13	6.20E-13	6.22E-13	6.24E-13	6.28E-13	6.38E-13	6.53E-13	6.64E-13	6.72E-13	6.79E-13
sm153	7.75E+04	5.41E+04	6.90E-10	2.50E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd153	6.36E+00	6.35E+00	4.92E+00	3.77E+00	2.23E+00	7.82E-01	3.37E-02	1.79E-04	9.46E-07	5.01E-09	2.65E-11
eu154	3.83E+03	3.83E+03	3.75E+03	3.68E+03	3.53E+03	3.26E+03	2.56E+03	1.71E+03	1.14E+03	7.62E+02	5.09E+02
eu155	2.65E+03	2.64E+03	2.55E+03	2.46E+03	2.28E+03	1.97E+03	1.26E+03	6.02E+02	2.87E+02	1.37E+02	6.53E+01
sm156	3.43E+03	5.85E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	4.25E+04	4.07E+04	7.00E+02	1.03E+01	2.45E-03	1.41E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu157	3.70E+03	1.24E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu158	1.31E+03	5.29E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd159	9.21E+02	3.81E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb160	2.29E+02	2.27E+02	9.66E+01	3.98E+01	6.90E+00	2.08E-01	5.71E-06	1.42E-13	3.54E-21	8.83E-29	.00E+00
tb161	1.76E+02	1.59E+02	2.08E-02	1.92E-06	2.05E-14	2.40E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb162m	9.66E-01	5.56E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy165	8.92E+01	7.21E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy166	5.22E-01	4.26E-01	5.63E-09	3.65E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	2.48E+01	1.36E+01	8.38E-09	5.43E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	3.12E-04	3.12E-04	3.12E-04	3.12E-04	3.12E-04	3.12E-04	3.11E-04	3.10E-04	3.09E-04	3.09E-04	3.08E-04
er169	7.69E-04	7.14E-04	1.01E-06	1.10E-09	1.55E-15	3.11E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm170	4.54E-06	4.51E-06	2.79E-06	1.70E-06	6.33E-07	8.84E-08	2.41E-10	1.28E-14	6.77E-19	3.59E-23	1.91E-27

er171	1.08E-03	1.19E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	7.85E-04	7.85E-04	7.19E-04	6.56E-04	5.47E-04	3.82E-04	1.29E-04	2.13E-05	3.50E-06	5.75E-07	9.46E-08
er172	7.14E-04	5.10E-04	4.64E-17	1.30E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm172	6.53E-04	6.41E-04	1.87E-13	5.83E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.05E+07	4.43E+06	9.83E+05	6.44E+05	4.15E+05	2.54E+05	1.23E+05	8.74E+04	7.40E+04	6.46E+04	5.69E+04

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Fuel - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	6.37E+14	2.75E+14	2.73E+13	1.29E+13	4.45E+12	1.95E+12	7.45E+11	2.89E+11	1.31E+11	6.50E+10	3.45E+10
3.00E-02	2.98E+14	1.86E+14	4.93E+13	3.69E+13	2.41E+13	1.28E+13	3.66E+12	9.33E+11	2.72E+11	8.24E+10	2.63E+10
5.50E-02	1.24E+14	4.97E+13	2.58E+12	1.11E+12	3.17E+11	1.38E+11	7.15E+10	3.08E+10	1.44E+10	7.00E+09	3.51E+09
8.50E-02	6.80E+13	2.69E+13	9.90E+11	4.18E+11	1.16E+11	5.10E+10	2.78E+10	1.20E+10	5.52E+09	2.67E+09	1.33E+09
1.20E-01	4.63E+13	1.80E+13	5.32E+11	2.52E+11	1.00E+11	5.81E+10	2.86E+10	9.79E+09	3.67E+09	1.51E+09	6.73E+08
1.70E-01	1.28E+14	9.65E+13	2.32E+12	1.13E+12	8.68E+11	6.50E+11	3.03E+11	8.59E+10	2.45E+10	7.08E+09	2.09E+09
3.00E-01	1.07E+14	3.43E+13	1.43E+12	7.28E+11	3.92E+11	2.51E+11	1.15E+11	3.25E+10	9.28E+09	2.68E+09	7.90E+08
6.50E-01	2.89E+15	1.82E+15	6.07E+14	2.53E+14	4.32E+13	6.14E+12	2.46E+12	6.90E+11	1.96E+11	5.74E+10	1.84E+10
1.13E+00	8.41E+13	5.07E+13	2.99E+13	2.89E+13	2.70E+13	2.37E+13	1.60E+13	8.28E+12	4.29E+12	2.22E+12	1.15E+12
1.58E+00	1.93E+13	6.77E+12	9.19E+10	3.23E+10	4.13E+09	7.12E+07	2.65E+04	2.07E+04	1.75E+04	1.50E+04	1.31E+04
2.00E+00	3.44E+12	9.92E+11	8.92E+09	3.17E+09	5.12E+08	1.32E+08	8.52E+07	4.41E+07	2.29E+07	1.18E+07	6.14E+06
2.40E+00	6.01E+10	1.38E+09	5.82E+07	1.97E+07	2.80E+06	4.35E+05	2.70E+05	1.40E+05	7.24E+04	3.75E+04	1.94E+04
2.80E+00	6.61E+10	8.27E+08	5.58E+06	1.92E+06	2.35E+05	3.50E+03	1.16E-02	2.74E-10	1.14E-10	9.83E-11	8.83E-11
3.25E+00	1.56E+10	8.56E+06	1.91E-08	1.61E-08	1.14E-08	5.80E-09	7.63E-10	3.76E-11	1.23E-11	1.04E-11	9.32E-12
3.75E+00	1.18E+10	5.02E+05	8.44E-12	7.10E-12	5.06E-12	2.57E-12	3.47E-13	2.64E-14	1.43E-14	1.25E-14	1.13E-14
4.25E+00	4.19E+09	6.54E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.61E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	6.11E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	4.41E+15	2.57E+15	7.21E+14	3.36E+14	1.01E+14	4.57E+13	2.34E+13	1.04E+13	4.94E+12	2.45E+12	1.24E+12
0 mev/sec	2.10E+15	1.30E+15	4.31E+14	1.99E+14	5.96E+13	3.13E+13	1.98E+13	9.82E+12	4.97E+12	2.54E+12	1.31E+12

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.46E+06	6.32E+05	6.28E+04	2.97E+04	1.02E+04	4.49E+03	1.71E+03	6.64E+02	3.02E+02	1.49E+02	7.92E+01
3.00E-02	2.06E+06	1.28E+06	3.40E+05	2.55E+05	1.66E+05	8.82E+04	2.52E+04	6.44E+03	1.88E+03	5.68E+02	1.81E+02
5.50E-02	1.57E+06	6.29E+05	3.26E+04	1.41E+04	4.01E+03	1.75E+03	9.05E+02	3.90E+02	1.82E+02	8.85E+01	4.44E+01
8.50E-02	1.33E+06	5.25E+05	1.93E+04	8.17E+03	2.27E+03	9.97E+02	5.44E+02	2.34E+02	1.08E+02	5.22E+01	2.61E+01
1.20E-01	1.28E+06	4.98E+05	1.47E+04	6.94E+03	2.77E+03	1.60E+03	7.88E+02	2.70E+02	1.01E+02	4.16E+01	1.86E+01
1.70E-01	5.02E+06	3.77E+06	9.07E+04	4.43E+04	3.39E+04	2.54E+04	1.19E+04	3.36E+03	9.58E+02	2.77E+02	8.17E+01
3.00E-01	7.39E+06	2.36E+06	9.89E+04	5.02E+04	2.70E+04	1.73E+04	7.92E+03	2.24E+03	6.40E+02	1.85E+02	5.45E+01
6.50E-01	4.32E+08	2.72E+08	9.07E+07	3.78E+07	6.46E+06	9.17E+05	3.68E+05	1.03E+05	2.93E+04	8.58E+03	2.75E+03
1.13E+00	2.17E+07	1.31E+07	7.73E+06	7.47E+06	6.99E+06	6.13E+06	4.13E+06	2.14E+06	1.11E+06	5.74E+05	2.98E+05
1.58E+00	6.98E+06	2.45E+06	3.33E+04	1.17E+04	1.50E+03	2.58E+01	9.58E-03	7.51E-03	6.34E-03	5.44E-03	4.73E-03
2.00E+00	1.58E+06	4.56E+05	4.10E+03	1.46E+03	2.35E+02	6.06E+01	3.92E+01	2.03E+01	1.05E+01	5.45E+00	2.82E+00
2.40E+00	3.32E+04	7.59E+02	3.21E+01	1.09E+01	1.54E+00	2.40E-01	1.49E-01	7.71E-02	3.99E-02	2.07E-02	1.07E-02
2.80E+00	4.25E+04	5.32E+02	3.59E+00	1.24E+00	1.51E-01	2.25E-03	7.46E-09	1.77E-16	7.33E-17	6.33E-17	5.69E-17
3.25E+00	1.17E+04	6.40E+00	1.43E-14	1.20E-14	8.55E-15	4.33E-15	5.70E-16	2.81E-17	9.22E-18	7.76E-18	6.97E-18
3.75E+00	1.01E+04	4.33E-01	7.27E-18	6.12E-18	4.36E-18	2.21E-18	3.00E-19	2.28E-20	1.23E-20	1.08E-20	9.72E-21
4.25E+00	4.09E+03	6.39E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.94E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	7.73E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	4.83E+08	2.98E+08	9.91E+07	4.57E+07	1.37E+07	7.19E+06	4.55E+06	2.26E+06	1.14E+06	5.84E+05	3.01E+05
0 gamma watts	3.37E+02	2.08E+02	6.91E+01	3.19E+01	9.55E+00	5.01E+00	3.17E+00	1.57E+00	7.97E-01	4.07E-01	2.10E-01

photon spectrum as a function of time for fission products

BWR SNF Assembly - Fuel - decay
spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.46E+17	3.20E+16	8.38E+15	6.20E+15	4.16E+15	2.25E+15	7.61E+14	5.08E+14	4.37E+14	3.83E+14	3.37E+14
3.00E-02	1.09E+17	2.50E+16	3.58E+15	2.59E+15	1.75E+15	9.47E+14	3.36E+14	2.29E+14	1.97E+14	1.73E+14	1.53E+14
5.50E-02	5.82E+16	8.78E+15	1.91E+15	1.46E+15	9.95E+14	5.41E+14	1.85E+14	1.19E+14	9.89E+13	8.43E+13	7.26E+13
8.50E-02	3.98E+16	7.45E+15	1.17E+15	9.00E+14	6.14E+14	3.26E+14	1.03E+14	6.31E+13	5.18E+13	4.42E+13	3.84E+13
1.20E-01	3.25E+16	6.99E+15	1.35E+15	1.07E+15	7.30E+14	3.77E+14	1.15E+14	6.80E+13	5.21E+13	4.13E+13	3.35E+13
1.70E-01	5.20E+16	8.30E+15	1.17E+15	6.42E+14	3.99E+14	2.07E+14	5.95E+13	3.70E+13	3.18E+13	2.79E+13	2.46E+13
3.00E-01	1.13E+17	1.75E+16	9.07E+14	6.87E+14	4.66E+14	2.41E+14	6.75E+13	4.10E+13	3.48E+13	3.01E+13	2.62E+13
6.50E-01	2.32E+17	6.43E+16	1.53E+16	9.08E+15	5.22E+15	3.48E+15	1.74E+15	9.71E+14	7.57E+14	6.51E+14	5.73E+14
1.13E+00	7.21E+16	5.19E+15	3.27E+14	2.59E+14	2.07E+14	1.47E+14	7.93E+13	4.62E+13	3.04E+13	2.05E+13	1.40E+13
1.58E+00	3.72E+16	8.86E+15	1.64E+14	8.57E+13	6.42E+13	3.89E+13	1.23E+13	3.40E+12	1.54E+12	9.33E+11	6.37E+11
2.00E+00	1.10E+16	6.45E+14	5.30E+13	3.77E+13	2.44E+13	1.04E+13	8.52E+11	3.00E+10	1.34E+10	1.15E+10	1.00E+10
2.40E+00	8.58E+15	4.31E+14	7.25E+12	3.23E+12	2.25E+12	1.12E+12	1.41E+11	4.55E+09	1.57E+08	1.14E+07	5.88E+06
2.80E+00	3.62E+15	6.93E+12	6.53E+11	5.13E+11	3.63E+11	1.82E+11	2.32E+10	7.60E+08	2.51E+07	8.31E+05	2.76E+04
3.25E+00	1.73E+15	2.50E+12	1.19E+11	8.41E+10	5.97E+10	3.02E+10	3.91E+09	1.30E+08	4.31E+06	1.43E+05	4.74E+03
3.75E+00	7.79E+14	1.18E+10	4.40E+07	3.70E+07	2.63E+07	1.33E+07	1.73E+06	5.72E+04	1.90E+03	6.30E+01	2.09E+00
4.25E+00	7.09E+14	1.56E+09	9.77E-06	9.82E-06	9.91E-06	1.01E-05	1.03E-05	1.05E-05	1.05E-05	1.06E-05	1.06E-05
4.75E+00	2.11E+14	1.16E+10	4.90E-06	4.93E-06	4.97E-06	5.05E-06	5.18E-06	5.27E-06	5.29E-06	5.30E-06	5.30E-06
5.50E+00	1.65E+14	7.39E+07	3.63E-06	3.65E-06	3.69E-06	3.74E-06	3.84E-06	3.91E-06	3.92E-06	3.93E-06	3.93E-06
total	1.02E+18	1.86E+17	3.43E+16	2.30E+16	1.46E+16	8.56E+15	3.46E+15	2.09E+15	1.69E+15	1.46E+15	1.27E+15
mev/sec	4.15E+17	7.36E+16	1.17E+16	7.16E+15	4.28E+15	2.77E+15	1.32E+15	7.39E+14	5.71E+14	4.84E+14	4.20E+14

spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.65E+08	7.36E+07	1.93E+07	1.43E+07	9.57E+06	5.16E+06	1.75E+06	1.17E+06	1.00E+06	8.80E+05	7.74E+05
3.00E-02	7.52E+08	1.73E+08	2.47E+07	1.79E+07	1.20E+07	6.53E+06	2.32E+06	1.58E+06	1.36E+06	1.19E+06	1.05E+06
5.50E-02	7.36E+08	1.11E+08	2.42E+07	1.84E+07	1.26E+07	6.84E+06	2.34E+06	1.51E+06	1.25E+06	1.07E+06	9.18E+05
8.50E-02	7.77E+08	1.46E+08	2.28E+07	1.76E+07	1.20E+07	6.37E+06	2.00E+06	1.23E+06	1.01E+06	8.64E+05	7.49E+05
1.20E-01	8.97E+08	1.93E+08	3.72E+07	2.95E+07	2.01E+07	1.04E+07	3.16E+06	1.88E+06	1.44E+06	1.14E+06	9.25E+05
1.70E-01	2.03E+09	3.24E+08	4.57E+07	2.51E+07	1.56E+07	8.09E+06	2.33E+06	1.44E+06	1.24E+06	1.09E+06	9.60E+05
3.00E-01	7.80E+09	1.21E+09	6.25E+07	4.74E+07	3.21E+07	1.67E+07	4.66E+06	2.83E+06	2.40E+06	2.07E+06	1.81E+06
6.50E-01	3.46E+10	9.61E+09	2.29E+09	1.36E+09	7.80E+08	5.20E+08	2.60E+08	1.45E+08	1.13E+08	9.73E+07	8.56E+07
1.13E+00	1.86E+10	1.34E+09	8.46E+07	6.71E+07	5.36E+07	3.81E+07	2.05E+07	1.20E+07	7.86E+06	5.30E+06	3.62E+06
1.58E+00	1.35E+10	3.21E+09	5.93E+07	3.10E+07	2.33E+07	1.41E+07	4.45E+06	1.23E+06	5.58E+05	3.38E+05	2.31E+05
2.00E+00	5.04E+09	2.96E+08	2.44E+07	1.73E+07	1.12E+07	4.79E+06	3.92E+05	1.38E+04	6.18E+03	5.27E+03	4.62E+03
2.40E+00	4.73E+09	2.38E+08	4.00E+06	1.78E+06	1.24E+06	6.19E+05	7.75E+04	2.51E+03	8.63E+01	6.29E+00	3.25E+00
2.80E+00	2.33E+09	4.46E+06	4.20E+05	3.30E+05	2.34E+05	1.17E+05	1.49E+04	4.89E+02	1.62E+01	5.35E-01	1.77E-02
3.25E+00	1.29E+09	1.87E+06	8.88E+04	6.28E+04	4.46E+04	2.26E+04	2.92E+03	9.70E+01	3.22E+00	1.07E-01	3.54E-03
3.75E+00	6.72E+08	1.02E+04	3.79E+01	3.19E+01	2.27E+01	1.15E+01	1.49E+00	4.93E-02	1.64E-03	5.43E-05	1.80E-06
4.25E+00	6.93E+08	1.52E+03	9.54E-12	9.59E-12	9.68E-12	9.83E-12	1.01E-11	1.03E-11	1.03E-11	1.03E-11	1.03E-11
4.75E+00	2.30E+08	1.26E+04	5.35E-12	5.38E-12	5.43E-12	5.51E-12	5.66E-12	5.75E-12	5.78E-12	5.78E-12	5.79E-12
5.50E+00	2.09E+08	9.35E+01	4.60E-12	4.62E-12	4.66E-12	4.73E-12	4.86E-12	4.94E-12	4.96E-12	4.97E-12	4.97E-12
total	9.55E+10	1.69E+10	2.70E+09	1.65E+09	9.83E+08	6.38E+08	3.04E+08	1.70E+08	1.31E+08	1.11E+08	9.66E+07
gamma watts	6.66E+04	1.18E+04	1.88E+03	1.15E+03	6.86E+02	4.45E+02	2.12E+02	1.19E+02	9.16E+01	7.75E+01	6.74E+01

principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.20E+16) at 1.0 d

nuclide	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	2.24E+15	1.74E+15	3.09E+05	2.27E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	3.27E+15	3.14E+15	2.66E+15	2.24E+15	1.59E+15	8.05E+14	1.04E+14	3.46E+12	1.15E+11	3.81E+09	1.26E+08

ba140	1.89E+15	1.79E+15	1.42E+13	9.30E+10	4.52E+06	1.08E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.58E+15	2.48E+15	2.04E+13	1.34E+11	6.52E+06	1.56E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	3.97E+15	3.94E+15	3.17E+15	2.53E+15	1.63E+15	6.68E+14	4.65E+13	5.47E+11	6.44E+09	7.58E+07	8.92E+05

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.50E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.25E+15	3.44E+15	2.06E+07	5.84E-02	7.61E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.25E+15	4.12E+15	3.58E+10	1.75E+05	5.63E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.57E+15	1.49E+15	1.18E+13	7.76E+10	3.77E+06	9.04E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.43E+15	1.41E+15	2.11E+14	2.93E+13	5.95E+11	2.46E+08	1.75E-02	2.12E-19	.00E+00	.00E+00	.00E+00
ce143	4.64E+15	2.82E+15	9.23E-05	5.18E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.31E+15	1.30E+15	1.05E+15	8.39E+14	5.38E+14	2.21E+14	1.54E+13	1.81E+11	2.13E+09	2.51E+07	2.95E+05
nd147	1.42E+15	1.34E+15	4.85E+12	1.41E+10	1.38E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.78E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.73E+14	7.42E+14	6.29E+14	5.29E+14	3.76E+14	1.90E+14	2.47E+13	8.18E+11	2.71E+10	9.00E+08	2.99E+07
te132	8.19E+14	6.62E+14	3.96E+06	1.13E-02	1.47E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.44E+14	5.24E+14	4.31E+12	2.83E+10	1.37E+06	3.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.32E+15	8.03E+14	2.63E-05	1.47E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.22E+14	9.16E+14	7.37E+14	5.89E+14	3.77E+14	1.55E+14	1.08E+13	1.27E+11	1.50E+09	1.76E+07	2.07E+05
sm153	1.51E+15	1.05E+15	1.34E+01	4.86E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.45E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.59E+14	4.41E+14	3.74E+14	3.14E+14	2.24E+14	1.13E+14	1.47E+13	4.86E+11	1.61E+10	5.35E+08	1.77E+07
xe133	3.01E+15	2.91E+15	2.53E+10	1.24E+05	3.98E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.43E+14	5.39E+14	4.34E+14	3.46E+14	2.22E+14	9.14E+13	6.36E+12	7.48E+10	8.80E+08	1.04E+07	1.22E+05
nd147	8.83E+14	8.30E+14	3.01E+12	8.77E+09	8.57E+04	8.30E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (6.99E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.65E+15	3.10E+15	5.54E+05	4.07E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	6.94E+14	6.92E+14	5.57E+14	4.45E+14	2.85E+14	1.17E+14	8.16E+12	9.60E+10	1.13E+09	1.33E+07	1.57E+05
pr144	3.88E+14	3.86E+14	3.10E+14	2.48E+14	1.59E+14	6.54E+13	4.55E+12	5.35E+10	6.30E+08	7.41E+06	8.72E+04
sm153	7.16E+14	5.00E+14	6.38E+00	2.31E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.30E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.90E+14	6.14E+14	1.09E+05	8.00E-06	7.62E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.58E+15	2.19E+15	3.91E+05	2.87E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.70E+14	4.45E+14	3.53E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.83E+15	2.79E+15	4.17E+14	5.81E+13	1.18E+12	4.88E+08	3.46E-02	4.20E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.41E+15	1.01E+15	6.67E-04	8.42E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.54E+15	4.24E+15	2.02E+12	6.95E+08	1.00E+02	2.12E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.14E+15	3.35E+15	2.00E+07	5.69E-02	7.42E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.29E+15	1.73E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.92E+15	1.85E+15	1.52E+13	9.99E+10	4.86E+06	1.16E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.06E+15	1.86E+15	6.09E-05	3.41E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.43E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.56E+15	7.48E+15	2.85E+15	1.05E+15	1.45E+14	2.78E+12	1.95E+07	5.05E-02	1.30E-10	3.37E-19	8.42E-28
nb 95	7.87E+15	7.87E+15	4.94E+15	2.14E+15	3.24E+14	6.54E+12	4.46E+07	1.15E-01	2.98E-10	7.69E-19	.00E+00
ru103	5.67E+15	5.57E+15	1.16E+15	2.26E+14	8.97E+12	1.42E+10	5.63E+01	5.59E-13	5.57E-27	.00E+00	.00E+00
i132	1.66E+16	1.36E+16	8.12E+07	2.31E-01	3.00E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.34E+15	3.38E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.97E+15	3.97E+15	3.65E+15	3.36E+15	2.84E+15	2.03E+15	7.39E+14	1.38E+14	2.56E+13	4.77E+12	8.89E+11
la140	6.17E+15	5.94E+15	4.89E+13	3.21E+11	1.56E+07	3.73E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.19E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.52E+15	2.64E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.81E+15	1.48E+15	8.83E+06	2.51E-02	3.27E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.02E+15	4.79E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.48E+14	4.25E+14	3.91E+12	2.99E+10	1.98E+06	8.72E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.73E+14	6.47E+14	5.33E+12	3.49E+10	1.70E+06	4.07E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.67E+14	7.34E+14	1.26E+13	1.85E+11	4.42E+07	2.54E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.86E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.84E+14	5.58E+14	3.34E+06	9.48E-03	1.24E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.98E+15	7.68E+15	6.32E+13	4.14E+11	2.01E+07	4.83E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.45E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.76E+14	1.43E+14	8.57E+05	2.44E-03	3.17E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.48E+14	3.56E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.07E+13	5.03E+13	4.05E+13	3.23E+13	2.07E+13	8.53E+12	5.93E+11	6.98E+09	8.22E+07	9.67E+05	1.14E+04
eu156	3.75E+14	3.59E+14	6.18E+12	9.06E+10	2.16E+07	1.24E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.31E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.78E+14	3.64E+14	2.99E+12	1.96E+10	9.54E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.66E+13	2.55E+13	4.38E+11	6.43E+09	1.53E+06	8.80E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.93E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.13E+11	6.85E+11	5.80E+11	4.88E+11	3.47E+11	1.76E+11	2.28E+10	7.55E+08	2.50E+07	8.31E+05	2.76E+04
ag112	1.32E+12	7.01E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.30E+12	5.10E+12	4.19E+10	2.75E+08	1.34E+04	3.20E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.50E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.42E+12	2.33E+12	1.91E+10	1.26E+08	6.10E+03	1.46E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.18E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.70E+12	8.39E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.70E+14	3.33E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.56E+09) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	5.02E+11	1.56E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.16E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	3.72E+12	1.16E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.39E+07) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.38E+10	7.39E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Fuel - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean		time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.45E+17	7.53E+16	9.54E+13	7.08E+13	4.37E+13	2.55E+13	2.06E+13	2.04E+13	2.01E+13	1.98E+13	1.94E+13
3.00E-02	9.18E+15	1.52E+15	8.89E+10	8.61E+10	1.09E+11	1.54E+11	2.74E+11	4.38E+11	5.66E+11	6.64E+11	7.39E+11
5.50E-02	1.28E+16	3.75E+15	1.45E+12	1.42E+12	1.77E+12	2.51E+12	4.58E+12	7.41E+12	9.61E+12	1.13E+13	1.26E+13
8.50E-02	5.78E+16	7.95E+15	4.78E+11	3.15E+11	3.15E+11	3.14E+11	3.12E+11	3.09E+11	3.06E+11	3.03E+11	3.00E+11
1.20E-01	5.87E+16	4.28E+16	5.28E+11	4.15E+11	4.10E+11	4.04E+11	3.92E+11	3.75E+11	3.60E+11	3.47E+11	3.35E+11
1.70E-01	1.92E+15	2.89E+14	1.90E+10	7.73E+09	5.55E+09	4.08E+09	3.65E+09	3.58E+09	3.52E+09	3.46E+09	3.41E+09
3.00E-01	3.10E+16	2.24E+16	3.17E+11	2.26E+11	2.25E+11	2.22E+11	2.14E+11	2.02E+11	1.92E+11	1.82E+11	1.74E+11
6.50E-01	1.71E+15	4.87E+13	2.19E+09	1.77E+09	1.32E+09	1.07E+09	1.16E+09	1.31E+09	1.35E+09	1.34E+09	1.31E+09
1.13E+00	1.69E+15	1.04E+15	7.59E+08	7.14E+08	6.63E+08	6.23E+08	5.96E+08	5.64E+08	5.34E+08	5.06E+08	4.81E+08
1.58E+00	1.53E+08	1.48E+08	1.32E+08	1.21E+08	1.10E+08	1.02E+08	1.02E+08	9.90E+07	9.10E+07	8.18E+07	7.33E+07
2.00E+00	1.54E+06	9.76E+05	9.45E+05	9.68E+05	1.02E+06	1.12E+06	1.42E+06	1.68E+06	1.75E+06	1.74E+06	1.71E+06
2.40E+00	6.83E+07	6.83E+07	6.05E+07	5.48E+07	4.80E+07	4.24E+07	3.69E+07	3.05E+07	2.52E+07	2.09E+07	1.74E+07
2.80E+00	9.13E+07	9.24E+07	9.44E+07	9.91E+07	1.12E+08	1.47E+08	2.46E+08	3.35E+08	3.56E+08	3.50E+08	3.36E+08
3.25E+00	2.44E+07	2.45E+07	2.17E+07	1.96E+07	1.72E+07	1.52E+07	1.32E+07	1.09E+07	9.05E+06	7.51E+06	6.24E+06
3.75E+00	1.42E+07	1.42E+07	1.26E+07	1.14E+07	9.98E+06	8.82E+06	7.66E+06	6.33E+06	5.25E+06	4.35E+06	3.62E+06
4.25E+00	8.21E+06	8.21E+06	7.28E+06	6.59E+06	5.79E+06	5.11E+06	4.44E+06	3.67E+06	3.04E+06	2.52E+06	2.10E+06
4.75E+00	4.76E+06	4.76E+06	4.22E+06	3.82E+06	3.35E+06	2.97E+06	2.57E+06	2.13E+06	1.76E+06	1.46E+06	1.21E+06
5.50E+00	4.30E+06	4.31E+06	3.82E+06	3.46E+06	3.04E+06	2.68E+06	2.33E+06	1.93E+06	1.60E+06	1.32E+06	1.10E+06
0 total	3.20E+17	1.55E+17	9.83E+13	7.33E+13	4.66E+13	2.91E+13	2.64E+13	2.91E+13	3.11E+13	3.26E+13	3.35E+13
0 mev/sec	2.70E+16	1.48E+16	1.24E+12	9.38E+11	6.85E+11	5.42E+11	6.07E+11	7.60E+11	8.76E+11	9.64E+11	1.03E+12

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean		time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.34E+08	1.73E+08	2.19E+05	1.63E+05	1.01E+05	5.87E+04	4.74E+04	4.69E+04	4.62E+04	4.54E+04	4.45E+04
3.00E-02	6.33E+07	1.05E+07	6.13E+02	5.94E+02	7.53E+02	1.06E+03	1.89E+03	3.02E+03	3.90E+03	4.58E+03	5.10E+03
5.50E-02	1.62E+08	4.74E+07	1.84E+04	1.80E+04	2.24E+04	3.17E+04	5.79E+04	9.37E+04	1.21E+05	1.43E+05	1.59E+05
8.50E-02	1.13E+09	1.55E+08	9.34E+03	6.16E+03	6.15E+03	6.14E+03	6.10E+03	6.03E+03	5.97E+03	5.92E+03	5.87E+03
1.20E-01	1.62E+09	1.18E+09	1.46E+04	1.15E+04	1.13E+04	1.11E+04	1.08E+04	1.03E+04	9.93E+03	9.56E+03	9.23E+03
1.70E-01	7.52E+07	1.13E+07	7.41E+02	3.02E+02	2.17E+02	1.60E+02	1.43E+02	1.40E+02	1.37E+02	1.35E+02	1.33E+02
3.00E-01	2.14E+09	1.55E+09	2.19E+04	1.56E+04	1.55E+04	1.53E+04	1.48E+04	1.39E+04	1.32E+04	1.26E+04	1.20E+04
6.50E-01	2.56E+08	7.27E+06	3.27E+02	2.65E+02	1.98E+02	1.59E+02	1.73E+02	1.96E+02	2.02E+02	2.00E+02	1.96E+02
1.13E+00	4.38E+08	2.69E+08	1.96E+02	1.85E+02	1.71E+02	1.61E+02	1.54E+02	1.46E+02	1.38E+02	1.31E+02	1.25E+02
1.58E+00	5.53E+01	5.36E+01	4.79E+01	4.40E+01	3.97E+01	3.70E+01	3.69E+01	3.58E+01	3.29E+01	2.96E+01	2.65E+01
2.00E+00	7.06E-01	4.49E-01	4.34E-01	4.45E-01	4.68E-01	5.17E-01	6.52E-01	7.74E-01	8.06E-01	8.02E-01	7.86E-01

	2.40E+00	3.77E+01	3.77E+01	3.34E+01	3.02E+01	2.65E+01	2.34E+01	2.03E+01	1.68E+01	1.39E+01	1.16E+01	9.60E+00
	2.80E+00	5.88E+01	5.95E+01	6.08E+01	6.38E+01	7.23E+01	9.43E+01	1.59E+02	2.16E+02	2.29E+02	2.25E+02	2.16E+02
	3.25E+00	1.83E+01	1.83E+01	1.62E+01	1.47E+01	1.29E+01	1.14E+01	9.87E+00	8.16E+00	6.76E+00	5.61E+00	4.66E+00
	3.75E+00	1.22E+01	1.22E+01	1.08E+01	9.81E+00	8.61E+00	7.60E+00	6.60E+00	5.46E+00	4.52E+00	3.75E+00	3.12E+00
	4.25E+00	8.02E+00	8.02E+00	7.11E+00	6.44E+00	5.65E+00	5.00E+00	4.34E+00	3.59E+00	2.97E+00	2.46E+00	2.05E+00
	4.75E+00	5.20E+00	5.20E+00	4.61E+00	4.17E+00	3.66E+00	3.24E+00	2.81E+00	2.32E+00	1.93E+00	1.60E+00	1.33E+00
	5.50E+00	5.44E+00	5.44E+00	4.82E+00	4.37E+00	3.84E+00	3.39E+00	2.95E+00	2.43E+00	2.02E+00	1.67E+00	1.39E+00
0	total	6.22E+09	3.40E+09	2.86E+05	2.16E+05	1.57E+05	1.25E+05	1.40E+05	1.75E+05	2.01E+05	2.22E+05	2.37E+05
0	gamma watts	4.33E+03	2.37E+03	1.99E-01	1.50E-01	1.10E-01	8.70E-02	9.73E-02	1.22E-01	1.40E-01	1.55E-01	1.65E-01

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pb210	1.19E-14	1.19E-14	1.26E-14	1.28E-14	1.32E-14	1.41E-14	1.90E-14	3.61E-14	6.98E-14	1.26E-13	2.09E-13
bi210	3.00E-12	3.01E-12	3.21E-12	3.26E-12	3.36E-12	3.61E-12	4.84E-12	9.21E-12	1.78E-11	3.21E-11	5.34E-11
bi211	1.94E-03	1.94E-03	2.10E-03	2.27E-03	2.62E-03	3.30E-03	5.08E-03	7.75E-03	1.01E-02	1.21E-02	1.39E-02
bi212	1.76E+00	1.80E+00	2.04E+00	2.33E+00	2.94E+00	4.27E+00	7.93E+00	1.12E+01	1.21E+01	1.19E+01	1.15E+01
bi213	8.92E-06	8.93E-06	2.07E-06	1.78E-06	1.78E-06	1.79E-06	1.84E-06	1.94E-06	2.06E-06	2.20E-06	2.37E-06
bi214	3.86E-09	3.87E-09	4.06E-09	4.27E-09	4.72E-09	5.78E-09	1.03E-08	2.24E-08	4.08E-08	6.60E-08	9.83E-08
po210	2.77E-06	2.77E-06	3.15E-06	3.44E-06	3.79E-06	4.20E-06	5.59E-06	1.13E-05	2.19E-05	3.95E-05	6.58E-05
po211	7.69E-06	7.69E-06	8.32E-06	8.97E-06	1.04E-05	1.31E-05	2.01E-05	3.07E-05	3.99E-05	4.81E-05	5.52E-05
po212	9.03E+00	9.23E+00	1.05E+01	1.19E+01	1.51E+01	2.19E+01	4.06E+01	5.73E+01	6.17E+01	6.11E+01	5.90E+01
po213	1.18E-03	1.18E-03	2.74E-04	2.35E-04	2.35E-04	2.37E-04	2.43E-04	2.55E-04	2.71E-04	2.90E-04	3.12E-04
po214	2.40E-04	2.33E-04	4.64E-05	3.85E-05	4.20E-05	5.15E-05	9.16E-05	2.00E-04	3.64E-04	5.88E-04	8.76E-04
po215	2.74E-03	2.75E-03	2.97E-03	3.20E-03	3.70E-03	4.66E-03	7.18E-03	1.10E-02	1.43E-02	1.72E-02	1.97E-02
po216	7.05E+00	7.06E+00	8.15E+00	9.30E+00	1.18E+01	1.71E+01	3.17E+01	4.47E+01	4.82E+01	4.77E+01	4.60E+01
po218	1.64E-05	1.64E-05	1.72E-05	1.81E-05	2.00E-05	2.45E-05	4.36E-05	9.50E-05	1.73E-04	2.80E-04	4.17E-04
at217	7.63E-04	7.64E-04	1.77E-04	1.52E-04	1.52E-04	1.53E-04	1.57E-04	1.66E-04	1.76E-04	1.88E-04	2.02E-04
rn218	1.67E-04	1.61E-04	8.31E-06	3.81E-07	8.63E-10	4.46E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	2.18E-03	2.18E-03	2.36E-03	2.55E-03	2.94E-03	3.70E-03	5.71E-03	8.71E-03	1.13E-02	1.36E-02	1.57E-02
rn220	5.58E+00	5.59E+00	6.46E+00	7.37E+00	9.32E+00	1.35E+01	2.51E+01	3.54E+01	3.82E+01	3.78E+01	3.64E+01
rn222	1.20E-05	1.20E-05	1.26E-05	1.32E-05	1.46E-05	1.79E-05	3.18E-05	6.94E-05	1.26E-04	2.04E-04	3.04E-04
fr221	5.57E-04	5.57E-04	1.29E-04	1.11E-04	1.11E-04	1.12E-04	1.15E-04	1.21E-04	1.28E-04	1.37E-04	1.48E-04
fr223	8.59E-10	8.60E-10	9.28E-10	9.98E-10	1.13E-09	1.40E-09	2.16E-09	3.30E-09	4.29E-09	5.16E-09	5.93E-09
ra222	1.29E-04	1.25E-04	6.43E-06	2.95E-07	6.67E-10	3.45E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	1.26E-03	1.26E-03	1.37E-03	1.47E-03	1.71E-03	2.15E-03	3.31E-03	5.04E-03	6.56E-03	7.90E-03	9.07E-03
ra224	3.95E+00	3.95E+00	4.57E+00	5.21E+00	6.59E+00	9.56E+00	1.77E+01	2.51E+01	2.70E+01	2.67E+01	2.58E+01
ra226	7.01E-06	7.01E-06	7.35E-06	7.73E-06	8.54E-06	1.05E-05	1.86E-05	4.06E-05	7.39E-05	1.19E-04	1.78E-04
ac225	4.00E-04	4.00E-04	9.31E-05	7.97E-05	7.99E-05	8.05E-05	8.25E-05	8.68E-05	9.22E-05	9.86E-05	1.06E-04
ac227	9.67E-06	9.68E-06	1.04E-05	1.12E-05	1.28E-05	1.58E-05	2.43E-05	3.71E-05	4.83E-05	5.81E-05	6.67E-05
ac228	5.60E-17	5.60E-17	6.14E-17	6.73E-17	7.97E-17	1.07E-16	2.11E-16	4.30E-16	6.85E-16	9.59E-16	1.24E-15
th226	1.16E-04	1.13E-04	5.80E-06	2.66E-07	6.02E-10	3.11E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	1.41E-03	1.42E-03	1.53E-03	1.65E-03	1.88E-03	2.37E-03	3.65E-03	5.56E-03	7.24E-03	8.71E-03	1.00E-02
th228	3.35E+00	3.36E+00	3.84E+00	4.38E+00	5.54E+00	8.04E+00	1.49E+01	2.11E+01	2.27E+01	2.25E+01	2.17E+01
th229	4.63E-05	4.63E-05	4.64E-05	4.65E-05	4.67E-05	4.70E-05	4.82E-05	5.07E-05	5.39E-05	5.76E-05	6.20E-05
th230	2.86E-03	2.87E-03	3.06E-03	3.27E-03	3.68E-03	4.51E-03	7.10E-03	1.17E-02	1.68E-02	2.22E-02	2.80E-02
th232	2.99E-09	2.99E-09	3.17E-09	3.36E-09	3.74E-09	4.50E-09	6.78E-09	1.06E-08	1.44E-08	1.82E-08	2.20E-08
pa231	8.63E-03	8.63E-03	8.65E-03	8.66E-03	8.67E-03	8.70E-03	8.79E-03	8.94E-03	9.09E-03	9.24E-03	9.39E-03
u230	9.17E-05	8.86E-05	4.57E-06	2.09E-07	4.74E-10	2.45E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u231	3.42E-07	2.90E-07	1.22E-13	2.87E-20	2.12E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	7.91E+00	7.92E+00	8.85E+00	9.76E+00	1.14E+01	1.41E+01	1.89E+01	2.14E+01	2.14E+01	2.07E+01	1.98E+01
u233	3.12E-03	3.12E-03	3.18E-03	3.24E-03	3.36E-03	3.63E-03	4.39E-03	5.62E-03	6.86E-03	8.11E-03	9.38E-03
u234	9.42E+01	9.42E+01	9.47E+01	9.52E+01	9.62E+01	9.81E+01	1.04E+02	1.13E+02	1.22E+02	1.31E+02	1.39E+02
u235	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01
u236	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01	2.71E+01

u238	1.78E+01	1.78E+01	1.78E+01	1.78E+01	1.78E+01	1.78E+01	1.78E+01	1.78E+01	1.78E+01	1.78E+01	1.78E+01
np235	8.83E-05	8.81E-05	7.54E-05	6.41E-05	4.66E-05	2.46E-05	3.62E-06	1.48E-07	6.07E-09	2.48E-10	1.02E-11
np237	5.00E+01	5.01E+01	5.06E+01	5.06E+01	5.06E+01	5.06E+01	5.07E+01	5.10E+01	5.15E+01	5.21E+01	5.27E+01
pu236	5.38E+02	5.39E+02	5.09E+02	4.79E+02	4.25E+02	3.35E+02	1.63E+02	4.94E+01	1.50E+01	4.53E+00	1.37E+00
pu237	1.17E-02	1.15E-02	2.95E-03	7.13E-04	4.32E-05	1.59E-07	7.93E-15	5.36E-27	.00E+00	.00E+00	.00E+00
pu238	1.13E+06	1.13E+06	1.16E+06	1.17E+06	1.19E+06	1.19E+06	1.17E+06	1.12E+06	1.08E+06	1.04E+06	9.98E+05

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pu239	4.80E+04	4.81E+04	4.85E+04	4.85E+04	4.85E+04	4.85E+04	4.85E+04	4.84E+04	4.84E+04	4.84E+04	4.84E+04
pu240	8.49E+04	8.49E+04	8.49E+04	8.49E+04	8.50E+04	8.51E+04	8.54E+04	8.58E+04	8.61E+04	8.64E+04	8.66E+04
pu241	4.76E+02	4.76E+02	4.70E+02	4.64E+02	4.53E+02	4.32E+02	3.74E+02	2.93E+02	2.30E+02	1.81E+02	1.42E+02
pu242	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02
pu244	7.11E-12	7.14E-12	9.91E-12	1.28E-11	1.85E-11	2.98E-11	6.39E-11	1.21E-10	1.78E-10	2.35E-10	2.92E-10
am239	5.26E-05	1.30E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	7.89E-05	5.69E-05	1.32E-17	9.71E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.12E+04	5.13E+04	6.33E+04	7.55E+04	9.93E+04	1.45E+05	2.70E+05	4.39E+05	5.71E+05	6.72E+05	7.50E+05
am242m	1.70E+01	1.70E+01	1.69E+01	1.69E+01	1.69E+01	1.68E+01	1.65E+01	1.61E+01	1.57E+01	1.54E+01	1.50E+01
am243	7.76E+03	7.76E+03	7.76E+03	7.76E+03	7.76E+03	7.76E+03	7.76E+03	7.75E+03	7.75E+03	7.75E+03	7.74E+03
cm241	7.34E-04	7.19E-04	1.10E-04	1.55E-05	3.26E-07	1.45E-10	1.27E-20	.00E+00	.00E+00	.00E+00	.00E+00
cm242	2.20E+07	2.20E+07	1.51E+07	1.02E+07	4.68E+06	9.95E+05	1.45E+04	5.01E+03	4.88E+03	4.76E+03	4.65E+03
cm243	1.32E+04	1.32E+04	1.32E+04	1.31E+04	1.29E+04	1.26E+04	1.17E+04	1.04E+04	9.19E+03	8.14E+03	7.21E+03
cm244	1.82E+06	1.82E+06	1.81E+06	1.79E+06	1.76E+06	1.69E+06	1.51E+06	1.24E+06	1.03E+06	8.48E+05	7.00E+05
cm245	1.53E+02	1.53E+02	1.53E+02	1.53E+02	1.53E+02	1.53E+02	1.53E+02	1.53E+02	1.53E+02	1.52E+02	1.52E+02
cm246	5.68E+01	5.68E+01	5.67E+01	5.67E+01	5.67E+01	5.67E+01	5.67E+01	5.67E+01	5.66E+01	5.66E+01	5.65E+01
cm247	2.97E-04	2.97E-04	2.97E-04	2.97E-04	2.97E-04	2.97E-04	2.97E-04	2.97E-04	2.97E-04	2.97E-04	2.97E-04
cm248	1.97E-03	1.97E-03	1.97E-03	1.97E-03	1.97E-03	1.97E-03	1.97E-03	1.97E-03	1.97E-03	1.97E-03	1.97E-03
cm250	9.82E-11	9.82E-11	9.83E-11	9.83E-11	9.83E-11	9.83E-11	9.83E-11	9.83E-11	9.82E-11	9.82E-11	9.82E-11
bk249	2.71E-04	2.71E-04	2.23E-04	1.83E-04	1.23E-04	5.58E-05	5.20E-06	9.95E-08	1.91E-09	3.65E-11	6.99E-13
cf249	1.40E-02	1.41E-02	2.55E-02	3.52E-02	4.94E-02	6.54E-02	7.71E-02	7.76E-02	7.68E-02	7.61E-02	7.53E-02
cf250	3.31E-01	3.32E-01	3.28E-01	3.24E-01	3.15E-01	2.99E-01	2.55E-01	1.96E-01	1.50E-01	1.15E-01	8.84E-02
cf251	2.99E-03	2.99E-03	2.99E-03	2.99E-03	2.99E-03	2.98E-03	2.98E-03	2.97E-03	2.95E-03	2.94E-03	2.93E-03
cf252	1.01E+00	1.01E+00	9.44E-01	8.83E-01	7.75E-01	5.96E-01	2.72E-01	7.33E-02	1.98E-02	5.33E-03	1.44E-03
cf253	2.50E-04	2.41E-04	7.54E-06	2.06E-07	1.68E-10	1.13E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	5.71E-08	5.64E-08	2.03E-08	7.05E-09	8.69E-10	1.32E-11	4.67E-17	3.82E-26	.00E+00	.00E+00	.00E+00
es253	9.27E-02	9.32E-02	1.71E-02	1.10E-03	3.01E-06	1.46E-11	1.12E-27	.00E+00	.00E+00	.00E+00	.00E+00
es254	3.12E-04	3.11E-04	2.49E-04	1.97E-04	1.24E-04	4.97E-05	3.16E-06	3.20E-08	3.25E-10	3.29E-12	3.34E-14
es255	4.01E-06	3.95E-06	8.12E-07	1.57E-07	6.09E-09	9.24E-12	3.22E-20	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.52E+07	2.52E+07	1.83E+07	1.34E+07	7.88E+06	4.18E+06	3.11E+06	2.97E+06	2.84E+06	2.72E+06	2.60E+06

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
spontaneous fission neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
th230	7.35E-08	7.35E-08	7.86E-08	8.39E-08	9.44E-08	1.16E-07	1.82E-07	3.01E-07	4.31E-07	5.70E-07	7.18E-07
pa231	1.08E-06	1.08E-06	1.08E-06	1.09E-06	1.09E-06	1.09E-06	1.10E-06	1.12E-06	1.14E-06	1.16E-06	1.18E-06
u232	4.86E-04	4.87E-04	5.44E-04	6.00E-04	6.99E-04	8.64E-04	1.16E-03	1.31E-03	1.31E-03	1.27E-03	1.21E-03
u234	2.03E-01	2.03E-01	2.04E-01	2.05E-01	2.07E-01	2.11E-01	2.24E-01	2.44E-01	2.63E-01	2.82E-01	3.00E-01
u235	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02	1.06E-02
u236	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.06E+00	4.07E+00	4.07E+00	4.07E+00

u237	2.75E-06	2.49E-06	2.84E-10	1.70E-11	1.66E-11	1.58E-11	1.37E-11	1.07E-11	8.44E-12	6.63E-12	5.21E-12
u238	2.51E+03	2.51E+03	2.51E+03	2.51E+03	2.51E+03	2.51E+03	2.51E+03	2.51E+03	2.51E+03	2.51E+03	2.51E+03
u239	1.03E-06	3.49E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07
np238	1.72E-05	1.24E-05	4.97E-12	4.96E-12	4.95E-12	4.93E-12	4.85E-12	4.74E-12	4.62E-12	4.51E-12	4.40E-12
np239	2.11E-02	1.58E-02	8.04E-08	8.04E-08	8.04E-08	8.04E-08	8.04E-08	8.03E-08	8.03E-08	8.03E-08	8.02E-08
pu236	3.64E+01	3.65E+01	3.44E+01	3.24E+01	2.88E+01	2.26E+01	1.11E+01	3.35E+00	1.01E+00	3.07E-01	9.29E-02
pu238	2.09E+05	2.09E+05	2.14E+05	2.17E+05	2.20E+05	2.20E+05	2.16E+05	2.07E+05	1.99E+05	1.92E+05	1.84E+05
pu239	2.57E+01	2.58E+01	2.59E+01	2.59E+01	2.59E+01	2.59E+01	2.59E+01	2.59E+01	2.59E+01	2.59E+01	2.59E+01
pu240	5.64E+05	5.64E+05	5.64E+05	5.65E+05	5.65E+05	5.66E+05	5.68E+05	5.70E+05	5.73E+05	5.75E+05	5.76E+05
pu241	1.71E+01	1.71E+01	1.69E+01	1.67E+01	1.63E+01	1.55E+01	1.34E+01	1.06E+01	8.29E+00	6.51E+00	5.11E+00
pu242	2.96E+05	2.96E+05	2.96E+05	2.96E+05	2.96E+05	2.96E+05	2.96E+05	2.96E+05	2.96E+05	2.96E+05	2.96E+05
pu243	2.23E-03	7.77E-05	1.28E-14	1.28E-14	1.28E-14	1.28E-14	1.28E-14	1.28E-14	1.28E-14	1.28E-14	1.28E-14
pu244	1.70E-06	1.71E-06	2.37E-06	3.06E-06	4.42E-06	7.13E-06	1.53E-05	2.89E-05	4.25E-05	5.61E-05	6.97E-05
am241	1.97E+01	1.97E+01	2.43E+01	2.91E+01	3.82E+01	5.59E+01	1.04E+02	1.69E+02	2.20E+02	2.59E+02	2.89E+02
am242m	8.06E+01	8.06E+01	8.05E+01	8.04E+01	8.02E+01	7.98E+01	7.86E+01	7.67E+01	7.48E+01	7.30E+01	7.13E+01
am242	4.36E+02	1.54E+02	8.74E-02	8.73E-02	8.71E-02	8.66E-02	8.54E-02	8.33E-02	8.13E-02	7.93E-02	7.74E-02
am243	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.57E+01	3.56E+01
am244	5.40E-02	1.04E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.10E+08	1.10E+08	7.54E+07	5.09E+07	2.34E+07	4.97E+06	7.24E+04	2.50E+04	2.44E+04	2.38E+04	2.32E+04
cm243	2.87E+02	2.87E+02	2.86E+02	2.84E+02	2.81E+02	2.74E+02	2.55E+02	2.25E+02	2.00E+02	1.77E+02	1.57E+02
cm244	2.38E+08	2.38E+08	2.36E+08	2.33E+08	2.29E+08	2.20E+08	1.96E+08	1.62E+08	1.34E+08	1.11E+08	9.13E+07
cm245	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.14E+01	4.13E+01	4.13E+01	4.13E+01
cm246	2.05E+06	2.05E+06	2.05E+06	2.05E+06	2.05E+06	2.05E+06	2.04E+06	2.04E+06	2.04E+06	2.04E+06	2.04E+06
cm248	3.22E+04	3.22E+04	3.22E+04	3.22E+04	3.22E+04	3.22E+04	3.22E+04	3.23E+04	3.23E+04	3.23E+04	3.23E+04
cm250	4.19E-02	4.19E-02	4.19E-02	4.19E-02	4.19E-02	4.19E-02	4.19E-02	4.19E-02	4.19E-02	4.19E-02	4.19E-02
bk249	1.49E+00	1.49E+00	1.23E+00	1.01E+00	6.78E-01	3.07E-01	2.86E-02	5.48E-04	1.05E-05	2.01E-07	3.85E-09
cf249	8.51E-03	8.60E-03	1.55E-02	2.14E-02	3.01E-02	3.98E-02	4.69E-02	4.72E-02	4.67E-02	4.63E-02	4.58E-02
cf250	2.77E+04	2.78E+04	2.75E+04	2.71E+04	2.64E+04	2.50E+04	2.14E+04	1.64E+04	1.26E+04	9.65E+03	7.40E+03
cf252	3.53E+06	3.52E+06	3.30E+06	3.09E+06	2.71E+06	2.09E+06	9.51E+05	2.57E+05	6.92E+04	1.87E+04	5.03E+03
cf254	2.45E+03	2.42E+03	8.73E+02	3.03E+02	3.73E+01	5.68E-01	2.00E-06	1.64E-15	1.34E-24	.00E+00	.00E+00
es253	6.90E-01	6.94E-01	1.27E-01	8.22E-03	2.24E-05	1.09E-10	8.44E-27	.00E+00	.00E+00	.00E+00	.00E+00
es255	1.16E-02	1.14E-02	2.34E-03	4.52E-04	1.75E-05	2.66E-08	9.27E-17	7.47E-31	.00E+00	.00E+00	.00E+00
0 total	3.54E+08	3.54E+08	3.18E+08	2.91E+08	2.58E+08	2.31E+08	2.01E+08	1.66E+08	1.37E+08	1.14E+08	9.45E+07
0 total	3.79E+08	3.80E+08	3.36E+08	3.04E+08	2.66E+08	2.35E+08	2.04E+08	1.69E+08	1.40E+08	1.17E+08	9.71E+07

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alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	1.072E+07	1.071E+07	7.593E+06	5.376E+06	2.884E+06	1.193E+06	7.102E+05	6.675E+05	6.321E+05	5.994E+05	5.693E+05
3	1.85E+00 - 3.00E+00	1.199E+07	1.198E+07	8.757E+06	6.464E+06	3.891E+06	2.160E+06	1.662E+06	1.587E+06	1.520E+06	1.458E+06	1.401E+06
4	1.40E+00 - 1.85E+00	1.700E+06	1.699E+06	1.301E+06	1.017E+06	7.000E+05	4.899E+05	4.284E+05	4.106E+05	3.944E+05	3.793E+05	3.653E+05
5	9.00E-01 - 1.40E+00	6.302E+05	6.300E+05	5.052E+05	4.163E+05	3.173E+05	2.532E+05	2.341E+05	2.249E+05	2.165E+05	2.086E+05	2.013E+05
6	4.00E-01 - 9.00E-01	1.195E+05	1.195E+05	1.028E+05	9.082E+04	7.766E+04	6.970E+04	6.715E+04	6.461E+04	6.223E+04	6.002E+04	5.797E+04
7	1.00E-01 - 4.00E-01	2.183E+04	2.183E+04	1.845E+04	1.604E+04	1.338E+04	1.172E+04	1.118E+04	1.071E+04	1.027E+04	9.859E+03	9.481E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		2.518E+07	2.516E+07	1.828E+07	1.338E+07	7.884E+06	4.178E+06	3.114E+06	2.965E+06	2.835E+06	2.715E+06	2.604E+06	

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spontaneous fission neutron source spectrum as a function of time

0 BWR SNF Assembly - Fuel - decay
spontaneous fission neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

boundaries, mev		initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	6.699E+06	6.702E+06	5.998E+06	5.483E+06	4.868E+06	4.342E+06	3.777E+06	3.119E+06	2.583E+06	2.142E+06	1.779E+06
2	3.00E+00 - 6.43E+00	7.423E+07	7.425E+07	6.654E+07	6.089E+07	5.413E+07	4.834E+07	4.206E+07	3.473E+07	2.876E+07	2.385E+07	1.981E+07
3	1.85E+00 - 3.00E+00	8.045E+07	8.047E+07	7.207E+07	6.592E+07	5.856E+07	5.227E+07	4.547E+07	3.754E+07	3.109E+07	2.579E+07	2.141E+07
4	1.40E+00 - 1.85E+00	4.617E+07	4.619E+07	4.142E+07	3.793E+07	3.375E+07	3.016E+07	2.625E+07	2.167E+07	1.795E+07	1.489E+07	1.236E+07
5	9.00E-01 - 1.40E+00	6.328E+07	6.330E+07	5.676E+07	5.197E+07	4.623E+07	4.131E+07	3.595E+07	2.968E+07	2.458E+07	2.039E+07	1.693E+07
6	4.00E-01 - 9.00E-01	6.977E+07	6.979E+07	6.251E+07	5.718E+07	5.080E+07	4.534E+07	3.945E+07	3.257E+07	2.697E+07	2.237E+07	1.858E+07
7	1.00E-01 - 4.00E-01	1.370E+07	1.370E+07	1.226E+07	1.121E+07	9.955E+06	8.880E+06	7.724E+06	6.377E+06	5.281E+06	4.380E+06	3.638E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		3.543E+08	3.544E+08	3.176E+08	2.906E+08	2.583E+08	2.306E+08	2.007E+08	1.657E+08	1.372E+08	1.138E+08	9.451E+07

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total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

boundaries, mev		initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d

1	6.43E+00 - 2.00E+01	6.699E+06	6.702E+06	5.998E+06	5.483E+06	4.868E+06	4.342E+06	3.777E+06	3.119E+06	2.583E+06	2.142E+06	1.779E+06
2	3.00E+00 - 6.43E+00	8.495E+07	8.496E+07	7.413E+07	6.626E+07	5.701E+07	4.953E+07	4.277E+07	3.539E+07	2.939E+07	2.445E+07	2.038E+07
3	1.85E+00 - 3.00E+00	9.244E+07	9.245E+07	8.083E+07	7.238E+07	6.245E+07	5.443E+07	4.713E+07	3.913E+07	3.261E+07	2.725E+07	2.282E+07
4	1.40E+00 - 1.85E+00	4.787E+07	4.789E+07	4.272E+07	3.895E+07	3.445E+07	3.065E+07	2.668E+07	2.209E+07	1.834E+07	1.527E+07	1.273E+07
5	9.00E-01 - 1.40E+00	6.391E+07	6.393E+07	5.727E+07	5.238E+07	4.655E+07	4.157E+07	3.619E+07	2.991E+07	2.480E+07	2.060E+07	1.713E+07
6	4.00E-01 - 9.00E-01	6.989E+07	6.991E+07	6.261E+07	5.727E+07	5.088E+07	4.541E+07	3.951E+07	3.263E+07	2.703E+07	2.243E+07	1.864E+07
7	1.00E-01 - 4.00E-01	1.372E+07	1.372E+07	1.228E+07	1.123E+07	9.968E+06	8.892E+06	7.735E+06	6.388E+06	5.292E+06	4.390E+06	3.647E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		3.795E+08	3.796E+08	3.358E+08	3.040E+08	2.662E+08	2.348E+08	2.038E+08	1.687E+08	1.401E+08	1.165E+08	9.712E+07

1

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements
actinides
fission products

1 gamma source spectrum for decay step for BWR source term - fuel ds1 - discharge

0 1.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.5877E+16	1.9763E+15
5.0000E-02	to	1.0000E-01	2.3252E+16	1.7439E+15
1.0000E-01	to	2.0000E-01	4.9706E+16	7.4560E+15
2.0000E-01	to	3.0000E-01	3.3669E+16	8.4172E+15
3.0000E-01	to	4.0000E-01	1.0210E+16	3.5736E+15
4.0000E-01	to	6.0000E-01	2.2444E+16	1.1222E+16
6.0000E-01	to	8.0000E-01	3.9673E+16	2.7771E+16
8.0000E-01	to	1.0000E+00	7.5149E+15	6.7634E+15
1.0000E+00	to	1.3300E+00	3.7275E+15	4.3425E+15
1.3300E+00	to	1.6600E+00	9.1447E+15	1.3671E+16
1.6600E+00	to	2.0000E+00	5.0760E+14	9.2891E+14
2.0000E+00	to	2.5000E+00	4.6339E+14	1.0426E+15
2.5000E+00	to	3.0000E+00	2.6814E+14	7.3737E+14
3.0000E+00	to	4.0000E+00	2.3351E+12	8.1727E+12
4.0000E+00	to	5.0000E+00	1.3692E+10	6.1614E+10
5.0000E+00	to	6.5000E+00	7.5925E+07	4.3657E+08
6.5000E+00	to	8.0000E+00	1.0063E+06	7.2958E+06

	8.0000E+00 to	1.0000E+01	2.1359E+05	1.9223E+06
0	totals		2.6646E+17	8.9655E+16
0				
0	total energy from nuclides with spectrum data =			8.9553E+16
0	total energy from nuclides with no spectrum data =			1.0165E+14
0	gamma source spectrum for decay step for BWR source term - fuel ds1 - 0.25 year			
1	90.00 day time of the requested nuclides			
0	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	6.7670E+15	2.0301E+14
	5.0000E-02 to	1.0000E-01	2.1237E+15	1.5928E+14
	1.0000E-01 to	2.0000E-01	2.4093E+15	3.6139E+14
	2.0000E-01 to	3.0000E-01	5.2166E+14	1.3042E+14
	3.0000E-01 to	4.0000E-01	4.0227E+14	1.4079E+14
	4.0000E-01 to	6.0000E-01	3.9293E+15	1.9646E+15
	6.0000E-01 to	8.0000E-01	1.0989E+16	7.6921E+15
	8.0000E-01 to	1.0000E+00	8.6933E+14	7.8240E+14
	1.0000E+00 to	1.3300E+00	2.7485E+14	3.2020E+14
	1.3300E+00 to	1.6600E+00	1.7133E+14	2.5614E+14
	1.6600E+00 to	2.0000E+00	1.3780E+13	2.5217E+13
	2.0000E+00 to	2.5000E+00	4.5777E+13	1.0300E+14
	2.5000E+00 to	3.0000E+00	2.9182E+12	8.0249E+12
	3.0000E+00 to	4.0000E+00	1.0936E+11	3.8275E+11
	4.0000E+00 to	5.0000E+00	1.1328E+07	5.0976E+07
	5.0000E+00 to	6.5000E+00	4.5443E+06	2.6130E+07
	6.5000E+00 to	8.0000E+00	8.9109E+05	6.4604E+06
	8.0000E+00 to	1.0000E+01	1.8915E+05	1.7023E+06
0	totals		2.8520E+16	1.2147E+16
0				
0	total energy from nuclides with spectrum data =			1.2143E+16
0	total energy from nuclides with no spectrum data =			3.8236E+12
1	gamma source spectrum for decay step for BWR source term - fuel ds1 - 0.50 year			
0	182.50 day time of the requested nuclides			
0	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	4.9761E+15	1.4928E+14
	5.0000E-02 to	1.0000E-01	1.6283E+15	1.2212E+14
	1.0000E-01 to	2.0000E-01	1.5861E+15	2.3791E+14
	2.0000E-01 to	3.0000E-01	3.9936E+14	9.9841E+13
	3.0000E-01 to	4.0000E-01	3.0356E+14	1.0625E+14
	4.0000E-01 to	6.0000E-01	2.4297E+15	1.2148E+15
	6.0000E-01 to	8.0000E-01	6.0458E+15	4.2320E+15
	8.0000E-01 to	1.0000E+00	7.5154E+14	6.7639E+14
	1.0000E+00 to	1.3300E+00	2.2665E+14	2.6405E+14
	1.3300E+00 to	1.6600E+00	9.0818E+13	1.3577E+14
	1.6600E+00 to	2.0000E+00	9.0135E+12	1.6495E+13
	2.0000E+00 to	2.5000E+00	3.3047E+13	7.4357E+13
	2.5000E+00 to	3.0000E+00	6.4575E+11	1.7758E+12
	3.0000E+00 to	4.0000E+00	7.7184E+10	2.7014E+11
	4.0000E+00 to	5.0000E+00	1.0266E+07	4.6198E+07
	5.0000E+00 to	6.5000E+00	4.1189E+06	2.3683E+07
	6.5000E+00 to	8.0000E+00	8.0775E+05	5.8562E+06
	8.0000E+00 to	1.0000E+01	1.7147E+05	1.5432E+06
0	totals		1.8481E+16	7.3314E+15
0				
0	total energy from nuclides with spectrum data =			7.3297E+15
0	total energy from nuclides with no spectrum data =			1.7105E+12
1	gamma source spectrum for decay step for BWR source term - fuel ds1 - 1 year			
0	365.25 day time of the requested nuclides			
0	energy interval in mev		photons / second	mev / second

1.0000E-02 to	5.0000E-02	3.3645E+15	1.0094E+14
5.0000E-02 to	1.0000E-01	1.1074E+15	8.3058E+13
1.0000E-01 to	2.0000E-01	1.0372E+15	1.5558E+14
2.0000E-01 to	3.0000E-01	2.7087E+14	6.7719E+13
3.0000E-01 to	4.0000E-01	2.0654E+14	7.2288E+13
4.0000E-01 to	6.0000E-01	1.7103E+15	8.5517E+14
6.0000E-01 to	8.0000E-01	2.9236E+15	2.0465E+15
8.0000E-01 to	1.0000E+00	6.1986E+14	5.5787E+14
1.0000E+00 to	1.3300E+00	1.8570E+14	2.1634E+14
1.3300E+00 to	1.6600E+00	6.9637E+13	1.0411E+14
1.6600E+00 to	2.0000E+00	6.0399E+12	1.1053E+13
2.0000E+00 to	2.5000E+00	2.1451E+13	4.8264E+13
2.5000E+00 to	3.0000E+00	4.4736E+11	1.2302E+12
3.0000E+00 to	4.0000E+00	5.4808E+10	1.9183E+11
4.0000E+00 to	5.0000E+00	9.0079E+06	4.0536E+07
5.0000E+00 to	6.5000E+00	3.6146E+06	2.0784E+07
6.5000E+00 to	8.0000E+00	7.0897E+05	5.1400E+06
8.0000E+00 to	1.0000E+01	1.5051E+05	1.3546E+06
totals		1.1524E+16	4.3204E+15

total energy from nuclides with spectrum data = 4.3198E+15
total energy from nuclides with no spectrum data = 5.9029E+11
gamma source spectrum for decay step for BWR source term - fuel ds1 - 2 year
730.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.8368E+15	5.5103E+13
5.0000E-02 to	1.0000E-01	5.8907E+14	4.4180E+13
1.0000E-01 to	2.0000E-01	5.3749E+14	8.0623E+13
2.0000E-01 to	3.0000E-01	1.4262E+14	3.5655E+13
3.0000E-01 to	4.0000E-01	1.0552E+14	3.6931E+13
4.0000E-01 to	6.0000E-01	1.0982E+15	5.4910E+14
6.0000E-01 to	8.0000E-01	1.9312E+15	1.3518E+15
8.0000E-01 to	1.0000E+00	4.3453E+14	3.9107E+14
1.0000E+00 to	1.3300E+00	1.3605E+14	1.5850E+14
1.3300E+00 to	1.6600E+00	4.4086E+13	6.5908E+13
1.6600E+00 to	2.0000E+00	2.9335E+12	5.3683E+12
2.0000E+00 to	2.5000E+00	9.1364E+12	2.0557E+13
2.5000E+00 to	3.0000E+00	2.2490E+11	6.1849E+11
3.0000E+00 to	4.0000E+00	2.7740E+10	9.7089E+10
4.0000E+00 to	5.0000E+00	7.9603E+06	3.5821E+07
5.0000E+00 to	6.5000E+00	3.1947E+06	1.8369E+07
6.5000E+00 to	8.0000E+00	6.2667E+05	4.5433E+06
8.0000E+00 to	1.0000E+01	1.3305E+05	1.1975E+06
totals		6.8678E+15	2.7956E+15

total energy from nuclides with spectrum data = 2.7955E+15
total energy from nuclides with no spectrum data = 9.0832E+10
gamma source spectrum for decay step for BWR source term - fuel ds1 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	6.5566E+14	1.9670E+13
5.0000E-02 to	1.0000E-01	1.8842E+14	1.4131E+13
1.0000E-01 to	2.0000E-01	1.5976E+14	2.3965E+13
2.0000E-01 to	3.0000E-01	4.3032E+13	1.0758E+13
3.0000E-01 to	4.0000E-01	2.7431E+13	9.6008E+12
4.0000E-01 to	6.0000E-01	3.4758E+14	1.7379E+14
6.0000E-01 to	8.0000E-01	1.1773E+15	8.2412E+14

8.0000E-01 to	1.0000E+00	1.6747E+14	1.5072E+14
1.0000E+00 to	1.3300E+00	7.4728E+13	8.7058E+13
1.3300E+00 to	1.6600E+00	1.5903E+13	2.3775E+13
1.6600E+00 to	2.0000E+00	3.8889E+11	7.1166E+11
2.0000E+00 to	2.5000E+00	7.3894E+11	1.6626E+12
2.5000E+00 to	3.0000E+00	2.8971E+10	7.9672E+10
3.0000E+00 to	4.0000E+00	3.6111E+09	1.2639E+10
4.0000E+00 to	5.0000E+00	6.9118E+06	3.1103E+07
5.0000E+00 to	6.5000E+00	2.7739E+06	1.5950E+07
6.5000E+00 to	8.0000E+00	5.4414E+05	3.9450E+06
8.0000E+00 to	1.0000E+01	1.1553E+05	1.0398E+06
totals		2.8585E+15	1.3401E+15

total energy from nuclides with spectrum data = 1.3400E+15
total energy from nuclides with no spectrum data = 1.4527E+10
gamma source spectrum for decay step for BWR source term - fuel ds1 - 10 year
3652.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	4.3783E+14	1.3135E+13
5.0000E-02 to	1.0000E-01	1.2201E+14	9.1508E+12
1.0000E-01 to	2.0000E-01	9.6707E+13	1.4506E+13
2.0000E-01 to	3.0000E-01	2.6824E+13	6.7061E+12
3.0000E-01 to	4.0000E-01	1.6209E+13	5.6731E+12
4.0000E-01 to	6.0000E-01	7.2387E+13	3.6193E+13
6.0000E-01 to	8.0000E-01	8.0644E+14	5.6451E+14
8.0000E-01 to	1.0000E+00	4.5654E+13	4.1089E+13
1.0000E+00 to	1.3300E+00	4.1948E+13	4.8870E+13
1.3300E+00 to	1.6600E+00	5.2041E+12	7.7802E+12
1.6600E+00 to	2.0000E+00	5.2478E+10	9.6035E+10
2.0000E+00 to	2.5000E+00	1.5416E+10	3.4685E+10
2.5000E+00 to	3.0000E+00	1.2840E+09	3.5309E+09
3.0000E+00 to	4.0000E+00	1.3602E+08	4.7607E+08
4.0000E+00 to	5.0000E+00	5.7121E+06	2.5704E+07
5.0000E+00 to	6.5000E+00	2.2924E+06	1.3181E+07
6.5000E+00 to	8.0000E+00	4.4966E+05	3.2601E+06
8.0000E+00 to	1.0000E+01	9.5470E+04	8.5923E+05
totals		1.6713E+15	7.4774E+14

total energy from nuclides with spectrum data = 7.4774E+14
total energy from nuclides with no spectrum data = 4.4560E+09
gamma source spectrum for decay step for BWR source term - fuel ds1 - 15 year
5478.75 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	3.6983E+14	1.1095E+13
5.0000E-02 to	1.0000E-01	1.0473E+14	7.8547E+12
1.0000E-01 to	2.0000E-01	7.7977E+13	1.1697E+13
2.0000E-01 to	3.0000E-01	2.2425E+13	5.6061E+12
3.0000E-01 to	4.0000E-01	1.3946E+13	4.8809E+12
4.0000E-01 to	6.0000E-01	2.3318E+13	1.1659E+13
6.0000E-01 to	8.0000E-01	6.7243E+14	4.7070E+14
8.0000E-01 to	1.0000E+00	1.8765E+13	1.6888E+13
1.0000E+00 to	1.3300E+00	2.6536E+13	3.0914E+13
1.3300E+00 to	1.6600E+00	2.4530E+12	3.6672E+12
1.6600E+00 to	2.0000E+00	3.6859E+10	6.7451E+10
2.0000E+00 to	2.5000E+00	2.1284E+09	4.7889E+09
2.5000E+00 to	3.0000E+00	3.9372E+08	1.0827E+09
3.0000E+00 to	4.0000E+00	1.7972E+07	6.2901E+07
4.0000E+00 to	5.0000E+00	4.7328E+06	2.1298E+07

energy interval in mev			photons / second	mev / second
5.0000E+00	to	6.5000E+00	1.8993E+06	1.0921E+07
6.5000E+00	to	8.0000E+00	3.7254E+05	2.7009E+06
8.0000E+00	to	1.0000E+01	7.9094E+04	7.1184E+05
totals			1.3324E+15	5.7504E+14

total energy from nuclides with spectrum data = 5.7503E+14
total energy from nuclides with no spectrum data = 1.4579E+09
gamma source spectrum for decay step for BWR source term - fuel ds1 - 20 year
7305.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.2076E+14	9.6228E+12
5.0000E-02	to	1.0000E-01	9.2642E+13	6.9482E+12
1.0000E-01	to	2.0000E-01	6.4937E+13	9.7406E+12
2.0000E-01	to	3.0000E-01	1.9167E+13	4.7917E+12
3.0000E-01	to	4.0000E-01	1.2244E+13	4.2854E+12
4.0000E-01	to	6.0000E-01	1.2462E+13	6.2308E+12
6.0000E-01	to	8.0000E-01	5.8857E+14	4.1200E+14
8.0000E-01	to	1.0000E+00	1.0653E+13	9.5880E+12
1.0000E+00	to	1.3300E+00	1.7344E+13	2.0206E+13
1.3300E+00	to	1.6600E+00	1.4016E+12	2.0954E+12
1.6600E+00	to	2.0000E+00	3.1890E+10	5.8359E+10
2.0000E+00	to	2.5000E+00	1.6058E+09	3.6130E+09
2.5000E+00	to	3.0000E+00	3.5768E+08	9.8362E+08
3.0000E+00	to	4.0000E+00	1.1765E+07	4.1177E+07
4.0000E+00	to	5.0000E+00	3.9267E+06	1.7670E+07
5.0000E+00	to	6.5000E+00	1.5757E+06	9.0603E+06
6.5000E+00	to	8.0000E+00	3.0906E+05	2.2407E+06
8.0000E+00	to	1.0000E+01	6.5614E+04	5.9053E+05
totals			1.1402E+15	4.8557E+14

total energy from nuclides with spectrum data = 4.8557E+14
total energy from nuclides with no spectrum data = 5.5243E+08
gamma source spectrum for decay step for BWR source term - fuel ds1 - 25 year
9131.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.8080E+14	8.4241E+12
5.0000E-02	to	1.0000E-01	8.2890E+13	6.2168E+12
1.0000E-01	to	2.0000E-01	5.4947E+13	8.2420E+12
2.0000E-01	to	3.0000E-01	1.6523E+13	4.1308E+12
3.0000E-01	to	4.0000E-01	1.0784E+13	3.7743E+12
4.0000E-01	to	6.0000E-01	9.0856E+12	4.5428E+12
6.0000E-01	to	8.0000E-01	5.2110E+14	3.6477E+14
8.0000E-01	to	1.0000E+00	7.0285E+12	6.3256E+12
1.0000E+00	to	1.3300E+00	1.1518E+13	1.3419E+13
1.3300E+00	to	1.6600E+00	8.7911E+11	1.3143E+12
1.6600E+00	to	2.0000E+00	2.7912E+10	5.1079E+10
2.0000E+00	to	2.5000E+00	1.4072E+09	3.1661E+09
2.5000E+00	to	3.0000E+00	3.4216E+08	9.4095E+08
3.0000E+00	to	4.0000E+00	9.6688E+06	3.3841E+07
4.0000E+00	to	5.0000E+00	3.2617E+06	1.4678E+07
5.0000E+00	to	6.5000E+00	1.3088E+06	7.5256E+06
6.5000E+00	to	8.0000E+00	2.5669E+05	1.8610E+06
8.0000E+00	to	1.0000E+01	5.4495E+04	4.9045E+05
totals			9.9559E+14	4.2121E+14

total energy from nuclides with spectrum data = 4.2121E+14
total energy from nuclides with no spectrum data = 2.7430E+08

```
1  * normal termination of execution *
0                                        table of contents for material tables
0                                          case or subcase printed      page

                                                     1                  1
0ndset          33
           33           4           1          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     19 entries read
0   74* array     19 entries read
0   75$ array     19 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0           0
           21         100          19           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero           4
            0         689         129         879
0pow             3
   .000000E+00  .000000E+00  .000000E+00
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              4.5046E+00      1.9428E+02      1.9878E+02
 start of interval flux =         2.09870E+13
 n-gamma, fission and total mev/fission =              4.9440E+00      1.9445E+02      1.9939E+02
 start of interval flux =         2.09027E+13
 n-gamma, fission and total mev/fission =              5.0603E+00      1.9461E+02      1.9967E+02
 start of interval flux =         2.08344E+13
 n-gamma, fission and total mev/fission =              5.1811E+00      1.9477E+02      1.9995E+02
 start of interval flux =         2.07980E+13
 n-gamma, fission and total mev/fission =              5.3070E+00      1.9491E+02      2.0022E+02
 start of interval flux =         2.07875E+13
 n-gamma, fission and total mev/fission =              5.4364E+00      1.9505E+02      2.0048E+02
 start of interval flux =         2.07985E+13
 n-gamma, fission and total mev/fission =              5.5684E+00      1.9518E+02      2.0074E+02
```

```
 start of interval flux =         2.08275E+13
 n-gamma, fission and total mev/fission =              5.7020E+00       1.9530E+02       2.0100E+02
 start of interval flux =         2.08720E+13
 n-gamma, fission and total mev/fission =              5.8365E+00       1.9542E+02       2.0125E+02
 start of interval flux =         2.09296E+13
 n-gamma, fission and total mev/fission =              5.9715E+00       1.9553E+02       2.0150E+02
 start of interval flux =         2.09986E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
0ndset           33
            33           4           2          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935          20           6          18        1697
0mmn             19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21         689         129         879
0pow              3
  4.349999E+00 1.799989E+03 2.088753E+13
0 linp            9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              6.0463E+00       1.9561E+02       2.0166E+02
 start of interval flux =         2.09442E+13
 n-gamma, fission and total mev/fission =              6.1684E+00       1.9571E+02       2.0188E+02
 start of interval flux =         2.10509E+13
 n-gamma, fission and total mev/fission =              6.2995E+00       1.9582E+02       2.0211E+02
 start of interval flux =         2.11635E+13
 n-gamma, fission and total mev/fission =              6.4316E+00       1.9591E+02       2.0235E+02
 start of interval flux =         2.12828E+13
 n-gamma, fission and total mev/fission =              6.5638E+00       1.9601E+02       2.0258E+02
 start of interval flux =         2.14080E+13
 n-gamma, fission and total mev/fission =              6.6961E+00       1.9611E+02       2.0280E+02
 start of interval flux =         2.15386E+13
 n-gamma, fission and total mev/fission =              6.8282E+00       1.9620E+02       2.0303E+02
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```
 start of interval flux =         2.16741E+13
 n-gamma, fission and total mev/fission =              6.9601E+00       1.9630E+02       2.0326E+02
 start of interval flux =         2.18140E+13
 n-gamma, fission and total mev/fission =              7.0916E+00       1.9639E+02       2.0348E+02
 start of interval flux =         2.19581E+13
 n-gamma, fission and total mev/fission =              7.2227E+00       1.9648E+02       2.0370E+02
 start of interval flux =         2.21060E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
0ndset           33
            33           4           3          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935          20           6          18        1697
0mmn             19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21         689         129         879
0pow              3
  4.349999E+00 3.599977E+03 2.157675E+13
0 linp            9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              7.0874E+00       1.9653E+02       2.0361E+02
 start of interval flux =         2.22535E+13
 n-gamma, fission and total mev/fission =              7.2106E+00       1.9661E+02       2.0382E+02
 start of interval flux =         2.24659E+13
 n-gamma, fission and total mev/fission =              7.3506E+00       1.9668E+02       2.0404E+02
 start of interval flux =         2.26783E+13
 n-gamma, fission and total mev/fission =              7.4906E+00       1.9676E+02       2.0425E+02
 start of interval flux =         2.28910E+13
 n-gamma, fission and total mev/fission =              7.6302E+00       1.9684E+02       2.0447E+02
 start of interval flux =         2.31038E+13
 n-gamma, fission and total mev/fission =              7.7694E+00       1.9692E+02       2.0469E+02
 start of interval flux =         2.33167E+13
 n-gamma, fission and total mev/fission =              7.9079E+00       1.9700E+02       2.0491E+02
```

```
 start of interval flux =         2.35299E+13
 n-gamma, fission and total mev/fission =              8.0459E+00       1.9708E+02       2.0513E+02
 start of interval flux =         2.37432E+13
 n-gamma, fission and total mev/fission =              8.1834E+00       1.9716E+02       2.0534E+02
 start of interval flux =         2.39566E+13
 n-gamma, fission and total mev/fission =              8.3202E+00       1.9724E+02       2.0556E+02
 start of interval flux =         2.41701E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
0ndset           33
           33            4            4           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
            0            0            0            0            0            0            0            0            0            0
            0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
         7935           20            6           18         1697
0mmn             19
           10           10            0            0            1            3            0            0            0           10
           21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
           21          689          129          879
0pow              3
  4.349999E+00 5.399966E+03 2.334041E+13
0 linp            9
            6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              8.2167E+00       1.9730E+02       2.0551E+02
 start of interval flux =         2.43932E+13
 n-gamma, fission and total mev/fission =              8.3590E+00       1.9736E+02       2.0572E+02
 start of interval flux =         2.46674E+13
 n-gamma, fission and total mev/fission =              8.5097E+00       1.9743E+02       2.0594E+02
 start of interval flux =         2.49379E+13
 n-gamma, fission and total mev/fission =              8.6594E+00       1.9750E+02       2.0616E+02
 start of interval flux =         2.52046E+13
 n-gamma, fission and total mev/fission =              8.8077E+00       1.9757E+02       2.0638E+02
 start of interval flux =         2.54676E+13
 n-gamma, fission and total mev/fission =              8.9548E+00       1.9765E+02       2.0660E+02
 start of interval flux =         2.57271E+13
 n-gamma, fission and total mev/fission =              9.1006E+00       1.9772E+02       2.0682E+02
```

```
 start of interval flux =         2.59830E+13
 n-gamma, fission and total mev/fission =              9.2450E+00       1.9779E+02       2.0703E+02
 start of interval flux =         2.62357E+13
 n-gamma, fission and total mev/fission =              9.3882E+00       1.9786E+02       2.0725E+02
 start of interval flux =         2.64850E+13
 n-gamma, fission and total mev/fission =              9.5299E+00       1.9793E+02       2.0746E+02
 start of interval flux =         2.67312E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
0ndset           33
            33           4           5          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935          20           6          18        1697
0mmn             19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 1.000000E-05
0mzero           4
            21         689         129         879
0pow             3
  4.349999E+00 7.199954E+03 2.574008E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              9.4289E+00       1.9799E+02       2.0742E+02
 start of interval flux =         2.70190E+13
 n-gamma, fission and total mev/fission =              9.5801E+00       1.9805E+02       2.0763E+02
 start of interval flux =         2.73320E+13
 n-gamma, fission and total mev/fission =              9.7379E+00       1.9812E+02       2.0785E+02
 start of interval flux =         2.76370E+13
 n-gamma, fission and total mev/fission =              9.8933E+00       1.9818E+02       2.0807E+02
 start of interval flux =         2.79335E+13
 n-gamma, fission and total mev/fission =              1.0046E+01       1.9824E+02       2.0829E+02
 start of interval flux =         2.82217E+13
 n-gamma, fission and total mev/fission =              1.0196E+01       1.9831E+02       2.0850E+02
 start of interval flux =         2.85020E+13
 n-gamma, fission and total mev/fission =              1.0344E+01       1.9837E+02       2.0871E+02
```

```
 start of interval flux =         2.87748E+13
 n-gamma, fission and total mev/fission =              1.0489E+01       1.9843E+02       2.0892E+02
 start of interval flux =         2.90403E+13
 n-gamma, fission and total mev/fission =              1.0631E+01       1.9849E+02       2.0913E+02
 start of interval flux =         2.92988E+13
 n-gamma, fission and total mev/fission =              1.0771E+01       1.9856E+02       2.0933E+02
 start of interval flux =         2.95507E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
0ndset           33
            33           4           5          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935          20           6          18        1697
0mmn             19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21         689         129         879
0pow              3
  4.349999E+00 8.999942E+03 2.850066E+13
0 linp            9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              1.0920E+01       1.9862E+02       2.0954E+02
 start of interval flux =         2.98186E+13
 n-gamma, fission and total mev/fission =              1.0984E+01       1.9865E+02       2.0963E+02
 start of interval flux =         2.99204E+13
 n-gamma, fission and total mev/fission =              1.1042E+01       1.9868E+02       2.0972E+02
 start of interval flux =         3.00219E+13
 n-gamma, fission and total mev/fission =              1.1100E+01       1.9870E+02       2.0980E+02
 start of interval flux =         3.01223E+13
 n-gamma, fission and total mev/fission =              1.1157E+01       1.9873E+02       2.0989E+02
 start of interval flux =         3.02217E+13
 n-gamma, fission and total mev/fission =              1.1214E+01       1.9876E+02       2.0997E+02
 start of interval flux =         3.03201E+13
 n-gamma, fission and total mev/fission =              1.1270E+01       1.9878E+02       2.1005E+02
```

```
 start of interval flux =         3.04175E+13
 n-gamma, fission and total mev/fission =              1.1326E+01       1.9881E+02       2.1013E+02
 start of interval flux =         3.05139E+13
 n-gamma, fission and total mev/fission =              1.1382E+01       1.9883E+02       2.1021E+02
 start of interval flux =         3.06094E+13
 n-gamma, fission and total mev/fission =              1.1437E+01       1.9886E+02       2.1029E+02
 start of interval flux =         3.07038E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 49000 MWd/MTU
0ndset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  87495
     used   107477 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
             0           10            0            0            1            1            0            0            0           10
            21          100            0            4            3            0            2            0            0
0tconst          5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero           4
            21          689          129          879
0pow             3
  4.350000E+00 9.799938E+03 2.452692E+13
0 linp           9
             6            2            0           26            1        18418         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Fuel - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     8000     140000
       240000    250000    260000
       280000    400000    500000
74**     64.6     7480.0      34.4  192421.0
          0.2        0.2      17.8
        193.8       12.7     672.9
        122.3      171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 49000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.0816335 e
   5t
BWR SNF Assembly - Bottom - deplete to 49000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Bottom - decay
per ONE BWR Fuel Assembly - Bottom Region - ds1b
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - bot ds1 - discharge
  decay step for BWR source term - bot ds1 - 0.25 year
  decay step for BWR source term - bot ds1 - 0.50 year
  decay step for BWR source term - bot ds1 - 1 year
  decay step for BWR source term - bot ds1 - 2 year
  decay step for BWR source term - bot ds1 - 5 year
  decay step for BWR source term - bot ds1 - 10 year
  decay step for BWR source term - bot ds1 - 15 year
  decay step for BWR source term - bot ds1 - 20 year
  decay step for BWR source term - bot ds1 - 25 year
56$$ f0
   5t
```

```
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii    gggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
   ooooooooooooo   rrrrrrrrrrrrr   iiiiiiiiiiii   gggggggggggggg   eeeeeeeeeeeee   nnn         nn  sssssssssssss
   oo         oo   rr         rr        ii        gg         gg   ee              nnnn        nn  ss         ss
   oo         oo   rr         rr        ii        gg              ee              nn nn       nn  ss
   oo         oo   rr         rr        ii        gg              ee              nn   nn     nn  ss
   oo         oo   rrrrrrrrrrrrr        ii        gg    ggggggg   eeeeeeeee       nn    nn    nn  sssssssssss
   oo         oo   rrrrrrrrrrrr         ii        gg    ggggggg   eeeeeeeee       nn     nn   nn   sssssssssss
   oo         oo   rr       rr          ii        gg         gg   ee              nn      nn  nn             ss
   oo         oo   rr        rr         ii        gg         gg   ee              nn       nn nn             ss
   oo         oo   rr         rr        ii        gg         gg   ee              nn        nnnn  ss         ss
   ooooooooooooo   rr          rr  iiiiiiiiiiii   gggggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
    ooooooooooo    rr          rr  iiiiiiiiiiii    gggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

   ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
   ll             ooooooooooooo   tttttttttttt    zzzzzzzzzzzz
   ll             oo         oo        tt                   zz
   ll             oo         oo        tt                  zz
   ll             oo         oo        tt                 zz
   ll             oo         oo        tt                zz
   ll             oo         oo        tt               zz
   ll             oo         oo        tt              zz
   ll             oo         oo        tt             zz
   lllllllllllll  ooooooooooooo        tt          zzzzzzzzzzzz
   lllllllllllll   ooooooooooo         tt         zzzzzzzzzzzzz
0

        11        22222222222                //     0000000      666666666666                //   99999999999    666666666666
       111       2222222222222               //    000000000    6666666666666               //   9999999999999  6666666666666
      1111       22         22              //    00       00   66                         //   99         99  66
        11                   22             //    00        00  66                        //    99         99  66
        11                   22            //     00        00  66                       //     99         99  66
        11                 22             //      00        00  666666666666            //      9999999999999  666666666666
        11               22              //       00        00  6666666666666          //       999999999999  6666666666666
        11             22               //        00        00  66         66         //                   99  66         66
        11           22                //         00        00  66         66        //                    99  66         66
        11         22                 //          00       00   66         66       //                     99  66         66
     11111111    2222222222222      //            000000000    6666666666666      //          9999999999999  6666666666666
     11111111    2222222222222     //              0000000      66666666666      //           999999999999    66666666666
0

        11             11                          0000000      88888888888                      0000000      88888888888
       111            111                         000000000    8888888888888                    000000000    8888888888888
      1111           1111              :::       00       00   88         88        :::       00       00   88         88
        11             11              :::      00        00  88         88        :::      00        00  88         88
        11             11              :::      00        00  88         88        :::      00        00  88         88
        11             11                       00        00   88888888888                  00        00   88888888888
        11             11                       00        00   88888888888                  00        00   88888888888
        11             11              :::      00        00  88         88        :::      00        00  88         88
        11             11              :::      00        00  88         88        :::      00        00  88         88
        11             11              :::       00       00   88         88        :::       00       00   88         88
     11111111       11111111                     000000000    8888888888888                    000000000    8888888888888
     11111111       11111111                      0000000      88888888888                      0000000      88888888888
1
0                                 sssssssssss    cccccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                 sssssssssssss  cccccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
                                 ss         ss  cc         cc  aa         aa  ll              ee
                                 ss             cc             aa         aa  ll              ee
```

```
ss              cc              aa         aa   ll              ee
ssssssssssss    cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 ssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
           ss   cc              aa         aa   ll              ee
           ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
ssssssssssss    cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
 ssssssssss      cccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  11:08:08                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0.............................columns 1-72.............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1836733 e
```

```
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     8000     140000
       240000    250000    260000
       280000    400000    500000
74**     64.6     7480.0      34.4  192421.0
          0.2        0.2      17.8
         193.8       12.7     672.9
         122.3      171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
```

```
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 49000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.0816335 e
   5t
BWR SNF Assembly - Bottom - deplete to 49000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds1b
58** 10r4.35
60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Bottom - decay
per ONE BWR Fuel Assembly - Bottom Region - ds1b
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - bot ds1 - discharge
  decay step for BWR source term - bot ds1 - 0.25 year
  decay step for BWR source term - bot ds1 - 0.50 year
  decay step for BWR source term - bot ds1 - 1 year
  decay step for BWR source term - bot ds1 - 2 year
  decay step for BWR source term - bot ds1 - 5 year
  decay step for BWR source term - bot ds1 - 10 year
  decay step for BWR source term - bot ds1 - 15 year
  decay step for BWR source term - bot ds1 - 20 year
  decay step for BWR source term - bot ds1 - 25 year
56$$ f0
   5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
```

```
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
```

```
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
0                      7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
```

```
          pass n applies mid time densities of nth library interval
         first library updated was...
         ********************************************************************************
         *                                                                              *
         *            prelim lwr origen-s binary working library--id = 1143             *
         *          made from modified card-image origen-s libraries of scale 4.2       *
         *       data from the light element, actinide, and fission product libraries   *
         *         decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                              *
         *       neutron flux spectrum factors and cross sections were produced from    *
         *      the "presas2" case updating all nuclides on the scale "burnup" library  *
         *                                                                              *
         *                   fission product yields are from endf/b-v                   *
         *                                                                              *
         *              photon libraries use an 18-energy-group structure               *
         *             the photon data are from the master photon data base,            *
         *              produced to include bremsstrahlung from uo2 matrix              *
         *                                                                              *
         *        see information above this box (if present) for later updates         *
         *                                                                              *
         ********************************************************************************
         *                                                                              *
0        ********************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0               7/ 9/1993     date library was produced
0                  1697     total number of nuclides in library
                    689     number of light-element nuclides
                    129     number of actinide nuclides
                    879     number of fission product nuclides
0                  7935     number of nonzero off-diagonal matrix elements
0        ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  4 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ********************************************************************************
         *                                                                              *
         *            prelim lwr origen-s binary working library--id = 1143             *
         *          made from modified card-image origen-s libraries of scale 4.2       *
         *       data from the light element, actinide, and fission product libraries   *
         *         decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                              *
         *       neutron flux spectrum factors and cross sections were produced from    *
```

```
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                               *
          *                    fission product yields are from endf/b-v                   *
          *                                                                               *
          *                photon libraries use an 18-energy-group structure              *
          *               the photon data are from the master photon data base,           *
          *                produced to include bremsstrahlung from uo2 matrix             *
          *                                                                               *
          *        see information above this box (if present) for later updates          *
          *                                                                               *
          *********************************************************************************
          *                                                                               *
0         *********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         *********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          *********************************************************************************
          *                                                                               *
          *            prelim lwr origen-s binary working library--id = 1143              *
          *         made from modified card-image origen-s libraries of scale 4.2         *
          *       data from the light element, actinide, and fission product libraries    *
          *         decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                               *
          *       neutron flux spectrum factors and cross sections were produced from     *
          *      the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                               *
          *                    fission product yields are from endf/b-v                   *
          *                                                                               *
          *                photon libraries use an 18-energy-group structure              *
          *               the photon data are from the master photon data base,           *
          *                produced to include bremsstrahlung from uo2 matrix             *
          *                                                                               *
          *        see information above this box (if present) for later updates          *
          *                                                                               *
```

```
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
0                      7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
```

```
0                    7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  5 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *            prelim lwr origen-s binary working library--id = 1143           *
         *         made from modified card-image origen-s libraries of scale 4.2      *
         *      data from the light element, actinide, and fission product libraries  *
         *        decay data, including gamma and total energy, are from endf/b-vi    *
         *                                                                            *
         *      neutron flux spectrum factors and cross sections were produced from   *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                            *
         *                  fission product yields are from endf/b-v                  *
         *                                                                            *
         *              photon libraries use an 18-energy-group structure             *
         *             the photon data are from the master photon data base,          *
         *              produced to include bremsstrahlung from uo2 matrix            *
         *                                                                            *
         *        see information above this box (if present) for later updates       *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
1
    BWR SNF Assembly - Bottom - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Bottom Regio
            initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     h  1   3.16E-03  3.16E-03  3.16E-03  3.16E-03  3.16E-03  3.16E-03  3.16E-03  3.16E-03  3.16E-03  3.16E-03  3.16E-03
     h  2   4.41E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06  4.41E-06
     h  3   9.36E-10  9.36E-10  9.23E-10  9.10E-10  8.85E-10  8.36E-10  7.06E-10  5.33E-10  4.03E-10  3.04E-10  2.30E-10
```

he 3	3.83E-11	3.85E-11	5.12E-11	6.43E-11	8.95E-11	1.38E-10	2.68E-10	4.41E-10	5.71E-10	6.70E-10	7.45E-10
he 4	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03
li 6	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10	2.33E-10
li 7	1.95E-13	1.95E-13	1.95E-13	1.95E-13	1.95E-13	1.95E-13	1.95E-13	1.95E-13	1.95E-13	1.95E-13	1.95E-13
be 9	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06	3.07E-06
be 10	6.77E-08	6.77E-08	6.77E-08	6.77E-08	6.77E-08	6.77E-08	6.77E-08	6.77E-08	6.77E-08	6.77E-08	6.77E-08
b 10	8.89E-15	8.97E-15	1.61E-14	2.35E-14	3.82E-14	6.75E-14	1.55E-13	3.02E-13	4.49E-13	5.95E-13	7.42E-13
b 11	8.81E-14	8.81E-14	8.81E-14	8.81E-14	8.81E-14	8.81E-14	8.81E-14	8.81E-14	8.81E-14	8.81E-14	8.81E-14
c 12	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
c 13	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03
c 14	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08	1.15E-08
n 14	3.97E-12	3.97E-12	4.31E-12	4.66E-12	5.36E-12	6.75E-12	1.09E-11	1.79E-11	2.48E-11	3.18E-11	3.87E-11
ne 20	4.23E-15	4.23E-15	4.23E-15	4.23E-15	4.23E-15	4.23E-15	4.23E-15	4.23E-15	4.23E-15	4.23E-15	4.23E-15
ne 22	1.60E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08	1.60E-08
na 23	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09
na 24	4.83E-15	1.55E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	4.68E-12	4.69E-12	4.69E-12	4.69E-12	4.69E-12	4.69E-12	4.69E-12	4.69E-12	4.69E-12	4.69E-12	4.69E-12
mg 25	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04
mg 26	6.96E-05	6.96E-05	6.96E-05	6.96E-05	6.96E-05	6.96E-05	6.96E-05	6.96E-05	6.96E-05	6.96E-05	6.96E-05
al 27	7.51E-07	7.51E-07	7.51E-07	7.51E-07	7.51E-07	7.51E-07	7.51E-07	7.51E-07	7.51E-07	7.51E-07	7.51E-07
si 28	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01
si 29	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01
si 30	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01
si 31	2.35E-08	4.12E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.10E-11	2.09E-11	2.07E-11	2.03E-11	1.99E-11	1.95E-11	1.91E-11
p 31	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04	2.67E-04
p 32	2.74E-09	2.61E-09	3.45E-11	3.89E-13	4.82E-15	4.75E-15	4.69E-15	4.60E-15	4.51E-15	4.42E-15	4.33E-15
p 33	6.61E-13	6.43E-13	5.63E-14	4.48E-15	3.02E-17	1.38E-21	1.32E-34	.00E+00	.00E+00	.00E+00	.00E+00
s 32	1.17E-07	1.17E-07	1.20E-07	1.20E-07	1.20E-07	1.20E-07	1.20E-07	1.20E-07	1.20E-07	1.20E-07	1.20E-07
s 33	3.92E-11	3.93E-11	3.98E-11	3.99E-11	3.99E-11	3.99E-11	3.99E-11	3.99E-11	3.99E-11	3.99E-11	3.99E-11
ca 44	2.47E-09	2.47E-09	2.47E-09	2.47E-09	2.47E-09	2.47E-09	2.47E-09	2.47E-09	2.47E-09	2.47E-09	2.47E-09
ca 45	8.49E-13	8.45E-13	5.80E-13	3.92E-13	1.81E-13	3.86E-14	3.73E-16	1.64E-19	7.22E-23	3.17E-26	1.40E-29
ca 46	8.38E-10	8.38E-10	8.38E-10	8.38E-10	8.38E-10	8.38E-10	8.38E-10	8.38E-10	8.38E-10	8.38E-10	8.38E-10
ca 47	2.06E-14	1.76E-14	2.19E-20	1.59E-26	1.18E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	2.01E-12	2.02E-12	2.28E-12	2.47E-12	2.68E-12	2.82E-12	2.86E-12	2.86E-12	2.86E-12	2.86E-12	2.86E-12
sc 46	9.17E-15	9.10E-15	4.36E-15	2.03E-15	4.47E-16	2.18E-17	2.53E-21	6.97E-28	1.92E-34	5.29E-41	.00E+00
sc 47	5.56E-11	4.52E-11	5.03E-19	4.67E-26	1.65E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	1.89E-10	1.29E-10	2.48E-25	1.26E-40	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	3.12E-14	3.12E-14	3.60E-14	3.83E-14	3.99E-14	4.03E-14	4.03E-14	4.03E-14	4.03E-14	4.03E-14	4.03E-14
ti 47	6.77E-05	6.77E-05	6.77E-05	6.77E-05	6.77E-05	6.77E-05	6.77E-05	6.77E-05	6.77E-05	6.77E-05	6.77E-05
ti 48	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07	3.17E-07
ti 49	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04	1.57E-04
ti 50	7.35E-04	7.35E-04	7.35E-04	7.35E-04	7.35E-04	7.35E-04	7.35E-04	7.35E-04	7.35E-04	7.35E-04	7.35E-04
v 50	2.45E-03	2.45E-03	2.45E-03	2.45E-03	2.45E-03	2.45E-03	2.45E-03	2.45E-03	2.45E-03	2.45E-03	2.45E-03
v 51	3.92E-01	3.92E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
cr 50	7.70E+00	7.70E+00	7.70E+00	7.70E+00	7.70E+00	7.70E+00	7.70E+00	7.70E+00	7.70E+00	7.70E+00	7.70E+00
cr 51	8.86E-03	8.64E-03	9.33E-04	9.22E-05	9.53E-07	1.03E-10	1.28E-22	1.86E-42	.00E+00	.00E+00	.00E+00
cr 52	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02
cr 53	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01

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BWR SNF Assembly - Bottom - decay light elements page 2

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cr 54	5.85E+00	5.85E+00	5.85E+00	5.85E+00	5.85E+00	5.85E+00	5.85E+00	5.85E+00	5.85E+00	5.85E+00	5.85E+00
mn 54	7.72E-03	7.71E-03	6.32E-03	5.15E-03	3.43E-03	1.53E-03	1.34E-04	2.32E-06	4.02E-08	6.97E-10	1.21E-11
mn 55	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01
mn 56	6.59E-05	1.04E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01
fe 55	1.50E-01	1.50E-01	1.41E-01	1.32E-01	1.17E-01	9.05E-02	4.22E-02	1.19E-02	3.33E-03	9.37E-04	2.63E-04

fe 56	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02
fe 57	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01
fe 58	2.23E+00	2.23E+00	2.23E+00	2.23E+00	2.23E+00	2.23E+00	2.23E+00	2.23E+00	2.23E+00	2.23E+00	2.23E+00
fe 59	3.84E-04	3.78E-04	9.46E-05	2.24E-05	1.30E-06	4.40E-09	1.70E-16	7.55E-29	3.35E-41	.00E+00	.00E+00
co 58m	2.85E-11	4.62E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.58E-03	3.55E-03	1.49E-03	6.02E-04	1.01E-04	2.84E-06	6.33E-11	1.12E-18	1.98E-26	3.50E-34	6.18E-42
co 59	5.97E-02	5.97E-02	6.00E-02	6.01E-02	6.01E-02	6.01E-02	6.01E-02	6.02E-02	6.02E-02	6.03E-02	6.03E-02
co 60	5.55E-03	5.55E-03	5.38E-03	5.20E-03	4.87E-03	4.27E-03	2.88E-03	1.49E-03	7.72E-04	4.00E-04	2.07E-04
co 61	6.04E-09	2.53E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.11E+01	8.11E+01	8.11E+01	8.11E+01	8.11E+01	8.11E+01	8.11E+01	8.11E+01	8.11E+01	8.11E+01	8.11E+01
ni 59	9.52E-01	9.52E-01	9.52E-01	9.52E-01	9.52E-01	9.52E-01	9.52E-01	9.52E-01	9.52E-01	9.52E-01	9.52E-01
ni 60	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01
ni 61	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00	1.72E+00
ni 62	4.44E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00	4.44E+00
ni 63	1.97E-01	1.97E-01	1.96E-01	1.96E-01	1.95E-01	1.94E-01	1.90E-01	1.84E-01	1.77E-01	1.71E-01	1.65E-01
ni 64	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
ni 65	5.65E-07	7.67E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	7.96E-11	5.87E-11	9.88E-23	5.72E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	3.91E-03	3.92E-03	4.25E-03	4.59E-03	5.27E-03	6.62E-03	1.06E-02	1.71E-02	2.33E-02	2.93E-02	3.52E-02
cu 64	3.25E-08	8.78E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03
cu 66	1.79E-10	9.16E-14	1.54E-25	8.92E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	1.18E-13	9.05E-14	3.61E-24	5.62E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05	1.03E-05
zn 65	5.34E-09	5.32E-09	4.13E-09	3.18E-09	1.89E-09	6.69E-10	2.97E-11	1.65E-13	9.21E-16	5.13E-18	2.85E-20
zn 66	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05
zn 67	3.57E-08	3.57E-08	3.57E-08	3.57E-08	3.57E-08	3.57E-08	3.57E-08	3.57E-08	3.57E-08	3.57E-08	3.57E-08
zn 68	4.70E-10	4.70E-10	4.70E-10	4.70E-10	4.70E-10	4.70E-10	4.70E-10	4.70E-10	4.70E-10	4.70E-10	4.70E-10
ga 69	8.01E-13	8.01E-13	8.01E-13	8.01E-13	8.01E-13	8.01E-13	8.01E-13	8.01E-13	8.01E-13	8.01E-13	8.01E-13
ge 70	4.32E-15	4.32E-15	4.32E-15	4.32E-15	4.32E-15	4.32E-15	4.32E-15	4.32E-15	4.32E-15	4.32E-15	4.32E-15
sr 87	3.97E-06	3.97E-06	3.97E-06	3.97E-06	3.97E-06	3.97E-06	3.97E-06	3.97E-06	3.97E-06	3.97E-06	3.97E-06
sr 88	3.91E-04	3.91E-04	3.91E-04	3.91E-04	3.91E-04	3.91E-04	3.91E-04	3.91E-04	3.91E-04	3.91E-04	3.91E-04
sr 89	1.16E-06	1.14E-06	3.37E-07	9.49E-08	7.75E-09	5.18E-11	1.55E-17	2.07E-28	2.76E-39	.00E+00	.00E+00
sr 90	2.13E-08	2.13E-08	2.12E-08	2.11E-08	2.08E-08	2.03E-08	1.89E-08	1.67E-08	1.47E-08	1.30E-08	1.15E-08
sr 91	1.80E-09	3.14E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	2.87E-05	2.87E-05	2.95E-05	2.97E-05	2.98E-05	2.98E-05	2.98E-05	2.98E-05	2.98E-05	2.98E-05	2.98E-05
y 90	2.28E-06	1.76E-06	5.51E-12	5.48E-12	5.41E-12	5.28E-12	4.90E-12	4.33E-12	3.83E-12	3.39E-12	3.00E-12
y 91	3.46E-06	3.42E-06	1.19E-06	3.98E-07	4.57E-08	6.03E-10	1.39E-15	5.58E-25	2.24E-34	1.28E-43	.00E+00
y 92	7.65E-09	6.95E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	4.38E-12	8.54E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01
zr 91	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
zr 92	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01
zr 93	6.06E-02	6.06E-02	6.06E-02	6.06E-02	6.06E-02	6.06E-02	6.06E-02	6.06E-02	6.06E-02	6.06E-02	6.06E-02
zr 94	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01
zr 95	1.21E-03	1.19E-03	4.56E-04	1.67E-04	2.31E-05	4.43E-07	3.12E-12	8.06E-21	2.08E-29	5.38E-38	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 96	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00
zr 97	2.08E-05	7.77E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	3.81E-14	3.81E-14	3.81E-14	3.81E-14	3.81E-14	3.81E-14	3.81E-14	3.81E-14	3.81E-14	3.81E-14	3.81E-14
nb 93	6.41E-09	6.42E-09	7.22E-09	8.12E-09	1.01E-08	1.48E-08	3.44E-08	8.34E-08	1.50E-07	2.30E-07	3.21E-07
nb 93m	7.34E-08	7.35E-08	7.93E-08	8.54E-08	9.72E-08	1.20E-07	1.83E-07	2.71E-07	3.42E-07	4.00E-07	4.46E-07
nb 94	2.90E-11	2.90E-11	2.90E-11	2.90E-11	2.90E-11	2.90E-11	2.90E-11	2.90E-11	2.90E-11	2.90E-11	2.90E-11
nb 95	6.52E-04	6.52E-04	4.14E-04	1.80E-04	2.72E-05	5.50E-07	3.75E-12	9.70E-21	2.50E-29	7.19E-40	.00E+00
nb 95m	7.55E-07	7.54E-07	3.02E-07	1.11E-07	1.53E-08	2.94E-10	2.07E-15	5.34E-24	1.38E-32	.00E+00	.00E+00
nb 96	1.78E-08	8.73E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

nb 97	1.48E-06	5.55E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.94E-08	7.27E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	1.16E-15	1.16E-15	1.41E-15	1.66E-15	2.15E-15	3.14E-15	6.11E-15	1.11E-14	1.60E-14	2.10E-14	2.59E-14
mo 95	2.10E-02	2.10E-02	2.20E-02	2.25E-02	2.28E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02	2.29E-02
mo 96	1.72E-03	1.72E-03	1.72E-03	1.72E-03	1.72E-03	1.72E-03	1.72E-03	1.72E-03	1.72E-03	1.72E-03	1.72E-03
mo 97	3.80E-02	3.80E-02	3.81E-02	3.81E-02	3.81E-02	3.81E-02	3.81E-02	3.81E-02	3.81E-02	3.81E-02	3.81E-02
mo 98	5.30E-04	5.30E-04	5.30E-04	5.30E-04	5.30E-04	5.30E-04	5.30E-04	5.30E-04	5.30E-04	5.30E-04	5.30E-04
mo 99	1.14E-08	8.83E-09	1.57E-18	1.15E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10	1.46E-10
tc 98	1.34E-12	1.34E-12	1.34E-12	1.34E-12	1.34E-12	1.34E-12	1.34E-12	1.34E-12	1.34E-12	1.34E-12	1.34E-12
tc 99	1.96E-07	1.97E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07
ru 99	8.76E-13	8.77E-13	1.04E-12	1.20E-12	1.52E-12	2.17E-12	4.12E-12	7.36E-12	1.06E-11	1.39E-11	1.71E-11
ru100	1.82E-08	1.82E-08	1.82E-08	1.82E-08	1.82E-08	1.82E-08	1.82E-08	1.82E-08	1.82E-08	1.82E-08	1.82E-08
ru101	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10	1.03E-10
ru102	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12	2.14E-12
cd111	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09
cd112	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08
cd113	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.61E-11	8.61E-11	8.61E-11	8.61E-11
cd113m	1.28E-10	1.28E-10	1.26E-10	1.25E-10	1.22E-10	1.16E-10	1.00E-10	7.83E-11	6.12E-11	4.79E-11	3.75E-11
cd114	4.66E-06	4.66E-06	4.90E-06	4.97E-06	4.99E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06
cd115	2.13E-10	1.56E-10	1.47E-22	4.69E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	4.64E-10	4.57E-10	1.15E-10	2.72E-11	1.59E-12	5.44E-15	2.18E-22	1.03E-34	.00E+00	.00E+00	.00E+00
cd116	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08
cd117	1.81E-12	2.27E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	9.76E-04	9.76E-04	1.02E-03	1.04E-03	1.06E-03	1.07E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03
in113m	6.02E-08	5.99E-08	3.50E-08	2.01E-08	6.68E-09	7.40E-10	1.01E-12	1.68E-17	2.82E-22	4.71E-27	7.88E-32
in114	1.79E-10	1.13E-10	3.24E-11	8.88E-12	6.87E-13	4.14E-15	9.01E-22	7.11E-33	.00E+00	.00E+00	.00E+00
in114m	7.10E-06	7.00E-06	2.02E-06	5.52E-07	4.27E-08	2.57E-10	5.60E-17	4.42E-28	3.48E-39	.00E+00	.00E+00
in115	9.66E-09	9.67E-09	1.00E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08
in117	5.97E-12	1.46E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.28E-12	7.56E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02
sn113	1.00E-04	9.97E-05	5.83E-05	3.34E-05	1.11E-05	1.23E-06	1.68E-09	2.81E-14	4.69E-19	7.85E-24	1.31E-28
sn114	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02
sn115	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03
sn116	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
sn117m	6.26E-05	5.95E-05	6.37E-07	5.71E-09	5.15E-13	4.23E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
sn119	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
sn119m	1.24E-03	1.23E-03	1.00E-03	8.03E-04	5.21E-04	2.20E-04	1.65E-05	2.19E-07	2.91E-09	3.88E-11	5.16E-13
sn120	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01
sn121	1.81E-06	9.80E-07	6.19E-10	6.17E-10	6.13E-10	6.06E-10	5.83E-10	5.48E-10	5.14E-10	4.83E-10	4.53E-10

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BWR SNF Assembly - Bottom - decay light elements page 4

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sn121m	1.43E-05	1.43E-05	1.42E-05	1.42E-05	1.41E-05	1.39E-05	1.34E-05	1.26E-05	1.18E-05	1.11E-05	1.04E-05
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.96E-05	1.95E-05	1.21E-05	7.37E-06	2.76E-06	3.89E-07	1.09E-09	6.03E-14	3.34E-18	1.85E-22	1.03E-26
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	3.00E-07	2.80E-07	4.65E-10	6.01E-13	1.18E-18	4.64E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03
sb122	9.11E-07	7.05E-07	8.43E-17	4.11E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.69E-04	1.69E-04	1.77E-04	1.81E-04	1.86E-04	1.88E-04	1.89E-04	1.89E-04	1.89E-04	1.89E-04	1.89E-04
sb124	1.19E-06	1.17E-06	4.21E-07	1.45E-07	1.77E-08	2.64E-10	8.74E-16	6.44E-25	4.74E-34	3.48E-43	.00E+00
sb125	7.09E-04	7.08E-04	6.66E-04	6.25E-04	5.50E-04	4.27E-04	1.99E-04	5.60E-05	1.57E-05	4.42E-06	1.24E-06
sb126	1.13E-07	1.06E-07	7.34E-10	4.16E-12	1.52E-16	2.05E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	2.13E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04

te123	1.98E-06	1.98E-06	2.24E-06	2.40E-06	2.54E-06	2.61E-06	2.62E-06	2.62E-06	2.62E-06	2.62E-06	2.62E-06
te123m	6.43E-07	6.40E-07	3.82E-07	2.24E-07	7.76E-08	9.35E-09	1.64E-11	4.18E-16	1.06E-20	2.71E-25	6.91E-30
te124	1.64E-05	1.64E-05	1.72E-05	1.75E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05
te125	6.21E-04	6.21E-04	6.64E-04	7.06E-04	7.81E-04	9.07E-04	1.14E-03	1.28E-03	1.32E-03	1.33E-03	1.34E-03
te125m	9.23E-06	9.23E-06	9.17E-06	8.78E-06	7.80E-06	6.06E-06	2.83E-06	7.95E-07	2.23E-07	6.28E-08	1.76E-08
te126	2.13E-05	2.13E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05
te127	1.09E-10	2.80E-11	6.62E-12	3.68E-12	1.15E-12	1.13E-13	1.06E-16	9.61E-22	8.69E-27	7.86E-32	7.11E-37
te127m	3.35E-09	3.33E-09	1.89E-09	1.05E-09	3.29E-10	3.22E-11	3.03E-14	2.74E-19	2.48E-24	2.25E-29	2.03E-34
te128	4.78E-10	4.78E-10	4.78E-10	4.78E-10	4.78E-10	4.78E-10	4.78E-10	4.78E-10	4.78E-10	4.78E-10	4.78E-10
te129m	3.73E-15	3.66E-15	5.83E-16	8.65E-17	1.99E-18	1.06E-21	1.62E-31	.00E+00	.00E+00	.00E+00	.00E+00
i127	1.12E-07	1.12E-07	1.14E-07	1.15E-07	1.15E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07
i129	4.49E-13	4.49E-13	4.52E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13
xe127	2.93E-15	2.87E-15	5.28E-16	9.07E-17	2.79E-18	2.66E-21	2.31E-30	.00E+00	.00E+00	.00E+00	.00E+00
xe128	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09
xe129	2.54E-11	2.54E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11
xe129m	6.07E-14	5.62E-14	5.44E-17	4.02E-20	2.60E-26	1.12E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12
xe131	3.46E-15	3.47E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15
total	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03

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BWR SNF Assembly - Bottom - decay light elements page 5

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	9.05E-06	9.05E-06	8.92E-06	8.80E-06	8.55E-06	8.09E-06	6.83E-06	5.16E-06	3.89E-06	2.94E-06	2.22E-06
be 10	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.51E-09	1.51E-09
c 14	5.13E-08	5.13E-08	5.13E-08	5.13E-08	5.13E-08	5.13E-08	5.12E-08	5.12E-08	5.12E-08	5.12E-08	5.11E-08
na 24	4.30E-08	1.38E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.40E-12	6.33E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	3.32E+00	6.34E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	9.05E-01	1.59E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.36E-09	1.36E-09	1.34E-09	1.32E-09	1.29E-09	1.26E-09	1.24E-09
p 32	7.84E-04	7.47E-04	9.87E-06	1.11E-07	1.38E-09	1.36E-09	1.34E-09	1.32E-09	1.29E-09	1.26E-09	1.24E-09
p 33	1.03E-07	1.00E-07	8.80E-09	7.01E-10	4.72E-12	2.16E-16	2.06E-29	.00E+00	.00E+00	.00E+00	.00E+00
k 42	8.13E-15	2.12E-15	6.24E-21	6.21E-21	6.14E-21	6.01E-21	5.65E-21	5.08E-21	4.57E-21	4.12E-21	3.70E-21
ca 45	1.50E-08	1.50E-08	1.03E-08	6.95E-09	3.21E-09	6.83E-10	6.62E-12	2.91E-15	1.28E-18	5.62E-22	2.47E-25
ca 47	1.26E-08	1.08E-08	1.34E-14	9.74E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	3.11E-10	3.08E-10	1.48E-10	6.87E-11	1.52E-11	7.39E-13	8.57E-17	2.36E-23	6.50E-30	.00E+00	.00E+00
sc 47	4.62E-05	3.76E-05	4.18E-13	3.88E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	2.82E-04	1.93E-04	3.71E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	1.05E-05	2.77E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	8.19E+02	7.99E+02	8.62E+01	8.52E+00	8.81E-02	9.48E-06	1.18E-17	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	5.98E+01	5.97E+01	4.90E+01	3.99E+01	2.66E+01	1.18E+01	1.04E+00	1.80E-02	3.12E-04	5.40E-06	9.36E-08
mn 56	1.43E+03	2.26E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	3.58E+02	3.58E+02	3.36E+02	3.15E+02	2.78E+02	2.16E+02	1.01E+02	2.83E+01	7.94E+00	2.23E+00	6.27E-01
fe 59	1.91E+01	1.88E+01	4.71E+00	1.11E+00	6.47E-02	2.19E-04	8.47E-12	3.76E-24	.00E+00	.00E+00	.00E+00
co 58m	1.69E-04	2.73E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.14E+02	1.13E+02	4.72E+01	1.91E+01	3.20E+00	9.01E-02	2.01E-06	3.56E-14	6.29E-22	1.11E-29	.00E+00
co 60	6.28E+00	6.28E+00	6.08E+00	5.88E+00	5.51E+00	4.83E+00	3.25E+00	1.69E+00	8.74E-01	4.53E-01	2.34E-01
co 61	1.88E-01	7.87E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	7.69E-02	7.69E-02	7.69E-02	7.69E-02	7.69E-02	7.69E-02	7.69E-02	7.69E-02	7.69E-02	7.69E-02	7.69E-02
ni 63	1.12E+01	1.12E+01	1.11E+01	1.11E+01	1.11E+01	1.10E+01	1.08E+01	1.04E+01	1.01E+01	9.71E+00	9.38E+00
ni 65	1.08E+01	1.47E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	6.93E-05	5.11E-05	8.59E-17	4.98E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	1.26E-01	3.39E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	9.99E-02	5.12E-05	8.61E-17	4.98E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	8.97E-08	6.85E-08	2.73E-18	4.26E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	4.40E-05	4.39E-05	3.41E-05	2.62E-05	1.56E-05	5.51E-06	2.45E-07	1.36E-09	7.59E-12	4.23E-14	2.35E-16
zn 69	6.07E-09	1.31E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	4.08E-10	1.22E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ge 71	7.54E-14	7.10E-14	3.22E-16	1.18E-18	1.83E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.37E-02	3.32E-02	9.80E-03	2.76E-03	2.25E-04	1.50E-06	4.49E-13	6.00E-24	.00E+00	.00E+00	.00E+00
sr 90	3.01E-06	3.01E-06	2.99E-06	2.98E-06	2.94E-06	2.87E-06	2.66E-06	2.35E-06	2.08E-06	1.84E-06	1.63E-06
sr 91	6.51E-03	1.13E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.13E-06	3.09E-06	9.11E-07	2.56E-07	2.09E-08	1.40E-10	4.18E-17	5.58E-28	.00E+00	.00E+00	.00E+00
y 90	1.24E+00	9.57E-01	2.99E-06	2.98E-06	2.94E-06	2.87E-06	2.66E-06	2.36E-06	2.08E-06	1.84E-06	1.63E-06
y 90m	1.15E-07	6.25E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	8.49E-02	8.39E-02	2.92E-02	9.77E-03	1.12E-03	1.48E-05	3.41E-11	1.37E-20	5.50E-30	.00E+00	.00E+00
y 92	7.37E-02	6.70E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.46E-05	2.85E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04
zr 95	2.59E+01	2.56E+01	9.78E+00	3.59E+00	4.97E-01	9.52E-03	6.70E-08	1.73E-16	4.47E-25	.00E+00	.00E+00
zr 97	3.98E+01	1.49E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 93m	1.75E-05	1.75E-05	1.89E-05	2.04E-05	2.32E-05	2.86E-05	4.36E-05	6.46E-05	8.16E-05	9.53E-05	1.06E-04
nb 94	5.44E-12	5.44E-12	5.44E-12	5.44E-12	5.44E-12	5.44E-12	5.43E-12	5.43E-12	5.43E-12	5.43E-12	5.43E-12
nb 95	2.56E+01	2.56E+01	1.63E+01	7.07E+00	1.07E+00	2.16E-02	1.48E-07	3.81E-16	9.85E-25	.00E+00	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 6

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 95m	2.88E-01	2.87E-01	1.15E-01	4.23E-02	5.84E-03	1.12E-04	7.88E-10	2.04E-18	5.26E-27	.00E+00	.00E+00
nb 96	2.49E-02	1.22E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	3.98E+01	1.49E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.77E+01	1.41E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	5.46E-03	4.24E-03	7.53E-13	5.53E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.16E-15	1.16E-15	1.16E-15	1.16E-15	1.16E-15	1.16E-15	1.16E-15	1.16E-15	1.16E-15	1.16E-15	1.16E-15
tc 99	3.36E-09	3.36E-09	3.38E-09	3.38E-09	3.38E-09	3.38E-09	3.38E-09	3.38E-09	3.38E-09	3.38E-09	3.38E-09
ru103	1.78E-11	1.75E-11	3.63E-12	7.08E-13	2.81E-14	4.45E-17	1.76E-25	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	2.87E-08	2.87E-08	2.84E-08	2.80E-08	2.74E-08	2.60E-08	2.25E-08	1.76E-08	1.37E-08	1.07E-08	8.41E-09
cd115	1.09E-04	7.96E-05	7.52E-17	2.39E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.18E-05	1.16E-05	2.92E-06	6.93E-07	4.05E-08	1.38E-10	5.55E-18	2.60E-30	.00E+00	.00E+00	.00E+00
cd117	1.95E-05	2.44E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.54E-08	2.51E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	1.01E+00	1.00E+00	5.86E-01	3.36E-01	1.12E-01	1.24E-02	1.69E-05	2.82E-10	4.72E-15	7.89E-20	1.32E-24
in114	2.47E-01	1.55E-01	4.46E-02	1.22E-02	9.47E-04	5.70E-06	1.24E-12	9.79E-24	.00E+00	.00E+00	.00E+00
in114m	1.64E-01	1.62E-01	4.66E-02	1.28E-02	9.89E-04	5.95E-06	1.30E-12	1.02E-23	.00E+00	.00E+00	.00E+00
in116m	2.94E-05	2.91E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.19E-04	5.35E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.77E-05	1.04E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	1.01E+00	1.00E+00	5.86E-01	3.36E-01	1.12E-01	1.24E-02	1.68E-05	2.82E-10	4.71E-15	7.88E-20	1.32E-24
sn117m	5.14E+00	4.88E+00	5.23E-02	4.69E-04	4.23E-08	3.48E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	4.63E+00	4.62E+00	3.74E+00	3.01E+00	1.95E+00	8.23E-01	6.16E-02	8.20E-04	1.09E-05	1.45E-07	1.93E-09
sn121	1.74E+00	9.39E-01	5.93E-04	5.91E-04	5.87E-04	5.80E-04	5.58E-04	5.24E-04	4.92E-04	4.62E-04	4.34E-04
sn121m	7.66E-04	7.66E-04	7.64E-04	7.61E-04	7.57E-04	7.47E-04	7.19E-04	6.76E-04	6.34E-04	5.96E-04	5.59E-04
sn123	1.61E-01	1.60E-01	9.95E-02	6.06E-02	2.27E-02	3.20E-03	8.94E-06	4.96E-10	2.75E-14	1.52E-18	8.45E-23
sn123m	9.23E-04	1.41E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	3.26E-02	3.03E-02	5.04E-05	6.51E-08	1.28E-13	5.03E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.61E-01	2.79E-01	3.34E-11	1.63E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	2.08E-02	2.05E-02	7.36E-03	2.54E-03	3.09E-04	4.61E-06	1.53E-11	1.13E-20	8.31E-30	.00E+00	.00E+00
sb125	7.43E-01	7.42E-01	6.98E-01	6.55E-01	5.77E-01	4.47E-01	2.09E-01	5.87E-02	1.65E-02	4.63E-03	1.30E-03
sb126	9.41E-03	8.90E-03	6.14E-05	3.48E-07	1.27E-11	1.71E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	5.71E-03	5.68E-03	3.39E-03	1.98E-03	6.88E-04	8.30E-05	1.45E-07	3.71E-12	9.45E-17	2.41E-21	6.14E-26
te125m	1.66E-01	1.66E-01	1.65E-01	1.58E-01	1.41E-01	1.09E-01	5.10E-02	1.43E-02	4.03E-03	1.13E-03	3.18E-04
te127	2.87E-04	7.40E-05	1.75E-05	9.71E-06	3.04E-06	2.98E-07	2.80E-10	2.54E-15	2.29E-20	2.08E-25	1.87E-30
te127m	3.16E-05	3.14E-05	1.78E-05	9.91E-06	3.10E-06	3.04E-07	2.86E-10	2.59E-15	2.34E-20	2.12E-25	1.92E-30
te129	1.74E-09	7.06E-11	1.13E-11	1.67E-12	3.85E-14	2.06E-17	3.13E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	1.13E-10	1.10E-10	1.76E-11	2.61E-12	6.01E-14	3.21E-17	4.89E-27	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.37E-15	1.30E-15	1.14E-17	8.29E-20	4.94E-24	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	3.56E-11	9.35E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

i131	3.62E-15	3.32E-15	1.55E-18	5.32E-22	7.66E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	8.28E-11	8.12E-11	1.49E-11	2.56E-12	7.89E-14	7.53E-17	6.53E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	6.92E-09	6.40E-09	6.20E-12	4.57E-15	2.97E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.31E-12	1.24E-12	6.93E-15	3.16E-17	7.53E-22	4.34E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.28E-15	1.13E-15	9.09E-21	4.44E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	3.07E+03	1.48E+03	5.73E+02	4.17E+02	3.29E+02	2.45E+02	1.16E+02	4.05E+01	1.90E+01	1.25E+01	1.03E+01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Bottom - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.19E+13	5.15E+12	1.07E+12	4.35E+11	1.82E+11	7.49E+10	1.43E+10	5.55E+09	3.72E+09	2.82E+09	2.33E+09
3.00E-02	9.10E+12	4.52E+11	1.30E+11	8.62E+10	5.08E+10	2.68E+10	8.54E+09	2.65E+09	1.03E+09	4.86E+08	2.82E+08
5.50E-02	6.14E+12	1.58E+11	2.76E+10	1.18E+10	3.14E+09	1.33E+09	8.30E+08	4.21E+08	2.17E+08	1.14E+08	6.13E+07
8.50E-02	3.54E+12	8.55E+10	1.42E+10	5.94E+09	1.43E+09	5.05E+08	3.13E+08	1.58E+08	8.03E+07	4.12E+07	2.13E+07
1.20E-01	2.49E+12	5.73E+10	9.15E+09	3.84E+09	9.00E+08	2.90E+08	1.65E+08	7.61E+07	3.67E+07	1.83E+07	9.25E+06
1.70E-01	2.72E+12	2.07E+11	1.22E+10	5.31E+09	2.25E+09	1.33E+09	6.27E+08	1.88E+08	5.90E+07	1.98E+07	7.23E+06
3.00E-01	6.18E+12	3.17E+12	3.43E+11	3.73E+10	1.61E+09	5.21E+08	2.37E+08	7.09E+07	2.22E+07	7.41E+06	2.69E+06
6.50E-01	8.40E+13	1.26E+13	6.06E+12	3.42E+12	1.52E+12	5.78E+11	5.40E+10	2.18E+09	3.88E+08	1.06E+08	3.01E+07
1.13E+00	9.79E+11	5.55E+11	5.01E+11	4.84E+11	4.54E+11	3.98E+11	2.68E+11	1.39E+11	7.19E+10	3.73E+10	1.93E+10
1.58E+00	9.24E+12	4.89E+10	9.75E+09	3.94E+09	6.58E+08	1.84E+07	5.24E+02	7.33E+01	5.07E+01	3.76E+01	2.94E+01
2.00E+00	1.45E+13	2.48E+10	1.96E+07	8.39E+06	3.13E+06	2.13E+06	1.43E+06	7.41E+05	3.84E+05	1.99E+05	1.03E+05
2.40E+00	5.57E+11	8.82E+08	1.20E+05	4.52E+04	1.22E+04	6.78E+03	4.52E+03	2.34E+03	1.21E+03	6.29E+02	3.26E+02
2.80E+00	5.04E+11	7.96E+08	1.08E+04	3.71E+03	4.52E+02	6.74E+00	2.23E-05	3.71E-14	1.80E-14	1.60E-14	1.44E-14
3.25E+00	9.23E+10	1.46E+08	2.59E-15	2.57E-15	2.54E-15	2.47E-15	2.31E-15	1.87E-15	1.68E-15	1.52E-15	1.52E-15
3.75E+00	9.71E+05	6.69E+00	3.11E-18	3.09E-18	3.05E-18	2.98E-18	2.79E-18	2.51E-18	2.26E-18	2.04E-18	1.83E-18
4.25E+00	1.09E+06	4.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	9.35E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	2.81E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	1.72E+14	2.25E+13	8.17E+12	4.49E+12	2.22E+12	1.08E+12	3.47E+11	1.50E+11	7.75E+10	4.09E+10	2.21E+10
0 mev/sec	1.06E+14	9.99E+12	4.64E+12	2.79E+12	1.50E+12	8.25E+11	3.37E+11	1.58E+11	8.13E+10	4.21E+10	2.18E+10

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	7.34E+04	1.18E+04	2.46E+03	1.00E+03	4.19E+02	1.72E+02	3.29E+01	1.28E+01	8.56E+00	6.49E+00	5.36E+00
3.00E-02	6.28E+04	3.12E+03	8.94E+02	5.94E+02	3.51E+02	1.85E+02	5.89E+01	1.83E+01	7.12E+00	3.35E+00	1.95E+00
5.50E-02	7.77E+04	1.99E+03	3.49E+02	1.49E+02	3.97E+01	1.68E+01	1.05E+01	5.32E+00	2.75E+00	1.44E+00	7.75E-01
8.50E-02	6.91E+04	1.67E+03	2.77E+02	1.16E+02	2.79E+01	9.86E+00	6.12E+00	3.08E+00	1.57E+00	8.06E-01	4.15E-01
1.20E-01	6.86E+04	1.58E+03	2.52E+02	1.06E+02	2.48E+01	8.00E+00	4.56E+00	2.10E+00	1.01E+00	5.04E-01	2.55E-01
1.70E-01	1.06E+05	8.09E+03	4.75E+02	2.08E+02	8.79E+01	5.20E+01	2.45E+01	7.35E+00	2.31E+00	7.74E-01	2.82E-01
3.00E-01	4.26E+05	2.19E+05	2.37E+04	2.57E+03	1.11E+02	3.59E+01	1.63E+01	4.89E+00	1.53E+00	5.11E-01	1.86E-01
6.50E-01	1.25E+07	1.88E+06	9.05E+05	5.11E+05	2.27E+05	8.63E+04	8.06E+03	3.25E+02	5.80E+01	1.58E+01	4.50E+00
1.13E+00	2.53E+05	1.44E+05	1.30E+05	1.25E+05	1.17E+05	1.03E+05	6.93E+04	3.59E+04	1.86E+04	9.64E+03	4.99E+03
1.58E+00	3.34E+06	1.77E+04	3.53E+03	1.43E+03	2.38E+02	6.67E+00	1.90E-04	2.66E-05	1.84E-05	1.36E-05	1.07E-05
2.00E+00	6.69E+06	1.14E+04	8.99E+00	3.86E+00	1.44E+00	9.80E-01	6.57E-01	3.40E-01	1.76E-01	9.14E-02	4.73E-02
2.40E+00	3.08E+05	4.87E+02	6.60E-02	2.49E-02	6.71E-03	3.74E-03	2.50E-03	1.29E-03	6.70E-04	3.47E-04	1.80E-04
2.80E+00	3.24E+05	5.12E+02	6.92E-03	2.39E-03	2.91E-04	4.34E-06	1.44E-11	2.39E-20	1.16E-20	1.03E-20	9.25E-21
3.25E+00	6.89E+04	1.09E+02	1.94E-21	1.92E-21	1.90E-21	1.85E-21	1.73E-21	1.55E-21	1.40E-21	1.26E-21	1.13E-21
3.75E+00	8.37E-01	5.77E-06	2.68E-24	2.66E-24	2.63E-24	2.57E-24	2.41E-24	2.17E-24	1.95E-24	1.76E-24	1.58E-24
4.25E+00	1.06E+00	4.19E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	1.02E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	3.56E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.44E+07	2.30E+06	1.07E+06	6.42E+05	3.46E+05	1.90E+05	7.75E+04	3.63E+04	1.87E+04	9.67E+03	5.01E+03
0 gamma watts	1.70E+01	1.60E+00	7.44E-01	4.48E-01	2.41E-01	1.32E-01	5.41E-02	2.53E-02	1.30E-02	6.74E-03	3.49E-03

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photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Bottom - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean		time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.47E+17	3.21E+16	8.40E+15	6.22E+15	4.17E+15	2.25E+15	7.62E+14	5.09E+14	4.37E+14	3.83E+14	3.37E+14
3.00E-02	1.09E+17	2.51E+16	3.59E+15	2.60E+15	1.75E+15	9.50E+14	3.37E+14	2.29E+14	1.97E+14	1.73E+14	1.53E+14
5.50E-02	5.84E+16	8.80E+15	1.92E+15	1.46E+15	9.98E+14	5.42E+14	1.85E+14	1.20E+14	9.91E+13	8.44E+13	7.28E+13
8.50E-02	3.99E+16	7.47E+15	1.17E+15	9.02E+14	6.15E+14	3.27E+14	1.03E+14	6.32E+13	5.19E+13	4.43E+13	3.84E+13
1.20E-01	3.26E+16	7.01E+15	1.35E+15	1.07E+15	7.32E+14	3.78E+14	1.15E+14	6.82E+13	5.22E+13	4.14E+13	3.36E+13
1.70E-01	5.22E+16	8.32E+15	1.17E+15	6.44E+14	4.00E+14	2.08E+14	5.96E+13	3.70E+13	3.18E+13	2.79E+13	2.46E+13
3.00E-01	1.13E+17	1.76E+16	9.09E+14	6.89E+14	4.67E+14	2.42E+14	6.77E+13	4.11E+13	3.48E+13	3.01E+13	2.62E+13
6.50E-01	2.32E+17	6.45E+16	1.54E+16	9.11E+15	5.24E+15	3.49E+15	1.75E+15	9.74E+14	7.59E+14	6.52E+14	5.74E+14
1.13E+00	7.23E+16	5.21E+15	3.28E+14	2.60E+14	2.08E+14	1.48E+14	7.96E+13	4.64E+13	3.05E+13	2.06E+13	1.40E+13
1.58E+00	3.73E+16	8.89E+15	1.64E+14	8.61E+13	6.45E+13	3.91E+13	1.23E+13	3.42E+12	1.55E+12	9.36E+11	6.39E+11
2.00E+00	1.10E+16	6.48E+14	5.31E+13	3.78E+13	2.45E+13	1.04E+13	8.54E+11	3.01E+10	1.35E+10	1.15E+10	1.01E+10
2.40E+00	8.60E+15	4.32E+14	7.28E+12	3.24E+12	2.26E+12	1.13E+12	1.41E+11	4.56E+09	1.57E+08	1.14E+07	5.89E+06
2.80E+00	3.63E+15	6.95E+12	6.55E+11	5.15E+11	3.64E+11	1.83E+11	2.33E+10	7.63E+08	2.52E+07	8.34E+05	2.77E+04
3.25E+00	1.73E+15	2.51E+12	1.19E+11	8.44E+10	5.99E+10	3.03E+10	3.93E+09	1.30E+08	4.32E+06	1.43E+05	4.76E+03
3.75E+00	7.80E+14	1.18E+10	4.41E+07	3.72E+07	2.64E+07	1.34E+07	1.73E+06	5.75E+04	1.91E+03	6.32E+01	2.10E+00
4.25E+00	7.10E+14	1.56E+09	9.79E-06	9.84E-06	9.93E-06	1.01E-05	1.03E-05	1.05E-05	1.06E-05	1.06E-05	1.06E-05
4.75E+00	2.11E+14	1.16E+10	4.91E-06	4.93E-06	4.98E-06	5.05E-06	5.19E-06	5.28E-06	5.30E-06	5.31E-06	5.31E-06
5.50E+00	1.65E+14	7.40E+07	3.64E-06	3.66E-06	3.69E-06	3.75E-06	3.85E-06	3.91E-06	3.93E-06	3.94E-06	3.94E-06
0 total	1.02E+18	1.86E+17	3.44E+16	2.31E+16	1.47E+16	8.59E+15	3.47E+15	2.09E+15	1.70E+15	1.46E+15	1.27E+15
0 mev/sec	4.16E+17	7.38E+16	1.18E+16	7.18E+15	4.29E+15	2.78E+15	1.33E+15	7.41E+14	5.72E+14	4.85E+14	4.21E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean		time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.67E+08	7.37E+07	1.93E+07	1.43E+07	9.60E+06	5.17E+06	1.75E+06	1.17E+06	1.01E+06	8.81E+05	7.76E+05
3.00E-02	7.53E+08	1.73E+08	2.47E+07	1.79E+07	1.21E+07	6.55E+06	2.33E+06	1.58E+06	1.36E+06	1.19E+06	1.05E+06
5.50E-02	7.38E+08	1.11E+08	2.43E+07	1.85E+07	1.26E+07	6.86E+06	2.34E+06	1.51E+06	1.25E+06	1.07E+06	9.20E+05
8.50E-02	7.79E+08	1.46E+08	2.29E+07	1.76E+07	1.20E+07	6.39E+06	2.01E+06	1.23E+06	1.01E+06	8.66E+05	7.51E+05
1.20E-01	8.99E+08	1.93E+08	3.73E+07	2.96E+07	2.02E+07	1.04E+07	3.17E+06	1.88E+06	1.44E+06	1.14E+06	9.27E+05
1.70E-01	2.04E+09	3.25E+08	4.59E+07	2.52E+07	1.56E+07	8.12E+06	2.33E+06	1.45E+06	1.24E+06	1.09E+06	9.61E+05
3.00E-01	7.82E+09	1.21E+09	6.27E+07	4.75E+07	3.22E+07	1.67E+07	4.67E+06	2.84E+06	2.40E+06	2.08E+06	1.81E+06
6.50E-01	3.47E+10	9.63E+09	2.30E+09	1.36E+09	7.83E+08	5.22E+08	2.61E+08	1.46E+08	1.13E+08	9.75E+07	8.58E+07
1.13E+00	1.87E+10	1.35E+09	8.49E+07	6.73E+07	5.38E+07	3.82E+07	2.06E+07	1.20E+07	7.88E+06	5.32E+06	3.63E+06
1.58E+00	1.35E+10	3.22E+09	5.95E+07	3.12E+07	2.33E+07	1.41E+07	4.46E+06	1.24E+06	5.60E+05	3.39E+05	2.31E+05
2.00E+00	5.05E+09	2.98E+08	2.44E+07	1.74E+07	1.13E+07	4.80E+06	3.93E+05	1.38E+04	6.19E+03	5.28E+03	4.63E+03
2.40E+00	4.75E+09	2.38E+08	4.01E+06	1.79E+06	1.25E+06	6.21E+05	7.78E+04	2.52E+03	8.66E+01	6.31E+00	3.25E+00
2.80E+00	2.34E+09	4.47E+06	4.22E+05	3.32E+05	2.35E+05	1.18E+05	1.50E+04	4.91E+02	1.62E+01	5.37E-01	1.78E-02
3.25E+00	1.29E+09	1.87E+06	8.91E+04	6.31E+04	4.48E+04	2.27E+04	2.94E+03	9.74E+01	3.23E+00	1.07E-01	3.55E-03
3.75E+00	6.73E+08	1.02E+04	3.81E+01	3.20E+01	2.28E+01	1.15E+01	1.49E+00	4.95E-02	1.64E-03	5.45E-05	1.81E-06
4.25E+00	6.94E+08	1.52E+03	9.56E-12	9.61E-12	9.70E-12	9.85E-12	1.01E-11	1.03E-11	1.03E-11	1.03E-11	1.03E-11
4.75E+00	2.31E+08	1.26E+04	5.36E-12	5.39E-12	5.44E-12	5.52E-12	5.67E-12	5.76E-12	5.79E-12	5.79E-12	5.80E-12
5.50E+00	2.09E+08	9.36E+01	4.60E-12	4.63E-12	4.67E-12	4.74E-12	4.87E-12	4.95E-12	4.97E-12	4.98E-12	4.98E-12
0 total	9.57E+10	1.70E+10	2.71E+09	1.65E+09	9.87E+08	6.40E+08	3.05E+08	1.70E+08	1.32E+08	1.11E+08	9.68E+07
0 gamma watts	6.68E+04	1.18E+04	1.89E+03	1.15E+03	6.88E+02	4.46E+02	2.13E+02	1.19E+02	9.18E+01	7.77E+01	6.75E+01

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0 principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.21E+16) at 1.0 d

nuclide	time after discharge									
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	2.25E+15	1.75E+15	3.10E+05	2.28E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

rh106	3.28E+15	3.15E+15	2.67E+15	2.24E+15	1.60E+15	8.08E+14	1.05E+14	3.47E+12	1.15E+11	3.82E+09	1.27E+08
ba140	1.89E+15	1.79E+15	1.42E+13	9.32E+10	4.53E+06	1.09E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.59E+15	2.49E+15	2.05E+13	1.34E+11	6.53E+06	1.56E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	3.98E+15	3.95E+15	3.18E+15	2.54E+15	1.63E+15	6.70E+14	4.66E+13	5.48E+11	6.45E+09	7.59E+07	8.94E+05

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.51E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.26E+15	3.45E+15	2.06E+07	5.86E-02	7.63E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.26E+15	4.13E+15	3.59E+10	1.76E+05	5.65E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.58E+15	1.49E+15	1.19E+13	7.78E+10	3.78E+06	9.06E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.43E+15	1.41E+15	2.11E+14	2.94E+13	5.96E+11	2.47E+08	1.75E-02	2.12E-19	.00E+00	.00E+00	.00E+00
ce143	4.65E+15	2.83E+15	9.26E-05	5.18E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.32E+15	1.31E+15	1.05E+15	8.40E+14	5.39E+14	2.22E+14	1.54E+13	1.81E+11	2.14E+09	2.51E+07	2.96E+05
nd147	1.42E+15	1.34E+15	4.86E+12	1.42E+10	1.38E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.80E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.76E+14	7.45E+14	6.31E+14	5.31E+14	3.78E+14	1.91E+14	2.48E+13	8.21E+11	2.72E+10	9.03E+08	3.00E+07
te132	8.21E+14	6.64E+14	3.97E+06	1.13E-02	1.47E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.45E+14	5.25E+14	4.32E+12	2.83E+10	1.38E+06	3.30E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.32E+15	8.05E+14	2.64E-05	1.47E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.24E+14	9.17E+14	7.39E+14	5.90E+14	3.78E+14	1.56E+14	1.08E+13	1.27E+11	1.50E+09	1.76E+07	2.08E+05
sm153	1.51E+15	1.06E+15	1.35E+01	4.88E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.47E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.61E+14	4.43E+14	3.75E+14	3.16E+14	2.24E+14	1.14E+14	1.47E+13	4.88E+11	1.62E+10	5.37E+08	1.78E+07
xe133	3.01E+15	2.92E+15	2.54E+10	1.24E+05	3.99E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.44E+14	5.40E+14	4.35E+14	3.47E+14	2.23E+14	9.16E+13	6.37E+12	7.50E+10	8.82E+08	1.04E+07	1.22E+05
nd147	8.85E+14	8.32E+14	3.02E+12	8.79E+09	8.59E+04	8.32E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.01E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.66E+15	3.11E+15	5.56E+05	4.08E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	6.95E+14	6.93E+14	5.58E+14	4.46E+14	2.86E+14	1.18E+14	8.18E+12	9.62E+10	1.13E+09	1.33E+07	1.57E+05
pr144	3.89E+14	3.86E+14	3.11E+14	2.48E+14	1.59E+14	6.55E+13	4.56E+12	5.36E+10	6.31E+08	7.43E+06	8.74E+04
sm153	7.20E+14	5.03E+14	6.41E+00	2.32E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.32E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.92E+14	6.15E+14	1.09E+05	8.02E-06	7.62E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.59E+15	2.19E+15	3.92E+05	2.88E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.71E+14	4.46E+14	3.54E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.84E+15	2.79E+15	4.18E+14	5.82E+13	1.18E+12	4.89E+08	3.46E-02	4.21E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.76E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.42E+15	1.02E+15	6.70E-04	8.45E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.55E+15	4.25E+15	2.03E+12	6.97E+08	1.00E+02	2.12E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.15E+15	3.36E+15	2.01E+07	5.71E-02	7.44E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.29E+15	1.73E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.93E+15	1.86E+15	1.53E+13	1.00E+11	4.87E+06	1.17E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.06E+15	1.86E+15	6.10E-05	3.41E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.45E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
zr 95	7.58E+15	7.50E+15	2.86E+15	1.05E+15	1.45E+14	2.78E+12	1.96E+07	5.06E-02	1.31E-10	3.38E-19	8.42E-28
nb 95	7.89E+15	7.89E+15	4.95E+15	2.15E+15	3.25E+14	6.55E+12	4.47E+07	1.16E-01	2.99E-10	7.71E-19	.00E+00
ru103	5.69E+15	5.59E+15	1.16E+15	2.27E+14	9.00E+12	1.42E+10	5.65E+01	5.60E-13	5.57E-27	.00E+00	.00E+00
i132	1.67E+16	1.36E+16	8.14E+07	2.31E-01	3.01E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.36E+15	3.39E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.99E+15	3.98E+15	3.67E+15	3.37E+15	2.85E+15	2.04E+15	7.42E+14	1.38E+14	2.57E+13	4.79E+12	8.93E+11
la140	6.19E+15	5.96E+15	4.90E+13	3.21E+11	1.56E+07	3.74E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec
mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.21E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
sr 91	1.52E+15	2.65E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.82E+15	1.48E+15	8.86E+06	2.52E-02	3.28E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.04E+15	4.80E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.49E+14	4.26E+14	3.92E+12	3.01E+10	1.98E+06	8.76E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.74E+14	6.49E+14	5.34E+12	3.50E+10	1.70E+06	4.08E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.72E+14	7.39E+14	1.27E+13	1.87E+11	4.45E+07	2.55E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec
mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.89E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	6.86E+14	5.60E+14	3.35E+06	9.51E-03	1.24E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	8.00E+15	7.70E+15	6.33E+13	4.15E+11	2.02E+07	4.84E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec
mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.48E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	1.76E+14	1.44E+14	8.59E+05	2.44E-03	3.18E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.49E+14	3.57E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.08E+13	5.04E+13	4.06E+13	3.24E+13	2.08E+13	8.55E+12	5.94E+11	7.00E+09	8.23E+07	9.69E+05	1.14E+04
eu156	3.78E+14	3.61E+14	6.22E+12	9.12E+10	2.17E+07	1.25E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec
mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.32E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	3.79E+14	3.65E+14	3.00E+12	1.97E+10	9.57E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.68E+13	2.56E+13	4.41E+11	6.47E+09	1.54E+06	8.86E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec
mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.95E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rh106	7.16E+11	6.87E+11	5.82E+11	4.90E+11	3.49E+11	1.76E+11	2.28E+10	7.58E+08	2.51E+07	8.34E+05	2.77E+04
ag112	1.33E+12	7.03E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.31E+12	5.11E+12	4.20E+10	2.76E+08	1.34E+04	3.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec
mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.51E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	2.42E+12	2.33E+12	1.92E+10	1.26E+08	6.12E+03	1.47E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec
mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.18E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.71E+12	8.40E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

la142	1.70E+14	3.34E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.56E+09) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	5.03E+11	1.56E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.16E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	3.73E+12	1.16E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.40E+07) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	2.39E+10	7.40E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Bottom - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean											
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	1.46E+17	7.55E+16	9.58E+13	7.11E+13	4.39E+13	2.57E+13	2.08E+13	2.05E+13	2.02E+13	1.98E+13	1.94E+13
3.00E-02	9.21E+15	1.53E+15	8.90E+10	8.62E+10	1.09E+11	1.54E+11	2.74E+11	4.39E+11	5.66E+11	6.65E+11	7.40E+11
5.50E-02	1.28E+16	3.76E+15	1.45E+12	1.42E+12	1.77E+12	2.51E+12	4.58E+12	7.42E+12	9.62E+12	1.13E+13	1.26E+13
8.50E-02	5.80E+16	7.98E+15	4.81E+11	3.17E+11	3.17E+11	3.16E+11	3.14E+11	3.11E+11	3.08E+11	3.05E+11	3.02E+11
1.20E-01	5.88E+16	4.29E+16	5.30E+11	4.17E+11	4.12E+11	4.06E+11	3.94E+11	3.77E+11	3.62E+11	3.48E+11	3.36E+11
1.70E-01	1.93E+15	2.90E+14	1.90E+10	7.76E+09	5.57E+09	4.10E+09	3.67E+09	3.60E+09	3.53E+09	3.48E+09	3.42E+09
3.00E-01	3.11E+16	2.25E+16	3.19E+11	2.27E+11	2.26E+11	2.23E+11	2.15E+11	2.03E+11	1.93E+11	1.83E+11	1.75E+11
6.50E-01	1.72E+15	4.89E+13	2.20E+09	1.78E+09	1.33E+09	1.07E+09	1.16E+09	1.32E+09	1.36E+09	1.34E+09	1.32E+09
1.13E+00	1.70E+15	1.05E+15	7.61E+08	7.16E+08	6.64E+08	6.25E+08	5.97E+08	5.65E+08	5.35E+08	5.07E+08	4.82E+08
1.58E+00	1.54E+08	1.49E+08	1.33E+08	1.22E+08	1.11E+08	1.03E+08	1.03E+08	9.98E+07	9.16E+07	8.24E+07	7.38E+07
2.00E+00	1.54E+06	9.77E+05	9.45E+05	9.68E+05	1.02E+06	1.13E+06	1.42E+06	1.69E+06	1.76E+06	1.75E+06	1.71E+06
2.40E+00	6.88E+07	6.88E+07	6.10E+07	5.53E+07	4.85E+07	4.29E+07	3.72E+07	3.08E+07	2.55E+07	2.12E+07	1.76E+07
2.80E+00	9.18E+07	9.29E+07	9.49E+07	9.96E+07	1.13E+08	1.47E+08	2.48E+08	3.37E+08	3.58E+08	3.52E+08	3.38E+08
3.25E+00	2.46E+07	2.46E+07	2.18E+07	1.98E+07	1.74E+07	1.54E+07	1.33E+07	1.10E+07	9.14E+06	7.58E+06	6.30E+06
3.75E+00	1.43E+07	1.43E+07	1.27E+07	1.15E+07	1.01E+07	8.91E+06	7.74E+06	6.39E+06	5.30E+06	4.39E+06	3.65E+06
4.25E+00	8.27E+06	8.28E+06	7.34E+06	6.65E+06	5.84E+06	5.16E+06	4.48E+06	3.71E+06	3.07E+06	2.55E+06	2.12E+06
4.75E+00	4.80E+06	4.80E+06	4.25E+06	3.86E+06	3.39E+06	2.99E+06	2.60E+06	2.15E+06	1.78E+06	1.48E+06	1.23E+06
5.50E+00	4.34E+06	4.34E+06	3.85E+06	3.49E+06	3.06E+06	2.71E+06	2.35E+06	1.94E+06	1.61E+06	1.34E+06	1.11E+06
0 total	3.21E+17	1.56E+17	9.87E+13	7.36E+13	4.68E+13	2.93E+13	2.65E+13	2.92E+13	3.12E+13	3.27E+13	3.36E+13
0 mev/sec	2.71E+16	1.48E+16	1.25E+12	9.41E+11	6.88E+11	5.45E+11	6.09E+11	7.62E+11	8.79E+11	9.67E+11	1.03E+12

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean											
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	3.35E+08	1.74E+08	2.20E+05	1.64E+05	1.01E+05	5.90E+04	4.77E+04	4.71E+04	4.64E+04	4.56E+04	4.47E+04
3.00E-02	6.36E+07	1.05E+07	6.14E+02	5.94E+02	7.54E+02	1.06E+03	1.89E+03	3.03E+03	3.91E+03	4.58E+03	5.11E+03
5.50E-02	1.62E+08	4.76E+07	1.84E+04	1.80E+04	2.24E+04	3.18E+04	5.80E+04	9.38E+04	1.22E+05	1.43E+05	1.60E+05
8.50E-02	1.13E+09	1.56E+08	9.39E+03	6.19E+03	6.19E+03	6.17E+03	6.13E+03	6.07E+03	6.01E+03	5.95E+03	5.90E+03
1.20E-01	1.62E+09	1.18E+09	1.46E+04	1.15E+04	1.14E+04	1.12E+04	1.09E+04	1.04E+04	9.99E+03	9.61E+03	9.28E+03
1.70E-01	7.54E+07	1.13E+07	7.44E+02	3.03E+02	2.18E+02	1.60E+02	1.43E+02	1.41E+02	1.38E+02	1.36E+02	1.34E+02
3.00E-01	2.15E+09	1.55E+09	2.20E+04	1.57E+04	1.56E+04	1.54E+04	1.48E+04	1.40E+04	1.33E+04	1.26E+04	1.21E+04
6.50E-01	2.57E+08	7.31E+06	3.28E+02	2.66E+02	1.99E+02	1.60E+02	1.74E+02	1.97E+02	2.03E+02	2.01E+02	1.97E+02
1.13E+00	4.41E+08	2.71E+08	1.97E+02	1.85E+02	1.72E+02	1.62E+02	1.54E+02	1.46E+02	1.38E+02	1.31E+02	1.25E+02
1.58E+00	5.57E+01	5.40E+01	4.82E+01	4.43E+01	4.00E+01	3.73E+01	3.72E+01	3.61E+01	3.32E+01	2.98E+01	2.67E+01

	2.00E+00	7.08E-01	4.49E-01	4.35E-01	4.45E-01	4.68E-01	5.18E-01	6.54E-01	7.76E-01	8.08E-01	8.04E-01	7.88E-01
	2.40E+00	3.79E+01	3.80E+01	3.36E+01	3.05E+01	2.68E+01	2.36E+01	2.05E+01	1.70E+01	1.41E+01	1.17E+01	9.70E+00
	2.80E+00	5.91E+01	5.98E+01	6.11E+01	6.41E+01	7.27E+01	9.48E+01	1.59E+02	2.17E+02	2.30E+02	2.27E+02	2.17E+02
	3.25E+00	1.84E+01	1.84E+01	1.63E+01	1.48E+01	1.30E+01	1.15E+01	9.97E+00	8.24E+00	6.83E+00	5.66E+00	4.71E+00
	3.75E+00	1.23E+01	1.23E+01	1.09E+01	9.89E+00	8.69E+00	7.68E+00	6.67E+00	5.51E+00	4.57E+00	3.79E+00	3.15E+00
	4.25E+00	8.08E+00	8.09E+00	7.17E+00	6.50E+00	5.71E+00	5.05E+00	4.38E+00	3.62E+00	3.00E+00	2.49E+00	2.07E+00
	4.75E+00	5.24E+00	5.24E+00	4.64E+00	4.21E+00	3.70E+00	3.27E+00	2.84E+00	2.35E+00	1.94E+00	1.61E+00	1.34E+00
	5.50E+00	5.48E+00	5.49E+00	4.86E+00	4.41E+00	3.87E+00	3.43E+00	2.97E+00	2.46E+00	2.04E+00	1.69E+00	1.40E+00
0	total	6.24E+09	3.41E+09	2.87E+05	2.16E+05	1.58E+05	1.25E+05	1.40E+05	1.75E+05	2.02E+05	2.22E+05	2.37E+05
0	gamma watts	4.35E+03	2.38E+03	2.00E-01	1.51E-01	1.10E-01	8.73E-02	9.77E-02	1.22E-01	1.41E-01	1.55E-01	1.65E-01

1

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - bot ds1 - discharge
0 1.00 day time of the requested nuclides
0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	7.2640E+11	2.1792E+10
5.0000E-02	to	1.0000E-01	1.6623E+11	1.2468E+10
1.0000E-01	to	2.0000E-01	2.8122E+11	4.2183E+10
2.0000E-01	to	3.0000E-01	4.6785E+10	1.1696E+10
3.0000E-01	to	4.0000E-01	2.6941E+12	9.4293E+11
4.0000E-01	to	6.0000E-01	1.3552E+12	6.7758E+11
6.0000E-01	to	8.0000E-01	3.1295E+12	2.1906E+12
8.0000E-01	to	1.0000E+00	5.9122E+12	5.3210E+12
1.0000E+00	to	1.3300E+00	3.9835E+11	4.6408E+11
1.3300E+00	to	1.6600E+00	1.1176E+11	1.6707E+11
1.6600E+00	to	2.0000E+00	5.1778E+10	9.4754E+10
2.0000E+00	to	2.5000E+00	1.1349E+10	2.5535E+10
2.5000E+00	to	3.0000E+00	1.5804E+09	4.3461E+09
3.0000E+00	to	4.0000E+00	1.3565E+08	4.7476E+08
4.0000E+00	to	5.0000E+00	4.0603E-03	1.8271E-02
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			1.4887E+13	9.9766E+12

0
0 total energy from nuclides with spectrum data = 9.9450E+12
0 total energy from nuclides with no spectrum data = 3.1603E+10
1 gamma source spectrum for decay step for BWR source term - bot ds1 - 0.25 year
0 90.00 day time of the requested nuclides
0
0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.8114E+11	5.4341E+09
5.0000E-02	to	1.0000E-01	2.8168E+10	2.1126E+09
1.0000E-01	to	2.0000E-01	2.1165E+10	3.1748E+09
2.0000E-01	to	3.0000E-01	6.4864E+09	1.6216E+09
3.0000E-01	to	4.0000E-01	2.9112E+11	1.0189E+11
4.0000E-01	to	6.0000E-01	5.5213E+11	2.7606E+11
6.0000E-01	to	8.0000E-01	1.0531E+12	7.3720E+11
8.0000E-01	to	1.0000E+00	3.2746E+12	2.9471E+12
1.0000E+00	to	1.3300E+00	3.5708E+11	4.1600E+11
1.3300E+00	to	1.6600E+00	1.0084E+11	1.5075E+11
1.6600E+00	to	2.0000E+00	8.4304E+09	1.5428E+10
2.0000E+00	to	2.5000E+00	1.7467E+07	3.9301E+07

	2.5000E+00 to	3.0000E+00	1.4726E+04	4.0496E+04
	3.0000E+00 to	4.0000E+00	2.4245E-15	8.4857E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		5.8743E+12	4.6568E+12

0
0 total energy from nuclides with spectrum data = 4.6305E+12
0 total energy from nuclides with no spectrum data = 2.6326E+10
1 gamma source spectrum for decay step for BWR source term - bot ds1 - 0.50 year
0 182.50 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	1.0894E+11	3.2682E+09
	5.0000E-02 to	1.0000E-01	1.1915E+10	8.9362E+08
	1.0000E-01 to	2.0000E-01	9.1143E+09	1.3671E+09
	2.0000E-01 to	3.0000E-01	2.7425E+09	6.8562E+08
	3.0000E-01 to	4.0000E-01	3.0278E+10	1.0597E+10
	4.0000E-01 to	6.0000E-01	2.3042E+11	1.1521E+11
	6.0000E-01 to	8.0000E-01	4.3601E+11	3.0521E+11
	8.0000E-01 to	1.0000E+00	2.0229E+12	1.8206E+12
	1.0000E+00 to	1.3300E+00	3.4618E+11	4.0330E+11
	1.3300E+00 to	1.6600E+00	9.7759E+10	1.4615E+11
	1.6600E+00 to	2.0000E+00	3.4142E+09	6.2479E+09
	2.0000E+00 to	2.5000E+00	7.5207E+06	1.6922E+07
	2.5000E+00 to	3.0000E+00	7.4034E+03	2.0359E+04
	3.0000E+00 to	4.0000E+00	2.4118E-15	8.4411E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.2997E+12	2.8136E+12

0
0 total energy from nuclides with spectrum data = 2.7909E+12
0 total energy from nuclides with no spectrum data = 2.2654E+10
1 gamma source spectrum for decay step for BWR source term - bot ds1 - 1 year
0 365.25 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	5.7921E+10	1.7376E+09
	5.0000E-02 to	1.0000E-01	2.9984E+09	2.2488E+08
	1.0000E-01 to	2.0000E-01	3.2685E+09	4.9028E+08
	2.0000E-01 to	3.0000E-01	5.9902E+08	1.4975E+08
	3.0000E-01 to	4.0000E-01	9.7351E+08	3.4073E+08
	4.0000E-01 to	6.0000E-01	4.6766E+10	2.3383E+10
	6.0000E-01 to	8.0000E-01	6.8687E+10	4.8081E+10
	8.0000E-01 to	1.0000E+00	1.0315E+12	9.2836E+11
	1.0000E+00 to	1.3300E+00	3.2540E+11	3.7909E+11
	1.3300E+00 to	1.6600E+00	9.1891E+10	1.3738E+11
	1.6600E+00 to	2.0000E+00	5.7246E+08	1.0476E+09
	2.0000E+00 to	2.5000E+00	2.8173E+06	6.3390E+06
	2.5000E+00 to	3.0000E+00	3.8473E+03	1.0580E+04
	3.0000E+00 to	4.0000E+00	2.3872E-15	8.3553E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.6306E+12	1.5203E+12

0

total energy from nuclides with spectrum data = 1.5021E+12
total energy from nuclides with no spectrum data = 1.8202E+10
gamma source spectrum for decay step for BWR source term - bot ds1 - 2 year
730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.0449E+10	9.1346E+08
5.0000E-02	to	1.0000E-01	1.1425E+09	8.5687E+07
1.0000E-01	to	2.0000E-01	1.7359E+09	2.6038E+08
2.0000E-01	to	3.0000E-01	1.2071E+08	3.0178E+07
3.0000E-01	to	4.0000E-01	3.6805E+08	1.2882E+08
4.0000E-01	to	6.0000E-01	8.7409E+09	4.3705E+09
6.0000E-01	to	8.0000E-01	5.2537E+09	3.6776E+09
8.0000E-01	to	1.0000E+00	4.1507E+11	3.7357E+11
1.0000E+00	to	1.3300E+00	2.8646E+11	3.3372E+11
1.3300E+00	to	1.6600E+00	8.0895E+10	1.2094E+11
1.6600E+00	to	2.0000E+00	1.6113E+07	2.9486E+07
2.0000E+00	to	2.5000E+00	1.9293E+06	4.3409E+06
2.5000E+00	to	3.0000E+00	2.9838E+03	8.2054E+03
3.0000E+00	to	4.0000E+00	2.3365E-15	8.1776E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			8.3026E+11	8.3773E+11

total energy from nuclides with spectrum data = 8.2431E+11
total energy from nuclides with no spectrum data = 1.3416E+10
gamma source spectrum for decay step for BWR source term - bot ds1 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.0864E+10	3.2593E+08
5.0000E-02	to	1.0000E-01	7.0723E+08	5.3042E+07
1.0000E-01	to	2.0000E-01	8.4384E+08	1.2658E+08
2.0000E-01	to	3.0000E-01	4.8835E+07	1.2209E+07
3.0000E-01	to	4.0000E-01	1.7215E+08	6.0254E+07
4.0000E-01	to	6.0000E-01	3.6017E+09	1.8009E+09
6.0000E-01	to	8.0000E-01	1.8647E+09	1.3053E+09
8.0000E-01	to	1.0000E+00	3.6242E+10	3.2618E+10
1.0000E+00	to	1.3300E+00	1.9347E+11	2.2539E+11
1.3300E+00	to	1.6600E+00	5.4635E+10	8.1679E+10
1.6600E+00	to	2.0000E+00	3.6540E+02	6.6867E+02
2.0000E+00	to	2.5000E+00	1.2966E+06	2.9173E+06
2.5000E+00	to	3.0000E+00	2.0105E+03	5.5288E+03
3.0000E+00	to	4.0000E+00	2.1888E-15	7.6608E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			3.0245E+11	3.4337E+11

total energy from nuclides with spectrum data = 3.3716E+11
total energy from nuclides with no spectrum data = 6.2133E+09
gamma source spectrum for decay step for BWR source term - bot ds1 - 10 year
3652.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.9044E+09	1.1713E+08
5.0000E-02	to	1.0000E-01	3.5332E+08	2.6499E+07

1.0000E-01 to	2.0000E-01	2.7301E+08	4.0952E+07
2.0000E-01 to	3.0000E-01	1.5487E+07	3.8718E+06
3.0000E-01 to	4.0000E-01	5.0473E+07	1.7665E+07
4.0000E-01 to	6.0000E-01	1.0048E+09	5.0241E+08
6.0000E-01 to	8.0000E-01	5.2019E+08	3.6413E+08
8.0000E-01 to	1.0000E+00	6.2787E+08	5.6508E+08
1.0000E+00 to	1.3300E+00	9.9505E+10	1.1592E+11
1.3300E+00 to	1.6600E+00	2.8100E+10	4.2010E+10
1.6600E+00 to	2.0000E+00	5.8066E+00	1.0626E+01
2.0000E+00 to	2.5000E+00	6.6686E+05	1.5004E+06
2.5000E+00 to	3.0000E+00	1.0340E+03	2.8436E+03
3.0000E+00 to	4.0000E+00	1.9545E-15	6.8406E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		1.3436E+11	1.5957E+11

total energy from nuclides with spectrum data = 1.5782E+11
total energy from nuclides with no spectrum data = 1.7518E+09
gamma source spectrum for decay step for BWR source term - bot ds1 - 15 year
5478.75 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.7968E+09	5.3903E+07
5.0000E-02 to	1.0000E-01	1.7957E+08	1.3468E+07
1.0000E-01 to	2.0000E-01	9.5732E+07	1.4360E+07
2.0000E-01 to	3.0000E-01	5.2949E+06	1.3237E+06
3.0000E-01 to	4.0000E-01	1.5376E+07	5.3817E+06
4.0000E-01 to	6.0000E-01	2.8101E+08	1.4050E+08
6.0000E-01 to	8.0000E-01	1.4546E+08	1.0182E+08
8.0000E-01 to	1.0000E+00	1.3037E+07	1.1733E+07
1.0000E+00 to	1.3300E+00	5.1296E+10	5.9760E+10
1.3300E+00 to	1.6600E+00	1.4486E+10	2.1657E+10
1.6600E+00 to	2.0000E+00	5.1087E+00	9.3489E+00
2.0000E+00 to	2.5000E+00	3.4377E+05	7.7349E+05
2.5000E+00 to	3.0000E+00	5.3306E+02	1.4659E+03
3.0000E+00 to	4.0000E+00	1.7503E-15	6.1261E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		6.8315E+10	8.1760E+10

total energy from nuclides with spectrum data = 8.1261E+10
total energy from nuclides with no spectrum data = 4.9830E+08
gamma source spectrum for decay step for BWR source term - bot ds1 - 20 year
7305.00 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.0056E+09	3.0167E+07
5.0000E-02 to	1.0000E-01	9.2244E+07	6.9183E+06
1.0000E-01 to	2.0000E-01	3.6853E+07	5.5280E+06
2.0000E-01 to	3.0000E-01	1.9830E+06	4.9575E+05
3.0000E-01 to	4.0000E-01	4.9628E+06	1.7370E+06
4.0000E-01 to	6.0000E-01	7.8786E+07	3.9393E+07
6.0000E-01 to	8.0000E-01	4.0776E+07	2.8543E+07
8.0000E-01 to	1.0000E+00	1.3668E+06	1.2302E+06
1.0000E+00 to	1.3300E+00	2.6504E+10	3.0877E+10
1.3300E+00 to	1.6600E+00	7.4847E+09	1.1190E+10

	1.6600E+00 to	2.0000E+00	4.5049E+00	8.2440E+00
	2.0000E+00 to	2.5000E+00	1.7762E+05	3.9965E+05
	2.5000E+00 to	3.0000E+00	2.7542E+02	7.5742E+02
	3.0000E+00 to	4.0000E+00	1.5711E-15	5.4989E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.5252E+10	4.2181E+10

0
0 total energy from nuclides with spectrum data = 4.2035E+10
0 total energy from nuclides with no spectrum data = 1.4611E+08
1 gamma source spectrum for decay step for BWR source term - bot ds1 - 25 year
0 9131.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	6.7338E+08	2.0201E+07
	5.0000E-02 to	1.0000E-01	4.7743E+07	3.5807E+06
	1.0000E-01 to	2.0000E-01	1.5531E+07	2.3296E+06
	2.0000E-01 to	3.0000E-01	8.1533E+05	2.0383E+05
	3.0000E-01 to	4.0000E-01	1.7314E+06	6.0600E+05
	4.0000E-01 to	6.0000E-01	2.2129E+07	1.1064E+07
	6.0000E-01 to	8.0000E-01	1.1449E+07	8.0145E+06
	8.0000E-01 to	1.0000E+00	6.1433E+05	5.5289E+05
	1.0000E+00 to	1.3300E+00	1.3713E+10	1.5975E+10
	1.3300E+00 to	1.6600E+00	3.8725E+09	5.7893E+09
	1.6600E+00 to	2.0000E+00	3.9779E+00	7.2795E+00
	2.0000E+00 to	2.5000E+00	9.1899E+04	2.0677E+05
	2.5000E+00 to	3.0000E+00	1.4250E+02	3.9187E+02
	3.0000E+00 to	4.0000E+00	1.4121E-15	4.9425E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.8359E+10	2.1811E+10

0
0 total energy from nuclides with spectrum data = 2.1764E+10
0 total energy from nuclides with no spectrum data = 4.7159E+07
1
1 * normal termination of execution *
0 table of contents for material tables
0 case or subcase printed page

1 1

```
0ndset          33
        33          4          1         27          6          0          0          0          0          0
         0          0          0          0          0          2         -1       1698        690        130
       880       7935          0          5         99          7          9         93         18         18
        18          0          0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
```

```
0   60* array      10 entries read
0   66$ array      12 entries read
0   73$ array      13 entries read
0   74* array      13 entries read
0   75$ array      13 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0            0
            21          100           13            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero            4
             0          689          129          879
0pow              3
   .000000E+00  .000000E+00  .000000E+00
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =             4.1289E+00       1.9428E+02       1.9841E+02
 start of interval flux =         2.10267E+13
 n-gamma, fission and total mev/fission =             4.5691E+00       1.9445E+02       1.9902E+02
 start of interval flux =         2.09420E+13
 n-gamma, fission and total mev/fission =             4.6862E+00       1.9461E+02       1.9930E+02
 start of interval flux =         2.08735E+13
 n-gamma, fission and total mev/fission =             4.8074E+00       1.9477E+02       1.9958E+02
 start of interval flux =         2.08370E+13
 n-gamma, fission and total mev/fission =             4.9331E+00       1.9491E+02       1.9985E+02
 start of interval flux =         2.08265E+13
 n-gamma, fission and total mev/fission =             5.0621E+00       1.9505E+02       2.0011E+02
 start of interval flux =         2.08378E+13
 n-gamma, fission and total mev/fission =             5.1933E+00       1.9518E+02       2.0037E+02
 start of interval flux =         2.08672E+13
 n-gamma, fission and total mev/fission =             5.3258E+00       1.9530E+02       2.0063E+02
 start of interval flux =         2.09121E+13
 n-gamma, fission and total mev/fission =             5.4590E+00       1.9542E+02       2.0088E+02
 start of interval flux =         2.09702E+13
 n-gamma, fission and total mev/fission =             5.5924E+00       1.9553E+02       2.0113E+02
 start of interval flux =         2.10398E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
0ndset           33
            33            4            2           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 1.799989E+03 2.092733E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              5.6605E+00   1.9561E+02   2.0127E+02
 start of interval flux =          2.09866E+13
 n-gamma, fission and total mev/fission =              5.7804E+00   1.9572E+02   2.0150E+02
 start of interval flux =          2.10941E+13
 n-gamma, fission and total mev/fission =              5.9092E+00   1.9582E+02   2.0173E+02
 start of interval flux =          2.12076E+13
 n-gamma, fission and total mev/fission =              6.0388E+00   1.9592E+02   2.0196E+02
 start of interval flux =          2.13277E+13
 n-gamma, fission and total mev/fission =              6.1685E+00   1.9602E+02   2.0218E+02
 start of interval flux =          2.14538E+13
 n-gamma, fission and total mev/fission =              6.2981E+00   1.9611E+02   2.0241E+02
 start of interval flux =          2.15853E+13
 n-gamma, fission and total mev/fission =              6.4274E+00   1.9621E+02   2.0263E+02
 start of interval flux =          2.17218E+13
 n-gamma, fission and total mev/fission =              6.5564E+00   1.9630E+02   2.0286E+02
 start of interval flux =          2.18627E+13
 n-gamma, fission and total mev/fission =              6.6849E+00   1.9639E+02   2.0308E+02
 start of interval flux =          2.20078E+13
 n-gamma, fission and total mev/fission =              6.8130E+00   1.9648E+02   2.0329E+02
 start of interval flux =          2.21568E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
0ndset          33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 3.599977E+03 2.162341E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =            6.6848E+00   1.9653E+02   2.0322E+02
 start of interval flux =         2.23046E+13
 n-gamma, fission and total mev/fission =            6.8039E+00   1.9661E+02   2.0341E+02
 start of interval flux =         2.25186E+13
 n-gamma, fission and total mev/fission =            6.9398E+00   1.9669E+02   2.0363E+02
 start of interval flux =         2.27325E+13
 n-gamma, fission and total mev/fission =            7.0758E+00   1.9677E+02   2.0384E+02
 start of interval flux =         2.29466E+13
 n-gamma, fission and total mev/fission =            7.2112E+00   1.9685E+02   2.0406E+02
 start of interval flux =         2.31609E+13
 n-gamma, fission and total mev/fission =            7.3462E+00   1.9693E+02   2.0427E+02
 start of interval flux =         2.33754E+13
 n-gamma, fission and total mev/fission =            7.4806E+00   1.9700E+02   2.0449E+02
 start of interval flux =         2.35900E+13
 n-gamma, fission and total mev/fission =            7.6145E+00   1.9708E+02   2.0470E+02
 start of interval flux =         2.38048E+13
 n-gamma, fission and total mev/fission =            7.7477E+00   1.9716E+02   2.0491E+02
 start of interval flux =         2.40197E+13
 n-gamma, fission and total mev/fission =            7.8803E+00   1.9724E+02   2.0512E+02
 start of interval flux =         2.42347E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
0ndset          33
            33            4            4           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 5.399966E+03 2.339868E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              7.7812E+00       1.9730E+02       2.0508E+02
 start of interval flux =         2.44586E+13
 n-gamma, fission and total mev/fission =              7.9183E+00       1.9737E+02       2.0529E+02
 start of interval flux =         2.47348E+13
 n-gamma, fission and total mev/fission =              8.0639E+00       1.9744E+02       2.0550E+02
 start of interval flux =         2.50073E+13
 n-gamma, fission and total mev/fission =              8.2085E+00       1.9751E+02       2.0572E+02
 start of interval flux =         2.52759E+13
 n-gamma, fission and total mev/fission =              8.3519E+00       1.9758E+02       2.0593E+02
 start of interval flux =         2.55408E+13
 n-gamma, fission and total mev/fission =              8.4940E+00       1.9765E+02       2.0614E+02
 start of interval flux =         2.58021E+13
 n-gamma, fission and total mev/fission =              8.6348E+00       1.9772E+02       2.0636E+02
 start of interval flux =         2.60598E+13
 n-gamma, fission and total mev/fission =              8.7744E+00       1.9779E+02       2.0657E+02
 start of interval flux =         2.63142E+13
 n-gamma, fission and total mev/fission =              8.9126E+00       1.9786E+02       2.0678E+02
 start of interval flux =         2.65653E+13
 n-gamma, fission and total mev/fission =              9.0496E+00       1.9793E+02       2.0698E+02
 start of interval flux =         2.68131E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
0ndset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
              0            0            0            0            0            0            0            0            0            0
              0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
           7935           20            6           18         1697
0mmn             19
             10           10            0            0            1            3            0            0            0           10
             21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 1.000000E-05
0mzero            4
             21          689          129          879
0pow              3
  4.349999E+00 7.199954E+03 2.581446E+13
0 linp            9
              6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              8.9539E+00       1.9800E+02       2.0695E+02
 start of interval flux =          2.71018E+13
 n-gamma, fission and total mev/fission =              9.0992E+00       1.9806E+02       2.0716E+02
 start of interval flux =          2.74171E+13
 n-gamma, fission and total mev/fission =              9.2514E+00       1.9812E+02       2.0737E+02
 start of interval flux =          2.77243E+13
 n-gamma, fission and total mev/fission =              9.4011E+00       1.9818E+02       2.0759E+02
 start of interval flux =          2.80228E+13
 n-gamma, fission and total mev/fission =              9.5483E+00       1.9825E+02       2.0780E+02
 start of interval flux =          2.83131E+13
 n-gamma, fission and total mev/fission =              9.6931E+00       1.9831E+02       2.0800E+02
 start of interval flux =          2.85953E+13
 n-gamma, fission and total mev/fission =              9.8353E+00       1.9838E+02       2.0821E+02
 start of interval flux =          2.88699E+13
 n-gamma, fission and total mev/fission =              9.9751E+00       1.9844E+02       2.0841E+02
 start of interval flux =          2.91372E+13
 n-gamma, fission and total mev/fission =              1.0112E+01       1.9850E+02       2.0861E+02
 start of interval flux =          2.93974E+13
 n-gamma, fission and total mev/fission =              1.0247E+01       1.9856E+02       2.0881E+02
 start of interval flux =          2.96508E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
0ndset           33
             33            4            5           27            6            0            0            0            0            0
              0            0            0            0            0            2           -1         1698          690          130
            880         7935            0            5           99            7            9           93           18           18
             18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 8.999942E+03 2.859305E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              1.0392E+01   1.9863E+02   2.0902E+02
 start of interval flux =         2.99204E+13
 n-gamma, fission and total mev/fission =              1.0453E+01   1.9866E+02   2.0911E+02
 start of interval flux =         3.00228E+13
 n-gamma, fission and total mev/fission =              1.0509E+01   1.9868E+02   2.0919E+02
 start of interval flux =         3.01249E+13
 n-gamma, fission and total mev/fission =              1.0565E+01   1.9871E+02   2.0928E+02
 start of interval flux =         3.02259E+13
 n-gamma, fission and total mev/fission =              1.0620E+01   1.9874E+02   2.0936E+02
 start of interval flux =         3.03259E+13
 n-gamma, fission and total mev/fission =              1.0675E+01   1.9876E+02   2.0944E+02
 start of interval flux =         3.04249E+13
 n-gamma, fission and total mev/fission =              1.0730E+01   1.9879E+02   2.0952E+02
 start of interval flux =         3.05228E+13
 n-gamma, fission and total mev/fission =              1.0784E+01   1.9881E+02   2.0960E+02
 start of interval flux =         3.06198E+13
 n-gamma, fission and total mev/fission =              1.0837E+01   1.9884E+02   2.0968E+02
 start of interval flux =         3.07158E+13
 n-gamma, fission and total mev/fission =              1.0890E+01   1.9886E+02   2.0975E+02
 start of interval flux =         3.08107E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 49000 MWd/MTU
0ndset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
```

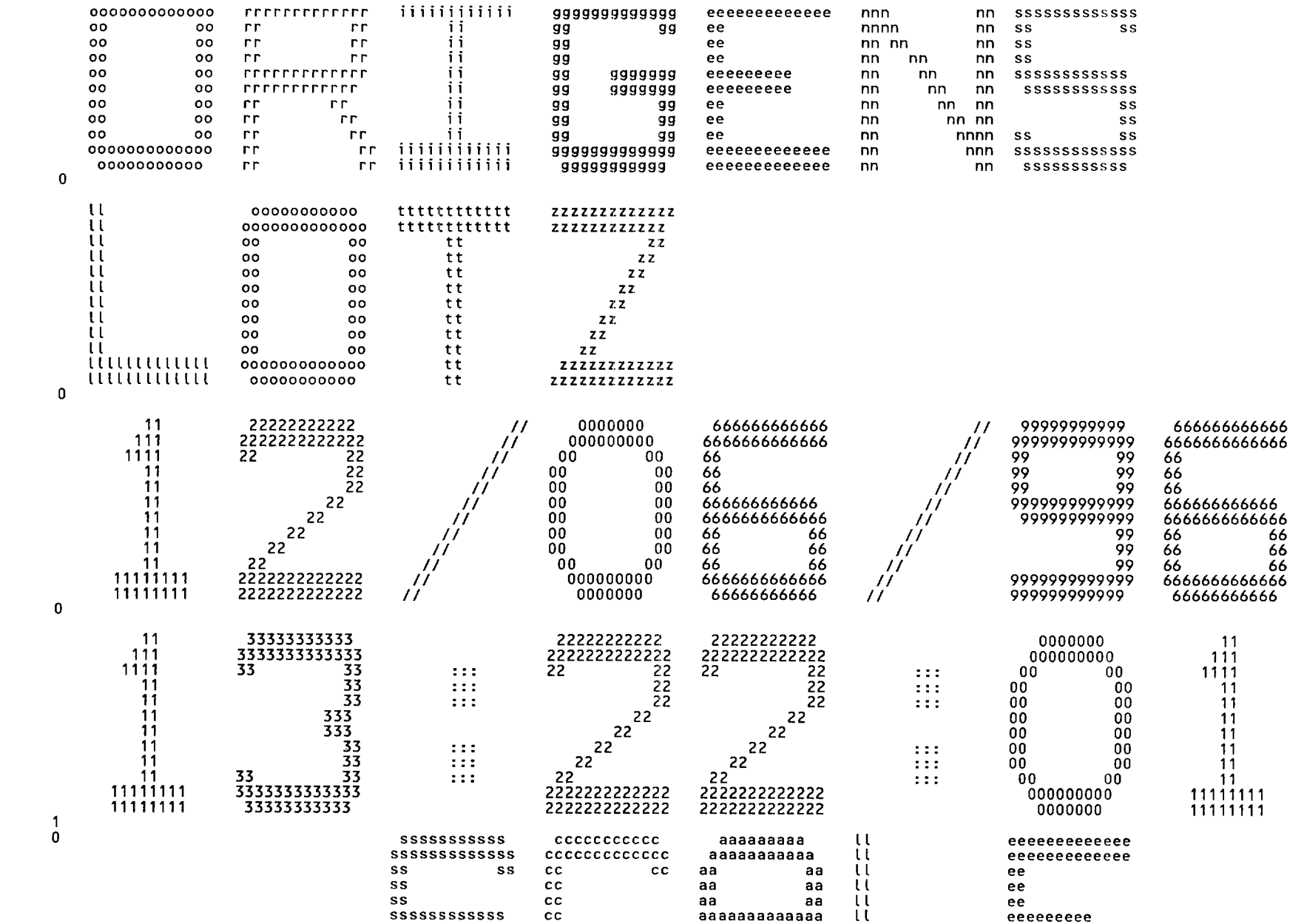
```
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
              0            0            0            0            0            0            0            0            0            0
              0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
           7935           20            6           18         1697
0mmn             19
              0           10            0            0            1            1            0            0            0           10
             21          100            0            4            3            0            2            0            0
0tconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero            4
             21          689          129          879
0pow              3
  4.350000E+00 9.799938E+03 2.459261E+13
0 linp            9
              6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Bottom - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
*                                                                               *
*                     scale4.2  bulletin  board                                 *
*                     --------  --------  -----                                 *
*                                                                               *
*      welcome to the configuration controlled version of scale4.2.             *
*      any problems should be reported to kay martin at 4-9213.                 *
*                                                                               *
*      updates that have been made from version 4.1 to 4.2 include:             *
*                                                                               *
*      nitawl:  parameter added to prevent exponent underflows for very         *
*      dilute resonance calculations on workstation.  (mrr 93-011)              *
*                                                                               *
*      nitawl:   corrected discrepancies in maximum fractional energy loss      *
*      of neutron in admixed moderator calculation and simpson rule             *
*      calculation of collision density as documented in "improved              *
*      calculation of flux shapes with the resonance shielding code             *
*      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
*      impact will vary, but is insignificant for hydrogen-moderated            *
*      systems. (mrr 93-030)                                                    *
*                                                                               *
*      sas4:  added option of axial source profile input for both radial        *
*      and axial dose calculations. also added option idr = 2 for               *
*      estimation to point detectors from collisions in both top and            *
*      bottom halves of geometry.  (mrr 92-016)                                 *
*                                                                               *
*      morse:  modifications made for compatibility with the new options in     *
*      sas4 (i.e., the axial source profile input option and                    *
*      the option idr = 2 for estimation to point detectors from collisions     *
*      in both top and bottom halves of geometry).  (mrr 92-016)                *
*                                                                               *
*      csas & keno-v.a:  error checking during input processing was added       *
*      so that these modules terminate with an error message if input           *
*      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
*                                                                               *
*      keno-v.a:  corrections made for applying differential albedo             *
*      boundary conditions to supergrouped problems where global unit           *
*      contains only an array specification.  effect on keff is very large      *
*      for this type of problem.  (mrr 93-033)                                  *
*                                                                               *
*      keno-v.a:  corrected an error introduced with modification on may 24,    *
*      1993 (mrr 93-033). this error affected problems with mirror or           *
*      periodic boundary conditions and could cause problem to loop, fail,      *
*      or run incorrectly.                                                      *
*                                                                               *
*      xsdrnpm:  corrected calculation of number of direct access data          *
*      blocks needed to weight the cross sections to prevent occasional         *
*      failure.  improved calculation of balance tables.  (mrr 93-021)          *
*                                                                               *
*      origen-s:  modified program to read combined binary libraries that       *
*      include multi-cycle cross sections.  add option to edit binary           *
*      library.  (mrr 93-026)                                                   *
*                                                                               *
*      sas2:  modified to produce combined binary libraries for origen-s.       *
*      (mrr 93-027)                                                             *
*                                                                               *
*      couple:  modified to allow combined binary libraries to be made by       *
*      sas2.  (mrr 93-031)                                                      *
*                                                                               *
*      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*       and expanded decay data and fission product yield libraries.  (mrr     *
*       92-088, 92-025, 92-026)                                                *
*                                                                              *
*       origen-s libraries:  the six standard origen-s card image libraries    *
*       have been replaced by two new libraries, end6dec and xsectpho.         *
*       end6dec contains the updated and expanded decay data library based     *
*       on endf/b-vi data.  xsectpho contains the basic cross section and      *
*       photon spectra data and updated fission product yield data based on    *
*       endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*       002, 003, 006, 008, 009)                                               *
*                                                                              *
*       std. comp. library:  in drr 92-033, the following nuclides were        *
*       changed to turn on resonance processing flag but should not have       *
*       been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*       feinconel.  flags for these nuclides have now been returned to off.    *
*       (drr 93-014)                                                           *
*                                                                              *
*       heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                              *
*       htas1:  updated for compatibility with heating7 and to interact        *
*       effectively with ocular.  fin effectiveness technique was added.       *
*       (mrr 93-036)                                                           *
*                                                                              *
*       ocular:  made compatible with heating7 and htas1 on mainframe and      *
*       workstation.  (mrr 93-037)                                             *
*                                                                              *
*       sas2:  corrected so that 'parm=skipshipdata' would work on             *
*       workstation.  (mrr 93-051)                                             *
*                                                                              *
*       aim:  ft47ft001 is no longer require for aim to execute on             *
*       workstation.  (mrr 93-052)                                             *
*                                                                              *
*       27group, 27burnup, and 218group - these libraries have been            *
*       updated to correct an error found in the chlorine cross-sections.      *
*       (drr93-022)                                                            *
*                                                                              *
*       bonami:  corrected so that a case with a number density of zero        *
*       for a nuclide that has bondarenko data will run without failing.       *
*       (mrr 93-060)                                                           *
*                                                                              *
*       csas:  corrected calculation of dancoff correction factor for          *
*       cylindrical cells.  note that previous calculations of small           *
*       cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*       values.  also corrected dancoff factor for multiregion slab            *
*       cell with vacuum boundary conditions to be set to zero.                *
*       (mrr 93-065)                                                           *
*                                                                              *
*       csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*       resonance materials that are not part of the unit cell in lattice-     *
*       cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*       check your nitawl output in any previous scale-4.2 calculations        *
*       for dancoff factors =-1.                                               *
*       (mrr 93-070)                                                           *
*                                                                              *
********************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        80000    220000    240000     250000     260000
       270000    280000    400000     410000     500000
74**     64.6     7480.0      34.4  192421.0
          2.6        0.2       3.2       0.1        4.9
          0.1        4.5    2160.1       0.1       30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
```

```
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 45000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.1836733 e
         5t
      BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds1p
      58** 10r4.35
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 49000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.0816335 e
         5t
      BWR SNF Assembly - Plenum - deplete to 49000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds1p
      58** 10r4.35
      60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
      66$$ 12r0 e
         6t
       BWR SNF Assembly Decay
      3$$  33 0 5 a33 -88 e
         2t
      35$$ 0
         4t
      56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
         5t
      BWR SNF Assembly - Plenum - decay
      per ONE BWR Fuel Assembly - Plenum Region - ds1p
      60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
      61** f1-15
      65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
      81$$ 2 0 26 1 e
      82$$ f4
         6t
        decay step for BWR source term - plen ds1 - discharge
        decay step for BWR source term - plen ds1 - 0.25 year
        decay step for BWR source term - plen ds1 - 0.50 year
        decay step for BWR source term - plen ds1 - 1 year
        decay step for BWR source term - plen ds1 - 2 year
        decay step for BWR source term - plen ds1 - 5 year
        decay step for BWR source term - plen ds1 - 10 year
        decay step for BWR source term - plen ds1 - 15 year
        decay step for BWR source term - plen ds1 - 20 year
        decay step for BWR source term - plen ds1 - 25 year
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1   ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii    ggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
```



```
      sssssssssss   cc              aaaaaaaaaaaa   ll              eeeeeeeee
               ss   cc              aa         aa   ll              ee
               ss   cc              aa         aa   ll              ee
     ss        ss   cc         cc   aa         aa   ll              ee
     sssssssssssss  ccccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
      sssssssssss    ccccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                  program verification information                *****
*****                                                                     *****
*****                 code system:    scale  version:    4.2           *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****         creation date:  04/27/95                                    *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  13:22:01                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0       note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------         comment or title end
0.............................columns 1-72.............................               ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1836733 e
    5t
 BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        80000    220000    240000     250000     260000
       270000    280000    400000     410000     500000
74**     64.6     7480.0      34.4  192421.0
          2.6        0.2       3.2        0.1        4.9
          0.1        4.5    2160.1        0.1       30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds1p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
```

```
 57** 0.0 0.0 1.0-5 0.1836733 e
    5t
 BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds1p
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 49000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.0816335 e
    5t
 BWR SNF Assembly - Plenum - deplete to 49000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds1p
 58** 10r4.35
 60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Plenum - decay
 per ONE BWR Fuel Assembly - Plenum Region - ds1p
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - plen ds1 - discharge
   decay step for BWR source term - plen ds1 - 0.25 year
   decay step for BWR source term - plen ds1 - 0.50 year
   decay step for BWR source term - plen ds1 - 1 year
   decay step for BWR source term - plen ds1 - 2 year
   decay step for BWR source term - plen ds1 - 5 year
   decay step for BWR source term - plen ds1 - 10 year
   decay step for BWR source term - plen ds1 - 15 year
   decay step for BWR source term - plen ds1 - 20 year
   decay step for BWR source term - plen ds1 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
```

```
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
```

```
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
```

```
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries  *
          *         decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                             *
          *       neutron flux spectrum factors and cross sections were produced from   *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                             *
          *                    fission product yields are from endf/b-v                 *
          *                                                                             *
          *               photon libraries use an 18-energy-group structure             *
          *              the photon data are from the master photon data base,          *
          *               produced to include bremsstrahlung from uo2 matrix            *
          *                                                                             *
          *         see information above this box (if present) for later updates       *
          *                                                                             *
          *******************************************************************************
          *                                                                             *
0         *******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0         *******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          *******************************************************************************
          *                                                                             *
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries  *
          *         decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                             *
          *       neutron flux spectrum factors and cross sections were produced from   *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                             *
          *                    fission product yields are from endf/b-v                 *
          *                                                                             *
```

```
          *              photon libraries use an 18-energy-group structure              *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *          made from modified card-image origen-s libraries of scale 4.2     *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *       neutron flux spectrum factors and cross sections were produced from  *
          *      the "presas2" case updating all nuclides on the scale "burnup" library*
          *                                                                            *
          *                    fission product yields are from endf/b-v                *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
```

```
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                    .other identification and sizes of library.
0                     data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                   7/ 9/1993    date library was produced
0                        1697    total number of nuclides in library
                          689    number of light-element nuclides
                          129    number of actinide nuclides
                          879    number of fission product nuclides
0                        7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
```

```
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
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     BWR SNF Assembly - Plenum - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Plenum Regio
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	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	2.64E-04	2.64E-04	2.64E-04	2.64E-04	2.64E-04	2.64E-04	2.64E-04	2.64E-04	2.64E-04	2.64E-04	2.64E-04
h 2	3.90E-07	3.90E-07	3.90E-07	3.90E-07	3.90E-07	3.90E-07	3.90E-07	3.90E-07	3.90E-07	3.90E-07	3.90E-07
h 3	7.34E-11	7.34E-11	7.24E-11	7.14E-11	6.94E-11	6.56E-11	5.54E-11	4.18E-11	3.16E-11	2.38E-11	1.80E-11
he 3	1.35E-12	1.36E-12	2.36E-12	3.38E-12	5.36E-12	9.15E-12	1.93E-11	3.29E-11	4.32E-11	5.09E-11	5.67E-11
he 4	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04	3.62E-04
li 7	1.59E-15	1.59E-15	1.59E-15	1.59E-15	1.59E-15	1.59E-15	1.59E-15	1.59E-15	1.59E-15	1.59E-15	1.59E-15
be 10	3.33E-09	3.33E-09	3.33E-09	3.33E-09	3.33E-09	3.33E-09	3.33E-09	3.33E-09	3.33E-09	3.33E-09	3.33E-09

b 11	6.75E-14	6.75E-14	6.75E-14	6.75E-14	6.75E-14	6.75E-14	6.75E-14	6.75E-14	6.75E-14	6.75E-14	6.75E-14
c 12	9.32E-12	9.32E-12	9.32E-12	9.32E-12	9.32E-12	9.32E-12	9.32E-12	9.32E-12	9.32E-12	9.32E-12	9.32E-12
c 13	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04
c 14	6.27E-07	6.27E-07	6.27E-07	6.27E-07	6.27E-07	6.27E-07	6.27E-07	6.26E-07	6.26E-07	6.25E-07	6.25E-07
n 14	2.14E-10	2.14E-10	2.32E-10	2.52E-10	2.90E-10	3.65E-10	5.93E-10	9.72E-10	1.35E-09	1.73E-09	2.11E-09
n 15	2.87E-07	2.87E-07	2.87E-07	2.87E-07	2.87E-07	2.87E-07	2.87E-07	2.87E-07	2.87E-07	2.87E-07	2.87E-07
o 16	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00
o 17	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03
o 18	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03
f 19	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08	1.17E-08
ne 20	2.81E-13	2.81E-13	2.81E-13	2.81E-13	2.81E-13	2.81E-13	2.81E-13	2.81E-13	2.81E-13	2.81E-13	2.81E-13
ar 40	7.50E-12	7.50E-12	7.50E-12	7.50E-12	7.50E-12	7.50E-12	7.50E-12	7.50E-12	7.50E-12	7.50E-12	7.50E-12
k 41	2.48E-13	2.48E-13	2.48E-13	2.48E-13	2.48E-13	2.48E-13	2.48E-13	2.48E-13	2.48E-13	2.48E-13	2.48E-13
k 43	4.68E-15	2.22E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	4.84E-15	4.85E-15	4.85E-15	4.85E-15	4.85E-15	4.85E-15	4.85E-15	4.85E-15	4.85E-15	4.85E-15	4.85E-15
ca 43	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07
ca 44	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06
ca 45	2.96E-09	2.95E-09	2.02E-09	1.37E-09	6.31E-10	1.35E-10	1.30E-12	5.73E-16	2.52E-19	1.11E-22	4.87E-26
ca 46	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07	1.36E-07
ca 47	1.32E-12	1.13E-12	1.41E-18	1.02E-24	7.60E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.94E-08	1.94E-08	2.03E-08	2.10E-08	2.17E-08	2.22E-08	2.24E-08	2.24E-08	2.24E-08	2.24E-08	2.24E-08
sc 46	1.81E-07	1.80E-07	8.62E-08	4.01E-08	8.84E-09	4.31E-10	5.00E-14	1.38E-20	3.80E-27	1.05E-33	2.88E-40
sc 47	1.17E-08	9.48E-09	9.66E-17	3.31E-24	2.09E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	6.04E-10	4.12E-10	7.93E-25	4.03E-40	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02
ti 47	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02
ti 48	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
ti 49	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02
ti 50	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02
v 50	4.04E-05	4.04E-05	4.04E-05	4.04E-05	4.04E-05	4.04E-05	4.04E-05	4.04E-05	4.04E-05	4.04E-05	4.04E-05
v 51	6.46E-03	6.47E-03	6.59E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03	6.61E-03
cr 50	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01
cr 51	1.46E-04	1.42E-04	1.54E-05	1.52E-06	1.57E-08	1.69E-12	2.11E-24	.00E+00	.00E+00	.00E+00	.00E+00
cr 52	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
cr 53	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01
cr 54	9.63E-02	9.63E-02	9.63E-02	9.63E-02	9.63E-02	9.63E-02	9.63E-02	9.63E-02	9.63E-02	9.63E-02	9.63E-02
mn 54	5.62E-05	5.61E-05	4.61E-05	3.75E-05	2.50E-05	1.11E-05	9.75E-07	1.69E-08	2.93E-10	5.07E-12	8.79E-14
mn 55	9.51E-02	9.51E-02	9.52E-02	9.52E-02	9.54E-02	9.56E-02	9.59E-02	9.61E-02	9.62E-02	9.62E-02	9.62E-02
mn 56	5.19E-07	8.19E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01
fe 55	1.10E-03	1.10E-03	1.03E-03	9.70E-04	8.54E-04	6.62E-04	3.09E-04	8.69E-05	2.44E-05	6.86E-06	1.93E-06
fe 56	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00
fe 57	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
fe 58	1.83E-02	1.83E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02
fe 59	3.26E-06	3.21E-06	8.02E-07	1.90E-07	1.10E-08	3.73E-11	1.44E-18	6.40E-31	2.48E-43	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 2

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
co 58m	3.98E-11	6.44E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.32E-04	1.31E-04	5.47E-05	2.21E-05	3.71E-06	1.04E-07	2.33E-12	4.12E-20	7.29E-28	1.29E-35	2.44E-43
co 59	8.33E-02	8.33E-02	8.33E-02	8.33E-02	8.33E-02	8.33E-02	8.33E-02	8.33E-02	8.33E-02	8.33E-02	8.34E-02
co 60	1.32E-02	1.32E-02	1.28E-02	1.24E-02	1.16E-02	1.02E-02	6.86E-03	3.55E-03	1.84E-03	9.54E-04	4.94E-04
co 61	9.25E-09	3.87E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00
ni 59	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02	3.50E-02
ni 60	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.22E+00	1.22E+00
ni 61	6.35E-02	6.35E-02	6.35E-02	6.35E-02	6.35E-02	6.35E-02	6.35E-02	6.35E-02	6.35E-02	6.35E-02	6.35E-02
ni 62	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01

ni 63	7.24E-03	7.24E-03	7.22E-03	7.21E-03	7.19E-03	7.14E-03	6.99E-03	6.75E-03	6.52E-03	6.30E-03	6.09E-03
ni 64	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02
ni 65	2.08E-08	2.82E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.93E-12	2.16E-12	3.64E-24	2.11E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.44E-04	1.44E-04	1.56E-04	1.69E-04	1.94E-04	2.44E-04	3.90E-04	6.28E-04	8.58E-04	1.08E-03	1.29E-03
cu 64	1.20E-09	3.23E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04
cu 66	6.58E-12	3.37E-15	5.67E-27	3.27E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	4.36E-15	3.33E-15	1.33E-25	2.07E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	3.80E-07	3.80E-07	3.80E-07	3.80E-07	3.80E-07	3.80E-07	3.80E-07	3.80E-07	3.80E-07	3.80E-07	3.80E-07
zn 65	1.96E-10	1.96E-10	1.52E-10	1.17E-10	6.96E-11	2.46E-11	1.09E-12	6.09E-15	3.39E-17	1.89E-19	1.05E-21
zn 66	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.15E-06	1.15E-06
zn 67	1.31E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09	1.31E-09
zn 68	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11	1.73E-11
ga 69	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14	2.95E-14
sr 87	4.99E-05	4.99E-05	4.99E-05	4.99E-05	4.99E-05	4.99E-05	4.99E-05	4.99E-05	4.99E-05	4.99E-05	4.99E-05
sr 88	4.91E-03	4.91E-03	4.91E-03	4.91E-03	4.91E-03	4.91E-03	4.91E-03	4.91E-03	4.91E-03	4.91E-03	4.91E-03
sr 89	1.46E-05	1.44E-05	4.24E-06	1.19E-06	9.74E-08	6.51E-10	1.95E-16	2.60E-27	3.47E-38	.00E+00	.00E+00
sr 90	2.68E-07	2.68E-07	2.67E-07	2.65E-07	2.62E-07	2.55E-07	2.37E-07	2.10E-07	1.85E-07	1.64E-07	1.45E-07
sr 91	2.26E-08	3.94E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	3.60E-04	3.60E-04	3.71E-04	3.74E-04	3.75E-04	3.75E-04	3.75E-04	3.75E-04	3.75E-04	3.75E-04	3.75E-04
y 89m	4.98E-15	4.91E-15	1.45E-15	4.08E-16	3.33E-17	2.23E-19	6.65E-26	8.89E-37	.00E+00	.00E+00	.00E+00
y 90	2.87E-05	2.21E-05	6.93E-11	6.88E-11	6.80E-11	6.63E-11	6.16E-11	5.45E-11	4.82E-11	4.26E-11	3.77E-11
y 91	4.35E-05	4.30E-05	1.50E-05	5.01E-06	5.74E-07	7.58E-09	1.75E-14	7.01E-24	2.81E-33	1.15E-42	.00E+00
y 92	9.62E-08	8.74E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	5.50E-11	1.07E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03
zr 91	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02
zr 92	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02
zr 93	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01	7.62E-01
zr 94	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02
zr 95	1.52E-02	1.50E-02	5.72E-03	2.10E-03	2.91E-04	5.57E-06	3.92E-11	1.01E-19	2.62E-28	6.76E-37	.00E+00
zr 96	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01
zr 97	2.61E-04	9.77E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.10E-09	1.09E-09	1.09E-09	1.08E-09	1.08E-09	1.07E-09
nb 92	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06	2.12E-06
nb 93	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02
nb 93m	4.90E-05	4.90E-05	4.85E-05	4.81E-05	4.72E-05	4.56E-05	4.11E-05	3.47E-05	2.95E-05	2.54E-05	2.20E-05
nb 94	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03	1.53E-03
nb 95	8.20E-03	8.20E-03	5.20E-03	2.26E-03	3.42E-04	6.91E-06	4.72E-11	1.22E-19	3.15E-28	1.29E-36	.00E+00
nb 95m	9.49E-06	9.48E-06	3.80E-06	1.39E-06	1.93E-07	3.69E-09	2.60E-14	6.72E-23	1.74E-31	.00E+00	.00E+00
nb 96	2.24E-07	1.10E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 97	1.86E-05	6.98E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	2.44E-07	9.14E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	1.56E-07	1.56E-07	1.69E-07	1.82E-07	2.09E-07	2.61E-07	4.18E-07	6.79E-07	9.41E-07	1.20E-06	1.46E-06
mo 95	2.64E-01	2.64E-01	2.77E-01	2.83E-01	2.87E-01	2.87E-01	2.87E-01	2.87E-01	2.87E-01	2.87E-01	2.87E-01
mo 96	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02
mo 97	4.78E-01	4.78E-01	4.78E-01	4.78E-01	4.78E-01	4.78E-01	4.78E-01	4.78E-01	4.78E-01	4.78E-01	4.78E-01
mo 98	6.66E-03	6.66E-03	6.66E-03	6.66E-03	6.66E-03	6.66E-03	6.66E-03	6.66E-03	6.66E-03	6.66E-03	6.66E-03
mo 99	1.43E-07	1.11E-07	1.97E-17	1.45E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.83E-09	1.83E-09	1.83E-09	1.83E-09	1.83E-09	1.83E-09	1.83E-09	1.83E-09	1.83E-09	1.83E-09	1.83E-09
tc 98	1.68E-11	1.68E-11	1.68E-11	1.68E-11	1.68E-11	1.68E-11	1.68E-11	1.68E-11	1.68E-11	1.68E-11	1.68E-11
tc 99	2.47E-06	2.47E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06	2.48E-06
ru 99	1.10E-11	1.10E-11	1.30E-11	1.51E-11	1.92E-11	2.73E-11	5.18E-11	9.26E-11	1.33E-10	1.74E-10	2.15E-10
ru100	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07

ru101	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09	1.30E-09
ru102	2.69E-11	2.69E-11	2.69E-11	2.69E-11	2.69E-11	2.69E-11	2.69E-11	2.69E-11	2.69E-11	2.69E-11	2.69E-11
ru103	6.91E-15	6.79E-15	1.41E-15	2.76E-16	1.09E-17	1.73E-20	6.86E-29	7.22E-43	.00E+00	.00E+00	.00E+00
cd111	4.89E-08	4.89E-08	4.89E-08	4.89E-08	4.89E-08	4.89E-08	4.89E-08	4.89E-08	4.89E-08	4.89E-08	4.89E-08
cd112	4.20E-07	4.20E-07	4.20E-07	4.20E-07	4.20E-07	4.20E-07	4.20E-07	4.20E-07	4.20E-07	4.20E-07	4.20E-07
cd113	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09
cd113m	1.58E-09	1.58E-09	1.56E-09	1.54E-09	1.50E-09	1.43E-09	1.23E-09	9.65E-10	7.55E-10	5.90E-10	4.62E-10
cd114	5.74E-05	5.74E-05	6.04E-05	6.12E-05	6.15E-05	6.16E-05	6.16E-05	6.16E-05	6.16E-05	6.16E-05	6.16E-05
cd115	2.63E-09	1.93E-09	1.82E-21	5.78E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	5.72E-09	5.63E-09	1.41E-09	3.35E-10	1.96E-11	6.70E-14	2.69E-21	1.26E-33	.00E+00	.00E+00	.00E+00
cd116	3.18E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07	3.18E-07
cd117	2.23E-11	2.80E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	1.20E-02	1.20E-02	1.25E-02	1.28E-02	1.31E-02	1.32E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02	1.33E-02
in113m	7.42E-07	7.38E-07	4.32E-07	2.47E-07	8.23E-08	9.12E-09	1.24E-11	2.08E-16	3.47E-21	5.81E-26	9.71E-31
in114	2.21E-09	1.39E-09	3.99E-10	1.09E-10	8.47E-12	5.10E-14	1.11E-20	8.76E-32	.00E+00	.00E+00	.00E+00
in114m	8.75E-05	8.63E-05	2.48E-05	6.80E-06	5.27E-07	3.17E-09	6.90E-16	5.44E-27	4.29E-38	.00E+00	.00E+00
in115	1.19E-07	1.19E-07	1.23E-07	1.24E-07	1.25E-07	1.25E-07	1.25E-07	1.25E-07	1.25E-07	1.25E-07	1.25E-07
in117	7.35E-11	1.80E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.58E-11	9.31E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01
sn113	1.24E-03	1.23E-03	7.19E-04	4.12E-04	1.37E-04	1.52E-05	2.07E-08	3.46E-13	5.78E-18	9.67E-23	1.62E-27
sn114	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
sn115	9.89E-02	9.89E-02	9.89E-02	9.89E-02	9.89E-02	9.89E-02	9.89E-02	9.89E-02	9.89E-02	9.89E-02	9.89E-02
sn116	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00
sn117	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00
sn117m	7.71E-04	7.33E-04	7.85E-06	7.04E-08	6.34E-12	5.22E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00
sn119	2.68E+00	2.68E+00	2.69E+00	2.69E+00	2.69E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00
sn119m	1.52E-02	1.52E-02	1.23E-02	9.90E-03	6.42E-03	2.71E-03	2.03E-04	2.70E-06	3.59E-08	4.78E-10	6.36E-12
sn120	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
sn121	2.23E-05	1.21E-05	7.63E-09	7.60E-09	7.56E-09	7.46E-09	7.19E-09	6.75E-09	6.33E-09	5.95E-09	5.58E-09
sn121m	1.76E-04	1.76E-04	1.75E-04	1.75E-04	1.74E-04	1.71E-04	1.65E-04	1.55E-04	1.45E-04	1.37E-04	1.28E-04
sn122	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00
sn123	2.42E-04	2.40E-04	1.49E-04	9.08E-05	3.41E-05	4.80E-06	1.34E-08	7.43E-13	4.12E-17	2.28E-21	1.27E-25
sn124	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00
sn125	3.70E-06	3.44E-06	5.73E-09	7.40E-12	1.45E-17	5.71E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	2.27E-02	2.27E-02	2.27E-02	2.27E-02	2.27E-02	2.27E-02	2.27E-02	2.27E-02	2.27E-02	2.28E-02	2.28E-02
sb122	1.12E-05	8.69E-06	1.04E-15	5.06E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	2.08E-03	2.08E-03	2.18E-03	2.23E-03	2.29E-03	2.32E-03	2.32E-03	2.32E-03	2.32E-03	2.32E-03	2.32E-03

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BWR SNF Assembly - Plenum - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sb124	1.46E-05	1.44E-05	5.18E-06	1.79E-06	2.18E-07	3.25E-09	1.08E-14	7.93E-24	5.84E-33	4.34E-42	.00E+00
sb125	8.73E-03	8.73E-03	8.21E-03	7.70E-03	6.78E-03	5.26E-03	2.45E-03	6.90E-04	1.94E-04	5.44E-05	1.53E-05
sb126	1.39E-06	1.31E-06	9.05E-09	5.13E-11	1.87E-15	2.52E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	2.63E-03	2.63E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03
te123	2.44E-05	2.44E-05	2.76E-05	2.95E-05	3.13E-05	3.22E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05
te123m	7.93E-06	7.88E-06	4.71E-06	2.76E-06	9.56E-07	1.15E-07	2.02E-10	5.15E-15	1.31E-19	3.34E-24	8.52E-29
te124	2.03E-04	2.03E-04	2.12E-04	2.15E-04	2.17E-04	2.17E-04	2.17E-04	2.17E-04	2.17E-04	2.17E-04	2.17E-04
te125	7.65E-03	7.66E-03	8.18E-03	8.70E-03	9.63E-03	1.12E-02	1.40E-02	1.58E-02	1.63E-02	1.64E-02	1.65E-02
te125m	1.14E-04	1.14E-04	1.13E-04	1.08E-04	9.61E-05	7.47E-05	3.49E-05	9.80E-06	2.75E-06	7.73E-07	2.17E-07
te126	2.62E-04	2.62E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04	2.63E-04
te127	1.34E-09	3.46E-10	8.16E-11	4.53E-11	1.42E-11	1.39E-12	1.31E-15	1.18E-20	1.07E-25	9.69E-31	8.77E-36
te127m	4.13E-08	4.10E-08	2.33E-08	1.29E-08	4.05E-09	3.97E-10	3.74E-13	3.38E-18	3.06E-23	2.77E-28	2.51E-33
te128	5.90E-09	5.90E-09	5.90E-09	5.90E-09	5.90E-09	5.90E-09	5.90E-09	5.90E-09	5.90E-09	5.90E-09	5.90E-09
te129m	4.60E-14	4.51E-14	7.19E-15	1.07E-15	2.46E-17	1.31E-20	2.00E-30	.00E+00	.00E+00	.00E+00	.00E+00
i127	1.38E-06	1.38E-06	1.40E-06	1.41E-06	1.42E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06	1.43E-06
i129	5.54E-12	5.54E-12	5.58E-12	5.58E-12	5.58E-12	5.58E-12	5.58E-12	5.58E-12	5.58E-12	5.58E-12	5.58E-12

xe127	3.61E-14	3.54E-14	6.51E-15	1.12E-15	3.44E-17	3.28E-20	2.85E-29	.00E+00	.00E+00	.00E+00	.00E+00
xe128	6.66E-08	6.66E-08	6.66E-08	6.66E-08	6.66E-08	6.66E-08	6.66E-08	6.66E-08	6.66E-08	6.66E-08	6.66E-08
xe129	3.13E-10	3.13E-10	3.14E-10	3.14E-10	3.14E-10	3.14E-10	3.14E-10	3.14E-10	3.14E-10	3.14E-10	3.14E-10
xe129m	7.49E-13	6.93E-13	6.71E-16	4.95E-19	3.21E-25	1.38E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	1.60E-11	1.60E-11	1.60E-11	1.60E-11	1.60E-11	1.60E-11	1.60E-11	1.60E-11	1.60E-11	1.60E-11	1.60E-11
xe131	4.27E-14	4.27E-14	4.29E-14	4.29E-14	4.29E-14	4.29E-14	4.29E-14	4.29E-14	4.29E-14	4.29E-14	4.29E-14
xe132	5.32E-15	5.32E-15	5.32E-15	5.32E-15	5.32E-15	5.32E-15	5.32E-15	5.32E-15	5.32E-15	5.32E-15	5.32E-15
total	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03

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BWR SNF Assembly - Plenum - decay light elements page 5

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	7.10E-07	7.10E-07	7.00E-07	6.90E-07	6.71E-07	6.34E-07	5.36E-07	4.05E-07	3.05E-07	2.31E-07	1.74E-07
be 10	7.44E-11	7.44E-11	7.44E-11	7.44E-11	7.44E-11	7.44E-11	7.44E-11	7.44E-11	7.44E-11	7.44E-11	7.44E-11
c 14	2.80E-06	2.80E-06	2.80E-06	2.80E-06	2.80E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06	2.79E-06
ar 41	1.24E-09	1.38E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	2.66E-11	6.92E-12	3.87E-18	3.85E-18	3.81E-18	3.73E-18	3.50E-18	3.15E-18	2.84E-18	2.55E-18	2.30E-18
k 43	1.53E-08	7.25E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	5.25E-05	5.23E-05	3.59E-05	2.43E-05	1.12E-05	2.38E-06	2.31E-08	1.02E-11	4.46E-15	1.96E-18	8.63E-22
ca 47	8.10E-07	6.95E-07	8.62E-13	6.26E-19	4.56E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	6.15E-03	6.10E-03	2.92E-03	1.36E-03	3.00E-04	1.46E-05	1.69E-09	4.67E-16	1.29E-22	3.55E-29	.00E+00
sc 47	9.69E-03	7.88E-03	8.03E-11	2.75E-18	1.73E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	9.02E-04	6.17E-04	1.19E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	9.75E-04	2.57E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	1.35E+01	1.32E+01	1.42E+00	1.41E-01	1.45E-03	1.56E-07	1.95E-19	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	4.36E-01	4.35E-01	3.57E-01	2.91E-01	1.94E-01	8.61E-02	7.55E-03	1.31E-04	2.27E-06	3.93E-08	6.82E-10
mn 56	1.13E+01	1.78E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	2.62E+00	2.62E+00	2.46E+00	2.31E+00	2.03E+00	1.58E+00	7.37E-01	2.07E-01	5.82E-02	1.63E-02	4.59E-03
fe 59	1.62E-01	1.60E-01	3.99E-02	9.44E-03	5.48E-04	1.85E-06	7.18E-14	3.18E-26	.00E+00	.00E+00	.00E+00
co 58m	2.35E-04	3.81E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	4.19E+00	4.14E+00	1.74E+00	7.03E-01	1.18E-01	3.32E-03	7.40E-08	1.31E-15	2.31E-23	4.11E-31	.00E+00
co 60	1.50E+01	1.50E+01	1.45E+01	1.40E+01	1.31E+01	1.15E+01	7.76E+00	4.02E+00	2.08E+00	1.08E+00	5.59E-01
co 61	2.88E-01	1.20E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	2.83E-03	2.83E-03	2.83E-03	2.83E-03	2.83E-03	2.83E-03	2.83E-03	2.83E-03	2.83E-03	2.83E-03	2.83E-03
ni 63	4.10E-01	4.10E-01	4.10E-01	4.09E-01	4.08E-01	4.05E-01	3.96E-01	3.83E-01	3.70E-01	3.57E-01	3.45E-01
ni 65	3.98E-01	5.41E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.55E-06	1.88E-06	3.16E-18	1.83E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	4.62E-03	1.25E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	3.68E-03	1.88E-06	3.17E-18	1.83E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	3.30E-09	2.52E-09	1.01E-19	1.57E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	1.62E-06	1.61E-06	1.25E-06	9.64E-07	5.73E-07	2.03E-07	9.01E-09	5.02E-11	2.79E-13	1.56E-15	8.66E-18
zn 69	2.23E-10	4.81E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.50E-11	4.48E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	2.78E-15	2.61E-15	1.19E-17	4.36E-20	6.74E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	4.23E-01	4.17E-01	1.23E-01	3.46E-02	2.83E-03	1.89E-05	5.65E-12	7.54E-23	.00E+00	.00E+00	.00E+00
sr 90	3.79E-05	3.79E-05	3.76E-05	3.74E-05	3.69E-05	3.60E-05	3.35E-05	2.96E-05	2.62E-05	2.31E-05	2.05E-05
sr 91	8.19E-02	1.43E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.93E-05	3.88E-05	1.15E-05	3.22E-06	2.63E-07	1.76E-09	5.25E-16	7.02E-27	.00E+00	.00E+00	.00E+00
y 90	1.56E+01	1.20E+01	3.76E-05	3.74E-05	3.70E-05	3.61E-05	3.35E-05	2.96E-05	2.62E-05	2.31E-05	2.05E-05
y 90m	1.45E-06	7.85E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.07E+00	1.05E+00	3.67E-01	1.23E-01	1.41E-02	1.86E-04	4.28E-10	1.72E-19	6.90E-29	.00E+00	.00E+00
y 92	9.26E-01	8.41E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.84E-04	3.58E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.92E-03	1.92E-03	1.92E-03	1.92E-03	1.92E-03	1.92E-03	1.92E-03	1.92E-03	1.92E-03	1.92E-03	1.91E-03
zr 95	3.26E+02	3.22E+02	1.23E+02	4.52E+01	6.24E+00	1.20E-01	8.42E-07	2.17E-15	5.62E-24	2.28E-32	.00E+00
zr 97	5.00E+02	1.87E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	6.35E-09	6.35E-09	6.35E-09	6.35E-09	6.34E-09	6.34E-09	6.32E-09	6.29E-09	6.25E-09	6.22E-09	6.19E-09
nb 92	2.35E-10	2.35E-10	2.35E-10	2.35E-10	2.35E-10	2.35E-10	2.35E-10	2.35E-10	2.35E-10	2.35E-10	2.35E-10
nb 93m	1.17E-02	1.17E-02	1.16E-02	1.15E-02	1.13E-02	1.09E-02	9.79E-03	8.27E-03	7.04E-03	6.05E-03	5.25E-03

nb 94	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04
nb 95	3.23E+02	3.23E+02	2.04E+02	8.89E+01	1.35E+01	2.72E-01	1.86E-06	4.79E-15	1.24E-23	4.56E-32	.00E+00
nb 95m	3.61E+00	3.61E+00	1.45E+00	5.31E-01	7.34E-02	1.41E-03	9.90E-09	2.56E-17	6.61E-26	.00E+00	.00E+00
nb 96	3.13E-01	1.54E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	5.00E+02	1.88E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 6

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 97m	4.74E+02	1.77E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	6.86E-02	5.33E-02	9.46E-12	6.95E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.46E-14	1.46E-14	1.46E-14	1.46E-14	1.46E-14	1.46E-14	1.46E-14	1.46E-14	1.46E-14	1.46E-14	1.46E-14
tc 99	4.22E-08	4.23E-08	4.25E-08	4.25E-08	4.25E-08	4.25E-08	4.25E-08	4.25E-08	4.25E-08	4.25E-08	4.25E-08
ru103	2.23E-10	2.19E-10	4.56E-11	8.91E-12	3.53E-13	5.59E-16	2.22E-24	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	3.54E-07	3.54E-07	3.50E-07	3.45E-07	3.37E-07	3.21E-07	2.77E-07	2.17E-07	1.69E-07	1.32E-07	1.04E-07
cd115	1.34E-03	9.81E-04	9.27E-16	2.94E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.46E-04	1.43E-04	3.60E-05	8.56E-06	4.99E-07	1.71E-09	6.85E-17	3.22E-29	.00E+00	.00E+00	.00E+00
cd117	2.40E-04	3.01E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	4.36E-07	3.09E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	1.24E+01	1.23E+01	7.22E+00	4.14E+00	1.38E+00	1.53E-01	2.08E-04	3.47E-09	5.81E-14	9.72E-19	1.62E-23
in114	3.04E+00	1.91E+00	5.50E-01	1.51E-01	1.17E-02	7.02E-05	1.53E-11	1.21E-22	.00E+00	.00E+00	.00E+00
in114m	2.03E+00	2.00E+00	5.75E-01	1.57E-01	1.22E-02	7.33E-05	1.60E-11	1.26E-22	.00E+00	.00E+00	.00E+00
in116m	3.63E-04	3.59E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.70E-03	6.59E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	2.18E-04	1.29E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	1.24E+01	1.23E+01	7.22E+00	4.14E+00	1.38E+00	1.52E-01	2.08E-04	3.47E-09	5.81E-14	9.71E-19	1.62E-23
sn117m	6.33E+01	6.02E+01	6.45E-01	5.78E-03	5.21E-07	4.28E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	5.71E+01	5.70E+01	4.61E+01	3.71E+01	2.41E+01	1.01E+01	7.60E-01	1.01E-02	1.34E-04	1.79E-06	2.38E-08
sn121	2.14E+01	1.16E+01	7.30E-03	7.28E-03	7.24E-03	7.14E-03	6.88E-03	6.46E-03	6.07E-03	5.69E-03	5.35E-03
sn121m	9.44E-03	9.44E-03	9.41E-03	9.38E-03	9.32E-03	9.21E-03	8.87E-03	8.32E-03	7.82E-03	7.34E-03	6.89E-03
sn123	1.99E+00	1.98E+00	1.23E+00	7.47E-01	2.80E-01	3.94E-02	1.10E-04	6.11E-09	3.39E-13	1.88E-17	1.04E-21
sn123m	1.14E-02	1.74E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	4.01E-01	3.73E-01	6.21E-04	8.03E-07	1.58E-12	6.19E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	4.45E+00	3.44E+00	4.12E-10	2.01E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	2.56E-01	2.53E-01	9.07E-02	3.13E-02	3.81E-03	5.69E-05	1.88E-10	1.39E-19	1.02E-28	.00E+00	.00E+00
sb125	9.15E+00	9.15E+00	8.60E+00	8.07E+00	7.10E+00	5.51E+00	2.57E+00	7.23E-01	2.03E-01	5.71E-02	1.60E-02
sb126	1.16E-01	1.10E-01	7.57E-04	4.29E-06	1.56E-10	2.11E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	5.71E-15	5.72E-15	6.47E-15	6.92E-15	7.35E-15	7.54E-15	7.57E-15	7.57E-15	7.57E-15	7.57E-15	7.57E-15
te123m	7.04E-02	7.00E-02	4.18E-02	2.44E-02	8.48E-03	1.02E-03	1.79E-06	4.57E-11	1.16E-15	2.97E-20	7.56E-25
te125m	2.05E+00	2.05E+00	2.04E+00	1.95E+00	1.73E+00	1.35E+00	6.28E-01	1.77E-01	4.96E-02	1.39E-02	3.92E-03
te127	3.54E-03	9.12E-04	2.15E-04	1.20E-04	3.74E-05	3.67E-06	3.45E-09	3.13E-14	2.83E-19	2.56E-24	2.32E-29
te127m	3.90E-04	3.87E-04	2.20E-04	1.22E-04	3.82E-05	3.75E-06	3.53E-09	3.19E-14	2.89E-19	2.61E-24	2.36E-29
te129	2.14E-08	8.71E-10	1.39E-10	2.06E-11	4.75E-13	2.54E-16	3.86E-26	.00E+00	.00E+00	.00E+00	.00E+00
te129m	1.39E-09	1.36E-09	2.17E-10	3.21E-11	7.41E-13	3.96E-16	6.03E-26	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.69E-14	1.60E-14	1.41E-16	1.02E-18	6.08E-23	2.28E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	4.39E-10	1.15E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.47E-14	4.10E-14	1.91E-17	6.57E-21	9.45E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	1.02E-09	1.00E-09	1.84E-10	3.16E-11	9.73E-13	9.28E-16	8.05E-25	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	8.53E-08	7.89E-08	7.64E-11	5.64E-14	3.66E-20	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.62E-11	1.52E-11	8.54E-14	3.90E-16	9.28E-21	5.32E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.57E-14	1.39E-14	1.12E-19	5.48E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.42E+03	1.42E+03	4.25E+02	2.09E+02	7.17E+01	3.14E+01	1.29E+01	5.55E+00	2.79E+00	1.55E+00	9.51E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Plenum - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

	emean			time after discharge							
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	1.52E+13	6.53E+12	6.62E+11	3.18E+11	1.16E+11	5.50E+10	2.35E+10	9.87E+09	4.66E+09	2.33E+09	1.21E+09
	3.00E-02	7.08E+12	4.40E+12	1.17E+12	8.77E+11	5.73E+11	3.05E+11	8.80E+10	2.29E+10	6.84E+09	2.16E+09	7.32E+08
	5.50E-02	2.95E+12	1.18E+12	6.27E+10	2.78E+10	8.79E+09	4.40E+09	2.45E+09	1.12E+09	5.42E+08	2.70E+08	1.37E+08
	8.50E-02	1.62E+12	6.37E+11	2.41E+10	1.05E+10	3.24E+09	1.63E+09	9.44E+08	4.31E+08	2.07E+08	1.03E+08	5.20E+07
	1.20E-01	1.10E+12	4.27E+11	1.29E+10	6.21E+09	2.59E+09	1.55E+09	7.97E+08	2.95E+08	1.19E+08	5.25E+07	2.46E+07
	1.70E-01	3.04E+12	2.28E+12	5.52E+10	2.70E+10	2.06E+10	1.55E+10	7.23E+09	2.06E+09	5.93E+08	1.74E+08	5.30E+07
	3.00E-01	2.53E+12	8 10E+11	3.39E+10	1.73E+10	9.31E+09	5.98E+09	2.74E+09	7.79E+08	2.24E+08	6.59E+07	2.00E+07
	6.50E-01	6.90E+13	4.32E+13	1.44E+13	6.01E+12	1.03E+12	1.45E+11	5.82E+10	1.63E+10	4.59E+09	1.31E+09	3.88E+08
	1.13E+00	2.49E+12	1.70E+12	1.19E+12	1.16E+12	1.08E+12	9.48E+11	6.39E+11	3.31E+11	1.71E+11	8.88E+10	4.60E+10
	1.58E+00	5.05E+11	1.61E+11	2.29E+09	8.10E+08	1.05E+08	1.89E+06	7.04E+02	5.30E+02	4.35E+02	3.67E+02	3.15E+02
	2.00E+00	1.76E+11	2.36E+10	2.14E+08	7.77E+07	1.45E+07	5.19E+06	3.41E+06	1.77E+06	9.15E+05	4.74E+05	2.45E+05
	2.40E+00	4.49E+09	3.84E+07	1.39E+06	4.76E+05	7.39E+04	1.68E+04	1.08E+04	5.59E+03	2.89E+03	1.50E+03	7.77E+02
	2.80E+00	4.00E+09	6.69E+06	1.33E+05	4.57E+04	5.57E+03	8.31E+01	2.75E-04	1.24E-11	1.10E-11	9.90E-12	8.91E-12
	3.25E+00	7.30E+08	1.17E+06	1.59E-12	1.58E-12	1.56E-12	1.53E-12	1.43E-12	1.29E-12	1.16E-12	1.05E-12	9.41E-13
	3.75E+00	1.31E+06	8.00E+01	1.92E-15	1.91E-15	1.89E-15	1.85E-15	1.73E-15	1.56E-15	1.40E-15	1.26E-15	1.14E-15
	4.25E+00	4.73E+05	6.31E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	3.51E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	5.92E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	1.06E+14	6.14E+13	1.76E+13	8.45E+12	2.84E+12	1.48E+12	8.23E+11	3.85E+11	1.89E+11	9.53E+10	4.86E+10
0	mev/sec	5.09E+13	3.13E+13	1.08E+13	5.25E+12	1.91E+12	1.18E+12	7.62E+11	3.84E+11	1.96E+11	1.01E+11	5.21E+10

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

	emean			time after discharge							
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	3.50E+04	1.50E+04	1.52E+03	7.31E+02	2.66E+02	1.26E+02	5.41E+01	2.27E+01	1.07E+01	5.35E+00	2.79E+00
	3.00E-02	4.88E+04	3.03E+04	8.07E+03	6.05E+03	3.95E+03	2.10E+03	6.07E+02	1.58E+02	4.72E+01	1.49E+01	5.05E+00
	5.50E-02	3.74E+04	1.49E+04	7.93E+02	3.52E+02	1.11E+02	5.56E+01	3.09E+01	1.42E+01	6.86E+00	3.42E+00	1.73E+00
	8.50E-02	3.16E+04	1.24E+04	4.71E+02	2.05E+02	6.33E+01	3.19E+01	1.84E+01	8.42E+00	4.05E+00	2.01E+00	1.02E+00
	1.20E-01	3.03E+04	1.18E+04	3.56E+02	1.71E+02	7.14E+01	4.29E+01	2.20E+01	8.13E+00	3.29E+00	1.45E+00	6.79E-01
	1.70E-01	1.19E+05	8.92E+04	2.16E+03	1.05E+03	8.06E+02	6.04E+02	2.82E+02	8.05E+01	2.32E+01	6.81E+00	2.07E+00
	3.00E-01	1.75E+05	5.58E+04	2.34E+03	1.19E+03	6.42E+02	4.12E+02	1.89E+02	5.37E+01	1.55E+01	4.54E+00	1.38E+00
	6.50E-01	1.03E+07	6.46E+06	2.15E+06	8.98E+05	1.53E+05	2.17E+04	8.69E+03	2.43E+03	6.86E+02	1.96E+02	5.79E+01
	1.13E+00	6.45E+05	4.41E+05	3.09E+05	2.99E+05	2.80E+05	2.45E+05	1.65E+05	8.56E+04	4.43E+04	2.30E+04	1.19E+04
	1.58E+00	1.83E+05	5.82E+04	8.28E+02	2.93E+02	3.81E+01	6.85E-01	2.55E-04	1.92E-04	1.57E-04	1.33E-04	1.14E-04
	2.00E+00	8.10E+04	1.09E+04	9.86E+01	3.57E+01	6.66E+00	2.38E+00	1.57E+00	8.12E-01	4.21E-01	2.18E-01	1.13E-01
	2.40E+00	2.48E+03	2.12E+01	7.67E-01	2.63E-01	4.08E-02	9.29E-03	5.95E-03	3.08E-03	1.60E-03	8.27E-04	4.29E-04
	2.80E+00	2.57E+03	4.30E+00	8.53E-02	2.94E-02	3.59E-03	5.35E-05	1.77E-10	8.00E-18	7.08E-18	6.37E-18	5.74E-18
	3.25E+00	5.45E+02	8.71E-01	1.18E-18	1.18E-18	1.17E-18	1.14E-18	1.07E-18	9.64E-19	8.68E-19	7.81E-19	7.03E-19
	3.75E+00	1.13E+00	6.89E-05	1.65E-21	1.64E-21	1.63E-21	1.59E-21	1.50E-21	1.35E-21	1.21E-21	1.09E-21	9.81E-22
	4.25E+00	4.62E-01	6.16E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	3.83E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	7.49E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	1.17E+07	7.19E+06	2.48E+06	1.21E+06	4.39E+05	2.70E+05	1.75E+05	8.84E+04	4.51E+04	2.32E+04	1.20E+04
0	gamma watts	8.16E+00	5.02E+00	1.73E+00	8.41E-01	3.06E-01	1.88E-01	1.22E-01	6.16E-02	3.15E-02	1.62E-02	8.35E-03

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photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Plenum - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

	emean			time after discharge							
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	2.47E+17	3.21E+16	8.40E+15	6.22E+15	4.18E+15	2.25E+15	7.63E+14	5.09E+14	4.37E+14	3.83E+14	3.37E+14
	3.00E-02	1.09E+17	2.51E+16	3.59E+15	2.60E+15	1.75E+15	9.50E+14	3.37E+14	2.29E+14	1.97E+14	1.73E+14	1.53E+14
	5.50E-02	5.84E+16	8.80E+15	1.92E+15	1.46E+15	9.98E+14	5.42E+14	1.85E+14	1.20E+14	9.91E+13	8.44E+13	7.28E+13
	8.50E-02	3.99E+16	7.47E+15	1.17E+15	9.02E+14	6.15E+14	3.27E+14	1.03E+14	6.32E+13	5.19E+13	4.43E+13	3.84E+13

	1.20E-01	3.26E+16	7.01E+15	1.35E+15	1.07E+15	7.32E+14	3.78E+14	1.15E+14	6.82E+13	5.22E+13	4.14E+13	3.36E+13
	1.70E-01	5.22E+16	8.32E+15	1.17E+15	6.44E+14	4.00E+14	2.08E+14	5.96E+13	3.70E+13	3.18E+13	2.79E+13	2.46E+13
	3.00E-01	1.13E+17	1.76E+16	9.09E+14	6.89E+14	4.67E+14	2.42E+14	6.77E+13	4.11E+13	3.48E+13	3.01E+13	2.62E+13
	6.50E-01	2.32E+17	6.45E+16	1.54E+16	9.11E+15	5.24E+15	3.49E+15	1.75E+15	9.74E+14	7.59E+14	6.52E+14	5.74E+14
	1.13E+00	7.23E+16	5.21E+15	3.28E+14	2.60E+14	2.08E+14	1.48E+14	7.96E+13	4.64E+13	3.05E+13	2.06E+13	1.40E+13
	1.58E+00	3.73E+16	8.89E+15	1.64E+14	8.61E+13	6.45E+13	3.91E+13	1.23E+13	3.42E+12	1.55E+12	9.36E+11	6.39E+11
	2.00E+00	1.10E+16	6.48E+14	5.31E+13	3.78E+13	2.45E+13	1.04E+13	8.54E+11	3.01E+10	1.35E+10	1.15E+10	1.01E+10
	2.40E+00	8.60E+15	4.32E+14	7.28E+12	3.24E+12	2.26E+12	1.13E+12	1.41E+11	4.57E+09	1.57E+08	1.14E+07	5.89E+06
	2.80E+00	3.63E+15	6.95E+12	6.55E+11	5.15E+11	3.64E+11	1.83E+11	2.33E+10	7.63E+08	2.52E+07	8.35E+05	2.77E+04
	3.25E+00	1.73E+15	2.51E+12	1.19E+11	8.44E+10	5.99E+10	3.03E+10	3.93E+09	1.30E+08	4.32E+06	1.43E+05	4.76E+03
	3.75E+00	7.80E+14	1.18E+10	4.42E+07	3.72E+07	2.64E+07	1.34E+07	1.73E+06	5.75E+04	1.91E+03	6.32E+01	2.10E+00
	4.25E+00	7.10E+14	1.56E+09	9.79E-06	9.84E-06	9.93E-06	1.01E-05	1.04E-05	1.05E-05	1.06E-05	1.06E-05	1.06E-05
	4.75E+00	2.11E+14	1.16E+10	4.91E-06	4.93E-06	4.98E-06	5.06E-06	5.19E-06	5.28E-06	5.30E-06	5.31E-06	5.31E-06
	5.50E+00	1.65E+14	7.40E+07	3.64E-06	3.66E-06	3.69E-06	3.75E-06	3.85E-06	3.91E-06	3.93E-06	3.94E-06	3.94E-06
0	total	1.02E+18	1.86E+17	3.44E+16	2.31E+16	1.47E+16	8.59E+15	3.47E+15	2.09E+15	1.70E+15	1.46E+15	1.27E+15
0	mev/sec	4.16E+17	7.38E+16	1.18E+16	7.18E+15	4.29E+15	2.78E+15	1.33E+15	7.41E+14	5.73E+14	4.85E+14	4.21E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

	emean	time after discharge									
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	5.67E+08	7.37E+07	1.93E+07	1.43E+07	9.60E+06	5.18E+06	1.75E+06	1.17E+06	1.01E+06	8.81E+05	7.76E+05
	3.00E-02	7.54E+08	1.73E+08	2.47E+07	1.79E+07	1.21E+07	6.55E+06	2.33E+06	1.58E+06	1.36E+06	1.19E+06	1.05E+06
	5.50E-02	7.38E+08	1.11E+08	2.43E+07	1.85E+07	1.26E+07	6.86E+06	2.34E+06	1.51E+06	1.25E+06	1.07E+06	9.20E+05
	8.50E-02	7.79E+08	1.46E+08	2.29E+07	1.76E+07	1.20E+07	6.39E+06	2.01E+06	1.23E+06	1.01E+06	8.66E+05	7.51E+05
	1.20E-01	8.99E+08	1.93E+08	3.73E+07	2.96E+07	2.02E+07	1.04E+07	3.17E+06	1.88E+06	1.44E+06	1.14E+06	9.27E+05
	1.70E-01	2.04E+09	3.25E+08	4.59E+07	2.52E+07	1.56E+07	8.12E+06	2.33E+06	1.45E+06	1.24E+06	1.09E+06	9.61E+05
	3.00E-01	7.82E+09	1.21E+09	6.27E+07	4.75E+07	3.22E+07	1.67E+07	4.67E+06	2.84E+06	2.40E+06	2.08E+06	1.81E+06
	6.50E-01	3.47E+10	9.63E+09	2.30E+09	1.36E+09	7.83E+08	5.22E+08	2.61E+08	1.46E+08	1.13E+08	9.75E+07	8.58E+07
	1.13E+00	1.87E+10	1.35E+09	8.49E+07	6.74E+07	5.38E+07	3.82E+07	2.06E+07	1.20E+07	7.89E+06	5.32E+06	3.63E+06
	1.58E+00	1.35E+10	3.22E+09	5.95E+07	3.12E+07	2.34E+07	1.42E+07	4.46E+06	1.24E+06	5.60E+05	3.39E+05	2.31E+05
	2.00E+00	5.05E+09	2.98E+08	2.44E+07	1.74E+07	1.13E+07	4.80E+06	3.93E+05	1.38E+04	6.19E+03	5.28E+03	4.63E+03
	2.40E+00	4.75E+09	2.38E+08	4.02E+06	1.79E+06	1.25E+06	6.21E+05	7.78E+04	2.52E+03	8.67E+01	6.31E+00	3.25E+00
	2.80E+00	2.34E+09	4.48E+06	4.22E+05	3.32E+05	2.35E+05	1.18E+05	1.50E+04	4.91E+02	1.62E+01	5.37E-01	1.78E-02
	3.25E+00	1.29E+09	1.87E+06	8.92E+04	6.31E+04	4.48E+04	2.27E+04	2.94E+03	9.74E+01	3.23E+00	1.07E-01	3.55E-03
	3.75E+00	6.73E+08	1.02E+04	3.81E+01	3.20E+01	2.28E+01	1.15E+01	1.49E+00	4.95E-02	1.64E-03	5.45E-05	1.81E-06
	4.25E+00	6.94E+08	1.52E+03	9.56E-12	9.61E-12	9.70E-12	9.85E-12	1.01E-11	1.03E-11	1.03E-11	1.03E-11	1.03E-11
	4.75E+00	2.31E+08	1.26E+04	5.36E-12	5.39E-12	5.44E-12	5.52E-12	5.67E-12	5.76E-12	5.79E-12	5.79E-12	5.80E-12
	5.50E+00	2.09E+08	9.36E+01	4.60E-12	4.63E-12	4.67E-12	4.74E-12	4.87E-12	4.95E-12	4.97E-12	4.98E-12	4.98E-12
0	total	9.57E+10	1.70E+10	2.71E+09	1.65E+09	9.87E+08	6.40E+08	3.05E+08	1.70E+08	1.32E+08	1.11E+08	9.69E+07
0	gamma watts	6.68E+04	1.18E+04	1.89E+03	1.15E+03	6.88E+02	4.46E+02	2.13E+02	1.19E+02	9.18E+01	7.77E+01	6.75E+01

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0 principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.21E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	2.25E+15	1.75E+15	3.10E+05	2.28E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	3.28E+15	3.15E+15	2.67E+15	2.25E+15	1.60E+15	8.08E+14	1.05E+14	3.47E+12	1.15E+11	3.82E+09	1.27E+08
ba140	1.89E+15	1.79E+15	1.42E+13	9.32E+10	4.53E+06	1.09E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.59E+15	2.49E+15	2.05E+13	1.34E+11	6.53E+06	1.57E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	3.98E+15	3.95E+15	3.18E+15	2.54E+15	1.63E+15	6.70E+14	4.66E+13	5.48E+11	6.45E+09	7.59E+07	8.94E+05

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.51E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.26E+15	3.45E+15	2.06E+07	5.86E-02	7.63E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.26E+15	4.13E+15	3.59E+10	1.76E+05	5.65E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.58E+15	1.49E+15	1.19E+13	7.78E+10	3.78E+06	9.06E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.43E+15	1.41E+15	2.11E+14	2.94E+13	5.96E+11	2.47E+08	1.75E-02	2.12E-19	.00E+00	.00E+00	.00E+00
ce143	4.65E+15	2.83E+15	9.26E-05	5.18E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

pr144	1.32E+15	1.31E+15	1.05E+15	8.40E+14	5.39E+14	2.22E+14	1.54E+13	1.81E+11	2.14E+09	2.51E+07	2.96E+05
nd147	1.42E+15	1.34E+15	4.86E+12	1.42E+10	1.38E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec
mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.80E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.76E+14	7.45E+14	6.31E+14	5.31E+14	3.78E+14	1.91E+14	2.48E+13	8.21E+11	2.72E+10	9.04E+08	3.00E+07
te132	8.21E+14	6.64E+14	3.97E+06	1.13E-02	1.47E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.46E+14	5.25E+14	4.32E+12	2.83E+10	1.38E+06	3.30E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.32E+15	8.05E+14	2.64E-05	1.47E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.24E+14	9.18E+14	7.39E+14	5.90E+14	3.78E+14	1.56E+14	1.08E+13	1.27E+11	1.50E+09	1.76E+07	2.08E+05
sm153	1.51E+15	1.06E+15	1.35E+01	4.88E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec
mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.47E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.61E+14	4.43E+14	3.75E+14	3.16E+14	2.24E+14	1.14E+14	1.47E+13	4.88E+11	1.62E+10	5.37E+08	1.78E+07
xe133	3.01E+15	2.92E+15	2.54E+10	1.24E+05	3.99E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.44E+14	5.40E+14	4.35E+14	3.47E+14	2.23E+14	9.16E+13	6.37E+12	7.50E+10	8.82E+08	1.04E+07	1.22E+05
nd147	8.85E+14	8.32E+14	3.02E+12	8.79E+09	8.59E+04	8.33E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 5, photons/sec
mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.01E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.66E+15	3.11E+15	5.56E+05	4.08E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	6.95E+14	6.93E+14	5.58E+14	4.46E+14	2.86E+14	1.18E+14	8.18E+12	9.63E+10	1.13E+09	1.33E+07	1.57E+05
pr144	3.89E+14	3.86E+14	3.11E+14	2.48E+14	1.59E+14	6.55E+13	4.56E+12	5.36E+10	6.31E+08	7.43E+06	8.74E+04
sm153	7.20E+14	5.03E+14	6.41E+00	2.32E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.32E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.92E+14	6.15E+14	1.09E+05	8.02E-06	7.62E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.59E+15	2.19E+15	3.93E+05	2.88E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.71E+14	4.46E+14	3.54E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.84E+15	2.79E+15	4.19E+14	5.82E+13	1.18E+12	4.89E+08	3.47E-02	4.21E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.76E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.42E+15	1.02E+15	6.70E-04	8.45E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.55E+15	4.25E+15	2.03E+12	6.97E+08	1.00E+02	2.12E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.15E+15	3.36E+15	2.01E+07	5.71E-02	7.44E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.29E+15	1.73E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.93E+15	1.86E+15	1.53E+13	1.00E+11	4.87E+06	1.17E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.06E+15	1.86E+15	6.10E-05	3.41E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.45E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.58E+15	7.50E+15	2.86E+15	1.05E+15	1.45E+14	2.78E+12	1.96E+07	5.06E-02	1.31E-10	3.38E-19	8.42E-28
nb 95	7.89E+15	7.89E+15	4.95E+15	2.15E+15	3.25E+14	6.55E+12	4.47E+07	1.16E-01	2.99E-10	7.71E-19	.00E+00
ru103	5.69E+15	5.59E+15	1.16E+15	2.27E+14	9.00E+12	1.42E+10	5.65E+01	5.60E-13	5.57E-27	.00E+00	.00E+00
i132	1.67E+16	1.36E+16	8.14E+07	2.31E-01	3.01E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.36E+15	3.39E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.99E+15	3.98E+15	3.67E+15	3.37E+15	2.85E+15	2.04E+15	7.43E+14	1.38E+14	2.57E+13	4.80E+12	8.93E+11
la140	6.19E+15	5.96E+15	4.90E+13	3.21E+11	1.56E+07	3.74E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.21E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.52E+15	2.65E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.82E+15	1.48E+15	8.86E+06	2.52E-02	3.28E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.04E+15	4.80E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.49E+14	4.26E+14	3.93E+12	3.01E+10	1.98E+06	8.76E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.75E+14	6.49E+14	5.34E+12	3.50E+10	1.70E+06	4.08E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.73E+14	7.39E+14	1.27E+13	1.87E+11	4.45E+07	2.56E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.89E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.86E+14	5.60E+14	3.35E+06	9.51E-03	1.24E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	8.00E+15	7.70E+15	6.33E+13	4.15E+11	2.02E+07	4.84E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.48E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.76E+14	1.44E+14	8.60E+05	2.44E-03	3.18E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.49E+14	3.57E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.08E+13	5.04E+13	4.06E+13	3.24E+13	2.08E+13	8.55E+12	5.95E+11	7.00E+09	8.23E+07	9.69E+05	1.14E+04
eu156	3.78E+14	3.61E+14	6.22E+12	9.12E+10	2.17E+07	1.25E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.32E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.79E+14	3.65E+14	3.00E+12	1.97E+10	9.57E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.68E+13	2.57E+13	4.42E+11	6.48E+09	1.54E+06	8.87E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.95E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.16E+11	6.88E+11	5.82E+11	4.90E+11	3.49E+11	1.76E+11	2.29E+10	7.58E+08	2.51E+07	8.34E+05	2.77E+04
ag112	1.33E+12	7.03E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.31E+12	5.11E+12	4.20E+10	2.76E+08	1.34E+04	3.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.51E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.42E+12	2.33E+12	1.92E+10	1.26E+08	6.12E+03	1.47E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.18E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.71E+12	8.40E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.70E+14	3.34E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.56E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.03E+11	1.56E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.16E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	3.73E+12	1.16E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec

mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.40E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.39E+10	7.40E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Plenum - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.46E+17	7.55E+16	9.58E+13	7.11E+13	4.39E+13	2.57E+13	2.08E+13	2.05E+13	2.02E+13	1.98E+13	1.95E+13
3.00E-02	9.22E+15	1.53E+15	8.90E+10	8.62E+10	1.09E+11	1.54E+11	2.74E+11	4.39E+11	5.66E+11	6.65E+11	7.40E+11
5.50E-02	1.28E+16	3.76E+15	1.45E+12	1.42E+12	1.77E+12	2.51E+12	4.58E+12	7.42E+12	9.62E+12	1.13E+13	1.26E+13
8.50E-02	5.80E+16	7.98E+15	4.81E+11	3.17E+11	3.17E+11	3.16E+11	3.14E+11	3.11E+11	3.08E+11	3.05E+11	3.02E+11
1.20E-01	5.89E+16	4.29E+16	5.30E+11	4.18E+11	4.12E+11	4.06E+11	3.94E+11	3.77E+11	3.62E+11	3.49E+11	3.37E+11
1.70E-01	1.93E+15	2.90E+14	1.90E+10	7.76E+09	5.58E+09	4.10E+09	3.67E+09	3.60E+09	3.53E+09	3.48E+09	3.43E+09
3.00E-01	3.11E+16	2.25E+16	3.19E+11	2.27E+11	2.26E+11	2.23E+11	2.15E+11	2.03E+11	1.93E+11	1.83E+11	1.75E+11
6.50E-01	1.72E+15	4.89E+13	2.20E+09	1.78E+09	1.33E+09	1.07E+09	1.16E+09	1.32E+09	1.36E+09	1.34E+09	1.32E+09
1.13E+00	1.70E+15	1.05E+15	7.61E+08	7.16E+08	6.64E+08	6.25E+08	5.97E+08	5.65E+08	5.35E+08	5.07E+08	4.82E+08
1.58E+00	1.54E+08	1.49E+08	1.33E+08	1.23E+08	1.11E+08	1.03E+08	1.03E+08	9.98E+07	9.17E+07	8.24E+07	7.38E+07
2.00E+00	1.54E+06	9.77E+05	9.45E+05	9.68E+05	1.02E+06	1.13E+06	1.42E+06	1.69E+06	1.76E+06	1.75E+06	1.71E+06
2.40E+00	6.88E+07	6.88E+07	6.10E+07	5.53E+07	4.85E+07	4.29E+07	3.72E+07	3.08E+07	2.55E+07	2.12E+07	1.76E+07
2.80E+00	9.18E+07	9.29E+07	9.49E+07	9.96E+07	1.13E+08	1.47E+08	2.48E+08	3.37E+08	3.58E+08	3.52E+08	3.38E+08
3.25E+00	2.46E+07	2.46E+07	2.18E+07	1.98E+07	1.74E+07	1.54E+07	1.33E+07	1.10E+07	9.14E+06	7.58E+06	6.30E+06
3.75E+00	1.43E+07	1.43E+07	1.27E+07	1.15E+07	1.01E+07	8.91E+06	7.74E+06	6.40E+06	5.30E+06	4.40E+06	3.65E+06
4.25E+00	8.28E+06	8.28E+06	7.34E+06	6.65E+06	5.84E+06	5.17E+06	4.49E+06	3.71E+06	3.07E+06	2.55E+06	2.12E+06
4.75E+00	4.80E+06	4.80E+06	4.25E+06	3.86E+06	3.39E+06	3.00E+06	2.60E+06	2.15E+06	1.78E+06	1.48E+06	1.23E+06
5.50E+00	4.34E+06	4.34E+06	3.85E+06	3.49E+06	3.06E+06	2.71E+06	2.35E+06	1.95E+06	1.61E+06	1.34E+06	1.11E+06
0 total	3.21E+17	1.56E+17	9.87E+13	7.36E+13	4.68E+13	2.93E+13	2.65E+13	2.93E+13	3.12E+13	3.27E+13	3.36E+13
0 mev/sec	2.71E+16	1.48E+16	1.25E+12	9.41E+11	6.88E+11	5.45E+11	6.10E+11	7.62E+11	8.79E+11	9.67E+11	1.03E+12

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.36E+08	1.74E+08	2.20E+05	1.64E+05	1.01E+05	5.90E+04	4.77E+04	4.71E+04	4.64E+04	4.56E+04	4.47E+04
3.00E-02	6.36E+07	1.05E+07	6.14E+02	5.94E+02	7.54E+02	1.06E+03	1.89E+03	3.03E+03	3.91E+03	4.59E+03	5.11E+03
5.50E-02	1.62E+08	4.76E+07	1.84E+04	1.80E+04	2.24E+04	3.18E+04	5.80E+04	9.38E+04	1.22E+05	1.43E+05	1.60E+05
8.50E-02	1.13E+09	1.56E+08	9.39E+03	6.20E+03	6.19E+03	6.18E+03	6.14E+03	6.07E+03	6.01E+03	5.95E+03	5.90E+03
1.20E-01	1.62E+09	1.18E+09	1.46E+04	1.15E+04	1.14E+04	1.12E+04	1.09E+04	1.04E+04	9.99E+03	9.62E+03	9.28E+03
1.70E-01	7.54E+07	1.13E+07	7.44E+02	3.03E+02	2.18E+02	1.60E+02	1.43E+02	1.41E+02	1.38E+02	1.36E+02	1.34E+02
3.00E-01	2.15E+09	1.55E+09	2.20E+04	1.57E+04	1.56E+04	1.54E+04	1.48E+04	1.40E+04	1.33E+04	1.26E+04	1.21E+04
6.50E-01	2.57E+08	7.31E+06	3.28E+02	2.66E+02	1.99E+02	1.60E+02	1.74E+02	1.97E+02	2.03E+02	2.01E+02	1.97E+02
1.13E+00	4.41E+08	2.71E+08	1.97E+02	1.85E+02	1.72E+02	1.62E+02	1.54E+02	1.46E+02	1.38E+02	1.31E+02	1.25E+02
1.58E+00	5.58E+01	5.40E+01	4.83E+01	4.44E+01	4.00E+01	3.73E+01	3.73E+01	3.61E+01	3.32E+01	2.99E+01	2.67E+01
2.00E+00	7.08E-01	4.49E-01	4.35E-01	4.45E-01	4.68E-01	5.18E-01	6.54E-01	7.76E-01	8.08E-01	8.04E-01	7.88E-01
2.40E+00	3.80E+01	3.80E+01	3.36E+01	3.05E+01	2.68E+01	2.37E+01	2.05E+01	1.70E+01	1.41E+01	1.17E+01	9.70E+00
2.80E+00	5.91E+01	5.98E+01	6.11E+01	6.41E+01	7.27E+01	9.48E+01	1.59E+02	2.17E+02	2.30E+02	2.27E+02	2.17E+02
3.25E+00	1.84E+01	1.84E+01	1.63E+01	1.48E+01	1.30E+01	1.15E+01	9.97E+00	8.24E+00	6.83E+00	5.67E+00	4.71E+00
3.75E+00	1.23E+01	1.23E+01	1.09E+01	9.90E+00	8.69E+00	7.68E+00	6.67E+00	5.51E+00	4.57E+00	3.79E+00	3.15E+00
4.25E+00	8.09E+00	8.09E+00	7.17E+00	6.50E+00	5.71E+00	5.05E+00	4.38E+00	3.62E+00	3.00E+00	2.49E+00	2.07E+00
4.75E+00	5.24E+00	5.24E+00	4.64E+00	4.21E+00	3.70E+00	3.27E+00	2.84E+00	2.35E+00	1.94E+00	1.61E+00	1.34E+00
5.50E+00	5.49E+00	5.49E+00	4.87E+00	4.41E+00	3.88E+00	3.43E+00	2.98E+00	2.46E+00	2.04E+00	1.69E+00	1.40E+00
0 total	6.24E+09	3.41E+09	2.87E+05	2.16E+05	1.58E+05	1.25E+05	1.40E+05	1.75E+05	2.02E+05	2.22E+05	2.37E+05
0 gamma watts	4.35E+03	2.38E+03	2.00E-01	1.51E-01	1.10E-01	8.73E-02	9.77E-02	1.22E-01	1.41E-01	1.55E-01	1.65E-01

1

1 * gamma sources determined *
0case applies the following photon data base

master photon library
in binary mode
0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - plen ds1 - discharge
0 1.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.5083E+12	1.9525E+11
5.0000E-02	to	1.0000E-01	1.2400E+12	9.3000E+10
1.0000E-01	to	2.0000E-01	2.9400E+12	4.4100E+11
2.0000E-01	to	3.0000E-01	4.1775E+11	1.0444E+11
3.0000E-01	to	4.0000E-01	3.9612E+11	1.3864E+11
4.0000E-01	to	6.0000E-01	8.9571E+11	4.4786E+11
6.0000E-01	to	8.0000E-01	3.9338E+13	2.7537E+13
8.0000E-01	to	1.0000E+00	2.5479E+11	2.2931E+11
1.0000E+00	to	1.3300E+00	1.2563E+12	1.4636E+12
1.3300E+00	to	1.6600E+00	3.4474E+11	5.1539E+11
1.6600E+00	to	2.0000E+00	1.1937E+11	2.1845E+11
2.0000E+00	to	2.5000E+00	7.7692E+08	1.7481E+09
2.5000E+00	to	3.0000E+00	1.2887E+07	3.5440E+07
3.0000E+00	to	4.0000E+00	1.0863E+06	3.8020E+06
4.0000E+00	to	5.0000E+00	6.0149E-20	2.7067E-19
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			5.3712E+13	3.1385E+13

0
0 total energy from nuclides with spectrum data = 3.1268E+13
0 total energy from nuclides with no spectrum data = 1.1754E+11
1 gamma source spectrum for decay step for BWR source term - plen ds1 - 0.25 year
0 90.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.3317E+12	3.9952E+10
5.0000E-02	to	1.0000E-01	5.3772E+10	4.0329E+09
1.0000E-01	to	2.0000E-01	7.2724E+10	1.0909E+10
2.0000E-01	to	3.0000E-01	2.3302E+10	5.8256E+09
3.0000E-01	to	4.0000E-01	1.2593E+10	4.4075E+09
4.0000E-01	to	6.0000E-01	1.7017E+11	8.5086E+10
6.0000E-01	to	8.0000E-01	1.3239E+13	9.2670E+12
8.0000E-01	to	1.0000E+00	7.0956E+10	6.3860E+10
1.0000E+00	to	1.3300E+00	8.5227E+11	9.9289E+11
1.3300E+00	to	1.6600E+00	2.4074E+11	3.5990E+11
1.6600E+00	to	2.0000E+00	1.8329E+09	3.3542E+09
2.0000E+00	to	2.5000E+00	1.9160E+08	4.3111E+08
2.5000E+00	to	3.0000E+00	1.4470E+05	3.9792E+05
3.0000E+00	to	4.0000E+00	1.4835E-12	5.1922E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			1.6069E+13	1.0838E+13

0
0 total energy from nuclides with spectrum data = 1.0769E+13
0 total energy from nuclides with no spectrum data = 6.8824E+10
1 gamma source spectrum for decay step for BWR source term - plen ds1 - 0.50 year
0 182.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	9.5084E+11	2.8525E+10
5.0000E-02	to	1.0000E-01	2.3768E+10	1.7826E+09
1.0000E-01	to	2.0000E-01	3.5256E+10	5.2884E+09
2.0000E-01	to	3.0000E-01	1.0826E+10	2.7066E+09
3.0000E-01	to	4.0000E-01	7.1974E+09	2.5191E+09
4.0000E-01	to	6.0000E-01	1.4691E+11	7.3454E+10
6.0000E-01	to	8.0000E-01	5.4726E+12	3.8308E+12
8.0000E-01	to	1.0000E+00	3.3836E+10	3.0452E+10
1.0000E+00	to	1.3300E+00	8.2499E+11	9.6111E+11
1.3300E+00	to	1.6600E+00	2.3297E+11	3.4830E+11
1.6600E+00	to	2.0000E+00	6.5082E+08	1.1910E+09
2.0000E+00	to	2.5000E+00	6.9581E+07	1.5656E+08
2.5000E+00	to	3.0000E+00	5.5448E+04	1.5248E+05
3.0000E+00	to	4.0000E+00	1.4772E-12	5.1701E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			7.7399E+12	5.2863E+12

total energy from nuclides with spectrum data = 5.2468E+12
total energy from nuclides with no spectrum data = 3.9484E+10
gamma source spectrum for decay step for BWR source term - plen ds1 - 1 year
365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	5.9631E+11	1.7889E+10
5.0000E-02	to	1.0000E-01	7.5496E+09	5.6622E+08
1.0000E-01	to	2.0000E-01	2.5141E+10	3.7711E+09
2.0000E-01	to	3.0000E-01	3.4071E+09	8.5179E+08
3.0000E-01	to	4.0000E-01	5.6052E+09	1.9618E+09
4.0000E-01	to	6.0000E-01	1.2265E+11	6.1323E+10
6.0000E-01	to	8.0000E-01	8.5712E+11	5.9998E+11
8.0000E-01	to	1.0000E+00	1.0715E+10	9.6431E+09
1.0000E+00	to	1.3300E+00	7.7181E+11	8.9915E+11
1.3300E+00	to	1.6600E+00	2.1794E+11	3.2583E+11
1.6600E+00	to	2.0000E+00	8.4963E+07	1.5548E+08
2.0000E+00	to	2.5000E+00	1.2977E+07	2.9199E+07
2.5000E+00	to	3.0000E+00	1.3732E+04	3.7763E+04
3.0000E+00	to	4.0000E+00	1.4607E-12	5.1125E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			2.6183E+12	1.9212E+12

total energy from nuclides with spectrum data = 1.9079E+12
total energy from nuclides with no spectrum data = 1.3214E+10
gamma source spectrum for decay step for BWR source term - plen ds1 - 2 year
730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.1430E+11	9.4290E+09
5.0000E-02	to	1.0000E-01	3.7537E+09	2.8152E+08
1.0000E-01	to	2.0000E-01	1.8415E+10	2.7622E+09
2.0000E-01	to	3.0000E-01	1.2440E+09	3.1101E+08
3.0000E-01	to	4.0000E-01	4.2460E+09	1.4861E+09
4.0000E-01	to	6.0000E-01	9.3492E+10	4.6746E+10
6.0000E-01	to	8.0000E-01	6.4083E+10	4.4858E+10

	8.0000E-01 to	1.0000E+00	3.1091E+09	2.7982E+09
	1.0000E+00 to	1.3300E+00	6.7285E+11	7.8387E+11
	1.3300E+00 to	1.6600E+00	1.9001E+11	2.8407E+11
	1.6600E+00 to	2.0000E+00	1.5332E+06	2.8058E+06
	2.0000E+00 to	2.5000E+00	4.6250E+06	1.0406E+07
	2.5000E+00 to	3.0000E+00	7.0767E+03	1.9461E+04
	3.0000E+00 to	4.0000E+00	1.4222E-12	4.9775E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.3655E+12	1.1766E+12
0				
0	total energy from nuclides with spectrum data =			1.1751E+12
0	total energy from nuclides with no spectrum data =			1.5498E+09
1	gamma source spectrum for decay step for BWR source term - plen ds1 - 5 year			
0	1826.25 day time of the requested nuclides			
0	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	9.3419E+10	2.8026E+09
	5.0000E-02 to	1.0000E-01	2.0842E+09	1.5632E+08
	1.0000E-01 to	2.0000E-01	8.6501E+09	1.2975E+09
	2.0000E-01 to	3.0000E-01	5.1342E+08	1.2836E+08
	3.0000E-01 to	4.0000E-01	1.9813E+09	6.9347E+08
	4.0000E-01 to	6.0000E-01	4.3572E+10	2.1786E+10
	6.0000E-01 to	8.0000E-01	2.2570E+10	1.5799E+10
	8.0000E-01 to	1.0000E+00	2.8963E+08	2.6066E+08
	1.0000E+00 to	1.3300E+00	4.5289E+11	5.2762E+11
	1.3300E+00 to	1.6600E+00	1.2790E+11	1.9121E+11
	1.6600E+00 to	2.0000E+00	9.7750E+01	1.7888E+02
	2.0000E+00 to	2.5000E+00	3.0352E+06	6.8292E+06
	2.5000E+00 to	3.0000E+00	4.7064E+03	1.2942E+04
	3.0000E+00 to	4.0000E+00	1.3332E-12	4.6663E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		7.5387E+11	7.6176E+11
0				
0	total energy from nuclides with spectrum data =			7.6171E+11
0	total energy from nuclides with no spectrum data =			4.9347E+07
1	gamma source spectrum for decay step for BWR source term - plen ds1 - 10 year			
0	3652.50 day time of the requested nuclides			
0	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	2.5368E+10	7.6103E+08
	5.0000E-02 to	1.0000E-01	9.4950E+08	7.1213E+07
	1.0000E-01 to	2.0000E-01	2.5191E+09	3.7786E+08
	2.0000E-01 to	3.0000E-01	1.4862E+08	3.7155E+07
	3.0000E-01 to	4.0000E-01	5.6245E+08	1.9686E+08
	4.0000E-01 to	6.0000E-01	1.2242E+10	6.1211E+09
	6.0000E-01 to	8.0000E-01	6.3489E+09	4.4442E+09
	8.0000E-01 to	1.0000E+00	2.5221E+07	2.2699E+07
	1.0000E+00 to	1.3300E+00	2.3462E+11	2.7333E+11
	1.3300E+00 to	1.6600E+00	6.6256E+10	9.9053E+10
	1.6600E+00 to	2.0000E+00	7.2184E+01	1.3210E+02
	2.0000E+00 to	2.5000E+00	1.5724E+06	3.5378E+06
	2.5000E+00 to	3.0000E+00	2.4381E+03	6.7048E+03
	3.0000E+00 to	4.0000E+00	1.1999E-12	4.1995E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00

	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.4904E+11	3.8442E+11

0
0 total energy from nuclides with spectrum data = 3.8440E+11
0 total energy from nuclides with no spectrum data = 1.4611E+07
1 gamma source spectrum for decay step for BWR source term - plen ds1 - 15 year
0 5478.75 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	8.0687E+09	2.4206E+08
	5.0000E-02 to	1.0000E-01	4.5742E+08	3.4307E+07
	1.0000E-01 to	2.0000E-01	7.5381E+08	1.1307E+08
	2.0000E-01 to	3.0000E-01	4.4066E+07	1.1016E+07
	3.0000E-01 to	4.0000E-01	1.6104E+08	5.6363E+07
	4.0000E-01 to	6.0000E-01	3.4397E+09	1.7199E+09
	6.0000E-01 to	8.0000E-01	1.7915E+09	1.2541E+09
	8.0000E-01 to	1.0000E+00	1.5768E+07	1.4191E+07
	1.0000E+00 to	1.3300E+00	1.2154E+11	1.4160E+11
	1.3300E+00 to	1.6600E+00	3.4324E+10	5.1314E+10
	1.6600E+00 to	2.0000E+00	6.3821E+01	1.1679E+02
	2.0000E+00 to	2.5000E+00	8.1456E+05	1.8328E+06
	2.5000E+00 to	3.0000E+00	1.2631E+03	3.4734E+03
	3.0000E+00 to	4.0000E+00	1.0798E-12	3.7795E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.7060E+11	1.9636E+11

0
0 total energy from nuclides with spectrum data = 1.9635E+11
0 total energy from nuclides with no spectrum data = 5.3400E+06
1 gamma source spectrum for decay step for BWR source term - plen ds1 - 20 year
0 7305.00 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	2.7822E+09	8.3465E+07
	5.0000E-02 to	1.0000E-01	2.2740E+08	1.7055E+07
	1.0000E-01 to	2.0000E-01	2.3570E+08	3.5355E+07
	2.0000E-01 to	3.0000E-01	1.3587E+07	3.3969E+06
	3.0000E-01 to	4.0000E-01	4.6812E+07	1.6384E+07
	4.0000E-01 to	6.0000E-01	9.6654E+08	4.8327E+08
	6.0000E-01 to	8.0000E-01	5.1104E+08	3.5773E+08
	8.0000E-01 to	1.0000E+00	1.3079E+07	1.1772E+07
	1.0000E+00 to	1.3300E+00	6.2967E+10	7.3356E+10
	1.3300E+00 to	1.6600E+00	1.7782E+10	2.6584E+10
	1.6600E+00 to	2.0000E+00	5.6428E+01	1.0326E+02
	2.0000E+00 to	2.5000E+00	4.2199E+05	9.4948E+05
	2.5000E+00 to	3.0000E+00	6.5433E+02	1.7994E+03
	3.0000E+00 to	4.0000E+00	9.7185E-13	3.4015E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		8.5545E+10	1.0095E+11

0
0 total energy from nuclides with spectrum data = 1.0095E+11
0 total energy from nuclides with no spectrum data = 2.6735E+06
1 gamma source spectrum for decay step for BWR source term - plen ds1 - 25 year

9131.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.0572E+09	3.1716E+07
5.0000E-02	to	1.0000E-01	1.1520E+08	8.6399E+06
1.0000E-01	to	2.0000E-01	7.8645E+07	1.1797E+07
2.0000E-01	to	3.0000E-01	4.4522E+06	1.1131E+06
3.0000E-01	to	4.0000E-01	1.3970E+07	4.8894E+06
4.0000E-01	to	6.0000E-01	2.7162E+08	1.3581E+08
6.0000E-01	to	8.0000E-01	1.5126E+08	1.0588E+08
8.0000E-01	to	1.0000E+00	1.1724E+07	1.0552E+07
1.0000E+00	to	1.3300E+00	3.2621E+10	3.8003E+10
1.3300E+00	to	1.6600E+00	9.2120E+09	1.3772E+10
1.6600E+00	to	2.0000E+00	4.9891E+01	9.1301E+01
2.0000E+00	to	2.5000E+00	2.1862E+05	4.9189E+05
2.5000E+00	to	3.0000E+00	3.3898E+02	9.3221E+02
3.0000E+00	to	4.0000E+00	8.7466E-13	3.0613E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			4.3537E+10	5.2086E+10

total energy from nuclides with spectrum data = 5.2084E+10
total energy from nuclides with no spectrum data = 1.8662E+06

* normal termination of execution *

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ondset 33

33	4	1	27	6	0	0	0	0	0
0	0	0	0	0	2	-1	1698	690	130
880	7935	0	5	99	7	9	93	18	18
18	0	0							

35$ array 1 entries read
4t
56$ array 20 entries read
57* array 5 entries read
5t
l90 102464
l116 66229
l32 33663 nudata (library) storage size
l44 33734
l103 81119
58* array 10 entries read
60* array 10 entries read
66$ array 12 entries read
73$ array 14 entries read
74* array 14 entries read
75$ array 14 entries read
6t
l140 71971
used 107088 in size 150000

ojopt 12

0	0	0	0	0	0	0	0	0	0
0	0								

otherm 4

4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25

```
0non              5
          7935              20               6              18            1697
0mmn             19
            10              10               0               0               1               3               0               0               0               0
            21             100              14               4               3               0               2               1               0
0tconst           5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero            4
             0             689             129             879
0pow              3
   .000000E+00  .000000E+00  .000000E+00
0 linp            9
             6               0              51              26               2            3000            1000            1697               5
 n-gamma, fission and total mev/fission =                4.1135E+00      1.9428E+02      1.9839E+02
 start of interval flux =          2.10284E+13
 n-gamma, fission and total mev/fission =                4.5537E+00      1.9445E+02      1.9900E+02
 start of interval flux =          2.09436E+13
 n-gamma, fission and total mev/fission =                4.6709E+00      1.9461E+02      1.9929E+02
 start of interval flux =          2.08751E+13
 n-gamma, fission and total mev/fission =                4.7920E+00      1.9477E+02      1.9956E+02
 start of interval flux =          2.08386E+13
 n-gamma, fission and total mev/fission =                4.9177E+00      1.9491E+02      1.9983E+02
 start of interval flux =          2.08282E+13
 n-gamma, fission and total mev/fission =                5.0467E+00      1.9505E+02      2.0009E+02
 start of interval flux =          2.08394E+13
 n-gamma, fission and total mev/fission =                5.1778E+00      1.9518E+02      2.0035E+02
 start of interval flux =          2.08688E+13
 n-gamma, fission and total mev/fission =                5.3103E+00      1.9530E+02      2.0061E+02
 start of interval flux =          2.09137E+13
 n-gamma, fission and total mev/fission =                5.4434E+00      1.9542E+02      2.0086E+02
 start of interval flux =          2.09718E+13
 n-gamma, fission and total mev/fission =                5.5768E+00      1.9553E+02      2.0111E+02
 start of interval flux =          2.10415E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
0ndset           33
            33               4               2              27               6               0               0               0               0               0
             0               0               0               0               0               2              -1            1698             690             130
           880            7935               0               5              99               7               9              93              18              18
            18               0               0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0               0               0               0               0               0               0               0               0               0
             0               0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
```

```
0non              5
          7935             20              6             18           1697
0mmn             19
            10             10              0              0              1              3              0              0              0             10
            21            100              0              4              3              0              2              1              0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21            689            129            879
0pow              3
  4.349999E+00 1.799989E+03 2.092898E+13
0 linp            9
             6              0             51             26              2           3000           1000           1697              5
 n-gamma, fission and total mev/fission =                5.6446E+00     1.9561E+02     2.0126E+02
 start of interval flux =          2.09883E+13
 n-gamma, fission and total mev/fission =                5.7643E+00     1.9572E+02     2.0148E+02
 start of interval flux =          2.10959E+13
 n-gamma, fission and total mev/fission =                5.8930E+00     1.9582E+02     2.0171E+02
 start of interval flux =          2.12094E+13
 n-gamma, fission and total mev/fission =                6.0225E+00     1.9592E+02     2.0194E+02
 start of interval flux =          2.13295E+13
 n-gamma, fission and total mev/fission =                6.1521E+00     1.9602E+02     2.0217E+02
 start of interval flux =          2.14557E+13
 n-gamma, fission and total mev/fission =                6.2816E+00     1.9611E+02     2.0239E+02
 start of interval flux =          2.15872E+13
 n-gamma, fission and total mev/fission =                6.4108E+00     1.9621E+02     2.0262E+02
 start of interval flux =          2.17237E+13
 n-gamma, fission and total mev/fission =                6.5396E+00     1.9630E+02     2.0284E+02
 start of interval flux =          2.18647E+13
 n-gamma, fission and total mev/fission =                6.6681E+00     1.9639E+02     2.0306E+02
 start of interval flux =          2.20099E+13
 n-gamma, fission and total mev/fission =                6.7960E+00     1.9648E+02     2.0328E+02
 start of interval flux =          2.21589E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
0ndset           33
            33              4              3             27              6              0              0              0              0              0
             0              0              0              0              0              2             -1           1698            690            130
           880           7935              0              5             99              7              9             93             18             18
            18              0              0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0              0              0              0              0              0              0              0              0              0
             0              0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
```

```
0non              5
          7935              20               6              18            1697
0mmn             19
            10              10               0               0               1               3               0               0               0              10
            21             100               0               4               3               0               2               1               0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21             689             129             879
0pow              3
  4.349999E+00 3.599977E+03 2.162535E+13
0 linp            9
             6               0              51              26               2            3000            1000            1697               5
 n-gamma, fission and total mev/fission =                6.6672E+00      1.9653E+02      2.0320E+02
 start of interval flux =          2.23069E+13
 n-gamma, fission and total mev/fission =                6.7861E+00      1.9661E+02      2.0340E+02
 start of interval flux =          2.25209E+13
 n-gamma, fission and total mev/fission =                6.9219E+00      1.9669E+02      2.0361E+02
 start of interval flux =          2.27349E+13
 n-gamma, fission and total mev/fission =                7.0576E+00      1.9677E+02      2.0382E+02
 start of interval flux =          2.29490E+13
 n-gamma, fission and total mev/fission =                7.1929E+00      1.9685E+02      2.0404E+02
 start of interval flux =          2.31634E+13
 n-gamma, fission and total mev/fission =                7.3277E+00      1.9693E+02      2.0425E+02
 start of interval flux =          2.33779E+13
 n-gamma, fission and total mev/fission =                7.4619E+00      1.9700E+02      2.0447E+02
 start of interval flux =          2.35926E+13
 n-gamma, fission and total mev/fission =                7.5956E+00      1.9708E+02      2.0468E+02
 start of interval flux =          2.38075E+13
 n-gamma, fission and total mev/fission =                7.7286E+00      1.9716E+02      2.0489E+02
 start of interval flux =          2.40224E+13
 n-gamma, fission and total mev/fission =                7.8611E+00      1.9724E+02      2.0510E+02
 start of interval flux =          2.42375E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
0ndset           33
            33               4               4              27               6               0               0               0               0               0
             0               0               0               0               0               2              -1            1698             690             130
           880            7935               0               5              99               7               9              93              18              18
            18               0               0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0               0               0               0               0               0               0               0               0               0
             0               0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
```

```
0non              5
          7935              20               6              18            1697
0mmn             19
            10              10               0               0               1               3               0               0               0              10
            21             100               0               4               3               0               2               1               0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21             689             129             879
0pow              3
  4.349999E+00 5.399966E+03 2.340122E+13
0 linp            9
             6               0              51              26               2            3000            1000            1697               5
 n-gamma, fission and total mev/fission =                7.7614E+00      1.9730E+02      2.0506E+02
 start of interval flux =          2.44616E+13
 n-gamma, fission and total mev/fission =                7.8983E+00      1.9737E+02      2.0527E+02
 start of interval flux =          2.47378E+13
 n-gamma, fission and total mev/fission =                8.0437E+00      1.9744E+02      2.0548E+02
 start of interval flux =          2.50104E+13
 n-gamma, fission and total mev/fission =                8.1880E+00      1.9751E+02      2.0570E+02
 start of interval flux =          2.52791E+13
 n-gamma, fission and total mev/fission =                8.3311E+00      1.9758E+02      2.0591E+02
 start of interval flux =          2.55441E+13
 n-gamma, fission and total mev/fission =                8.4730E+00      1.9765E+02      2.0612E+02
 start of interval flux =          2.58054E+13
 n-gamma, fission and total mev/fission =                8.6136E+00      1.9772E+02      2.0634E+02
 start of interval flux =          2.60633E+13
 n-gamma, fission and total mev/fission =                8.7529E+00      1.9779E+02      2.0655E+02
 start of interval flux =          2.63177E+13
 n-gamma, fission and total mev/fission =                8.8909E+00      1.9786E+02      2.0676E+02
 start of interval flux =          2.65689E+13
 n-gamma, fission and total mev/fission =                9.0277E+00      1.9793E+02      2.0696E+02
 start of interval flux =          2.68168E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
0ndset           33
            33              4               5              27               6               0               0               0               0               0
             0              0               0               0               0               2              -1            1698             690             130
           880           7935               0               5              99               7               9              93              18              18
            18              0               0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0               0               0               0               0               0               0               0               0               0
             0               0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
```

```
0non              5
          7935              20               6              18            1697
0mmn             19
            10              10               0               0               1               3               0               0               0              10
            21             100               0               4               3               0               2               1               0
0tconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 1.000000E-05
0mzero            4
            21             689             129             879
0pow              3
  4.349999E+00 7.199954E+03 2.581781E+13
0 linp            9
             6               0              51              26               2            3000            1000            1697               5
 n-gamma, fission and total mev/fission =                 8.9314E+00      1.9800E+02      2.0693E+02
 start of interval flux =          2.71057E+13
 n-gamma, fission and total mev/fission =                 9.0765E+00      1.9806E+02      2.0714E+02
 start of interval flux =          2.74211E+13
 n-gamma, fission and total mev/fission =                 9.2283E+00      1.9812E+02      2.0735E+02
 start of interval flux =          2.77284E+13
 n-gamma, fission and total mev/fission =                 9.3778E+00      1.9818E+02      2.0756E+02
 start of interval flux =          2.80270E+13
 n-gamma, fission and total mev/fission =                 9.5248E+00      1.9825E+02      2.0777E+02
 start of interval flux =          2.83173E+13
 n-gamma, fission and total mev/fission =                 9.6692E+00      1.9831E+02      2.0798E+02
 start of interval flux =          2.85997E+13
 n-gamma, fission and total mev/fission =                 9.8112E+00      1.9838E+02      2.0819E+02
 start of interval flux =          2.88744E+13
 n-gamma, fission and total mev/fission =                 9.9507E+00      1.9844E+02      2.0839E+02
 start of interval flux =          2.91417E+13
 n-gamma, fission and total mev/fission =                 1.0088E+01      1.9850E+02      2.0859E+02
 start of interval flux =          2.94020E+13
 n-gamma, fission and total mev/fission =                 1.0223E+01      1.9856E+02      2.0879E+02
 start of interval flux =          2.96555E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
0ndset           33
            33               4               5              27               6               0               0               0               0               0
             0               0               0               0               0               2              -1            1698             690             130
           880            7935               0               5              99               7               9              93              18              18
            18               0               0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0               0               0               0               0               0               0               0               0               0
             0               0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
```

```
0non              5
          7935            20             6            18          1697
0mmn             19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21           689           129           879
0pow              3
  4.349999E+00 8.999942E+03 2.859735E+13
0 linp            9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              1.0366E+01    1.9863E+02    2.0900E+02
 start of interval flux =         2.99251E+13
 n-gamma, fission and total mev/fission =              1.0427E+01    1.9866E+02    2.0908E+02
 start of interval flux =         3.00276E+13
 n-gamma, fission and total mev/fission =              1.0484E+01    1.9868E+02    2.0917E+02
 start of interval flux =         3.01297E+13
 n-gamma, fission and total mev/fission =              1.0540E+01    1.9871E+02    2.0925E+02
 start of interval flux =         3.02308E+13
 n-gamma, fission and total mev/fission =              1.0595E+01    1.9874E+02    2.0933E+02
 start of interval flux =         3.03308E+13
 n-gamma, fission and total mev/fission =              1.0650E+01    1.9876E+02    2.0941E+02
 start of interval flux =         3.04298E+13
 n-gamma, fission and total mev/fission =              1.0704E+01    1.9879E+02    2.0949E+02
 start of interval flux =         3.05278E+13
 n-gamma, fission and total mev/fission =              1.0758E+01    1.9881E+02    2.0957E+02
 start of interval flux =         3.06248E+13
 n-gamma, fission and total mev/fission =              1.0811E+01    1.9884E+02    2.0965E+02
 start of interval flux =         3.07207E+13
 n-gamma, fission and total mev/fission =              1.0864E+01    1.9886E+02    2.0973E+02
 start of interval flux =         3.08158E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 49000 MWd/MTU
0ndset           33
            33             4             5            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
0therm            4
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*       and expanded decay data and fission product yield libraries.  (mrr     *
*       92-088, 92-025, 92-026)                                                *
*                                                                              *
*       origen-s libraries:  the six standard origen-s card image libraries    *
*       have been replaced by two new libraries, end6dec and xsectpho.         *
*       end6dec contains the updated and expanded decay data library based     *
*       on endf/b-vi data.  xsectpho contains the basic cross section and      *
*       photon spectra data and updated fission product yield data based on    *
*       endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*       002, 003, 006, 008, 009)                                               *
*                                                                              *
*       std. comp. library:  in drr 92-033, the following nuclides were        *
*       changed to turn on resonance processing flag but should not have       *
*       been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*       feinconel.  flags for these nuclides have now been returned to off.    *
*       (drr 93-014)                                                           *
*                                                                              *
*       heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                              *
*       htas1:  updated for compatibility with heating7 and to interact        *
*       effectively with ocular.  fin effectiveness technique was added.       *
*       (mrr 93-036)                                                           *
*                                                                              *
*       ocular:  made compatible with heating7 and htas1 on mainframe and      *
*       workstation.  (mrr 93-037)                                             *
*                                                                              *
*       sas2:  corrected so that 'parm=skipshipdata' would work on             *
*       workstation.  (mrr 93-051)                                             *
*                                                                              *
*       aim:  ft47ft001 is no longer require for aim to execute on             *
*       workstation.  (mrr 93-052)                                             *
*                                                                              *
*       27group, 27burnup, and 218group - these libraries have been            *
*       updated to correct an error found in the chlorine cross-sections.      *
*       (drr93-022)                                                            *
*                                                                              *
*       bonami:  corrected so that a case with a number density of zero        *
*       for a nuclide that has bondarenko data will run without failing.       *
*       (mrr 93-060)                                                           *
*                                                                              *
*       csas:  corrected calculation of dancoff correction factor for          *
*       cylindrical cells.  note that previous calculations of small           *
*       cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*       values.  also corrected dancoff factor for multiregion slab            *
*       cell with vacuum boundary conditions to be set to zero.                *
*       (mrr 93-065)                                                           *
*                                                                              *
*       csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*       resonance materials that are not part of the unit cell in lattice-     *
*       cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*       check your nitawl output in any previous scale-4.2 calculations        *
*       for dancoff factors =-1.                                               *
*       (mrr 93-070)                                                           *
*                                                                              *
********************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
       0$$  a4 33 a8 26 e
       1$$  1
          1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    500000
74**     64.6     7480.0      34.4  192421.0
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
```

```
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 49000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.0816335 e
   5t
BWR SNF Assembly - Top - deplete to 49000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Top - decay
per ONE BWR Fuel Assembly - Top Region - ds1t
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - top ds1 - discharge
  decay step for BWR source term - top ds1 - 0.25 year
  decay step for BWR source term - top ds1 - 0.50 year
  decay step for BWR source term - top ds1 - 1 year
  decay step for BWR source term - top ds1 - 2 year
  decay step for BWR source term - top ds1 - 5 year
  decay step for BWR source term - top ds1 - 10 year
  decay step for BWR source term - top ds1 - 15 year
  decay step for BWR source term - top ds1 - 20 year
  decay step for BWR source term - top ds1 - 25 year
```

```
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooo    rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nnn         nn  ssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn    nn    nn  ssssssssssss
    oo         oo   rrrrrrrrrrrr         ii         gg    gggggggg   eeeeeeeee       nn     nn   nn   ssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooo    rr          rr  iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nn         nnn  ssssssssssss
     ooooooooooo    rr          rr  iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooo   tttttttttttt    zzzzzzzzzzzz
    ll             oo         oo        tt                   zz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    llllllllllll   oooooooooooo        tt           zzzzzzzzzzzz
    llllllllllll    ooooooooooo        tt          zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666              //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666             //   9999999999999  6666666666666
       1111       22         22              //    00       00   66                       //   99         99  66
         11                  22             //    00         00  66                      //    99         99  66
         11                  22            //     00         00  66                     //     99         99  66
         11                 22             //     00         00  666666666666          //      9999999999999  666666666666
         11               22              //      00         00  6666666666666        //       999999999999  6666666666666
         11             22               //       00         00  66         66       //                  99  66         66
         11           22                //        00         00  66         66      //                   99  66         66
         11         22                 //         00       00   66         66     //                    99  66         66
      11111111    2222222222222       //           000000000    6666666666666   //           9999999999999  6666666666666
      11111111    2222222222222      //              0000000      66666666666  //            999999999999    66666666666
0

         11        33333333333                    5555555555555   33333333333                   33333333333    33333333333
        111       3333333333333                   5555555555555  3333333333333                 3333333333333  3333333333333
       1111       33         33         :::      55             33         33        :::      33         33  33         33
         11                  33         :::      55                        33        :::                 33             33
         11                  33         :::      55                        33        :::                 33             33
         11                 333                  555555555555            333                           333            333
         11                 333                  5555555555555           333                           333            333
         11                  33         :::                 55             33        :::                 33             33
         11                  33         :::                 55             33        :::                 33             33
         11       33         33         :::      55         55  33         33        :::      33         33  33         33
      11111111    3333333333333                   5555555555555  3333333333333                 3333333333333  3333333333333
      11111111     33333333333                     55555555555    33333333333                   33333333333    33333333333
1
0                                 sssssssssss    cccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                 ssssssssssss   cccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
```

```
ss         ss   cc         cc   aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
            ss   cc              aa         aa   ll              ee
            ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     cccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  13:53:34                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    500000
74**     64.6    7480.0      34.4  192421.0
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1836733 e
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds1t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1836733 e
    5t
 BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds1t
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 49000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.0816335 e
    5t
 BWR SNF Assembly - Top - deplete to 49000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds1t
 58** 10r4.35
 60** 18.0 36.0 54.0 72.0 90.0 108.0 126.0 144.0 162.0 183.908046
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Top - decay
 per ONE BWR Fuel Assembly - Top Region - ds1t
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - top ds1 - discharge
   decay step for BWR source term - top ds1 - 0.25 year
   decay step for BWR source term - top ds1 - 0.50 year
   decay step for BWR source term - top ds1 - 1 year
   decay step for BWR source term - top ds1 - 2 year
   decay step for BWR source term - top ds1 - 5 year
   decay step for BWR source term - top ds1 - 10 year
   decay step for BWR source term - top ds1 - 15 year
   decay step for BWR source term - top ds1 - 20 year
   decay step for BWR source term - top ds1 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                    .other identification and sizes of library.
0                     data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                   7/ 9/1993     date library was produced
0                        1697     total number of nuclides in library
                          689     number of light-element nuclides
                          129     number of actinide nuclides
                          879     number of fission product nuclides
0                        7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *      data from the light element, actinide, and fission product libraries  *
          *        decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
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0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
    BWR SNF Assembly - Top - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Top Region -
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03
h 2	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06
h 3	7.17E-10	7.17E-10	7.07E-10	6.97E-10	6.78E-10	6.41E-10	5.41E-10	4.09E-10	3.09E-10	2.33E-10	1.76E-10
he 3	1.76E-11	1.77E-11	2.75E-11	3.75E-11	5.68E-11	9.39E-11	1.93E-10	3.26E-10	4.26E-10	5.02E-10	5.59E-10
he 4	6.91E-04	6.91E-04	6.91E-04	6.91E-04	6.91E-04	6.91E-04	6.91E-04	6.91E-04	6.91E-04	6.91E-04	6.91E-04
li 6	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10	1.16E-10
li 7	9.74E-14	9.74E-14	9.74E-14	9.74E-14	9.74E-14	9.74E-14	9.74E-14	9.74E-14	9.74E-14	9.74E-14	9.74E-14
be 9	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06
be 10	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08
b 10	4.48E-15	4.52E-15	8.12E-15	1.19E-14	1.92E-14	3.40E-14	7.83E-14	1.52E-13	2.26E-13	3.00E-13	3.74E-13
b 11	4.92E-14	4.92E-14	4.92E-14	4.92E-14	4.92E-14	4.92E-14	4.92E-14	4.92E-14	4.92E-14	4.92E-14	4.92E-14
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03
c 14	5.40E-08	5.40E-08	5.40E-08	5.40E-08	5.40E-08	5.40E-08	5.39E-08	5.39E-08	5.39E-08	5.38E-08	5.38E-08
n 14	1.84E-11	1.84E-11	2.00E-11	2.17E-11	2.50E-11	3.15E-11	5.11E-11	8.37E-11	1.16E-10	1.49E-10	1.81E-10
n 15	2.21E-08	2.21E-08	2.21E-08	2.21E-08	2.21E-08	2.21E-08	2.21E-08	2.21E-08	2.21E-08	2.21E-08	2.21E-08
o 16	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
o 17	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05
o 18	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04
f 19	9.03E-10	9.03E-10	9.03E-10	9.03E-10	9.03E-10	9.03E-10	9.03E-10	9.03E-10	9.03E-10	9.03E-10	9.03E-10
ne 20	2.27E-14	2.27E-14	2.27E-14	2.27E-14	2.27E-14	2.27E-14	2.27E-14	2.27E-14	2.27E-14	2.27E-14	2.27E-14
ne 21	3.84E-11	3.84E-11	3.84E-11	3.84E-11	3.84E-11	3.84E-11	3.84E-11	3.84E-11	3.84E-11	3.84E-11	3.84E-11
ne 22	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09	3.95E-09
na 23	3.22E-10	3.22E-10	3.22E-10	3.22E-10	3.22E-10	3.22E-10	3.22E-10	3.22E-10	3.22E-10	3.22E-10	3.22E-10
na 24	1.97E-09	6.34E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	4.17E-06	4.17E-06	4.17E-06	4.17E-06	4.17E-06	4.17E-06	4.17E-06	4.17E-06	4.17E-06	4.17E-06	4.17E-06
mg 25	3.75E-05	3.75E-05	3.75E-05	3.75E-05	3.75E-05	3.75E-05	3.75E-05	3.75E-05	3.75E-05	3.75E-05	3.75E-05
mg 26	1.73E-05	1.73E-05	1.73E-05	1.73E-05	1.73E-05	1.73E-05	1.73E-05	1.73E-05	1.73E-05	1.73E-05	1.73E-05
al 27	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
si 28	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00
si 29	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01
si 30	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
si 31	5.80E-09	1.02E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	5.22E-12	5.22E-12	5.21E-12	5.21E-12	5.20E-12	5.17E-12	5.11E-12	5.01E-12	4.91E-12	4.81E-12	4.72E-12
p 31	6.59E-05	6.59E-05	6.59E-05	6.59E-05	6.59E-05	6.59E-05	6.59E-05	6.59E-05	6.59E-05	6.59E-05	6.59E-05
p 32	6.77E-10	6.45E-10	8.52E-12	9.62E-14	1.19E-15	1.17E-15	1.16E-15	1.14E-15	1.11E-15	1.09E-15	1.07E-15
p 33	1.63E-13	1.59E-13	1.39E-14	1.11E-15	7.47E-18	3.42E-22	3.27E-35	.00E+00	.00E+00	.00E+00	.00E+00
s 32	2.90E-08	2.90E-08	2.97E-08	2.97E-08	2.97E-08	2.97E-08	2.97E-08	2.97E-08	2.97E-08	2.97E-08	2.97E-08
s 33	9.70E-12	9.71E-12	9.85E-12	9.86E-12	9.86E-12	9.87E-12	9.87E-12	9.87E-12	9.87E-12	9.87E-12	9.87E-12
ar 40	4.50E-11	4.50E-11	4.50E-11	4.50E-11	4.50E-11	4.50E-11	4.50E-11	4.50E-11	4.50E-11	4.50E-11	4.50E-11
k 41	1.49E-12	1.49E-12	1.49E-12	1.49E-12	1.49E-12	1.49E-12	1.49E-12	1.49E-12	1.49E-12	1.49E-12	1.49E-12
k 43	2.81E-14	1.33E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	2.91E-14	2.91E-14	2.91E-14	2.91E-14	2.91E-14	2.91E-14	2.91E-14	2.91E-14	2.91E-14	2.91E-14	2.91E-14
ca 43	8.16E-07	8.16E-07	8.16E-07	8.16E-07	8.16E-07	8.16E-07	8.16E-07	8.16E-07	8.16E-07	8.16E-07	8.16E-07
ca 44	6.34E-06	6.34E-06	6.34E-06	6.34E-06	6.34E-06	6.34E-06	6.34E-06	6.34E-06	6.34E-06	6.34E-06	6.34E-06
ca 45	1.78E-08	1.77E-08	1.21E-08	8.21E-09	3.79E-09	8.07E-10	7.81E-12	3.44E-15	1.51E-18	6.64E-22	2.92E-25
ca 46	8.18E-07	8.18E-07	8.18E-07	8.18E-07	8.18E-07	8.18E-07	8.18E-07	8.18E-07	8.18E-07	8.18E-07	8.18E-07
ca 47	7.94E-12	6.81E-12	8.44E-18	6.13E-24	4.56E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.16E-07	1.16E-07	1.22E-07	1.26E-07	1.30E-07	1.33E-07	1.34E-07	1.34E-07	1.34E-07	1.34E-07	1.34E-07
sc 46	1.09E-06	1.08E-06	5.17E-07	2.41E-07	5.31E-08	2.59E-09	3.00E-13	8.26E-20	2.28E-26	6.28E-33	1.73E-39
sc 47	7.00E-08	5.69E-08	5.80E-16	1.99E-23	1.29E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	3.65E-09	2.50E-09	4.80E-24	2.44E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

BWR SNF Assembly - Top - decay light elements page 2

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02
ti 47	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02

ti 48	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01
ti 49	8.76E-02	8.76E-02	8.76E-02	8.76E-02	8.76E-02	8.76E-02	8.76E-02	8.76E-02	8.76E-02	8.76E-02	8.76E-02
ti 50	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02
v 50	6.78E-04	6.78E-04	6.78E-04	6.78E-04	6.78E-04	6.78E-04	6.78E-04	6.78E-04	6.78E-04	6.78E-04	6.78E-04
v 51	1.09E-01	1.09E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01
cr 50	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00
cr 51	2.45E-03	2.39E-03	2.58E-04	2.55E-05	2.64E-07	2.84E-11	3.54E-23	5.00E-43	.00E+00	.00E+00	.00E+00
cr 52	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01
cr 53	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00
cr 54	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00
mn 54	1.88E-03	1.88E-03	1.54E-03	1.25E-03	8.36E-04	3.71E-04	3.26E-05	5.65E-07	9.79E-09	1.70E-10	2.94E-12
mn 55	3.23E+00	3.23E+00	3.23E+00	3.24E+00	3.24E+00	3.25E+00	3.26E+00	3.27E+00	3.27E+00	3.27E+00	3.27E+00
mn 56	1.76E-05	2.78E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00
fe 55	3.67E-02	3.66E-02	3.44E-02	3.23E-02	2.84E-02	2.21E-02	1.03E-02	2.89E-03	8.13E-04	2.28E-04	6.42E-05
fe 56	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02
fe 57	4.86E+00	4.86E+00	4.86E+00	4.86E+00	4.86E+00	4.86E+00	4.86E+00	4.86E+00	4.86E+00	4.86E+00	4.86E+00
fe 58	5.62E-01	5.62E-01	5.63E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01	5.64E-01
fe 59	9.75E-05	9.60E-05	2.40E-05	5.68E-06	3.30E-07	1.12E-09	4.32E-17	1.92E-29	8.52E-42	.00E+00	.00E+00
co 58m	2.08E-10	3.37E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.90E-03	1.88E-03	7.87E-04	3.19E-04	5.34E-05	1.50E-06	3.36E-11	5.93E-19	1.05E-26	1.86E-34	3.25E-42
co 59	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01	4.36E-01
co 60	6.80E-02	6.80E-02	6.59E-02	6.37E-02	5.96E-02	5.23E-02	3.52E-02	1.83E-02	9.46E-03	4.90E-03	2.54E-03
co 61	4.83E-08	2.02E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01
ni 59	5.04E-01	5.04E-01	5.04E-01	5.04E-01	5.04E-01	5.04E-01	5.04E-01	5.04E-01	5.04E-01	5.04E-01	5.04E-01
ni 60	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01
ni 61	9.13E-01	9.13E-01	9.13E-01	9.13E-01	9.13E-01	9.13E-01	9.13E-01	9.13E-01	9.13E-01	9.13E-01	9.13E-01
ni 62	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00
ni 63	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.03E-01	1.01E-01	9.73E-02	9.39E-02	9.08E-02	8.77E-02
ni 64	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01
ni 65	3.00E-07	4.08E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	4.23E-11	3.12E-11	5.25E-23	3.04E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.38E-01	1.40E-01	1.43E-01	1.47E-01	1.50E-01	1.53E-01
cu 64	1.14E-06	3.06E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02
cu 66	1.78E-09	4.87E-14	8.18E-26	4.74E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	1.18E-12	9.03E-13	3.60E-23	5.61E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	9.88E-04	9.88E-04	9.88E-04	9.88E-04	9.88E-04	9.88E-04	9.88E-04	9.88E-04	9.88E-04	9.88E-04	9.88E-04
zn 65	6.58E-07	6.56E-07	5.09E-07	3.92E-07	2.33E-07	8.25E-08	3.66E-09	2.04E-11	1.14E-13	6.32E-16	3.52E-18
zn 66	6.10E-04	6.10E-04	6.10E-04	6.10E-04	6.10E-04	6.10E-04	6.10E-04	6.10E-04	6.10E-04	6.10E-04	6.10E-04
zn 67	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06	1.03E-06
zn 68	1.81E-08	1.81E-08	1.81E-08	1.81E-08	1.81E-08	1.81E-08	1.81E-08	1.81E-08	1.81E-08	1.81E-08	1.81E-08
zn 69m	4.76E-15	1.42E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 70	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15
ga 69	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11	3.86E-11
ge 70	2.50E-13	2.50E-13	2.50E-13	2.50E-13	2.50E-13	2.50E-13	2.50E-13	2.50E-13	2.50E-13	2.50E-13	2.50E-13
sr 87	4.07E-06	4.07E-06	4.07E-06	4.07E-06	4.07E-06	4.07E-06	4.07E-06	4.07E-06	4.07E-06	4.07E-06	4.07E-06
sr 88	4.01E-04	4.01E-04	4.01E-04	4.01E-04	4.01E-04	4.01E-04	4.01E-04	4.01E-04	4.01E-04	4.01E-04	4.01E-04
sr 89	1.19E-06	1.17E-06	3.46E-07	9.74E-08	7.95E-09	5.31E-11	1.59E-17	2.12E-28	2.83E-39	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 3

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 90	2.19E-08	2.19E-08	2.18E-08	2.16E-08	2.14E-08	2.08E-08	1.94E-08	1.71E-08	1.51E-08	1.34E-08	1.18E-08
sr 91	1.85E-09	3.22E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	2.95E-05	2.95E-05	3.04E-05	3.06E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05	3.07E-05
y 90	2.34E-06	1.81E-06	5.65E-12	5.62E-12	5.55E-12	5.42E-12	5.03E-12	4.45E-12	3.93E-12	3.48E-12	3.07E-12
y 91	3.55E-06	3.51E-06	1.22E-06	4.09E-07	4.69E-08	6.19E-10	1.43E-15	5.72E-25	2.30E-34	1.28E-43	.00E+00

y 92	7.85E-09	7.13E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	4.49E-12	8.76E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01
zr 91	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01
zr 92	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01
zr 93	6.22E-02	6.22E-02	6.22E-02	6.22E-02	6.22E-02	6.22E-02	6.22E-02	6.22E-02	6.22E-02	6.22E-02	6.22E-02
zr 94	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01
zr 95	1.24E-03	1.22E-03	4.67E-04	1.72E-04	2.37E-05	4.55E-07	3.20E-12	8.26E-21	2.13E-29	5.52E-38	.00E+00
zr 96	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00
zr 97	2.13E-05	7.97E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	5.49E-09	5.49E-09	5.49E-09	5.49E-09	5.49E-09	5.48E-09	5.47E-09	5.44E-09	5.41E-09	5.38E-09	5.36E-09
nb 92	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05	1.06E-05
nb 93	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01
nb 93m	2.40E-04	2.40E-04	2.38E-04	2.35E-04	2.30E-04	2.21E-04	1.94E-04	1.57E-04	1.26E-04	1.02E-04	8.25E-05
nb 94	7.66E-03	7.66E-03	7.66E-03	7.66E-03	7.66E-03	7.66E-03	7.66E-03	7.65E-03	7.65E-03	7.65E-03	7.65E-03
nb 95	7.03E-04	7.02E-04	4.30E-04	1.85E-04	2.80E-05	5.64E-07	3.85E-12	9.95E-21	2.57E-29	7.37E-40	.00E+00
nb 95m	7.74E-07	7.74E-07	3.10E-07	1.14E-07	1.57E-08	3.02E-10	2.12E-15	5.48E-24	1.42E-32	.00E+00	.00E+00
nb 96	1.92E-08	9.42E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.52E-06	5.70E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.99E-08	7.46E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	7.82E-07	7.82E-07	8.46E-07	9.12E-07	1.04E-06	1.30E-06	2.09E-06	3.40E-06	4.70E-06	6.01E-06	7.32E-06
mo 95	2.21E-02	2.22E-02	2.32E-02	2.37E-02	2.40E-02	2.41E-02	2.41E-02	2.41E-02	2.41E-02	2.41E-02	2.41E-02
mo 96	1.80E-03	1.80E-03	1.80E-03	1.80E-03	1.80E-03	1.80E-03	1.80E-03	1.80E-03	1.80E-03	1.80E-03	1.80E-03
mo 97	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02	3.90E-02
mo 98	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04	5.44E-04
mo 99	1.17E-08	9.06E-09	1.61E-18	1.18E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.50E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10	1.50E-10
tc 98	1.37E-12	1.37E-12	1.37E-12	1.37E-12	1.37E-12	1.37E-12	1.37E-12	1.37E-12	1.37E-12	1.37E-12	1.37E-12
tc 99	2.01E-07	2.02E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07	2.03E-07
ru 99	8.98E-13	9.00E-13	1.06E-12	1.23E-12	1.56E-12	2.23E-12	4.23E-12	7.56E-12	1.09E-11	1.42E-11	1.75E-11
ru100	1.87E-08	1.87E-08	1.87E-08	1.87E-08	1.87E-08	1.87E-08	1.87E-08	1.87E-08	1.87E-08	1.87E-08	1.87E-08
ru101	1.06E-10	1.06E-10	1.06E-10	1.06E-10	1.06E-10	1.06E-10	1.06E-10	1.06E-10	1.06E-10	1.06E-10	1.06E-10
ru102	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12	2.19E-12
cd111	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09	3.97E-09
cd112	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08	3.41E-08
cd113	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.60E-11	8.61E-11	8.61E-11	8.61E-11	8.61E-11
cd113m	1.28E-10	1.28E-10	1.26E-10	1.25E-10	1.22E-10	1.16E-10	1.00E-10	7.83E-11	6.12E-11	4.79E-11	3.75E-11
cd114	4.66E-06	4.66E-06	4.90E-06	4.97E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06	5.00E-06
cd115	2.13E-10	1.56E-10	1.48E-22	4.69E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	4.64E-10	4.57E-10	1.15E-10	2.72E-11	1.59E-12	5.44E-15	2.18E-22	1.03E-34	.00E+00	.00E+00	.00E+00
cd116	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08	2.58E-08
cd117	1.81E-12	2.27E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	9.76E-04	9.76E-04	1.02E-03	1.04E-03	1.07E-03	1.07E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03
in113m	6.02E-08	5.99E-08	3.50E-08	2.01E-08	6.68E-09	7.40E-10	1.01E-12	1.69E-17	2.82E-22	4.71E-27	7.88E-32
in114	1.79E-10	1.13E-10	3.24E-11	8.88E-12	6.88E-13	4.14E-15	9.01E-22	7.11E-33	.00E+00	.00E+00	.00E+00
in114m	7.11E-06	7.01E-06	2.02E-06	5.52E-07	4.28E-08	2.57E-10	5.60E-17	4.42E-28	3.49E-39	.00E+00	.00E+00
in115	9.66E-09	9.67E-09	1.00E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08

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BWR SNF Assembly - Top - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
in117	5.97E-12	1.46E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.28E-12	7.56E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02
sn113	1.00E-04	9.97E-05	5.83E-05	3.34E-05	1.11E-05	1.23E-06	1.68E-09	2.81E-14	4.69E-19	7.85E-24	1.31E-28
sn114	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02
sn115	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03	8.02E-03
sn116	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01

sn117m	6.26E-05	5.95E-05	6.37E-07	5.71E-09	5.15E-13	4.23E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
sn119	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
sn119m	1.24E-03	1.23E-03	1.00E-03	8.03E-04	5.21E-04	2.20E-04	1.65E-05	2.19E-07	2.91E-09	3.88E-11	5.16E-13
sn120	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01
sn121	1.81E-06	9.81E-07	6.19E-10	6.17E-10	6.13E-10	6.06E-10	5.83E-10	5.48E-10	5.14E-10	4.83E-10	4.53E-10
sn121m	1.43E-05	1.43E-05	1.42E-05	1.42E-05	1.41E-05	1.39E-05	1.34E-05	1.26E-05	1.18E-05	1.11E-05	1.04E-05
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.96E-05	1.95E-05	1.21E-05	7.37E-06	2.76E-06	3.89E-07	1.09E-09	6.03E-14	3.34E-18	1.85E-22	1.03E-26
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	3.00E-07	2.80E-07	4.65E-10	6.01E-13	1.18E-18	4.64E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.84E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03
sb122	9.11E-07	7.05E-07	8.44E-17	4.11E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.69E-04	1.69E-04	1.77E-04	1.81E-04	1.86E-04	1.88E-04	1.89E-04	1.89E-04	1.89E-04	1.89E-04	1.89E-04
sb124	1.19E-06	1.17E-06	4.21E-07	1.45E-07	1.77E-08	2.64E-10	8.74E-16	6.44E-25	4.74E-34	3.48E-43	.00E+00
sb125	7.09E-04	7.08E-04	6.66E-04	6.25E-04	5.50E-04	4.27E-04	1.99E-04	5.60E-05	1.57E-05	4.42E-06	1.24E-06
sb126	1.13E-07	1.06E-07	7.34E-10	4.16E-12	1.52E-16	2.05E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	2.13E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04	2.14E-04
te123	1.98E-06	1.98E-06	2.24E-06	2.40E-06	2.54E-06	2.61E-06	2.62E-06	2.62E-06	2.62E-06	2.62E-06	2.62E-06
te123m	6.44E-07	6.40E-07	3.82E-07	2.24E-07	7.76E-08	9.36E-09	1.64E-11	4.18E-16	1.07E-20	2.71E-25	6.92E-30
te124	1.64E-05	1.65E-05	1.72E-05	1.75E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05	1.76E-05
te125	6.21E-04	6.22E-04	6.64E-04	7.06E-04	7.82E-04	9.07E-04	1.14E-03	1.28E-03	1.32E-03	1.33E-03	1.34E-03
te125m	9.23E-06	9.24E-06	9.18E-06	8.78E-06	7.80E-06	6.06E-06	2.83E-06	7.95E-07	2.23E-07	6.28E-08	1.76E-08
te126	2.13E-05	2.13E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05	2.14E-05
te127	1.09E-10	2.80E-11	6.62E-12	3.68E-12	1.15E-12	1.13E-13	1.06E-16	9.61E-22	8.69E-27	7.87E-32	7.11E-37
te127m	3.35E-09	3.33E-09	1.89E-09	1.05E-09	3.29E-10	3.22E-11	3.03E-14	2.75E-19	2.48E-24	2.25E-29	2.03E-34
te128	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10
te129m	3.74E-15	3.66E-15	5.84E-16	8.66E-17	2.00E-18	1.07E-21	1.62E-31	.00E+00	.00E+00	.00E+00	.00E+00
i127	1.12E-07	1.12E-07	1.14E-07	1.15E-07	1.15E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07
i129	4.49E-13	4.50E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13	4.53E-13
xe127	2.93E-15	2.88E-15	5.28E-16	9.07E-17	2.79E-18	2.67E-21	2.31E-30	.00E+00	.00E+00	.00E+00	.00E+00
xe128	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09
xe129	2.54E-11	2.54E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11	2.55E-11
xe129m	6.08E-14	5.62E-14	5.45E-17	4.02E-20	2.60E-26	1.12E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12	1.30E-12
xe131	3.47E-15	3.47E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15	3.48E-15
total	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02

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BWR SNF Assembly - Top - decay light elements page 5

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	6.93E-06	6.93E-06	6.84E-06	6.74E-06	6.56E-06	6.20E-06	5.24E-06	3.95E-06	2.98E-06	2.25E-06	1.70E-06
be 10	7.62E-10	7.62E-10	7.62E-10	7.62E-10	7.62E-10	7.62E-10	7.62E-10	7.62E-10	7.62E-10	7.62E-10	7.62E-10
c 14	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07
na 24	1.76E-02	5.65E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	4.05E-11	1.83E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	2.19E+00	1.83E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	2.24E-01	3.93E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	3.39E-10	3.39E-10	3.39E-10	3.38E-10	3.37E-10	3.36E-10	3.32E-10	3.25E-10	3.19E-10	3.13E-10	3.06E-10
p 32	1.94E-04	1.85E-04	2.44E-06	2.75E-08	3.41E-10	3.36E-10	3.32E-10	3.26E-10	3.19E-10	3.13E-10	3.06E-10
p 33	2.55E-08	2.48E-08	2.18E-09	1.73E-10	1.17E-12	5.34E-17	5.11E-30	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	7.43E-09	8.25E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	1.59E-10	4.15E-11	2.32E-17	2.31E-17	2.29E-17	2.24E-17	2.10E-17	1.89E-17	1.70E-17	1.53E-17	1.38E-17
k 43	9.17E-08	4.35E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	3.15E-04	3.14E-04	2.15E-04	1.46E-04	6.71E-05	1.43E-05	1.39E-07	6.09E-11	2.68E-14	1.18E-17	5.18E-21
ca 47	4.86E-06	4.17E-06	5.17E-12	3.76E-18	2.81E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	3.69E-02	3.66E-02	1.75E-02	8.15E-03	1.80E-03	8.77E-05	1.02E-08	2.80E-15	7.72E-22	2.13E-28	.00E+00
sc 47	5.82E-02	4.73E-02	4.82E-10	1.65E-17	1.07E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.46E-03	3.73E-03	7.18E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

sc 49	5.85E-03	1.54E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	2.27E+02	2.21E+02	2.39E+01	2.36E+00	2.44E-02	2.63E-06	3.27E-18	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	1.46E+01	1.45E+01	1.19E+01	9.72E+00	6.48E+00	2.88E+00	2.53E-01	4.38E-03	7.59E-05	1.31E-06	2.28E-08
mn 56	3.83E+02	6.04E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	8.73E+01	8.73E+01	8.20E+01	7.69E+01	6.77E+01	5.26E+01	2.45E+01	6.89E+00	1.94E+00	5.44E-01	1.53E-01
fe 59	4.85E+00	4.78E+00	1.19E+00	2.83E-01	1.64E-02	5.55E-05	2.15E-12	9.53E-25	.00E+00	.00E+00	.00E+00
co 58m	1.23E-03	1.99E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	6.03E+01	5.97E+01	2.50E+01	1.01E+01	1.70E+00	4.78E-02	1.07E-06	1.88E-14	3.33E-22	5.89E-30	.00E+00
co 60	7.69E+01	7.69E+01	7.45E+01	7.21E+01	6.75E+01	5.91E+01	3.99E+01	2.07E+01	1.07E+01	5.54E+00	2.87E+00
co 61	1.50E+00	6.29E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	4.08E-02	4.08E-02	4.08E-02	4.08E-02	4.08E-02	4.08E-02	4.08E-02	4.08E-02	4.08E-02	4.08E-02	4.08E-02
ni 63	5.91E+00	5.91E+00	5.90E+00	5.89E+00	5.87E+00	5.83E+00	5.71E+00	5.52E+00	5.33E+00	5.15E+00	4.97E+00
ni 65	5.75E+00	7.81E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	3.68E-05	2.71E-05	4.57E-17	2.64E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	4.38E+00	1.18E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	9.94E-01	2.72E-05	4.57E-17	2.65E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	8.95E-07	6.84E-07	2.73E-17	4.25E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	5.42E-03	5.41E-03	4.20E-03	3.23E-03	1.92E-03	6.80E-04	3.02E-05	1.68E-07	9.36E-10	5.21E-12	2.90E-14
zn 69	2.34E-07	5.03E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.57E-08	4.69E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	4.92E-14	1.51E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	4.41E-12	4.15E-12	1.89E-14	6.92E-17	1.07E-21	2.51E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.45E-02	3.41E-02	1.01E-02	2.83E-03	2.31E-04	1.54E-06	4.61E-13	6.16E-24	.00E+00	.00E+00	.00E+00
sr 90	3.09E-06	3.09E-06	3.07E-06	3.05E-06	3.02E-06	2.94E-06	2.73E-06	2.42E-06	2.14E-06	1.89E-06	1.67E-06
sr 91	6.68E-03	1.16E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.21E-06	3.17E-06	9.35E-07	2.63E-07	2.15E-08	1.43E-10	4.29E-17	5.73E-28	.00E+00	.00E+00	.00E+00
y 90	1.27E+00	9.82E-01	3.07E-06	3.05E-06	3.02E-06	2.94E-06	2.73E-06	2.42E-06	2.14E-06	1.89E-06	1.67E-06
y 90m	1.19E-07	6.44E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	8.71E-02	8.61E-02	3.00E-02	1.00E-02	1.15E-03	1.52E-05	3.50E-11	1.40E-20	5.64E-30	.00E+00	.00E+00
y 92	7.56E-02	6.87E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.50E-05	2.92E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04	1.56E-04
zr 95	2.66E+01	2.63E+01	1.00E+01	3.69E+00	5.10E-01	9.77E-03	6.87E-08	1.78E-16	4.59E-25	.00E+00	.00E+00
zr 97	4.08E+01	1.52E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 6

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 91	3.18E-08	3.18E-08	3.17E-08	3.17E-08	3.17E-08	3.17E-08	3.16E-08	3.14E-08	3.13E-08	3.11E-08	3.10E-08
nb 92	1.18E-09	1.18E-09	1.18E-09	1.18E-09	1.18E-09	1.18E-09	1.18E-09	1.18E-09	1.18E-09	1.18E-09	1.18E-09
nb 93m	5.73E-02	5.73E-02	5.67E-02	5.61E-02	5.49E-02	5.26E-02	4.62E-02	3.73E-02	3.01E-02	2.43E-02	1.97E-02
nb 94	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.43E-03	1.43E-03	1.43E-03	1.43E-03	1.43E-03
nb 95	2.77E+01	2.76E+01	1.69E+01	7.29E+00	1.10E+00	2.22E-02	1.51E-07	3.91E-16	1.01E-24	.00E+00	.00E+00
nb 95m	2.95E-01	2.95E-01	1.18E-01	4.34E-02	5.99E-03	1.15E-04	8.08E-10	2.09E-18	5.39E-27	.00E+00	.00E+00
nb 96	2.69E-02	1.32E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	4.08E+01	1.53E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.87E+01	1.45E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	5.60E-03	4.35E-03	7.72E-13	5.67E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15	1.19E-15
tc 99	3.45E-09	3.45E-09	3.47E-09	3.47E-09	3.47E-09	3.47E-09	3.47E-09	3.47E-09	3.47E-09	3.47E-09	3.47E-09
ru103	1.82E-11	1.79E-11	3.72E-12	7.27E-13	2.89E-14	4.57E-17	1.81E-25	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	2.87E-08	2.87E-08	2.84E-08	2.80E-08	2.74E-08	2.60E-08	2.25E-08	1.76E-08	1.37E-08	1.08E-08	8.41E-09
cd115	1.09E-04	7.97E-05	7.52E-17	2.39E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.18E-05	1.16E-05	2.92E-06	6.93E-07	4.05E-08	1.39E-10	5.56E-18	2.60E-30	.00E+00	.00E+00	.00E+00
cd117	1.95E-05	2.44E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.54E-08	2.51E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	1.01E+00	1.00E+00	5.86E-01	3.36E-01	1.12E-01	1.24E-02	1.69E-05	2.82E-10	4.72E-15	7.89E-20	1.32E-24
in114	2.47E-01	1.55E-01	4.46E-02	1.22E-02	9.47E-04	5.70E-06	1.24E-12	9.79E-24	.00E+00	.00E+00	.00E+00
in114m	1.64E-01	1.62E-01	4.66E-02	1.28E-02	9.89E-04	5.95E-06	1.30E-12	1.02E-23	.00E+00	.00E+00	.00E+00

in116m	2.95E-05	2.91E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.19E-04	5.35E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.77E-05	1.04E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	1.01E+00	1.00E+00	5.86E-01	3.36E-01	1.12E-01	1.24E-02	1.69E-05	2.82E-10	4.71E-15	7.88E-20	1.32E-24
sn117m	5.14E+00	4.88E+00	5.23E-02	4.69E-04	4.23E-08	3.48E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	4.63E+00	4.62E+00	3.75E+00	3.01E+00	1.95E+00	8.23E-01	6.17E-02	8.20E-04	1.09E-05	1.45E-07	1.93E-09
sn121	1.74E+00	9.39E-01	5.93E-04	5.91E-04	5.87E-04	5.80E-04	5.58E-04	5.24E-04	4.92E-04	4.62E-04	4.34E-04
sn121m	7.66E-04	7.66E-04	7.64E-04	7.62E-04	7.57E-04	7.47E-04	7.20E-04	6.76E-04	6.34E-04	5.96E-04	5.59E-04
sn123	1.61E-01	1.61E-01	9.96E-02	6.06E-02	2.27E-02	3.20E-03	8.95E-06	4.96E-10	2.75E-14	1.52E-18	8.45E-23
sn123m	9.23E-04	1.41E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	3.26E-02	3.03E-02	5.04E-05	6.51E-08	1.28E-13	5.03E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.61E-01	2.80E-01	3.35E-11	1.63E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	2.08E-02	2.05E-02	7.36E-03	2.54E-03	3.10E-04	4.61E-06	1.53E-11	1.13E-20	8.31E-30	.00E+00	.00E+00
sb125	7.43E-01	7.42E-01	6.98E-01	6.55E-01	5.77E-01	4.47E-01	2.09E-01	5.87E-02	1.65E-02	4.63E-03	1.30E-03
sb126	9.41E-03	8.90E-03	6.14E-05	3.48E-07	1.27E-11	1.71E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	5.71E-03	5.68E-03	3.39E-03	1.98E-03	6.89E-04	8.30E-05	1.46E-07	3.71E-12	9.45E-17	2.41E-21	6.14E-26
te125m	1.66E-01	1.66E-01	1.65E-01	1.58E-01	1.41E-01	1.09E-01	5.10E-02	1.43E-02	4.03E-03	1.13E-03	3.18E-04
te127	2.87E-04	7.41E-05	1.75E-05	9.71E-06	3.04E-06	2.98E-07	2.80E-10	2.54E-15	2.30E-20	2.08E-25	1.87E-30
te127m	3.16E-05	3.14E-05	1.79E-05	9.91E-06	3.10E-06	3.04E-07	2.86E-10	2.59E-15	2.34E-20	2.12E-25	1.92E-30
te129	1.74E-09	7.07E-11	1.13E-11	1.67E-12	3.85E-14	2.06E-17	3.14E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	1.13E-10	1.10E-10	1.76E-11	2.61E-12	6.01E-14	3.21E-17	4.89E-27	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.37E-15	1.30E-15	1.14E-17	8.29E-20	4.94E-24	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	3.57E-11	9.35E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	3.63E-15	3.33E-15	1.55E-18	5.33E-22	7.67E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	8.28E-11	8.13E-11	1.49E-11	2.56E-12	7.90E-14	7.53E-17	6.53E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	6.92E-09	6.40E-09	6.21E-12	4.58E-15	2.97E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.31E-12	1.24E-12	6.93E-15	3.17E-17	7.53E-22	4.34E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.28E-15	1.13E-15	9.10E-21	4.45E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	1.16E+03	5.87E+02	2.58E+02	1.93E+02	1.54E+02	1.22E+02	7.08E+01	3.32E+01	1.81E+01	1.13E+01	8.06E+00

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Top - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -
0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.07E+13	2.18E+12	5.62E+11	3.05E+11	1.84E+11	1.31E+11	7.90E+10	4.07E+10	2.16E+10	1.17E+10	6.58E+09
3.00E-02	2.95E+12	4.39E+11	1.46E+11	1.11E+11	7.91E+10	5.24E+10	2.58E+10	1.16E+10	5.62E+09	2.83E+09	1.47E+09
5.50E-02	2.00E+12	1.44E+11	3.35E+10	2.35E+10	1.73E+10	1.42E+10	9.55E+09	4.94E+09	2.56E+09	1.32E+09	6.88E+08
8.50E-02	1.07E+12	7.52E+10	1.46E+10	9.67E+09	6.65E+09	5.39E+09	3.61E+09	1.87E+09	9.66E+08	5.00E+08	2.59E+08
1.20E-01	7.49E+11	4.89E+10	7.96E+09	4.87E+09	3.03E+09	2.37E+09	1.57E+09	8.04E+08	4.14E+08	2.14E+08	1.11E+08
1.70E-01	9.27E+11	1.99E+11	9.58E+09	4.89E+09	2.97E+09	2.16E+09	1.19E+09	4.82E+08	2.11E+08	9.87E+07	4.81E+07
3.00E-01	1.86E+12	9.29E+11	9.90E+10	1.25E+10	1.49E+09	8.22E+08	4.44E+08	1.78E+08	7.78E+07	3.63E+07	1.76E+07
6.50E-01	2.83E+13	7.58E+12	3.12E+12	1.51E+12	4.84E+11	1.51E+11	1.70E+10	1.73E+09	5.43E+08	2.54E+08	1.69E+08
1.13E+00	6.57E+12	6.37E+12	6.13E+12	5.93E+12	5.56E+12	4.87E+12	3.28E+12	1.70E+12	8.81E+11	4.56E+11	2.36E+11
1.58E+00	2.59E+12	2.90E+10	5.24E+09	2.11E+09	3.52E+08	9.81E+06	1.17E+03	5.07E+02	2.76E+02	1.55E+02	9.03E+01
2.00E+00	3.89E+12	8.08E+09	4.96E+07	3.75E+07	3.03E+07	2.60E+07	1.75E+07	9.07E+06	4.70E+06	2.43E+06	1.26E+06
2.40E+00	1.49E+11	2.38E+08	2.15E+05	1.37E+05	9.83E+04	8.23E+04	5.54E+04	2.87E+04	1.49E+04	7.70E+03	3.99E+03
2.80E+00	1.35E+11	4.18E+08	1.08E+04	3.71E+03	4.52E+02	6.74E+00	2.23E-05	7.34E-11	6.60E-11	5.94E-11	5.35E-11
3.25E+00	2.47E+10	3.89E+07	9.51E-12	9.46E-12	9.36E-12	9.16E-12	8.60E-12	7.74E-12	6.97E-12	6.27E-12	5.64E-12
3.75E+00	8.40E+05	1.34E+05	1.15E-14	1.14E-14	1.13E-14	1.11E-14	1.04E-14	9.37E-15	8.43E-15	7.59E-15	6.83E-15
4.25E+00	6.35E+05	1.75E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	5.01E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	4.56E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	6.18E+13	1.80E+13	1.01E+13	7.91E+12	6.33E+12	5.23E+12	3.42E+12	1.76E+12	9.13E+11	4.73E+11	2.46E+11
0 mev/sec	3.96E+13	1.25E+13	8.98E+12	7.67E+12	6.57E+12	5.58E+12	3.71E+12	1.92E+12	9.92E+11	5.14E+11	2.66E+11

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

	emean	time after discharge										
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	2.45E+04	5.02E+03	1.29E+03	7.01E+02	4.22E+02	3.02E+02	1.82E+02	9.36E+01	4.97E+01	2.70E+01	1.51E+01
	3.00E-02	2.03E+04	3.02E+03	1.01E+03	7.68E+02	5.46E+02	3.61E+02	1.78E+02	7.97E+01	3.87E+01	1.95E+01	1.01E+01
	5.50E-02	2.53E+04	1.82E+03	4.24E+02	2.97E+02	2.18E+02	1.80E+02	1.21E+02	6.24E+01	3.23E+01	1.68E+01	8.69E+00
	8.50E-02	2.09E+04	1.47E+03	2.86E+02	1.89E+02	1.30E+02	1.05E+02	7.06E+01	3.65E+01	1.89E+01	9.77E+00	5.06E+00
	1.20E-01	2.07E+04	1.35E+03	2.20E+02	1.34E+02	8.36E+01	6.53E+01	4.33E+01	2.22E+01	1.14E+01	5.89E+00	3.05E+00
	1.70E-01	3.62E+04	7.76E+03	3.75E+02	1.91E+02	1.16E+02	8.46E+01	4.67E+01	1.88E+01	8.25E+00	3.86E+00	1.88E+00
	3.00E-01	1.28E+05	6.41E+04	6.83E+03	8.59E+02	1.03E+02	5.67E+01	3.06E+01	1.23E+01	5.37E+00	2.50E+00	1.22E+00
	6.50E-01	4.22E+06	1.13E+06	4.66E+05	2.25E+05	7.23E+04	2.26E+04	2.53E+03	2.59E+02	8.11E+01	3.79E+01	2.52E+01
	1.13E+00	1.70E+06	1.65E+06	1.59E+06	1.53E+06	1.44E+06	1.26E+06	8.49E+05	4.40E+05	2.28E+05	1.18E+05	6.11E+04
	1.58E+00	9.37E+05	1.05E+04	1.90E+03	7.65E+02	1.27E+02	3.55E+00	4.23E-04	1.84E-04	9.99E-05	5.59E-05	3.27E-05
	2.00E+00	1.79E+06	3.72E+03	2.28E+01	1.72E+01	1.39E+01	1.19E+01	8.05E+00	4.17E+00	2.16E+00	1.12E+00	5.80E-01
	2.40E+00	8.22E+04	1.31E+02	1.18E-01	7.57E-02	5.42E-02	4.54E-02	3.06E-02	1.58E-02	8.20E-03	4.25E-03	2.20E-03
	2.80E+00	8.71E+04	2.69E+02	6.93E-03	2.39E-03	2.91E-04	4.34E-06	1.44E-11	4.72E-17	4.25E-17	3.82E-17	3.44E-17
	3.25E+00	1.84E+04	2.91E+01	7.10E-18	7.07E-18	6.99E-18	6.85E-18	6.43E-18	5.78E-18	5.21E-18	4.69E-18	4.22E-18
	3.75E+00	7.24E-01	1.15E-01	9.92E-21	9.86E-21	9.76E-21	9.56E-21	8.97E-21	8.07E-21	7.27E-21	6.54E-21	5.89E-21
	4.25E+00	6.21E-01	1.71E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	5.47E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	5.76E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	9.11E+06	2.88E+06	2.06E+06	1.76E+06	1.51E+06	1.28E+06	8.52E+05	4.40E+05	2.28E+05	1.18E+05	6.12E+04
0	gamma watts	6.35E+00	2.01E+00	1.44E+00	1.23E+00	1.05E+00	8.95E-01	5.94E-01	3.07E-01	1.59E-01	8.24E-02	4.27E-02

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photon spectrum as a function of time for fission products

BWR SNF Assembly - Top - decay

spectrum of photon release rates, photons/sec

basis = per ONE BWR Fuel Assembly - Top Region -

	emean	time after discharge										
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	2.47E+17	3.21E+16	8.40E+15	6.22E+15	4.18E+15	2.25E+15	7.63E+14	5.09E+14	4.37E+14	3.83E+14	3.37E+14
	3.00E-02	1.09E+17	2.51E+16	3.59E+15	2.60E+15	1.75E+15	9.50E+14	3.37E+14	2.29E+14	1.97E+14	1.73E+14	1.53E+14
	5.50E-02	5.84E+16	8.80E+15	1.92E+15	1.46E+15	9.98E+14	5.42E+14	1.85E+14	1.20E+14	9.91E+13	8.44E+13	7.28E+13
	8.50E-02	3.99E+16	7.47E+15	1.17E+15	9.02E+14	6.15E+14	3.27E+14	1.03E+14	6.32E+13	5.19E+13	4.43E+13	3.84E+13
	1.20E-01	3.26E+16	7.01E+15	1.35E+15	1.07E+15	7.32E+14	3.78E+14	1.15E+14	6.82E+13	5.22E+13	4.14E+13	3.36E+13
	1.70E-01	5.22E+16	8.32E+15	1.17E+15	6.44E+14	4.00E+14	2.08E+14	5.96E+13	3.70E+13	3.18E+13	2.79E+13	2.46E+13
	3.00E-01	1.13E+17	1.76E+16	9.09E+14	6.89E+14	4.67E+14	2.42E+14	6.77E+13	4.11E+13	3.48E+13	3.01E+13	2.62E+13
	6.50E-01	2.32E+17	6.45E+16	1.54E+16	9.11E+15	5.24E+15	3.49E+15	1.75E+15	9.74E+14	7.59E+14	6.52E+14	5.74E+14
	1.13E+00	7.23E+16	5.21E+15	3.28E+14	2.60E+14	2.08E+14	1.48E+14	7.96E+13	4.64E+13	3.05E+13	2.06E+13	1.40E+13
	1.58E+00	3.73E+16	8.89E+15	1.64E+14	8.61E+13	6.45E+13	3.91E+13	1.23E+13	3.42E+12	1.55E+12	9.36E+11	6.39E+11
	2.00E+00	1.10E+16	6.48E+14	5.31E+13	3.78E+13	2.45E+13	1.04E+13	8.54E+11	3.01E+10	1.35E+10	1.15E+10	1.01E+10
	2.40E+00	8.60E+15	4.32E+14	7.28E+12	3.24E+12	2.26E+12	1.13E+12	1.41E+11	4.57E+09	1.57E+08	1.14E+07	5.89E+06
	2.80E+00	3.63E+15	6.95E+12	6.55E+11	5.15E+11	3.64E+11	1.83E+11	2.33E+10	7.63E+08	2.52E+07	8.35E+05	2.77E+04
	3.25E+00	1.73E+15	2.51E+12	1.19E+11	8.44E+10	5.99E+10	3.03E+10	3.93E+09	1.30E+08	4.32E+06	1.43E+05	4.76E+03
	3.75E+00	7.80E+14	1.18E+10	4.42E+07	3.72E+07	2.64E+07	1.34E+07	1.73E+06	5.75E+04	1.91E+03	6.32E+01	2.10E+00
	4.25E+00	7.10E+14	1.56E+09	9.79E-06	9.84E-06	9.93E-06	1.01E-05	1.04E-05	1.05E-05	1.06E-05	1.06E-05	1.06E-05
	4.75E+00	2.11E+14	1.16E+10	4.91E-06	4.93E-06	4.98E-06	5.06E-06	5.19E-06	5.28E-06	5.30E-06	5.31E-06	5.31E-06
	5.50E+00	1.65E+14	7.40E+07	3.64E-06	3.66E-06	3.69E-06	3.75E-06	3.85E-06	3.91E-06	3.93E-06	3.94E-06	3.94E-06
0	total	1.02E+18	1.86E+17	3.44E+16	2.31E+16	1.47E+16	8.59E+15	3.47E+15	2.09E+15	1.70E+15	1.46E+15	1.27E+15
0	mev/sec	4.16E+17	7.38E+16	1.18E+16	7.18E+15	4.29E+15	2.78E+15	1.33E+15	7.41E+14	5.73E+14	4.85E+14	4.21E+14

spectrum of energy release rates, mev/watt-sec

basis = per ONE BWR Fuel Assembly - Top Region -

	emean	time after discharge										
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	5.67E+08	7.37E+07	1.93E+07	1.43E+07	9.60E+06	5.18E+06	1.75E+06	1.17E+06	1.01E+06	8.81E+05	7.76E+05
	3.00E-02	7.54E+08	1.73E+08	2.47E+07	1.79E+07	1.21E+07	6.55E+06	2.33E+06	1.58E+06	1.36E+06	1.19E+06	1.05E+06
	5.50E-02	7.38E+08	1.11E+08	2.43E+07	1.85E+07	1.26E+07	6.86E+06	2.34E+06	1.51E+06	1.25E+06	1.07E+06	9.20E+05

	8.50E-02	7.79E+08	1.46E+08	2.29E+07	1.76E+07	1.20E+07	6.39E+06	2.01E+06	1.23E+06	1.01E+06	8.66E+05	7.51E+05
	1.20E-01	8.99E+08	1.93E+08	3.73E+07	2.96E+07	2.02E+07	1.04E+07	3.17E+06	1.88E+06	1.44E+06	1.14E+06	9.27E+05
	1.70E-01	2.04E+09	3.25E+08	4.59E+07	2.52E+07	1.56E+07	8.12E+06	2.33E+06	1.45E+06	1.24E+06	1.09E+06	9.61E+05
	3.00E-01	7.82E+09	1.21E+09	6.27E+07	4.75E+07	3.22E+07	1.67E+07	4.67E+06	2.84E+06	2.40E+06	2.08E+06	1.81E+06
	6.50E-01	3.47E+10	9.63E+09	2.30E+09	1.36E+09	7.83E+08	5.22E+08	2.61E+08	1.46E+08	1.13E+08	9.75E+07	8.58E+07
	1.13E+00	1.87E+10	1.35E+09	8.49E+07	6.74E+07	5.38E+07	3.82E+07	2.06E+07	1.20E+07	7.89E+06	5.32E+06	3.63E+06
	1.58E+00	1.35E+10	3.22E+09	5.95E+07	3.12E+07	2.34E+07	1.42E+07	4.46E+06	1.24E+06	5.60E+05	3.39E+05	2.31E+05
	2.00E+00	5.05E+09	2.98E+08	2.44E+07	1.74E+07	1.13E+07	4.80E+06	3.93E+05	1.38E+04	6.19E+03	5.28E+03	4.63E+03
	2.40E+00	4.75E+09	2.38E+08	4.02E+06	1.79E+06	1.25E+06	6.21E+05	7.78E+04	2.52E+03	8.67E+01	6.31E+00	3.25E+00
	2.80E+00	2.34E+09	4.48E+06	4.22E+05	3.32E+05	2.35E+05	1.18E+05	1.50E+04	4.91E+02	1.62E+01	5.37E-01	1.78E-02
	3.25E+00	1.29E+09	1.87E+06	8.92E+04	6.31E+04	4.48E+04	2.27E+04	2.94E+03	9.74E+01	3.23E+00	1.07E-01	3.55E-03
	3.75E+00	6.73E+08	1.02E+04	3.81E+01	3.20E+01	2.28E+01	1.15E+01	1.49E+00	4.95E-02	1.64E-03	5.45E-05	1.81E-06
	4.25E+00	6.94E+08	1.52E+03	9.56E-12	9.61E-12	9.70E-12	9.85E-12	1.01E-11	1.03E-11	1.03E-11	1.03E-11	1.03E-11
	4.75E+00	2.31E+08	1.26E+04	5.36E-12	5.39E-12	5.44E-12	5.52E-12	5.67E-12	5.76E-12	5.79E-12	5.79E-12	5.80E-12
	5.50E+00	2.09E+08	9.36E+01	4.60E-12	4.63E-12	4.67E-12	4.74E-12	4.87E-12	4.95E-12	4.97E-12	4.98E-12	4.98E-12
0	total	9.57E+10	1.70E+10	2.71E+09	1.65E+09	9.87E+08	6.40E+08	3.05E+08	1.70E+08	1.32E+08	1.11E+08	9.69E+07
0	gamma watts	6.68E+04	1.18E+04	1.89E+03	1.15E+03	6.88E+02	4.46E+02	2.13E+02	1.19E+02	9.18E+01	7.77E+01	6.75E+01

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0 principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.21E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	2.25E+15	1.75E+15	3.10E+05	2.28E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	3.28E+15	3.15E+15	2.67E+15	2.25E+15	1.60E+15	8.08E+14	1.05E+14	3.47E+12	1.15E+11	3.82E+09	1.27E+08
ba140	1.89E+15	1.79E+15	1.42E+13	9.32E+10	4.53E+06	1.09E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.59E+15	2.49E+15	2.05E+13	1.34E+11	6.53E+06	1.57E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	3.98E+15	3.95E+15	3.18E+15	2.54E+15	1.63E+15	6.70E+14	4.66E+13	5.48E+11	6.45E+09	7.59E+07	8.94E+05

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.51E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.26E+15	3.45E+15	2.06E+07	5.86E-02	7.63E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.26E+15	4.13E+15	3.59E+10	1.76E+05	5.65E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.58E+15	1.49E+15	1.19E+13	7.78E+10	3.78E+06	9.06E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.43E+15	1.41E+15	2.11E+14	2.94E+13	5.96E+11	2.47E+08	1.75E-02	2.12E-19	.00E+00	.00E+00	.00E+00
ce143	4.65E+15	2.83E+15	9.26E-05	5.18E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.32E+15	1.31E+15	1.05E+15	8.40E+14	5.39E+14	2.22E+14	1.54E+13	1.81E+11	2.14E+09	2.51E+07	2.96E+05
nd147	1.42E+15	1.34E+15	4.86E+12	1.42E+10	1.38E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.80E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.76E+14	7.45E+14	6.31E+14	5.31E+14	3.78E+14	1.91E+14	2.48E+13	8.21E+11	2.72E+10	9.04E+08	3.00E+07
te132	8.21E+14	6.64E+14	3.97E+06	1.13E-02	1.47E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.46E+14	5.25E+14	4.32E+12	2.83E+10	1.38E+06	3.30E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.32E+15	8.05E+14	2.64E-05	1.47E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.24E+14	9.18E+14	7.39E+14	5.90E+14	3.78E+14	1.56E+14	1.08E+13	1.27E+11	1.50E+09	1.76E+07	2.08E+05
sm153	1.51E+15	1.06E+15	1.35E+01	4.88E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.47E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.61E+14	4.43E+14	3.75E+14	3.16E+14	2.24E+14	1.14E+14	1.47E+13	4.88E+11	1.62E+10	5.37E+08	1.78E+07
xe133	3.01E+15	2.92E+15	2.54E+10	1.24E+05	3.99E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.44E+14	5.40E+14	4.35E+14	3.47E+14	2.23E+14	9.16E+13	6.37E+12	7.50E+10	8.82E+08	1.04E+07	1.22E+05
nd147	8.85E+14	8.32E+14	3.02E+12	8.79E+09	8.59E+04	8.33E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.01E+15) at 1.0 d

nuclide	time after discharge

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.66E+15	3.11E+15	5.56E+05	4.08E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	6.95E+14	6.93E+14	5.58E+14	4.46E+14	2.86E+14	1.18E+14	8.18E+12	9.63E+10	1.13E+09	1.33E+07	1.57E+05
pr144	3.89E+14	3.86E+14	3.11E+14	2.48E+14	1.59E+14	6.55E+13	4.56E+12	5.36E+10	6.31E+08	7.43E+06	8.74E+04
sm153	7.20E+14	5.03E+14	6.41E+00	2.32E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.32E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.92E+14	6.15E+14	1.09E+05	8.02E-06	7.62E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.59E+15	2.19E+15	3.93E+05	2.88E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.71E+14	4.46E+14	3.54E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.84E+15	2.79E+15	4.19E+14	5.82E+13	1.18E+12	4.89E+08	3.47E-02	4.21E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.76E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.42E+15	1.02E+15	6.70E-04	8.45E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.55E+15	4.25E+15	2.03E+12	6.97E+08	1.00E+02	2.12E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.15E+15	3.36E+15	2.01E+07	5.71E-02	7.44E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.29E+15	1.73E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.93E+15	1.86E+15	1.53E+13	1.00E+11	4.87E+06	1.17E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.06E+15	1.86E+15	6.10E-05	3.41E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.45E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.58E+15	7.50E+15	2.86E+15	1.05E+15	1.45E+14	2.78E+12	1.96E+07	5.06E-02	1.31E-10	3.38E-19	8.42E-28
nb 95	7.89E+15	7.89E+15	4.95E+15	2.15E+15	3.25E+14	6.55E+12	4.47E+07	1.16E-01	2.99E-10	7.71E-19	.00E+00
ru103	5.69E+15	5.59E+15	1.16E+15	2.27E+14	9.00E+12	1.42E+10	5.65E+01	5.60E-13	5.57E-27	.00E+00	.00E+00
i132	1.67E+16	1.36E+16	8.14E+07	2.31E-01	3.01E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.36E+15	3.39E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.99E+15	3.98E+15	3.67E+15	3.37E+15	2.85E+15	2.04E+15	7.43E+14	1.38E+14	2.57E+13	4.80E+12	8.93E+11
la140	6.19E+15	5.96E+15	4.90E+13	3.21E+11	1.56E+07	3.74E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.21E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.52E+15	2.65E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.82E+15	1.48E+15	8.86E+06	2.52E-02	3.28E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.04E+15	4.80E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.49E+14	4.26E+14	3.93E+12	3.01E+10	1.98E+06	8.76E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.75E+14	6.49E+14	5.34E+12	3.50E+10	1.70E+06	4.08E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.73E+14	7.39E+14	1.27E+13	1.87E+11	4.45E+07	2.56E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.89E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.86E+14	5.60E+14	3.35E+06	9.51E-03	1.24E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	8.00E+15	7.70E+15	6.33E+13	4.15E+11	2.02E+07	4.84E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.48E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.76E+14	1.44E+14	8.60E+05	2.44E-03	3.18E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.49E+14	3.57E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.08E+13	5.04E+13	4.06E+13	3.24E+13	2.08E+13	8.55E+12	5.95E+11	7.00E+09	8.23E+07	9.69E+05	1.14E+04
eu156	3.78E+14	3.61E+14	6.22E+12	9.12E+10	2.17E+07	1.25E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.32E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.79E+14	3.65E+14	3.00E+12	1.97E+10	9.57E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.68E+13	2.57E+13	4.42E+11	6.48E+09	1.54E+06	8.87E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.95E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.16E+11	6.88E+11	5.82E+11	4.90E+11	3.49E+11	1.76E+11	2.29E+10	7.58E+08	2.51E+07	8.34E+05	2.77E+04
ag112	1.33E+12	7.03E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.31E+12	5.11E+12	4.20E+10	2.76E+08	1.34E+04	3.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.51E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.42E+12	2.33E+12	1.92E+10	1.26E+08	6.12E+03	1.47E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.18E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.71E+12	8.40E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.70E+14	3.34E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.56E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.03E+11	1.56E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.16E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	3.73E+12	1.16E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec

mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.40E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.39E+10	7.40E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Top - decay

0 actinide photon release rates, photons/sec

basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.46E+17	7.55E+16	9.58E+13	7.11E+13	4.39E+13	2.57E+13	2.08E+13	2.05E+13	2.02E+13	1.98E+13	1.95E+13
3.00E-02	9.22E+15	1.53E+15	8.90E+10	8.62E+10	1.09E+11	1.54E+11	2.74E+11	4.39E+11	5.66E+11	6.65E+11	7.40E+11
5.50E-02	1.28E+16	3.76E+15	1.45E+12	1.42E+12	1.77E+12	2.51E+12	4.58E+12	7.42E+12	9.62E+12	1.13E+13	1.26E+13
8.50E-02	5.80E+16	7.98E+15	4.81E+11	3.17E+11	3.17E+11	3.16E+11	3.14E+11	3.11E+11	3.08E+11	3.05E+11	3.02E+11
1.20E-01	5.89E+16	4.29E+16	5.30E+11	4.18E+11	4.12E+11	4.06E+11	3.94E+11	3.77E+11	3.62E+11	3.49E+11	3.37E+11
1.70E-01	1.93E+15	2.90E+14	1.90E+10	7.76E+09	5.58E+09	4.10E+09	3.67E+09	3.60E+09	3.53E+09	3.48E+09	3.43E+09
3.00E-01	3.11E+16	2.25E+16	3.19E+11	2.27E+11	2.26E+11	2.23E+11	2.15E+11	2.03E+11	1.93E+11	1.83E+11	1.75E+11
6.50E-01	1.72E+15	4.89E+13	2.20E+09	1.78E+09	1.33E+09	1.07E+09	1.16E+09	1.32E+09	1.36E+09	1.34E+09	1.32E+09
1.13E+00	1.70E+15	1.05E+15	7.61E+08	7.16E+08	6.64E+08	6.25E+08	5.97E+08	5.65E+08	5.35E+08	5.07E+08	4.82E+08
1.58E+00	1.54E+08	1.49E+08	1.33E+08	1.23E+08	1.11E+08	1.03E+08	1.03E+08	9.98E+07	9.17E+07	8.25E+07	7.38E+07
2.00E+00	1.54E+06	9.77E+05	9.45E+05	9.68E+05	1.02E+06	1.13E+06	1.42E+06	1.69E+06	1.76E+06	1.75E+06	1.71E+06
2.40E+00	6.88E+07	6.88E+07	6.10E+07	5.53E+07	4.85E+07	4.29E+07	3.72E+07	3.08E+07	2.55E+07	2.12E+07	1.76E+07

	2.80E+00	9.18E+07	9.29E+07	9.49E+07	9.96E+07	1.13E+08	1.47E+08	2.48E+08	3.37E+08	3.58E+08	3.52E+08	3.38E+08
	3.25E+00	2.46E+07	2.46E+07	2.18E+07	1.98E+07	1.74E+07	1.54E+07	1.33E+07	1.10E+07	9.14E+06	7.58E+06	6.30E+06
	3.75E+00	1.43E+07	1.43E+07	1.27E+07	1.15E+07	1.01E+07	8.91E+06	7.74E+06	6.40E+06	5.30E+06	4.40E+06	3.65E+06
	4.25E+00	8.28E+06	8.28E+06	7.34E+06	6.65E+06	5.84E+06	5.17E+06	4.49E+06	3.71E+06	3.07E+06	2.55E+06	2.12E+06
	4.75E+00	4.80E+06	4.80E+06	4.25E+06	3.86E+06	3.39E+06	3.00E+06	2.60E+06	2.15E+06	1.78E+06	1.48E+06	1.23E+06
	5.50E+00	4.34E+06	4.34E+06	3.85E+06	3.49E+06	3.06E+06	2.71E+06	2.35E+06	1.95E+06	1.61E+06	1.34E+06	1.11E+06
0	total	3.21E+17	1.56E+17	9.87E+13	7.36E+13	4.68E+13	2.93E+13	2.65E+13	2.93E+13	3.12E+13	3.27E+13	3.36E+13
0	mev/sec	2.71E+16	1.48E+16	1.25E+12	9.41E+11	6.88E+11	5.45E+11	6.10E+11	7.62E+11	8.79E+11	9.67E+11	1.03E+12

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean		time after discharge								
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.36E+08	1.74E+08	2.20E+05	1.64E+05	1.01E+05	5.90E+04	4.77E+04	4.71E+04	4.64E+04	4.56E+04	4.47E+04
3.00E-02	6.36E+07	1.05E+07	6.14E+02	5.94E+02	7.54E+02	1.06E+03	1.89E+03	3.03E+03	3.91E+03	4.59E+03	5.11E+03
5.50E-02	1.62E+08	4.76E+07	1.84E+04	1.80E+04	2.24E+04	3.18E+04	5.80E+04	9.38E+04	1.22E+05	1.43E+05	1.60E+05
8.50E-02	1.13E+09	1.56E+08	9.39E+03	6.20E+03	6.19E+03	6.18E+03	6.14E+03	6.07E+03	6.01E+03	5.95E+03	5.90E+03
1.20E-01	1.62E+09	1.18E+09	1.46E+04	1.15E+04	1.14E+04	1.12E+04	1.09E+04	1.04E+04	9.99E+03	9.62E+03	9.28E+03
1.70E-01	7.54E+07	1.13E+07	7.44E+02	3.03E+02	2.18E+02	1.60E+02	1.43E+02	1.41E+02	1.38E+02	1.36E+02	1.34E+02
3.00E-01	2.15E+09	1.55E+09	2.20E+04	1.57E+04	1.56E+04	1.54E+04	1.48E+04	1.40E+04	1.33E+04	1.26E+04	1.21E+04
6.50E-01	2.57E+08	7.31E+06	3.28E+02	2.66E+02	1.99E+02	1.60E+02	1.74E+02	1.97E+02	2.03E+02	2.01E+02	1.97E+02
1.13E+00	4.41E+08	2.71E+08	1.97E+02	1.85E+02	1.72E+02	1.62E+02	1.54E+02	1.46E+02	1.38E+02	1.31E+02	1.25E+02
1.58E+00	5.58E+01	5.40E+01	4.83E+01	4.44E+01	4.00E+01	3.73E+01	3.73E+01	3.61E+01	3.32E+01	2.99E+01	2.67E+01
2.00E+00	7.08E-01	4.49E-01	4.35E-01	4.45E-01	4.68E-01	5.18E-01	6.54E-01	7.76E-01	8.08E-01	8.04E-01	7.88E-01
2.40E+00	3.80E+01	3.80E+01	3.36E+01	3.05E+01	2.68E+01	2.37E+01	2.05E+01	1.70E+01	1.41E+01	1.17E+01	9.70E+00
2.80E+00	5.91E+01	5.98E+01	6.11E+01	6.41E+01	7.27E+01	9.48E+01	1.59E+02	2.17E+02	2.30E+02	2.27E+02	2.17E+02
3.25E+00	1.84E+01	1.84E+01	1.63E+01	1.48E+01	1.30E+01	1.15E+01	9.97E+00	8.24E+00	6.83E+00	5.67E+00	4.71E+00
3.75E+00	1.23E+01	1.23E+01	1.09E+01	9.90E+00	8.69E+00	7.68E+00	6.67E+00	5.51E+00	4.57E+00	3.79E+00	3.15E+00
4.25E+00	8.09E+00	8.09E+00	7.17E+00	6.50E+00	5.71E+00	5.05E+00	4.38E+00	3.62E+00	3.00E+00	2.49E+00	2.07E+00
4.75E+00	5.24E+00	5.24E+00	4.64E+00	4.21E+00	3.70E+00	3.27E+00	2.84E+00	2.35E+00	1.94E+00	1.61E+00	1.34E+00
5.50E+00	5.49E+00	5.49E+00	4.87E+00	4.41E+00	3.88E+00	3.43E+00	2.98E+00	2.46E+00	2.04E+00	1.69E+00	1.40E+00
0 total	6.24E+09	3.41E+09	2.87E+05	2.16E+05	1.58E+05	1.25E+05	1.40E+05	1.75E+05	2.02E+05	2.22E+05	2.37E+05
0 gamma watts	4.35E+03	2.38E+03	2.00E-01	1.51E-01	1.10E-01	8.73E-02	9.77E-02	1.22E-01	1.41E-01	1.55E-01	1.65E-01

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1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - top ds1 - discharge

0 1.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.9852E+11	2.0956E+10
5.0000E-02	to	1.0000E-01	1.4776E+11	1.1082E+10
1.0000E-01	to	2.0000E-01	2.6439E+11	3.9658E+10
2.0000E-01	to	3.0000E-01	4.0731E+10	1.0183E+10
3.0000E-01	to	4.0000E-01	7.6791E+11	2.6877E+11
4.0000E-01	to	6.0000E-01	7.6519E+11	3.8260E+11
6.0000E-01	to	8.0000E-01	3.2560E+12	2.2792E+12
8.0000E-01	to	1.0000E+00	2.5245E+12	2.2721E+12
1.0000E+00	to	1.3300E+00	4.5274E+12	5.2744E+12
1.3300E+00	to	1.6600E+00	1.2777E+12	1.9101E+12
1.6600E+00	to	2.0000E+00	2.6123E+10	4.7805E+10
2.0000E+00	to	2.5000E+00	3.0974E+09	6.9691E+09
2.5000E+00	to	3.0000E+00	6.3078E+08	1.7346E+09
3.0000E+00	to	4.0000E+00	3.6329E+07	1.2715E+08
4.0000E+00	to	5.0000E+00	1.6545E+03	7.4452E+03

	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.4300E+13	1.2526E+13

0
0 total energy from nuclides with spectrum data = 1.2511E+13
0 total energy from nuclides with no spectrum data = 1.4913E+10
1 gamma source spectrum for decay step for BWR source term - top ds1 - 0.25 year
0 90.00 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	2.1585E+11	6.4755E+09
5.0000E-02 to	1.0000E-01	3.0702E+10	2.3027E+09
1.0000E-01 to	2.0000E-01	1.7207E+10	2.5810E+09
2.0000E-01 to	3.0000E-01	4.4723E+09	1.1181E+09
3.0000E-01 to	4.0000E-01	8.1732E+10	2.8606E+10
4.0000E-01 to	6.0000E-01	2.9699E+11	1.4849E+11
6.0000E-01 to	8.0000E-01	1.0842E+12	7.5896E+11
8.0000E-01 to	1.0000E+00	1.2463E+12	1.1217E+12
1.0000E+00 to	1.3300E+00	4.3536E+12	5.0720E+12
1.3300E+00 to	1.6600E+00	1.2293E+12	1.8378E+12
1.6600E+00 to	2.0000E+00	4.5052E+09	8.2446E+09
2.0000E+00 to	2.5000E+00	4.4183E+07	9.9412E+07
2.5000E+00 to	3.0000E+00	5.6204E+04	1.5456E+05
3.0000E+00 to	4.0000E+00	8.8526E-12	3.0984E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		8.5649E+12	8.9883E+12

0
0 total energy from nuclides with spectrum data = 8.9777E+12
0 total energy from nuclides with no spectrum data = 1.0637E+10
1 gamma source spectrum for decay step for BWR source term - top ds1 - 0.50 year
0 182.50 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	1.6185E+11	4.8556E+09
5.0000E-02 to	1.0000E-01	2.0777E+10	1.5583E+09
1.0000E-01 to	2.0000E-01	9.4018E+09	1.4103E+09
2.0000E-01 to	3.0000E-01	2.0180E+09	5.0451E+08
3.0000E-01 to	4.0000E-01	9.2472E+09	3.2365E+09
4.0000E-01 to	6.0000E-01	1.2652E+11	6.3262E+10
6.0000E-01 to	8.0000E-01	4.4536E+11	3.1175E+11
8.0000E-01 to	1.0000E+00	6.7248E+11	6.0524E+11
1.0000E+00 to	1.3300E+00	4.2100E+12	4.9047E+12
1.3300E+00 to	1.6600E+00	1.1888E+12	1.7773E+12
1.6600E+00 to	2.0000E+00	1.8164E+09	3.3241E+09
2.0000E+00 to	2.5000E+00	3.3378E+07	7.5100E+07
2.5000E+00 to	3.0000E+00	4.7526E+04	1.3070E+05
3.0000E+00 to	4.0000E+00	8.8042E-12	3.0815E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		6.8483E+12	7.6772E+12

0
0 total energy from nuclides with spectrum data = 7.6692E+12
0 total energy from nuclides with no spectrum data = 7.9408E+09
1 gamma source spectrum for decay step for BWR source term - top ds1 - 1 year

365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.1734E+11	3.5203E+09
5.0000E-02	to	1.0000E-01	1.4665E+10	1.0999E+09
1.0000E-01	to	2.0000E-01	5.7551E+09	8.6327E+08
2.0000E-01	to	3.0000E-01	5.9692E+08	1.4923E+08
3.0000E-01	to	4.0000E-01	8.4964E+08	2.9738E+08
4.0000E-01	to	6.0000E-01	2.9120E+10	1.4560E+10
6.0000E-01	to	8.0000E-01	6.9617E+10	4.8732E+10
8.0000E-01	to	1.0000E+00	2.7929E+11	2.5136E+11
1.0000E+00	to	1.3300E+00	3.9407E+12	4.5909E+12
1.3300E+00	to	1.6600E+00	1.1128E+12	1.6637E+12
1.6600E+00	to	2.0000E+00	3.0239E+08	5.5337E+08
2.0000E+00	to	2.5000E+00	2.7039E+07	6.0837E+07
2.5000E+00	to	3.0000E+00	4.1410E+04	1.1388E+05
3.0000E+00	to	4.0000E+00	8.7097E-12	3.0484E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			5.5711E+12	6.5758E+12

total energy from nuclides with spectrum data = 6.5705E+12
total energy from nuclides with no spectrum data = 5.2440E+09
gamma source spectrum for decay step for BWR source term - top ds1 - 2 year

730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	8.4320E+10	2.5296E+09
5.0000E-02	to	1.0000E-01	1.1970E+10	8.9775E+08
1.0000E-01	to	2.0000E-01	4.3176E+09	6.4763E+08
2.0000E-01	to	3.0000E-01	2.4499E+08	6.1248E+07
3.0000E-01	to	4.0000E-01	5.3045E+08	1.8566E+08
4.0000E-01	to	6.0000E-01	8.1362E+09	4.0681E+09
6.0000E-01	to	8.0000E-01	5.2619E+09	3.6833E+09
8.0000E-01	to	1.0000E+00	1.0058E+11	9.0522E+10
1.0000E+00	to	1.3300E+00	3.4542E+12	4.0242E+12
1.3300E+00	to	1.6600E+00	9.7547E+11	1.4583E+12
1.6600E+00	to	2.0000E+00	8.4427E+06	1.5450E+07
2.0000E+00	to	2.5000E+00	2.3159E+07	5.2107E+07
2.5000E+00	to	3.0000E+00	3.5902E+04	9.8732E+04
3.0000E+00	to	4.0000E+00	8.5265E-12	2.9843E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			4.6451E+12	5.5852E+12

total energy from nuclides with spectrum data = 5.5818E+12
total energy from nuclides with no spectrum data = 3.3628E+09
gamma source spectrum for decay step for BWR source term - top ds1 - 5 year

1826.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	4.7282E+10	1.4185E+09
5.0000E-02	to	1.0000E-01	8.0154E+09	6.0116E+08
1.0000E-01	to	2.0000E-01	2.5954E+09	3.8930E+08
2.0000E-01	to	3.0000E-01	1.3570E+08	3.3925E+07
3.0000E-01	to	4.0000E-01	2.8419E+08	9.9468E+07

4.0000E-01 to	6.0000E-01	3.5458E+09	1.7729E+09
6.0000E-01 to	8.0000E-01	1.8878E+09	1.3214E+09
8.0000E-01 to	1.0000E+00	8.8219E+09	7.9397E+09
1.0000E+00 to	1.3300E+00	2.3275E+12	2.7116E+12
1.3300E+00 to	1.6600E+00	6.5729E+11	9.8265E+11
1.6600E+00 to	2.0000E+00	1.9354E+02	3.5418E+02
2.0000E+00 to	2.5000E+00	1.5598E+07	3.5097E+07
2.5000E+00 to	3.0000E+00	2.4187E+04	6.6514E+04
3.0000E+00 to	4.0000E+00	8.0025E-12	2.8009E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		3.0574E+12	3.7078E+12

0
0 total energy from nuclides with spectrum data = 3.7063E+12
0 total energy from nuclides with no spectrum data = 1.5176E+09
1 gamma source spectrum for decay step for BWR source term - top ds1 - 10 year
0 3652.50 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	2.2760E+10	6.8279E+08
5.0000E-02 to	1.0000E-01	4.1415E+09	3.1061E+08
1.0000E-01 to	2.0000E-01	1.1851E+09	1.7777E+08
2.0000E-01 to	3.0000E-01	6.0774E+07	1.5193E+07
3.0000E-01 to	4.0000E-01	1.0954E+08	3.8338E+07
4.0000E-01 to	6.0000E-01	9.9791E+08	4.9895E+08
6.0000E-01 to	8.0000E-01	5.6925E+08	3.9847E+08
8.0000E-01 to	1.0000E+00	2.5526E+08	2.2973E+08
1.0000E+00 to	1.3300E+00	1.2056E+12	1.4045E+12
1.3300E+00 to	1.6600E+00	3.4045E+11	5.0897E+11
1.6600E+00 to	2.0000E+00	5.8929E+00	1.0784E+01
2.0000E+00 to	2.5000E+00	8.0794E+06	1.8179E+07
2.5000E+00 to	3.0000E+00	1.2528E+04	3.4452E+04
3.0000E+00 to	4.0000E+00	7.2009E-12	2.5203E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		1.5761E+12	1.9158E+12

0
0 total energy from nuclides with spectrum data = 1.9154E+12
0 total energy from nuclides with no spectrum data = 4.2963E+08
1 gamma source spectrum for decay step for BWR source term - top ds1 - 15 year
0 5478.75 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	1.1507E+10	3.4522E+08
5.0000E-02 to	1.0000E-01	2.1429E+09	1.6072E+08
1.0000E-01 to	2.0000E-01	5.6926E+08	8.5388E+07
2.0000E-01 to	3.0000E-01	2.8822E+07	7.2055E+06
3.0000E-01 to	4.0000E-01	4.6162E+07	1.6157E+07
4.0000E-01 to	6.0000E-01	2.8132E+08	1.4066E+08
6.0000E-01 to	8.0000E-01	1.9856E+08	1.3899E+08
8.0000E-01 to	1.0000E+00	8.1788E+07	7.3609E+07
1.0000E+00 to	1.3300E+00	6.2449E+11	7.2753E+11
1.3300E+00 to	1.6600E+00	1.7636E+11	2.6365E+11
1.6600E+00 to	2.0000E+00	5.2097E+00	9.5338E+00
2.0000E+00 to	2.5000E+00	4.1852E+06	9.4166E+06
2.5000E+00 to	3.0000E+00	6.4895E+03	1.7846E+04

	3.0000E+00 to	4.0000E+00	6.4801E-12	2.2680E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		8.1570E+11	9.9216E+11

0
0 total energy from nuclides with spectrum data = 9.9203E+11
0 total energy from nuclides with no spectrum data = 1.2399E+08
1 gamma source spectrum for decay step for BWR source term - top ds1 - 20 year
0 7305.00 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	5.9689E+09	1.7907E+08
	5.0000E-02 to	1.0000E-01	1.1097E+09	8.3231E+07
	1.0000E-01 to	2.0000E-01	2.8243E+08	4.2365E+07
	2.0000E-01 to	3.0000E-01	1.4194E+07	3.5486E+06
	3.0000E-01 to	4.0000E-01	2.0943E+07	7.3301E+06
	4.0000E-01 to	6.0000E-01	7.9540E+07	3.9770E+07
	6.0000E-01 to	8.0000E-01	9.4250E+07	6.5975E+07
	8.0000E-01 to	1.0000E+00	6.5811E+07	5.9230E+07
	1.0000E+00 to	1.3300E+00	3.2350E+11	3.7688E+11
	1.3300E+00 to	1.6600E+00	9.1357E+10	1.3658E+11
	1.6600E+00 to	2.0000E+00	4.6060E+00	8.4289E+00
	2.0000E+00 to	2.5000E+00	2.1680E+06	4.8781E+06
	2.5000E+00 to	3.0000E+00	3.3618E+03	9.2449E+03
	3.0000E+00 to	4.0000E+00	5.8317E-12	2.0411E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		4.2250E+11	5.1395E+11

0
0 total energy from nuclides with spectrum data = 5.1391E+11
0 total energy from nuclides with no spectrum data = 3.8111E+07
1 gamma source spectrum for decay step for BWR source term - top ds1 - 25 year
0 9131.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	3.1751E+09	9.5252E+07
	5.0000E-02 to	1.0000E-01	5.7510E+08	4.3132E+07
	1.0000E-01 to	2.0000E-01	1.4289E+08	2.1434E+07
	2.0000E-01 to	3.0000E-01	7.1573E+06	1.7893E+06
	3.0000E-01 to	4.0000E-01	1.0017E+07	3.5059E+06
	4.0000E-01 to	6.0000E-01	2.2609E+07	1.1304E+07
	6.0000E-01 to	8.0000E-01	6.4854E+07	4.5398E+07
	8.0000E-01 to	1.0000E+00	5.8810E+07	5.2929E+07
	1.0000E+00 to	1.3300E+00	1.6759E+11	1.9524E+11
	1.3300E+00 to	1.6600E+00	4.7327E+10	7.0754E+10
	1.6600E+00 to	2.0000E+00	4.0723E+00	7.4523E+00
	2.0000E+00 to	2.5000E+00	1.1231E+06	2.5271E+06
	2.5000E+00 to	3.0000E+00	1.7415E+03	4.7893E+03
	3.0000E+00 to	4.0000E+00	5.2484E-12	1.8369E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		2.1897E+11	2.6627E+11

0
0 total energy from nuclides with spectrum data = 2.6626E+11

```
0                        total energy from nuclides with no spectrum data =   1.3978E+07
1
1  * normal termination of execution *
0                                      table of contents for material tables
0                                        case or subcase printed      page

                                                  1                   1
0ndset          33
           33           4           1          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     18 entries read
0   74* array     18 entries read
0   75$ array     18 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0           0
           21         100          18           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero           4
            0         689         129         879
0pow             3
   .000000E+00  .000000E+00  .000000E+00
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              4.1126E+00       1.9428E+02       1.9839E+02
 start of interval flux =         2.10285E+13
 n-gamma, fission and total mev/fission =              4.5528E+00       1.9445E+02       1.9900E+02
 start of interval flux =         2.09437E+13
 n-gamma, fission and total mev/fission =              4.6700E+00       1.9461E+02       1.9928E+02
 start of interval flux =         2.08752E+13
 n-gamma, fission and total mev/fission =              4.7911E+00       1.9477E+02       1.9956E+02
 start of interval flux =         2.08387E+13
 n-gamma, fission and total mev/fission =              4.9169E+00       1.9491E+02       1.9983E+02
 start of interval flux =         2.08283E+13
 n-gamma, fission and total mev/fission =              5.0459E+00       1.9505E+02       2.0009E+02
```

```
 start of interval flux =         2.08395E+13
 n-gamma, fission and total mev/fission =              5.1770E+00       1.9518E+02       2.0035E+02
 start of interval flux =         2.08689E+13
 n-gamma, fission and total mev/fission =              5.3094E+00       1.9530E+02       2.0061E+02
 start of interval flux =         2.09138E+13
 n-gamma, fission and total mev/fission =              5.4426E+00       1.9542E+02       2.0086E+02
 start of interval flux =         2.09719E+13
 n-gamma, fission and total mev/fission =              5.5759E+00       1.9553E+02       2.0111E+02
 start of interval flux =         2.10416E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
0ndset          33
           33           4           2          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm          4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
         7935          20           6          18        1697
0mmn           19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst         5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero          4
           21         689         129         879
0pow            3
  4.349999E+00 1.799989E+03 2.092907E+13
0 linp          9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              5.6437E+00       1.9561E+02       2.0126E+02
 start of interval flux =         2.09884E+13
 n-gamma, fission and total mev/fission =              5.7635E+00       1.9572E+02       2.0148E+02
 start of interval flux =         2.10960E+13
 n-gamma, fission and total mev/fission =              5.8922E+00       1.9582E+02       2.0171E+02
 start of interval flux =         2.12095E+13
 n-gamma, fission and total mev/fission =              6.0217E+00       1.9592E+02       2.0194E+02
 start of interval flux =         2.13296E+13
 n-gamma, fission and total mev/fission =              6.1513E+00       1.9602E+02       2.0217E+02
 start of interval flux =         2.14558E+13
 n-gamma, fission and total mev/fission =              6.2807E+00       1.9611E+02       2.0239E+02
```

```
 start of interval flux =         2.15873E+13
 n-gamma, fission and total mev/fission =              6.4099E+00       1.9621E+02       2.0262E+02
 start of interval flux =         2.17238E+13
 n-gamma, fission and total mev/fission =              6.5388E+00       1.9630E+02       2.0284E+02
 start of interval flux =         2.18649E+13
 n-gamma, fission and total mev/fission =              6.6672E+00       1.9639E+02       2.0306E+02
 start of interval flux =         2.20100E+13
 n-gamma, fission and total mev/fission =              6.7952E+00       1.9648E+02       2.0328E+02
 start of interval flux =         2.21590E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
0ndset           33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 3.599977E+03 2.162545E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              6.6666E+00       1.9653E+02       2.0320E+02
 start of interval flux =         2.23069E+13
 n-gamma, fission and total mev/fission =              6.7855E+00       1.9661E+02       2.0339E+02
 start of interval flux =         2.25210E+13
 n-gamma, fission and total mev/fission =              6.9213E+00       1.9669E+02       2.0361E+02
 start of interval flux =         2.27350E+13
 n-gamma, fission and total mev/fission =              7.0571E+00       1.9677E+02       2.0382E+02
 start of interval flux =         2.29491E+13
 n-gamma, fission and total mev/fission =              7.1924E+00       1.9685E+02       2.0404E+02
 start of interval flux =         2.31635E+13
 n-gamma, fission and total mev/fission =              7.3271E+00       1.9693E+02       2.0425E+02
```

```
 start of interval flux =         2.33780E+13
 n-gamma, fission and total mev/fission =              7.4614E+00       1.9700E+02       2.0447E+02
 start of interval flux =         2.35927E+13
 n-gamma, fission and total mev/fission =              7.5950E+00       1.9708E+02       2.0468E+02
 start of interval flux =         2.38075E+13
 n-gamma, fission and total mev/fission =              7.7281E+00       1.9716E+02       2.0489E+02
 start of interval flux =         2.40225E+13
 n-gamma, fission and total mev/fission =              7.8605E+00       1.9724E+02       2.0510E+02
 start of interval flux =         2.42376E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
0ndset           33
            33            4            4           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 5.399966E+03 2.340131E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              7.7610E+00       1.9730E+02       2.0506E+02
 start of interval flux =         2.44616E+13
 n-gamma, fission and total mev/fission =              7.8979E+00       1.9737E+02       2.0527E+02
 start of interval flux =         2.47379E+13
 n-gamma, fission and total mev/fission =              8.0433E+00       1.9744E+02       2.0548E+02
 start of interval flux =         2.50105E+13
 n-gamma, fission and total mev/fission =              8.1876E+00       1.9751E+02       2.0570E+02
 start of interval flux =         2.52792E+13
 n-gamma, fission and total mev/fission =              8.3308E+00       1.9758E+02       2.0591E+02
 start of interval flux =         2.55442E+13
 n-gamma, fission and total mev/fission =              8.4726E+00       1.9765E+02       2.0612E+02
```

```
 start of interval flux =         2.58055E+13
 n-gamma, fission and total mev/fission =              8.6132E+00       1.9772E+02       2.0634E+02
 start of interval flux =         2.60634E+13
 n-gamma, fission and total mev/fission =              8.7526E+00       1.9779E+02       2.0655E+02
 start of interval flux =         2.63178E+13
 n-gamma, fission and total mev/fission =              8.8906E+00       1.9786E+02       2.0675E+02
 start of interval flux =         2.65690E+13
 n-gamma, fission and total mev/fission =              9.0273E+00       1.9793E+02       2.0696E+02
 start of interval flux =         2.68169E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
0ndset          33
           33            4            5           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0            0            0            0            0            0            0            0            0            0
            0            0
0therm          4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
         7935           20            6           18         1697
0mmn           19
           10           10            0            0            1            3            0            0            0           10
           21          100            0            4            3            0            2            1            0
0tconst         5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 1.000000E-05
0mzero          4
           21          689          129          879
0pow            3
  4.349999E+00 7.199954E+03 2.581788E+13
0 linp          9
            6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              8.9313E+00       1.9800E+02       2.0693E+02
 start of interval flux =         2.71057E+13
 n-gamma, fission and total mev/fission =              9.0764E+00       1.9806E+02       2.0714E+02
 start of interval flux =         2.74211E+13
 n-gamma, fission and total mev/fission =              9.2282E+00       1.9812E+02       2.0735E+02
 start of interval flux =         2.77284E+13
 n-gamma, fission and total mev/fission =              9.3777E+00       1.9818E+02       2.0756E+02
 start of interval flux =         2.80270E+13
 n-gamma, fission and total mev/fission =              9.5247E+00       1.9825E+02       2.0777E+02
 start of interval flux =         2.83174E+13
 n-gamma, fission and total mev/fission =              9.6691E+00       1.9831E+02       2.0798E+02
```

```
 start of interval flux =         2.85997E+13
 n-gamma, fission and total mev/fission =              9.8111E+00       1.9838E+02       2.0819E+02
 start of interval flux =         2.88744E+13
 n-gamma, fission and total mev/fission =              9.9507E+00       1.9844E+02       2.0839E+02
 start of interval flux =         2.91417E+13
 n-gamma, fission and total mev/fission =              1.0088E+01       1.9850E+02       2.0859E+02
 start of interval flux =         2.94020E+13
 n-gamma, fission and total mev/fission =              1.0223E+01       1.9856E+02       2.0879E+02
 start of interval flux =         2.96555E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
0ndset          33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 8.999942E+03 2.859739E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              1.0366E+01       1.9863E+02       2.0900E+02
 start of interval flux =         2.99252E+13
 n-gamma, fission and total mev/fission =              1.0427E+01       1.9866E+02       2.0908E+02
 start of interval flux =         3.00276E+13
 n-gamma, fission and total mev/fission =              1.0484E+01       1.9868E+02       2.0917E+02
 start of interval flux =         3.01298E+13
 n-gamma, fission and total mev/fission =              1.0540E+01       1.9871E+02       2.0925E+02
 start of interval flux =         3.02308E+13
 n-gamma, fission and total mev/fission =              1.0595E+01       1.9874E+02       2.0933E+02
 start of interval flux =         3.03308E+13
 n-gamma, fission and total mev/fission =              1.0650E+01       1.9876E+02       2.0941E+02
```

```
 start of interval flux =         3.04298E+13
 n-gamma, fission and total mev/fission =              1.0704E+01       1.9879E+02       2.0949E+02
 start of interval flux =         3.05278E+13
 n-gamma, fission and total mev/fission =              1.0758E+01       1.9881E+02       2.0957E+02
 start of interval flux =         3.06248E+13
 n-gamma, fission and total mev/fission =              1.0811E+01       1.9884E+02       2.0965E+02
 start of interval flux =         3.07208E+13
 n-gamma, fission and total mev/fission =              1.0864E+01       1.9886E+02       2.0973E+02
 start of interval flux =         3.08158E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 49000 MWd/MTU
0ndset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
             0           10            0            0            1            1            0            0            0           10
            21          100            0            4            3            0            2            0            0
0tconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero            4
            21          689          129          879
0pow              3
  4.350000E+00 9.799938E+03 2.459561E+13
0 linp            9
             6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Top - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
*                                                                               *
*                    scale4.2  bulletin  board                                  *
*                    --------  --------  -----                                  *
*                                                                               *
*      welcome to the configuration controlled version of scale4.2.             *
*      any problems should be reported to kay martin at 4-9213.                 *
*                                                                               *
*      updates that have been made from version 4.1 to 4.2 include:             *
*                                                                               *
*      nitawl:  parameter added to prevent exponent underflows for very         *
*      dilute resonance calculations on workstation.  (mrr 93-011)              *
*                                                                               *
*      nitawl:   corrected discrepancies in maximum fractional energy loss      *
*      of neutron in admixed moderator calculation and simpson rule             *
*      calculation of collision density as documented in "improved              *
*      calculation of flux shapes with the resonance shielding code             *
*      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
*      impact will vary, but is insignificant for hydrogen-moderated            *
*      systems. (mrr 93-030)                                                    *
*                                                                               *
*      sas4:  added option of axial source profile input for both radial        *
*      and axial dose calculations. also added option idr = 2 for               *
*      estimation to point detectors from collisions in both top and            *
*      bottom halves of geometry.  (mrr 92-016)                                 *
*                                                                               *
*      morse:  modifications made for compatibility with the new options in     *
*      sas4 (i.e., the axial source profile input option and                    *
*      the option idr = 2 for estimation to point detectors from collisions     *
*      in both top and bottom halves of geometry).  (mrr 92-016)                *
*                                                                               *
*      csas & keno-v.a:  error checking during input processing was added       *
*      so that these modules terminate with an error message if input           *
*      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
*                                                                               *
*      keno-v.a:  corrections made for applying differential albedo             *
*      boundary conditions to supergrouped problems where global unit           *
*      contains only an array specification.  effect on keff is very large      *
*      for this type of problem.  (mrr 93-033)                                  *
*                                                                               *
*      keno-v.a:  corrected an error introduced with modification on may 24,    *
*      1993 (mrr 93-033). this error affected problems with mirror or           *
*      periodic boundary conditions and could cause problem to loop, fail,      *
*      or run incorrectly.                                                      *
*                                                                               *
*      xsdrnpm:  corrected calculation of number of direct access data          *
*      blocks needed to weight the cross sections to prevent occasional         *
*      failure.  improved calculation of balance tables.  (mrr 93-021)          *
*                                                                               *
*      origen-s:  modified program to read combined binary libraries that       *
*      include multi-cycle cross sections.  add option to edit binary           *
*      library.  (mrr 93-026)                                                   *
*                                                                               *
*      sas2:  modified to produce combined binary libraries for origen-s.       *
*      (mrr 93-027)                                                             *
*                                                                               *
*      couple:  modified to allow combined binary libraries to be made by       *
*      sas2.  (mrr 93-031)                                                      *
*                                                                               *
*      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1         primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    420000    500000
74**     89.4    10100.0      46.5  189764.1
          0.1    27013.3       1.5       0.6
          2.0      140.0       0.6     225.4
          2.5      133.1       0.5   91535.0
         12.3        7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
```

```
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 50000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1000000 e
   5t
BWR SNF Assembly - Fuel - deplete to 50000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Fuel - decay
per ONE BWR Fuel Assembly - Fuel Region - ds2f
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
81$$ 2 0 26 1 e
82$$ f2
   6t
  decay step for BWR source term - fuel ds2 - discharge
  decay step for BWR source term - fuel ds2 - 0.25 year
  decay step for BWR source term - fuel ds2 - 0.50 year
  decay step for BWR source term - fuel ds2 - 1 year
  decay step for BWR source term - fuel ds2 - 2 year
  decay step for BWR source term - fuel ds2 - 5 year
  decay step for BWR source term - fuel ds2 - 10 year
  decay step for BWR source term - fuel ds2 - 15 year
  decay step for BWR source term - fuel ds2 - 20 year
  decay step for BWR source term - fuel ds2 - 25 year
```

```
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    18.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooo    rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nnn         nn  ssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn    nn    nn  ssssssssssss
    oo         oo   rrrrrrrrrrrr         ii         gg    gggggggg   eeeeeeeee       nn     nn   nn   ssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooo    rr          rr  iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nn         nnn  ssssssssssss
     ooooooooooo    rr          rr  iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooo   tttttttttttt    zzzzzzzzzzzz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    ll             oo         oo        tt           zz
    llllllllllll   oooooooooooo        tt          zzzzzzzzzzzz
    llllllllllll    ooooooooooo        tt         zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666              //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666             //   9999999999999  6666666666666
       1111       22         22              //    00       00  66                        //   99         99  66
         11                  22             //    00         00 66                        //   99         99  66
         11                  22            //     00         00 66                       //    99         99  66
         11                22             //      00         00 666666666666            //     9999999999999  666666666666
         11               22             //       00         00 6666666666666          //      999999999999  6666666666666
         11              22             //        00         00 66         66         //                 99  66         66
         11             22             //         00         00 66         66        //                  99  66         66
         11            22             //          00       00  66         66       //                   99  66         66
      11111111    2222222222222     //             000000000    6666666666666     //          9999999999999  6666666666666
      11111111    2222222222222    //               0000000      66666666666     //           999999999999    66666666666
0

         11          0000000                        0000000              44                    33333333333    99999999999
        111         000000000                      000000000            444                   3333333333333  9999999999999
       1111        00       00         :::        00       00          4444          :::     33         33  99         99
         11       00         00        :::       00         00        44 44          :::                 33  99         99
         11       00         00        :::       00         00       44  44          :::                 33  99         99
         11       00         00                  00         00      44   44                            333  9999999999999
         11       00         00                  00         00     44    44                            333   999999999999
         11       00         00        :::       00         00   444444444444       :::                 33             99
         11       00         00        :::       00         00  4444444444444       :::                 33             99
         11        00       00         :::        00       00            44          :::     33         33             99
      11111111      000000000                      000000000             44                   3333333333333  9999999999999
      11111111       0000000                        0000000              44                    33333333333   999999999999
1
0                                 sssssssssss    cccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                 ssssssssssss   cccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
```

```
      ss          ss   cc          cc   aa          aa   ll              ee
      ss               cc               aa          aa   ll              ee
      ss               cc               aa          aa   ll              ee
      sssssssssssss    cc               aaaaaaaaaaaaa    ll              eeeeeeeee
       sssssssssssss   cc               aaaaaaaaaaaaa    ll              eeeeeeeee
                  ss   cc               aa          aa   ll              ee
                  ss   cc               aa          aa   ll              ee
      ss          ss   cc          cc   aa          aa   ll              ee
      sssssssssssss    ccccccccccccc    aa          aa   lllllllllllll   eeeeeeeeeeeee
       sssssssssss      ccccccccccc     aa          aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                  program verification information                *****
*****                                                                     *****
*****                 code system:    scale  version:    4.2           *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****         creation date:  04/27/95                                    *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  10:04:39                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0       note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------         comment or title end
0.............................columns 1-72.............................               ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    420000    500000
74**     89.4   10100.0      46.5  189764.1
          0.1   27013.3       1.5       0.6
          2.0     140.0       0.6     225.4
          2.5     133.1       0.5   91535.0
         12.3       7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds2f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1800000 e
    5t
 BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds2f
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 50000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1000000 e
    5t
 BWR SNF Assembly - Fuel - deplete to 50000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds2f
 58** 10r4.35
 60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Fuel - decay
 per ONE BWR Fuel Assembly - Fuel Region - ds2f
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
 81$$ 2 0 26 1 e
 82$$ f2
    6t
   decay step for BWR source term - fuel ds2 - discharge
   decay step for BWR source term - fuel ds2 - 0.25 year
   decay step for BWR source term - fuel ds2 - 0.50 year
   decay step for BWR source term - fuel ds2 - 1 year
   decay step for BWR source term - fuel ds2 - 2 year
   decay step for BWR source term - fuel ds2 - 5 year
   decay step for BWR source term - fuel ds2 - 10 year
   decay step for BWR source term - fuel ds2 - 15 year
   decay step for BWR source term - fuel ds2 - 20 year
   decay step for BWR source term - fuel ds2 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi       *
          *                                                                               *
          *      neutron flux spectrum factors and cross sections were produced from      *
          *     the "presas2" case updating all nuclides on the scale "burnup" library    *
          *                                                                               *
          *                    fission product yields are from endf/b-v                   *
          *                                                                               *
          *                photon libraries use an 18-energy-group structure              *
          *               the photon data are from the master photon data base,           *
          *                produced to include bremsstrahlung from uo2 matrix             *
          *                                                                               *
          *        see information above this box (if present) for later updates          *
          *                                                                               *
          *********************************************************************************
          *                                                                               *
0         *********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                     1697     total number of nuclides in library
                       689     number of light-element nuclides
                       129     number of actinide nuclides
                       879     number of fission product nuclides
0                     7935     number of nonzero off-diagonal matrix elements
0         *********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          *********************************************************************************
          *                                                                               *
          *            prelim lwr origen-s binary working library--id = 1143              *
          *         made from modified card-image origen-s libraries of scale 4.2         *
          *      data from the light element, actinide, and fission product libraries     *
          *        decay data, including gamma and total energy, are from endf/b-vi       *
          *                                                                               *
          *      neutron flux spectrum factors and cross sections were produced from      *
          *     the "presas2" case updating all nuclides on the scale "burnup" library    *
          *                                                                               *
          *                    fission product yields are from endf/b-v                   *
          *                                                                               *
          *                photon libraries use an 18-energy-group structure              *
          *               the photon data are from the master photon data base,           *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
    BWR SNF Assembly - Fuel - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Fuel Region
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	9.01E-03	9.01E-03	9.01E-03	9.01E-03	9.01E-03	9.01E-03	9.01E-03	9.01E-03	9.01E-03	9.01E-03	9.01E-03
h 2	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04	2.21E-04
h 3	2.16E-09	2.16E-09	2.13E-09	2.10E-09	2.04E-09	1.93E-09	1.63E-09	1.23E-09	9.29E-10	7.02E-10	5.30E-10
he 3	4.01E-11	4.04E-11	6.98E-11	9.99E-11	1.58E-10	2.70E-10	5.69E-10	9.69E-10	1.27E-09	1.50E-09	1.67E-09
he 4	6.50E-01	6.50E-01	6.50E-01	6.50E-01	6.50E-01	6.50E-01	6.50E-01	6.50E-01	6.50E-01	6.50E-01	6.50E-01
li 6	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11
li 7	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11	1.11E-11
be 9	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
be 10	2.40E-05	2.40E-05	2.40E-05	2.40E-05	2.40E-05	2.40E-05	2.40E-05	2.40E-05	2.40E-05	2.40E-05	2.40E-05
b 10	3.37E-12	3.40E-12	5.93E-12	8.57E-12	1.38E-11	2.42E-11	5.54E-11	1.07E-10	1.59E-10	2.11E-10	2.63E-10
b 11	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	2.08E+00	2.08E+00	2.08E+00	2.08E+00	2.08E+00	2.08E+00	2.08E+00	2.08E+00	2.08E+00	2.08E+00	2.08E+00
c 14	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.43E-03	5.42E-03	5.42E-03	5.42E-03
n 14	1.85E-06	1.85E-06	2.01E-06	2.18E-06	2.51E-06	3.17E-06	5.14E-06	8.42E-06	1.17E-05	1.50E-05	1.83E-05
n 15	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03	2.49E-03
o 16	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04
o 17	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01
o 18	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01
f 19	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04	1.02E-04
ne 20	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09	2.03E-09
ne 21	9.98E-11	9.98E-11	9.98E-11	9.98E-11	9.98E-11	9.98E-11	9.98E-11	9.98E-11	9.98E-11	9.98E-11	9.98E-11
ne 22	3.73E-10	3.73E-10	3.73E-10	3.73E-10	3.73E-10	3.73E-10	3.73E-10	3.73E-10	3.73E-10	3.73E-10	3.73E-10
na 23	3.47E-11	3.47E-11	3.47E-11	3.47E-11	3.47E-11	3.47E-11	3.47E-11	3.47E-11	3.47E-11	3.47E-11	3.47E-11
na 24	6.40E-09	2.06E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05	1.30E-05
mg 25	4.26E-06	4.26E-06	4.26E-06	4.26E-06	4.26E-06	4.26E-06	4.26E-06	4.26E-06	4.26E-06	4.26E-06	4.26E-06
mg 26	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06
al 27	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
si 28	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01
si 29	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02	2.91E-02
si 30	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02
si 31	6.85E-10	1.20E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	4.90E-13	4.90E-13	4.90E-13	4.89E-13	4.88E-13	4.86E-13	4.80E-13	4.71E-13	4.61E-13	4.52E-13	4.43E-13
p 31	7.49E-06	7.49E-06	7.49E-06	7.49E-06	7.49E-06	7.49E-06	7.49E-06	7.49E-06	7.49E-06	7.49E-06	7.49E-06
p 32	6.65E-11	6.34E-11	8.38E-13	9.45E-15	1.12E-16	1.10E-16	1.09E-16	1.07E-16	1.05E-16	1.03E-16	1.01E-16
p 33	1.15E-14	1.12E-14	9.83E-16	7.82E-17	5.27E-19	2.41E-23	2.31E-36	.00E+00	.00E+00	.00E+00	.00E+00
s 32	2.75E-09	2.75E-09	2.81E-09	2.81E-09	2.81E-09	2.81E-09	2.81E-09	2.81E-09	2.81E-09	2.81E-09	2.81E-09
s 33	7.94E-13	7.94E-13	8.04E-13	8.05E-13	8.05E-13	8.05E-13	8.05E-13	8.05E-13	8.05E-13	8.05E-13	8.05E-13
ar 40	5.20E-11	5.20E-11	5.20E-11	5.20E-11	5.20E-11	5.20E-11	5.20E-11	5.20E-11	5.20E-11	5.20E-11	5.20E-11
k 41	1.71E-12	1.71E-12	1.71E-12	1.71E-12	1.71E-12	1.71E-12	1.71E-12	1.71E-12	1.71E-12	1.71E-12	1.71E-12
k 43	3.38E-14	1.60E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	3.29E-14	3.30E-14	3.30E-14	3.30E-14	3.30E-14	3.30E-14	3.30E-14	3.30E-14	3.30E-14	3.30E-14	3.30E-14
ca 43	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06	1.13E-06
ca 44	8.79E-06	8.79E-06	8.79E-06	8.79E-06	8.79E-06	8.79E-06	8.79E-06	8.79E-06	8.79E-06	8.79E-06	8.79E-06
ca 45	2.48E-08	2.47E-08	1.69E-08	1.14E-08	5.28E-09	1.12E-09	1.09E-11	4.79E-15	2.11E-18	9.26E-22	4.07E-25
ca 46	1.11E-06	1.11E-06	1.11E-06	1.11E-06	1.11E-06	1.11E-06	1.11E-06	1.11E-06	1.11E-06	1.11E-06	1.11E-06
ca 47	9.65E-12	8.28E-12	1.03E-17	7.46E-24	5.55E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.60E-07	1.60E-07	1.68E-07	1.73E-07	1.80E-07	1.84E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07	1.85E-07
sc 46	1.56E-06	1.55E-06	7.40E-07	3.45E-07	7.60E-08	3.71E-09	4.30E-13	1.18E-19	3.26E-26	8.99E-33	2.48E-39
sc 47	1.01E-07	8.22E-08	8.32E-16	2.47E-23	1.56E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.32E-09	3.63E-09	6.99E-24	3.55E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 2

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01
ti 47	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01

ti 48	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00
ti 49	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01	1.40E-01
ti 50	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
v 50	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03
v 51	2.37E-01	2.37E-01	2.42E-01	2.42E-01	2.42E-01	2.42E-01	2.42E-01	2.42E-01	2.42E-01	2.42E-01	2.42E-01
cr 50	5.61E+00	5.61E+00	5.61E+00	5.61E+00	5.61E+00	5.61E+00	5.61E+00	5.61E+00	5.61E+00	5.61E+00	5.61E+00
cr 51	5.57E-03	5.43E-03	5.86E-04	5.79E-05	5.99E-07	6.45E-11	8.03E-23	1.14E-42	.00E+00	.00E+00	.00E+00
cr 52	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
cr 53	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01	1.32E+01
cr 54	4.08E+00	4.08E+00	4.08E+00	4.08E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00	4.09E+00
mn 54	2.19E-03	2.18E-03	1.79E-03	1.46E-03	9.72E-04	4.32E-04	3.79E-05	6.57E-07	1.14E-08	1.97E-10	3.42E-12
mn 55	6.09E-01	6.09E-01	6.12E-01	6.14E-01	6.19E-01	6.26E-01	6.40E-01	6.48E-01	6.51E-01	6.51E-01	6.52E-01
mn 56	3.03E-06	4.79E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01	1.26E+01
fe 55	4.23E-02	4.23E-02	3.97E-02	3.72E-02	3.28E-02	2.54E-02	1.19E-02	3.34E-03	9.38E-04	2.64E-04	7.40E-05
fe 56	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02
fe 57	6.40E+00	6.40E+00	6.40E+00	6.40E+00	6.40E+00	6.40E+00	6.40E+00	6.40E+00	6.40E+00	6.40E+00	6.40E+00
fe 58	7.83E-01	7.83E-01	7.85E-01	7.86E-01	7.86E-01	7.86E-01	7.86E-01	7.86E-01	7.86E-01	7.86E-01	7.86E-01
fe 59	1.19E-04	1.17E-04	2.93E-05	6.93E-06	4.02E-07	1.36E-09	5.27E-17	2.33E-29	1.03E-41	.00E+00	.00E+00
co 58m	9.00E-10	1.46E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.61E-03	3.58E-03	1.50E-03	6.07E-04	1.02E-04	2.86E-06	6.39E-11	1.13E-18	2.00E-26	3.53E-34	6.26E-42
co 59	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00
co 60	2.81E-01	2.81E-01	2.72E-01	2.63E-01	2.47E-01	2.16E-01	1.46E-01	7.55E-02	3.91E-02	2.03E-02	1.05E-02
co 61	1.71E-07	7.13E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.85E+01	8.85E+01	8.85E+01	8.85E+01	8.85E+01	8.85E+01	8.85E+01	8.85E+01	8.85E+01	8.85E+01	8.85E+01
ni 59	8.98E-01	8.98E-01	8.98E-01	8.98E-01	8.98E-01	8.98E-01	8.98E-01	8.98E-01	8.98E-01	8.98E-01	8.98E-01
ni 60	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.56E+01	3.56E+01	3.57E+01	3.58E+01	3.58E+01	3.58E+01
ni 61	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00	1.82E+00
ni 62	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.87E+00	4.87E+00
ni 63	1.80E-01	1.80E-01	1.80E-01	1.79E-01	1.79E-01	1.77E-01	1.74E-01	1.68E-01	1.62E-01	1.57E-01	1.51E-01
ni 64	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00
ni 65	5.34E-07	7.25E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	6.52E-11	4.81E-11	8.08E-23	4.68E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	3.41E-01	3.41E-01	3.41E-01	3.41E-01	3.42E-01	3.43E-01	3.47E-01	3.53E-01	3.58E-01	3.64E-01	3.69E-01
cu 64	2.45E-06	6.62E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01	1.62E-01
cu 66	3.79E-09	7.49E-14	1.26E-25	7.30E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.18E-12	1.67E-12	6.65E-23	1.04E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03	2.06E-03
zn 65	1.16E-06	1.16E-06	9.00E-07	6.92E-07	4.12E-07	1.46E-07	6.47E-09	3.60E-11	2.01E-13	1.12E-15	6.22E-18
zn 66	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03
zn 67	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06
zn 68	2.61E-08	2.61E-08	2.61E-08	2.61E-08	2.61E-08	2.61E-08	2.61E-08	2.61E-08	2.61E-08	2.61E-08	2.61E-08
zn 69m	5.95E-15	1.78E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 70	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15	1.03E-15
ga 69	4.64E-11	4.65E-11	4.65E-11	4.65E-11	4.65E-11	4.65E-11	4.65E-11	4.65E-11	4.65E-11	4.65E-11	4.65E-11
ge 70	2.51E-13	2.51E-13	2.51E-13	2.51E-13	2.51E-13	2.51E-13	2.51E-13	2.51E-13	2.51E-13	2.51E-13	2.51E-13
sr 87	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03	1.78E-03
sr 88	1.73E-01	1.73E-01	1.73E-01	1.73E-01	1.73E-01	1.73E-01	1.73E-01	1.73E-01	1.73E-01	1.73E-01	1.73E-01
sr 89	5.32E-04	5.24E-04	1.55E-04	4.35E-05	3.55E-06	2.38E-08	7.10E-15	9.48E-26	1.27E-36	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 3

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 90	7.89E-06	7.89E-06	7.84E-06	7.79E-06	7.70E-06	7.51E-06	6.98E-06	6.17E-06	5.45E-06	4.82E-06	4.26E-06
sr 91	8.30E-07	1.45E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	1.27E-02	1.27E-02	1.31E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02	1.32E-02
y 89m	2.38E-13	2.25E-13	5.29E-14	1.49E-14	1.22E-15	8.13E-18	2.43E-24	3.24E-35	.00E+00	.00E+00	.00E+00
y 90	1.05E-03	8.12E-04	2.04E-09	2.03E-09	2.00E-09	1.95E-09	1.81E-09	1.60E-09	1.42E-09	1.25E-09	1.11E-09

y 90m	4.04E-12	2.19E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.59E-03	1.57E-03	5.47E-04	1.83E-04	2.10E-05	2.77E-07	6.38E-13	2.56E-22	1.03E-31	4.12E-41	.00E+00	
y 92	3.53E-06	3.20E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	2.02E-09	3.94E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	9.87E-10	7.98E-10	5.07E-18	1.53E-26	2.49E-43	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04
zr 91	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04
zr 92	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04
zr 93	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01
zr 94	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04
zr 95	5.53E-01	5.47E-01	2.09E-01	7.67E-02	1.06E-02	2.03E-04	1.43E-09	3.69E-18	9.54E-27	2.47E-35	.00E+00	
zr 96	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03
zr 97	9.60E-03	3.59E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.13E-07	1.13E-07	1.13E-07	1.13E-07	1.12E-07	1.12E-07	1.12E-07	1.11E-07	1.11E-07	1.10E-07	1.10E-07	
nb 92	2.94E-04	2.94E-04	2.94E-04	2.94E-04	2.94E-04	2.94E-04	2.94E-04	2.94E-04	2.94E-04	2.94E-04	2.94E-04	
nb 93	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	
nb 93m	4.96E-03	4.96E-03	4.91E-03	4.86E-03	4.76E-03	4.57E-03	4.05E-03	3.33E-03	2.74E-03	2.26E-03	1.88E-03	
nb 94	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	
nb 95	2.98E-01	2.99E-01	1.90E-01	8.24E-02	1.25E-02	2.52E-04	1.72E-09	4.45E-18	1.15E-26	2.97E-35	.00E+00	
nb 95m	3.46E-04	3.46E-04	1.39E-04	5.09E-05	7.03E-06	1.35E-07	9.48E-13	2.45E-21	6.33E-30	.00E+00	.00E+00	
nb 96	7.06E-06	3.46E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	6.83E-04	2.56E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	8.98E-06	3.36E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 92	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
mo 93	9.54E-04	9.54E-04	9.54E-04	9.54E-04	9.54E-04	9.53E-04	9.53E-04	9.52E-04	9.51E-04	9.50E-04	9.49E-04	
mo 94	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	
mo 95	1.04E+01	1.04E+01	1.09E+01	1.11E+01	1.13E+01	1.13E+01	1.13E+01	1.13E+01	1.13E+01	1.13E+01	1.13E+01	
mo 96	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00	2.02E+00
mo 97	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01
mo 98	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00	2.04E+00
mo 99	3.81E-05	2.96E-05	5.25E-15	3.85E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01	7.46E-01
tc 98	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08	1.90E-08
tc 99	1.67E-03	1.67E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03
ru 98	5.84E-15	5.85E-15	6.61E-15	7.41E-15	8.98E-15	1.21E-14	2.15E-14	3.72E-14	5.29E-14	6.86E-14	8.43E-14	
ru 99	1.57E-08	1.57E-08	1.70E-08	1.84E-08	2.12E-08	2.67E-08	4.32E-08	7.08E-08	9.83E-08	1.26E-07	1.53E-07	
ru100	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04	2.62E-04
ru101	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03	3.66E-03
ru102	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04	1.90E-04
ru103	4.70E-08	4.62E-08	9.60E-09	1.88E-09	7.44E-11	1.18E-13	4.67E-22	4.63E-36	.00E+00	.00E+00	.00E+00	.00E+00
ru104	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09	1.24E-09
rh102	1.65E-15	1.65E-15	1.56E-15	1.47E-15	1.30E-15	1.02E-15	5.00E-16	1.51E-16	4.58E-17	1.39E-17	4.20E-18	
rh103	1.01E-09	1.01E-09	1.11E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
rh105	1.29E-14	9.19E-15	6.05E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd104	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10	3.05E-10
pd105	3.81E-12	3.82E-12	3.83E-12	3.83E-12	3.83E-12	3.83E-12	3.83E-12	3.83E-12	3.83E-12	3.83E-12	3.83E-12	3.83E-12
pd106	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13	1.67E-13

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BWR SNF Assembly - Fuel - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cd111	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.74E-06
cd112	1.50E-05	1.50E-05	1.50E-05	1.50E-05	1.50E-05	1.50E-05	1.50E-05	1.50E-05	1.50E-05	1.50E-05	1.50E-05
cd113	4.46E-08	4.46E-08	4.46E-08	4.46E-08	4.46E-08	4.46E-08	4.46E-08	4.46E-08	4.46E-08	4.46E-08	4.46E-08
cd113m	4.67E-08	4.67E-08	4.61E-08	4.56E-08	4.45E-08	4.23E-08	3.65E-08	2.86E-08	2.23E-08	1.75E-08	1.37E-08
cd114	1.72E-03	1.73E-03	1.82E-03	1.84E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03
cd115	6.90E-08	5.06E-08	4.78E-20	1.52E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.48E-07	1.46E-07	3.66E-08	8.68E-09	5.07E-10	1.74E-12	6.96E-20	3.27E-32	.00E+00	.00E+00	.00E+00
cd116	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05

cd117	8.18E-10	1.03E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	1.67E-12	1.18E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	4.34E-01	4.34E-01	4.53E-01	4.64E-01	4.74E-01	4.79E-01	4.79E-01	4.79E-01	4.79E-01	4.79E-01	4.79E-01
in113m	2.72E-05	2.70E-05	1.58E-05	9.05E-06	3.01E-06	3.34E-07	4.54E-10	7.60E-15	1.27E-19	2.12E-24	3.55E-29
in114	6.88E-08	4.31E-08	1.24E-08	3.40E-09	2.63E-10	1.58E-12	3.45E-19	2.72E-30	1.66E-41	.00E+00	.00E+00
in114m	2.72E-03	2.68E-03	7.71E-04	2.11E-04	1.64E-05	9.85E-08	2.14E-14	1.69E-25	1.33E-36	.00E+00	.00E+00
in115	4.73E-06	4.73E-06	4.84E-06	4.87E-06	4.88E-06	4.88E-06	4.88E-06	4.88E-06	4.88E-06	4.88E-06	4.88E-06
in117	2.70E-09	6.58E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	5.80E-10	3.42E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01
sn113	4.52E-02	4.50E-02	2.63E-02	1.51E-02	5.01E-03	5.56E-04	7.56E-07	1.26E-11	2.12E-16	3.54E-21	5.92E-26
sn114	8.43E+00	8.43E+00	8.43E+00	8.43E+00	8.43E+00	8.43E+00	8.43E+00	8.43E+00	8.43E+00	8.43E+00	8.43E+00
sn115	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00	4.28E+00
sn116	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02
sn117	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01
sn117m	2.83E-02	2.69E-02	2.89E-04	2.59E-06	2.33E-10	1.92E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02
sn119	1.13E+02	1.13E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02
sn119m	5.46E-01	5.45E-01	4.41E-01	3.55E-01	2.30E-01	9.70E-02	7.26E-03	9.67E-05	1.29E-06	1.71E-08	2.28E-10
sn120	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02
sn121	8.19E-04	4.43E-04	2.69E-07	2.68E-07	2.66E-07	2.63E-07	2.53E-07	2.38E-07	2.23E-07	2.10E-07	1.97E-07
sn121m	6.20E-03	6.20E-03	6.18E-03	6.16E-03	6.12E-03	6.04E-03	5.82E-03	5.46E-03	5.13E-03	4.82E-03	4.52E-03
sn122	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01
sn123	8.77E-03	8.72E-03	5.41E-03	3.29E-03	1.24E-03	1.74E-04	4.86E-07	2.69E-11	1.49E-15	8.28E-20	4.59E-24
sn124	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01	7.57E+01
sn125	1.36E-04	1.27E-04	2.10E-07	2.72E-10	5.34E-16	2.10E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.16E-01	8.17E-01	8.17E-01	8.17E-01	8.17E-01	8.18E-01	8.18E-01
sb122	3.49E-04	2.70E-04	3.23E-14	1.58E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	7.41E-02	7.42E-02	7.75E-02	7.96E-02	8.17E-02	8.27E-02	8.29E-02	8.29E-02	8.29E-02	8.29E-02	8.29E-02
sb124	4.47E-04	4.42E-04	1.59E-04	5.47E-05	6.67E-06	9.95E-08	3.30E-13	2.43E-22	1.79E-31	1.32E-40	.00E+00
sb125	3.10E-01	3.09E-01	2.91E-01	2.73E-01	2.40E-01	1.86E-01	8.70E-02	2.44E-02	6.87E-03	1.93E-03	5.42E-04
sb126	4.25E-05	4.02E-05	2.77E-07	1.57E-09	5.73E-14	7.73E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	7.86E-02	7.86E-02	7.89E-02	7.89E-02	7.89E-02	7.89E-02	7.89E-02	7.89E-02	7.89E-02	7.89E-02	7.89E-02
te123	6.89E-04	6.90E-04	7.71E-04	8.20E-04	8.66E-04	8.88E-04	8.91E-04	8.91E-04	8.91E-04	8.91E-04	8.91E-04
te123m	2.02E-04	2.01E-04	1.20E-04	7.01E-05	2.43E-05	2.93E-06	5.14E-09	1.31E-13	3.34E-18	8.51E-23	2.17E-27
te124	5.62E-03	5.62E-03	5.91E-03	6.01E-03	6.06E-03	6.07E-03	6.07E-03	6.07E-03	6.07E-03	6.07E-03	6.07E-03
te125	2.70E-01	2.70E-01	2.89E-01	3.07E-01	3.40E-01	3.95E-01	4.95E-01	5.59E-01	5.77E-01	5.82E-01	5.83E-01
te125m	4.02E-03	4.02E-03	4.00E-03	3.83E-03	3.41E-03	2.65E-03	1.24E-03	3.47E-04	9.76E-05	2.74E-05	7.70E-06
te126	7.72E-03	7.72E-03	7.76E-03	7.76E-03	7.76E-03	7.76E-03	7.76E-03	7.76E-03	7.76E-03	7.76E-03	7.76E-03
te127	3.41E-08	8.76E-09	2.05E-09	1.14E-09	3.57E-10	3.50E-11	3.29E-14	2.98E-19	2.70E-24	2.44E-29	2.21E-34
te127m	1.04E-06	1.03E-06	5.87E-07	3.26E-07	1.02E-07	9.99E-09	9.41E-12	8.51E-17	7.70E-22	6.97E-27	6.31E-32
te128	1.21E-07	1.21E-07	1.21E-07	1.21E-07	1.21E-07	1.21E-07	1.21E-07	1.21E-07	1.21E-07	1.21E-07	1.21E-07
te129m	8.13E-13	7.96E-13	1.27E-13	1.88E-14	4.34E-16	2.32E-19	3.53E-29	.00E+00	.00E+00	.00E+00	.00E+00
te130	1.42E-15	1.42E-15	1.42E-15	1.42E-15	1.42E-15	1.42E-15	1.42E-15	1.42E-15	1.42E-15	1.42E-15	1.42E-15

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BWR SNF Assembly - Fuel - decay light elements page 5

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i127	3.42E-05	3.42E-05	3.46E-05	3.49E-05	3.51E-05	3.52E-05	3.52E-05	3.52E-05	3.52E-05	3.52E-05	3.52E-05
i129	9.46E-11	9.46E-11	9.53E-11	9.54E-11	9.54E-11	9.54E-11	9.54E-11	9.54E-11	9.54E-11	9.54E-11	9.54E-11
xe126	4.38E-15	4.38E-15	4.39E-15	4.39E-15	4.39E-15	4.39E-15	4.39E-15	4.39E-15	4.39E-15	4.39E-15	4.39E-15
xe127	6.38E-13	6.26E-13	1.15E-13	1.97E-14	6.08E-16	5.80E-19	5.03E-28	3.56E-43	.00E+00	.00E+00	.00E+00
xe128	1.37E-06	1.37E-06	1.37E-06	1.37E-06	1.37E-06	1.37E-06	1.37E-06	1.37E-06	1.37E-06	1.37E-06	1.37E-06
xe129	5.39E-09	5.39E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09	5.41E-09
xe129m	1.33E-11	1.23E-11	1.19E-14	8.79E-18	5.70E-24	2.44E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10
xe131	5.18E-13	5.18E-13	5.20E-13	5.20E-13	5.20E-13	5.20E-13	5.20E-13	5.20E-13	5.20E-13	5.20E-13	5.20E-13
xe131m	2.38E-15	2.25E-15	1.26E-17	5.75E-20	1.37E-24	7.85E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	5.35E-14	5.35E-14	5.35E-14	5.35E-14	5.35E-14	5.35E-14	5.35E-14	5.35E-14	5.35E-14	5.35E-14	5.35E-14

total	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05

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BWR SNF Assembly - Fuel - decay light elements page 6

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	2.09E-05	2.09E-05	2.06E-05	2.03E-05	1.97E-05	1.87E-05	1.58E-05	1.19E-05	8.99E-06	6.78E-06	5.12E-06
be 10	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07	5.37E-07
c 14	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.41E-02
na 24	5.70E-02	1.83E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.13E-10	5.10E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	4.55E+00	5.11E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	2.64E-02	4.64E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	3.18E-11	3.18E-11	3.18E-11	3.18E-11	3.17E-11	3.16E-11	3.12E-11	3.06E-11	3.00E-11	2.94E-11	2.88E-11
p 32	1.91E-05	1.81E-05	2.40E-07	2.71E-09	3.21E-11	3.16E-11	3.12E-11	3.06E-11	3.00E-11	2.94E-11	2.88E-11
p 33	1.80E-09	1.75E-09	1.54E-10	1.22E-11	8.24E-14	3.77E-18	3.65E-31	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	8.87E-09	9.85E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	1.86E-10	4.83E-11	2.24E-17	2.23E-17	2.21E-17	2.16E-17	2.03E-17	1.83E-17	1.64E-17	1.48E-17	1.33E-17
k 43	1.10E-07	5.24E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	4.39E-04	4.37E-04	3.00E-04	2.03E-04	9.35E-05	1.99E-05	1.93E-07	8.49E-11	3.73E-14	1.64E-17	7.22E-21
ca 47	5.91E-06	5.07E-06	6.29E-12	4.57E-18	3.40E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	5.28E-02	5.24E-02	2.51E-02	1.17E-02	2.58E-03	1.26E-04	1.46E-08	4.01E-15	1.11E-21	3.05E-28	.00E+00
sc 47	8.40E-02	6.83E-02	6.91E-10	2.06E-17	1.30E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	7.95E-03	5.43E-03	1.04E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	8.11E-03	2.14E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	5.15E+02	5.02E+02	5.42E+01	5.36E+00	5.54E-02	5.96E-06	7.43E-18	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	1.69E+01	1.69E+01	1.39E+01	1.13E+01	7.53E+00	3.35E+00	2.94E-01	5.09E-03	8.82E-05	1.53E-06	2.65E-08
mn 56	6.59E+01	1.04E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	1.01E+02	1.01E+02	9.46E+01	8.87E+01	7.81E+01	6.06E+01	2.83E+01	7.95E+00	2.23E+00	6.28E-01	1.76E-01
fe 59	5.91E+00	5.82E+00	1.46E+00	3.45E-01	2.00E-02	6.77E-05	2.62E-12	1.16E-24	.00E+00	.00E+00	.00E+00
co 58m	5.32E-03	8.62E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.15E+02	1.14E+02	4.76E+01	1.93E+01	3.23E+00	9.09E-02	2.03E-06	3.59E-14	6.34E-22	1.12E-29	.00E+00
co 60	3.18E+02	3.18E+02	3.08E+02	2.98E+02	2.79E+02	2.44E+02	1.65E+02	8.54E+01	4.42E+01	2.29E+01	1.19E+01
co 61	5.31E+00	2.22E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02	7.26E-02
ni 63	1.02E+01	1.02E+01	1.02E+01	1.02E+01	1.01E+01	1.01E+01	9.86E+00	9.52E+00	9.20E+00	8.89E+00	8.58E+00
ni 65	1.02E+01	1.39E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	5.67E-05	4.18E-05	7.03E-17	4.07E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	9.46E+00	2.55E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	2.12E+00	4.19E-05	7.04E-17	4.08E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	1.65E-06	1.26E-06	5.04E-17	7.84E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	9.58E-03	9.55E-03	7.42E-03	5.70E-03	3.39E-03	1.20E-03	5.33E-05	2.97E-07	1.65E-09	9.20E-12	5.12E-14
zn 69	2.92E-07	6.29E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.96E-08	5.87E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	3.55E-14	1.09E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	3.82E-12	3.59E-12	1.63E-14	5.99E-17	9.26E-22	2.28E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	1.54E+01	1.52E+01	4.49E+00	1.26E+00	1.03E-01	6.90E-04	2.06E-10	2.75E-21	4.56E-32	.00E+00	.00E+00
sr 90	1.11E-03	1.11E-03	1.11E-03	1.10E-03	1.09E-03	1.06E-03	9.85E-04	8.71E-04	7.70E-04	6.81E-04	6.02E-04
sr 91	3.00E+00	5.23E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	1.88E-03	1.77E-03	4.18E-04	1.18E-04	9.60E-06	6.42E-08	1.92E-14	2.56E-25	.00E+00	.00E+00	.00E+00
y 90	5.72E+02	4.41E+02	1.11E-03	1.10E-03	1.09E-03	1.06E-03	9.85E-04	8.71E-04	7.70E-04	6.81E-04	6.02E-04
y 90m	4.41E-05	2.39E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	3.90E+01	3.85E+01	1.34E+01	4.49E+00	5.15E-01	6.80E-03	1.56E-08	6.28E-18	2.52E-27	.00E+00	.00E+00
y 92	3.39E+01	3.09E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	6.75E-03	1.32E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	4.43E-04	3.58E-04	2.28E-12	6.89E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02	6.79E-02
zr 95	1.19E+04	1.18E+04	4.49E+03	1.65E+03	2.28E+02	4.36E+00	3.07E-05	7.93E-14	2.05E-22	5.25E-31	.00E+00

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 97	1.84E+04	6.86E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	6.51E-07	6.51E-07	6.51E-07	6.50E-07	6.50E-07	6.49E-07	6.47E-07	6.44E-07	6.41E-07	6.38E-07	6.34E-07
nb 92	3.27E-08	3.27E-08	3.27E-08	3.27E-08	3.27E-08	3.27E-08	3.27E-08	3.27E-08	3.27E-08	3.27E-08	3.27E-08
nb 93m	1.18E+00	1.18E+00	1.17E+00	1.16E+00	1.13E+00	1.09E+00	9.66E-01	7.93E-01	6.53E-01	5.40E-01	4.49E-01
nb 94	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02	2.98E-02
nb 95	1.17E+04	1.17E+04	7.45E+03	3.24E+03	4.91E+02	9.91E+00	6.77E-05	1.75E-13	4.52E-22	1.16E-30	.00E+00
nb 95m	1.32E+02	1.32E+02	5.28E+01	1.94E+01	2.68E+00	5.13E-02	3.61E-07	9.33E-16	2.41E-24	.00E+00	.00E+00
nb 96	9.87E+00	4.84E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.84E+04	6.90E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.74E+04	6.51E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 93	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.04E-03	1.04E-03
mo 99	1.83E+01	1.42E+01	2.52E-09	1.85E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11	1.65E-11
tc 99	2.86E-05	2.87E-05	2.87E-05	2.87E-05	2.87E-05	2.87E-05	2.87E-05	2.87E-05	2.87E-05	2.87E-05	2.87E-05
ru103	1.52E-03	1.49E-03	3.10E-04	6.06E-05	2.40E-06	3.80E-09	1.51E-17	1.60E-31	.00E+00	.00E+00	.00E+00
ru105	1.13E-08	2.65E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	7.14E-15	7.13E-15	6.04E-15	5.08E-15	3.61E-15	1.83E-15	2.37E-16	7.85E-18	2.61E-19	8.64E-21	2.87E-22
rh102	2.00E-12	2.00E-12	1.88E-12	1.77E-12	1.57E-12	1.24E-12	6.05E-13	1.83E-13	5.54E-14	1.68E-14	5.08E-15
rh105	1.09E-08	7.76E-09	5.11E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	3.20E-09	7.55E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.73E-10	7.13E-15	6.04E-15	5.08E-15	3.61E-15	1.83E-15	2.37E-16	7.85E-18	2.61E-19	8.64E-21	2.87E-22
rh106m	1.14E-10	5.26E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	2.47E-15	2.26E-15	5.72E-19	1.05E-22	4.34E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	1.05E-05	1.05E-05	1.04E-05	1.02E-05	9.98E-06	9.50E-06	8.20E-06	6.41E-06	5.01E-06	3.92E-06	3.07E-06
cd115	3.52E-02	2.58E-02	2.43E-14	7.74E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	3.77E-03	3.71E-03	9.31E-04	2.21E-04	1.29E-05	4.42E-08	1.77E-15	8.33E-28	.00E+00	.00E+00	.00E+00
cd117	8.80E-03	1.10E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	1.33E-05	9.43E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	4.54E+02	4.52E+02	2.64E+02	1.51E+02	5.04E+01	5.58E+00	7.60E-03	1.27E-07	2.13E-12	3.56E-17	5.95E-22
in114	9.47E+01	5.94E+01	1.71E+01	4.68E+00	3.62E-01	2.18E-03	4.75E-10	3.75E-21	2.28E-32	.00E+00	.00E+00
in114m	6.29E+01	6.21E+01	1.79E+01	4.89E+00	3.79E-01	2.28E-03	4.96E-10	3.91E-21	2.28E-32	.00E+00	.00E+00
in116m	1.25E-02	1.23E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	9.90E-02	2.42E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	8.01E-03	4.71E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	4.54E+02	4.52E+02	2.64E+02	1.51E+02	5.03E+01	5.58E+00	7.60E-03	1.27E-07	2.12E-12	3.55E-17	5.94E-22
sn117m	2.33E+03	2.21E+03	2.37E+01	2.12E-01	1.91E-05	1.57E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	2.05E+03	2.04E+03	1.65E+03	1.33E+03	8.62E+02	3.63E+02	2.72E+01	3.62E-01	4.82E-03	6.41E-05	8.53E-07
sn121	7.85E+02	4.24E+02	2.58E-01	2.57E-01	2.55E-01	2.52E-01	2.43E-01	2.28E-01	2.14E-01	2.01E-01	1.89E-01
sn121m	3.33E-01	3.33E-01	3.32E-01	3.31E-01	3.29E-01	3.25E-01	3.13E-01	2.93E-01	2.76E-01	2.59E-01	2.43E-01
sn123	7.21E+01	7.17E+01	4.45E+01	2.71E+01	1.02E+01	1.43E+00	4.00E-03	2.22E-07	1.23E-11	6.81E-16	3.78E-20
sn123m	4.17E-01	6.40E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	1.47E+01	1.37E+01	2.28E-02	2.95E-05	5.79E-11	2.28E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	1.39E+02	1.07E+02	1.28E-08	6.25E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	7.83E+00	7.74E+00	2.78E+00	9.58E-01	1.17E-01	1.74E-03	5.77E-09	4.25E-18	3.13E-27	.00E+00	.00E+00
sb125	3.24E+02	3.24E+02	3.05E+02	2.86E+02	2.52E+02	1.95E+02	9.12E+01	2.56E+01	7.20E+00	2.02E+00	5.68E-01
sb126	3.56E+00	3.36E+00	2.32E-02	1.32E-04	4.80E-09	6.47E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	1.62E-13	1.62E-13	1.81E-13	1.92E-13	2.03E-13	2.08E-13	2.09E-13	2.09E-13	2.09E-13	2.09E-13	2.09E-13
te123m	1.79E+00	1.78E+00	1.06E+00	6.22E-01	2.16E-01	2.60E-02	4.56E-05	1.16E-09	2.96E-14	7.55E-19	1.92E-23
te125m	7.24E+01	7.24E+01	7.21E+01	6.90E+01	6.14E+01	4.77E+01	2.23E+01	6.26E+00	1.76E+00	4.94E-01	1.39E-01
te127	9.01E-02	2.31E-02	5.42E-03	3.01E-03	9.42E-04	9.23E-05	8.70E-08	7.87E-13	7.12E-18	6.44E-23	5.83E-28
te127m	9.81E-03	9.75E-03	5.54E-03	3.07E-03	9.62E-04	9.43E-05	8.88E-08	8.03E-13	7.27E-18	6.58E-23	5.95E-28
te129	3.80E-07	1.54E-08	2.45E-09	3.64E-10	8.38E-12	4.48E-15	6.82E-25	.00E+00	.00E+00	.00E+00	.00E+00

nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d

te129m	2.45E-08	2.40E-08	3.83E-09	5.67E-10	1.31E-11	6.99E-15	1.06E-24	.00E+00	.00E+00	.00E+00	.00E+00
i126	3.21E-13	3.04E-13	2.66E-15	1.93E-17	1.15E-21	4.15E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i129	1.67E-14	1.67E-14	1.68E-14	1.68E-14	1.69E-14	1.69E-14	1.69E-14	1.69E-14	1.69E-14	1.69E-14	1.69E-14
i130	6.50E-09	1.70E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	5.71E-13	5.24E-13	2.44E-16	8.40E-20	1.21E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	1.80E-08	1.77E-08	3.25E-09	5.58E-10	1.72E-11	1.64E-14	1.42E-23	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	1.51E-06	1.40E-06	1.36E-09	1.00E-12	6.49E-19	2.74E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	2.00E-10	1.88E-10	1.06E-12	4.82E-15	1.15E-19	6.58E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.36E-13	1.20E-13	9.72E-19	4.75E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	9.25E-15	6.74E-15	3.92E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	8.77E+04	5.18E+04	1.52E+04	7.37E+03	2.39E+03	9.54E+02	3.46E+02	1.37E+02	6.60E+01	3.61E+01	2.24E+01

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BWR SNF Assembly - Fuel - decay actinides page 9

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
he 4	2.37E-01	2.38E-01	2.65E-01	2.85E-01	3.12E-01	3.42E-01	4.00E-01	4.92E-01	5.83E-01	6.74E-01	7.64E-01
tl207	9.03E-15	9.04E-15	9.82E-15	1.06E-14	1.24E-14	1.58E-14	2.46E-14	3.79E-14	4.96E-14	6.00E-14	6.92E-14
tl208	4.87E-12	4.98E-12	5.64E-12	6.42E-12	8.06E-12	1.15E-11	2.07E-11	2.88E-11	3.09E-11	3.05E-11	2.94E-11
pb206	1.97E-12	1.97E-12	2.36E-12	2.81E-12	3.80E-12	6.04E-12	1.50E-11	4.43E-11	1.06E-10	2.25E-10	4.31E-10
pb207	1.28E-09	1.28E-09	1.46E-09	1.66E-09	2.13E-09	3.21E-09	7.82E-09	1.98E-08	3.66E-08	5.76E-08	8.23E-08
pb208	2.40E-06	2.41E-06	2.83E-06	3.34E-06	4.53E-06	7.77E-06	2.41E-05	6.65E-05	1.17E-04	1.68E-04	2.18E-04
pb209	7.21E-14	6.87E-14	1.67E-14	1.43E-14	1.44E-14	1.46E-14	1.51E-14	1.63E-14	1.76E-14	1.93E-14	2.11E-14
pb210	6.43E-11	6.44E-11	6.84E-11	7.05E-11	7.47E-11	8.48E-11	1.31E-10	2.87E-10	5.79E-10	1.05E-09	1.74E-09
pb211	6.99E-14	6.99E-14	7.60E-14	8.23E-14	9.59E-14	1.22E-13	1.90E-13	2.93E-13	3.84E-13	4.64E-13	5.35E-13
pb212	2.89E-09	2.89E-09	3.34E-09	3.81E-09	4.78E-09	6.83E-09	1.23E-08	1.71E-08	1.83E-08	1.81E-08	1.74E-08
bi209	1.74E-10	1.74E-10	1.91E-10	1.98E-10	2.11E-10	2.38E-10	3.22E-10	4.68E-10	6.26E-10	7.98E-10	9.86E-10
bi210	3.92E-14	3.92E-14	4.21E-14	4.34E-14	4.60E-14	5.22E-14	8.08E-14	1.76E-13	3.56E-13	6.46E-13	1.07E-12
bi211	4.14E-15	4.15E-15	4.50E-15	4.88E-15	5.68E-15	7.22E-15	1.13E-14	1.74E-14	2.28E-14	2.75E-14	3.17E-14
bi212	2.74E-10	2.80E-10	3.17E-10	3.61E-10	4.53E-10	6.48E-10	1.17E-09	1.62E-09	1.74E-09	1.72E-09	1.66E-09
bi213	1.72E-14	1.72E-14	3.98E-15	3.41E-15	3.43E-15	3.46E-15	3.60E-15	3.87E-15	4.20E-15	4.59E-15	5.03E-15
po210	8.14E-13	8.15E-13	9.25E-13	1.01E-12	1.14E-12	1.32E-12	2.05E-12	4.87E-12	9.84E-12	1.79E-11	2.96E-11
po216	1.11E-14	1.11E-14	1.29E-14	1.47E-14	1.84E-14	2.63E-14	4.74E-14	6.59E-14	7.06E-14	6.98E-14	6.73E-14
rn220	4.35E-12	4.35E-12	5.04E-12	5.73E-12	7.20E-12	1.03E-11	1.85E-11	2.57E-11	2.76E-11	2.73E-11	2.63E-11
rn222	1.47E-13	1.47E-13	1.55E-13	1.63E-13	1.80E-13	2.22E-13	3.91E-13	8.34E-13	1.49E-12	2.36E-12	3.46E-12
fr221	1.91E-15	1.92E-15	4.44E-16	3.80E-16	3.82E-16	3.86E-16	4.02E-16	4.32E-16	4.69E-16	5.12E-16	5.61E-16
ra223	3.37E-11	3.37E-11	3.66E-11	3.97E-11	4.62E-11	5.87E-11	9.18E-11	1.41E-10	1.85E-10	2.24E-10	2.58E-10
ra224	2.52E-08	2.52E-08	2.92E-08	3.32E-08	4.17E-08	5.96E-08	1.07E-07	1.49E-07	1.60E-07	1.58E-07	1.52E-07
ra225	8.69E-12	8.37E-12	1.78E-12	1.68E-12	1.69E-12	1.71E-12	1.78E-12	1.91E-12	2.08E-12	2.27E-12	2.49E-12
ra226	2.29E-08	2.29E-08	2.41E-08	2.53E-08	2.81E-08	3.45E-08	6.09E-08	1.30E-07	2.31E-07	3.67E-07	5.38E-07
ra228	1.47E-14	1.47E-14	1.61E-14	1.77E-14	2.10E-14	2.85E-14	5.65E-14	1.16E-13	1.86E-13	2.61E-13	3.40E-13
ac225	5.73E-12	5.73E-12	1.33E-12	1.14E-12	1.14E-12	1.16E-12	1.20E-12	1.29E-12	1.40E-12	1.53E-12	1.68E-12
ac227	2.48E-08	2.49E-08	2.69E-08	2.91E-08	3.33E-08	4.15E-08	6.49E-08	1.00E-07	1.31E-07	1.58E-07	1.82E-07
th226	2.66E-15	2.58E-15	1.33E-16	6.08E-18	1.38E-20	7.12E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	5.62E-11	5.63E-11	6.11E-11	6.61E-11	7.58E-11	9.65E-11	1.51E-10	2.32E-10	3.04E-10	3.67E-10	4.24E-10
th228	4.93E-06	4.94E-06	5.64E-06	6.42E-06	8.07E-06	1.15E-05	2.08E-05	2.90E-05	3.10E-05	3.07E-05	2.96E-05
th229	3.31E-07	3.31E-07	3.32E-07	3.33E-07	3.35E-07	3.39E-07	3.52E-07	3.79E-07	4.11E-07	4.48E-07	4.92E-07
th230	5.11E-04	5.12E-04	5.44E-04	5.77E-04	6.42E-04	7.75E-04	1.18E-03	1.89E-03	2.63E-03	3.40E-03	4.21E-03
th231	7.05E-07	3.71E-07	8.17E-09	8.17E-09	8.17E-09	8.17E-09	8.17E-09	8.17E-09	8.17E-09	8.17E-09	8.17E-09
th232	1.54E-04	1.54E-04	1.64E-04	1.75E-04	1.95E-04	2.36E-04	3.58E-04	5.61E-04	7.65E-04	9.68E-04	1.17E-03
th234	2.67E-06	2.67E-06	2.67E-06	2.67E-06	2.67E-06	2.67E-06	2.67E-06	2.67E-06	2.67E-06	2.67E-06	2.67E-06
pa231	4.49E-04	4.49E-04	4.50E-04	4.51E-04	4.52E-04	4.54E-04	4.59E-04	4.69E-04	4.79E-04	4.89E-04	4.98E-04
pa232	5.44E-07	3.20E-07	1.14E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pa233	5.58E-06	5.57E-06	5.53E-06	5.53E-06	5.53E-06	5.53E-06	5.54E-06	5.57E-06	5.61E-06	5.66E-06	5.72E-06
pa234m	9.17E-11	9.00E-11	9.00E-11	9.00E-11	9.00E-11	9.00E-11	9.00E-11	9.00E-11	9.00E-11	9.00E-11	9.00E-11
pa234	6.00E-10	8.69E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11
u230	2.63E-12	2.54E-12	1.31E-13	6.00E-15	1.36E-17	7.02E-23	9.70E-39	.00E+00	.00E+00	.00E+00	.00E+00
u231	4.79E-11	4.06E-11	1.71E-17	4.02E-24	3.24E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	4.68E-04	4.68E-04	5.17E-04	5.64E-04	6.48E-04	7.86E-04	1.03E-03	1.16E-03	1.12E-03	1.12E-03	1.07E-03
u233	8.46E-04	8.46E-04	8.58E-04	8.72E-04	8.97E-04	9.55E-04	1.12E-03	1.38E-03	1.64E-03	1.90E-03	2.17E-03

u234	4.69E+01	4.69E+01	4.70E+01	4.72E+01	4.74E+01	4.80E+01	4.96E+01	5.22E+01	5.48E+01	5.72E+01	5.96E+01
u235	2.01E+03	2.01E+03	2.01E+03	2.01E+03	2.01E+03	2.01E+03	2.01E+03	2.01E+03	2.01E+03	2.01E+03	2.01E+03
u236	1.40E+03	1.40E+03	1.40E+03	1.40E+03	1.40E+03	1.40E+03	1.40E+03	1.40E+03	1.40E+03	1.40E+03	1.40E+03
u237	1.82E+00	1.64E+00	1.85E-04	9.09E-06	8.86E-06	8.45E-06	7.31E-06	5.74E-06	4.51E-06	3.54E-06	2.78E-06
u238	1.84E+05	1.84E+05	1.84E+05	1.84E+05	1.84E+05	1.84E+05	1.84E+05	1.84E+05	1.84E+05	1.84E+05	1.84E+05
np235	6.56E-06	6.55E-06	5.61E-06	4.77E-06	3.46E-06	1.83E-06	2.69E-07	1.10E-08	4.51E-10	1.85E-11	7.57E-13
np236m	4.69E-06	2.24E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	9.99E-04	9.99E-04	9.99E-04	9.99E-04	9.99E-04	9.99E-04	9.99E-04	9.99E-04	9.99E-04	9.99E-04	9.99E-04

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BWR SNF Assembly - Fuel - decay actinides page 10

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
np237	1.61E+02	1.61E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.63E+02	1.64E+02	1.65E+02	1.67E+02	1.68E+02
np238	2.96E-01	2.13E-01	8.44E-08	8.43E-08	8.41E-08	8.37E-08	8.25E-08	8.05E-08	7.85E-08	7.66E-08	7.48E-08
np239	1.01E+01	7.58E+00	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.69E-05	2.68E-05
np240	2.66E-04	2.64E-11	5.00E-25	6.53E-25	9.53E-25	1.55E-24	3.36E-24	6.36E-24	9.36E-24	1.24E-23	1.54E-23
pu236	8.83E-04	8.84E-04	8.35E-04	7.86E-04	6.97E-04	5.49E-04	2.68E-04	8.11E-05	2.46E-05	7.43E-06	2.25E-06
pu237	2.20E-05	2.16E-05	5.52E-06	1.34E-06	8.09E-08	2.98E-10	1.49E-17	1.01E-29	6.64E-42	.00E+00	.00E+00
pu238	6.74E+01	6.75E+01	6.89E+01	6.97E+01	7.05E+01	7.06E+01	6.92E+01	6.65E+01	6.39E+01	6.15E+01	5.91E+01
pu239	1.12E+03	1.12E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03
pu240	5.13E+02	5.13E+02	5.13E+02	5.13E+02	5.14E+02	5.14E+02	5.15E+02	5.16E+02	5.17E+02	5.18E+02	5.18E+02
pu241	3.07E+02	3.07E+02	3.03E+02	3.00E+02	2.92E+02	2.79E+02	2.41E+02	1.89E+02	1.49E+02	1.17E+02	9.17E+01
pu242	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02	1.24E+02
pu243	2.12E-02	7.40E-04	5.74E-14	5.74E-14	5.74E-14	5.74E-14	5.74E-14	5.74E-14	5.74E-14	5.74E-14	5.74E-14
pu244	2.03E-10	2.04E-10	2.89E-10	3.76E-10	5.50E-10	8.96E-10	1.93E-09	3.67E-09	5.40E-09	7.13E-09	8.87E-09
am239	3.79E-10	9.36E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	1.66E-07	1.20E-07	2.77E-20	2.04E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.64E+01	1.64E+01	2.00E+01	2.37E+01	3.08E+01	4.45E+01	8.18E+01	1.33E+02	1.72E+02	2.02E+02	2.26E+02
am242m	4.65E-01	4.65E-01	4.64E-01	4.64E-01	4.62E-01	4.60E-01	4.53E-01	4.42E-01	4.32E-01	4.21E-01	4.11E-01
am242	2.65E-02	9.37E-03	5.99E-06	5.98E-06	5.97E-06	5.94E-06	5.85E-06	5.71E-06	5.57E-06	5.43E-06	5.30E-06
am243	3.12E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.13E+01	3.12E+01	3.12E+01	3.12E+01	3.12E+01
am244	1.55E-02	2.99E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	1.14E-14	1.14E-14	9.35E-15	7.66E-15	5.15E-15	2.34E-15	2.18E-16	4.17E-18	7.98E-20	1.53E-21	2.93E-23
cm241	2.40E-09	2.35E-09	3.59E-10	5.08E-11	1.07E-12	4.75E-16	4.17E-26	6.75E-43	.00E+00	.00E+00	.00E+00
cm242	4.33E+00	4.32E+00	2.97E+00	2.00E+00	9.20E-01	1.96E-01	3.02E-03	1.15E-03	1.13E-03	1.10E-03	1.07E-03
cm243	1.67E-01	1.67E-01	1.66E-01	1.65E-01	1.63E-01	1.59E-01	1.48E-01	1.31E-01	1.16E-01	1.03E-01	9.10E-02
cm244	1.03E+01	1.03E+01	1.02E+01	1.01E+01	9.89E+00	9.52E+00	8.49E+00	7.01E+00	5.79E+00	4.78E+00	3.94E+00
cm245	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.67E-01	4.66E-01	4.66E-01
cm246	7.96E-02	7.96E-02	7.96E-02	7.96E-02	7.96E-02	7.96E-02	7.95E-02	7.95E-02	7.94E-02	7.94E-02	7.93E-02
cm247	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03
cm248	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04	1.88E-04
cm249	1.82E-09	2.50E-15	6.85E-17	1.87E-18	1.53E-21	1.03E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	1.13E-12	1.13E-12	1.13E-12	1.13E-12	1.13E-12	1.13E-12	1.13E-12	1.13E-12	1.13E-12	1.13E-12	1.13E-12
bk249	2.98E-06	2.98E-06	2.46E-06	2.01E-06	1.35E-06	6.13E-07	5.71E-08	1.09E-09	2.10E-11	4.01E-13	7.68E-15
bk250	1.56E-09	8.88E-12	4.70E-15	3.72E-15	2.35E-15	9.39E-16	5.97E-17	6.09E-19	9.46E-21	3.39E-21	3.32E-21
cf249	6.68E-07	6.75E-07	1.20E-06	1.64E-06	2.30E-06	3.03E-06	3.57E-06	3.59E-06	3.55E-06	3.52E-06	3.48E-06
cf250	4.93E-07	4.95E-07	4.89E-07	4.82E-07	4.69E-07	4.45E-07	3.80E-07	2.91E-07	2.24E-07	1.72E-07	1.32E-07
cf251	3.24E-07	3.24E-07	3.24E-07	3.24E-07	3.24E-07	3.24E-07	3.23E-07	3.22E-07	3.21E-07	3.19E-07	3.18E-07
cf252	2.28E-07	2.28E-07	2.14E-07	2.00E-07	1.75E-07	1.35E-07	6.15E-08	1.66E-08	4.47E-09	1.21E-09	3.25E-10
cf253	2.97E-10	2.86E-10	8.95E-12	2.45E-13	2.00E-16	1.34E-22	4.08E-41	.00E+00	.00E+00	.00E+00	.00E+00
cf254	2.21E-13	2.18E-13	7.88E-14	2.73E-14	3.36E-15	5.12E-17	1.81E-22	1.48E-31	1.21E-40	.00E+00	.00E+00
es253	2.86E-10	2.88E-10	5.32E-11	3.44E-12	9.40E-15	4.56E-20	3.54E-36	.00E+00	.00E+00	.00E+00	.00E+00
es254	1.23E-11	1.23E-11	9.81E-12	7.78E-12	4.91E-12	1.96E-12	1.25E-13	1.26E-15	1.28E-17	1.30E-19	1.32E-21
es255	1.33E-14	1.31E-14	2.70E-15	5.22E-16	2.03E-17	3.07E-20	1.07E-28	7.15E-43	.00E+00	.00E+00	.00E+00
total	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05	1.90E+05

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tl206	6.41E-15	6.43E-15	6.90E-15	7.11E-15	7.54E-15	8.55E-15	1.32E-14	2.89E-14	5.84E-14	1.06E-13	1.75E-13
tl207	1.72E-06	1.72E-06	1.87E-06	2.03E-06	2.36E-06	3.00E-06	4.69E-06	7.22E-06	9.46E-06	1.14E-05	1.32E-05
tl208	1.44E-03	1.47E-03	1.67E-03	1.90E-03	2.39E-03	3.41E-03	6.15E-03	8.54E-03	9.15E-03	9.05E-03	8.72E-03
tl209	6.98E-09	6.99E-09	1.62E-09	1.39E-09	1.39E-09	1.41E-09	1.46E-09	1.58E-09	1.71E-09	1.87E-09	2.05E-09
pb209	3.32E-07	3.17E-07	7.71E-08	6.61E-08	6.64E-08	6.71E-08	6.97E-08	7.50E-08	8.14E-08	8.89E-08	9.75E-08
pb210	4.91E-09	4.92E-09	5.23E-09	5.38E-09	5.71E-09	6.48E-09	1.00E-08	2.19E-08	4.42E-08	8.02E-08	1.33E-07
pb211	1.73E-06	1.73E-06	1.88E-06	2.03E-06	2.37E-06	3.01E-06	4.70E-06	7.24E-06	9.48E-06	1.15E-05	1.32E-05
pb212	4.01E-03	4.01E-03	4.65E-03	5.29E-03	6.64E-03	9.49E-03	1.71E-02	2.38E-02	2.54E-02	2.52E-02	2.43E-02
pb214	2.26E-08	2.26E-08	2.38E-08	2.51E-08	2.78E-08	3.41E-08	6.02E-08	1.28E-07	2.29E-07	3.63E-07	5.32E-07
bi210	4.86E-09	4.87E-09	5.23E-09	5.39E-09	5.71E-09	6.48E-09	1.00E-08	2.19E-08	4.42E-08	8.02E-08	1.33E-07
bi211	1.73E-06	1.73E-06	1.88E-06	2.03E-06	2.37E-06	3.01E-06	4.70E-06	7.24E-06	9.48E-06	1.15E-05	1.32E-05
bi212	4.01E-03	4.10E-03	4.65E-03	5.29E-03	6.64E-03	9.49E-03	1.71E-02	2.38E-02	2.54E-02	2.52E-02	2.43E-02
bi213	3.32E-07	3.33E-07	7.71E-08	6.61E-08	6.64E-08	6.71E-08	6.97E-08	7.50E-08	8.14E-08	8.89E-08	9.75E-08
bi214	2.26E-08	2.26E-08	2.38E-08	2.51E-08	2.78E-08	3.41E-08	6.02E-08	1.28E-07	2.29E-07	3.63E-07	5.32E-07
po210	3.66E-09	3.66E-09	4.16E-09	4.56E-09	5.12E-09	5.95E-09	9.20E-09	2.19E-08	4.42E-08	8.02E-08	1.33E-07
po211	4.74E-09	4.75E-09	5.16E-09	5.59E-09	6.51E-09	8.27E-09	1.29E-08	1.99E-08	2.61E-08	3.15E-08	3.63E-08
po212	2.57E-03	2.63E-03	2.98E-03	3.39E-03	4.26E-03	6.08E-03	1.10E-02	1.52E-02	1.63E-02	1.61E-02	1.55E-02
po213	3.25E-07	3.26E-07	7.55E-08	6.47E-08	6.50E-08	6.57E-08	6.83E-08	7.34E-08	7.97E-08	8.70E-08	9.54E-08
po214	9.43E-08	9.20E-08	2.74E-08	2.52E-08	2.78E-08	3.41E-08	6.02E-08	1.28E-07	2.29E-07	3.63E-07	5.32E-07
po215	1.73E-06	1.73E-06	1.88E-06	2.03E-06	2.37E-06	3.01E-06	4.70E-06	7.24E-06	9.48E-06	1.15E-05	1.32E-05
po216	4.01E-03	4.02E-03	4.65E-03	5.29E-03	6.64E-03	9.49E-03	1.71E-02	2.38E-02	2.54E-02	2.52E-02	2.43E-02
po218	2.26E-08	2.26E-08	2.38E-08	2.51E-08	2.78E-08	3.41E-08	6.02E-08	1.28E-07	2.29E-07	3.63E-07	5.32E-07
at217	3.32E-07	3.33E-07	7.71E-08	6.61E-08	6.64E-08	6.71E-08	6.98E-08	7.50E-08	8.14E-08	8.89E-08	9.75E-08
rn218	7.17E-08	6.94E-08	3.58E-09	1.64E-10	3.71E-13	1.92E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	1.73E-06	1.73E-06	1.88E-06	2.03E-06	2.37E-06	3.01E-06	4.70E-06	7.24E-06	9.48E-06	1.15E-05	1.32E-05
rn220	4.01E-03	4.02E-03	4.65E-03	5.29E-03	6.64E-03	9.49E-03	1.71E-02	2.38E-02	2.54E-02	2.52E-02	2.43E-02
rn222	2.26E-08	2.26E-08	2.38E-08	2.51E-08	2.78E-08	3.41E-08	6.02E-08	1.28E-07	2.29E-07	3.63E-07	5.32E-07
fr221	3.32E-07	3.33E-07	7.71E-08	6.61E-08	6.64E-08	6.71E-08	6.98E-08	7.50E-08	8.14E-08	8.89E-08	9.75E-08
fr223	2.48E-08	2.48E-08	2.69E-08	2.90E-08	3.32E-08	4.14E-08	6.48E-08	9.98E-08	1.31E-07	1.58E-07	1.82E-07
ra222	7.17E-08	6.94E-08	3.58E-09	1.64E-10	3.71E-13	1.92E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	1.73E-06	1.73E-06	1.88E-06	2.03E-06	2.37E-06	3.01E-06	4.70E-06	7.24E-06	9.48E-06	1.15E-05	1.32E-05
ra224	4.01E-03	4.02E-03	4.65E-03	5.29E-03	6.64E-03	9.49E-03	1.71E-02	2.38E-02	2.54E-02	2.52E-02	2.43E-02
ra225	3.41E-07	3.28E-07	6.98E-08	6.60E-08	6.64E-08	6.71E-08	6.98E-08	7.50E-08	8.14E-08	8.89E-08	9.75E-08
ra226	2.26E-08	2.26E-08	2.38E-08	2.51E-08	2.78E-08	3.41E-08	6.02E-08	1.28E-07	2.29E-07	3.63E-07	5.32E-07
ra228	4.00E-12	4.00E-12	4.39E-12	4.82E-12	5.73E-12	7.77E-12	1.54E-11	3.18E-11	5.08E-11	7.14E-11	9.27E-11
ac225	3.32E-07	3.33E-07	7.71E-08	6.61E-08	6.64E-08	6.71E-08	6.98E-08	7.50E-08	8.14E-08	8.89E-08	9.75E-08
ac227	1.80E-06	1.80E-06	1.95E-06	2.10E-06	2.41E-06	3.00E-06	4.70E-06	7.23E-06	9.47E-06	1.14E-05	1.32E-05
ac228	4.00E-12	4.00E-12	4.39E-12	4.82E-12	5.73E-12	7.77E-12	1.54E-11	3.18E-11	5.08E-11	7.14E-11	9.27E-11
th226	7.17E-08	6.94E-08	3.58E-09	1.64E-10	3.71E-13	1.92E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	1.73E-06	1.73E-06	1.88E-06	2.03E-06	2.33E-06	2.97E-06	4.64E-06	7.14E-06	9.35E-06	1.13E-05	1.30E-05
th228	4.04E-03	4.05E-03	4.63E-03	5.27E-03	6.62E-03	9.47E-03	1.71E-02	2.37E-02	2.54E-02	2.51E-02	2.42E-02
th229	6.56E-08	6.56E-08	6.58E-08	6.60E-08	6.63E-08	6.71E-08	6.98E-08	7.50E-08	8.14E-08	8.89E-08	9.75E-08
th230	1.06E-05	1.06E-05	1.12E-05	1.19E-05	1.32E-05	1.60E-05	2.43E-05	3.89E-05	5.42E-05	7.02E-05	8.69E-05
th231	3.75E-01	1.97E-01	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.35E-03	4.35E-03	4.35E-03
th232	1.69E-11	1.69E-11	1.80E-11	1.92E-11	2.14E-11	2.59E-11	3.93E-11	6.16E-11	8.39E-11	1.06E-10	1.29E-10
th234	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02
pa231	2.12E-05	2.12E-05	2.13E-05	2.13E-05	2.13E-05	2.14E-05	2.17E-05	2.22E-05	2.26E-05	2.31E-05	2.35E-05
pa232	2.34E-01	1.38E-01	4.90E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pa233	1.16E-01	1.16E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.16E-01	1.16E-01	1.18E-01	1.19E-01
pa234m	6.30E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02
pa234	1.20E-03	1.74E-04	8.04E-05	8.04E-05	8.04E-05	8.04E-05	8.04E-05	8.04E-05	8.04E-05	8.04E-05	8.04E-05
u230	7.17E-08	6.94E-08	3.57E-09	1.64E-10	3.71E-13	1.92E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
u231	6.45E-06	5.47E-06	2.30E-12	5.41E-19	4.56E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.03E-02	1.03E-02	1.14E-02	1.24E-02	1.43E-02	1.74E-02	2.28E-02	2.57E-02	2.56E-02	2.47E-02	2.37E-02

u233	8.15E-06	8.15E-06	8.28E-06	8.40E-06	8.65E-06	9.21E-06	1.08E-05	1.33E-05	1.58E-05	1.83E-05	2.09E-05
u234	2.92E-01	2.92E-01	2.93E-01	2.93E-01	2.95E-01	2.98E-01	3.09E-01	3.25E-01	3.41E-01	3.56E-01	3.70E-01
u235	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.34E-03	4.35E-03	4.35E-03	4.35E-03
u236	9.05E-02	9.05E-02	9.05E-02	9.05E-02	9.05E-02	9.05E-02	9.05E-02	9.05E-02	9.05E-02	9.05E-02	9.06E-02
u237	1.48E+05	1.34E+05	1.51E+01	7.43E-01	7.24E-01	6.90E-01	5.97E-01	4.69E-01	3.68E-01	2.89E-01	2.27E-01
u238	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02	6.18E-02
u239	2.35E+06	7.92E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u240	3.72E-15	3.73E-15	5.28E-15	6.89E-15	1.01E-14	1.64E-14	3.54E-14	6.71E-14	9.88E-14	1.31E-13	1.62E-13
np235	9.21E-03	9.20E-03	7.87E-03	6.69E-03	4.86E-03	2.57E-03	3.77E-04	1.55E-05	6.33E-07	2.59E-08	1.06E-09
np236m	2.77E+00	1.32E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05	1.32E-05
np237	1.13E-01	1.14E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.15E-01	1.16E-01	1.16E-01	1.18E-01	1.19E-01
np238	7.66E+04	5.52E+04	2.19E-02	2.19E-02	2.18E-02	2.17E-02	2.14E-02	2.09E-02	2.04E-02	1.99E-02	1.94E-02
np239	2.34E+06	1.76E+06	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.23E+00	6.23E+00
np240m	3.72E-15	3.74E-15	5.28E-15	6.89E-15	1.01E-14	1.64E-14	3.54E-14	6.71E-14	9.88E-14	1.31E-13	1.62E-13
np240	3.37E+03	3.35E-04	6.34E-18	8.26E-18	1.21E-17	1.97E-17	4.25E-17	8.05E-17	1.19E-16	1.57E-16	1.95E-16
pu236	4.61E-01	4.62E-01	4.36E-01	4.10E-01	3.64E-01	2.87E-01	1.40E-01	4.24E-02	1.28E-02	3.88E-03	1.18E-03
pu237	2.68E-01	2.64E-01	6.74E-02	1.63E-02	9.87E-04	3.63E-06	1.81E-13	1.23E-25	.00E+00	.00E+00	.00E+00
pu238	1.15E+03	1.16E+03	1.18E+03	1.19E+03	1.21E+03	1.21E+03	1.19E+03	1.14E+03	1.10E+03	1.05E+03	1.01E+03
pu239	6.95E+01	6.96E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.00E+01
pu240	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.18E+02	1.18E+02
pu241	3.17E+04	3.17E+04	3.14E+04	3.10E+04	3.02E+04	2.88E+04	2.49E+04	1.96E+04	1.54E+04	1.21E+04	9.49E+03
pu242	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01
pu243	5.53E+04	1.93E+03	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07
pu244	3.72E-15	3.74E-15	5.29E-15	6.89E-15	1.01E-14	1.64E-14	3.54E-14	6.72E-14	9.89E-14	1.31E-13	1.62E-13
pu245	2.84E-10	5.82E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	7.27E-14	6.96E-14	2.33E-14	2.32E-14	2.32E-14	2.32E-14	2.32E-14	2.32E-14	2.32E-14	2.31E-14	2.31E-14
am239	4.19E-04	1.03E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	4.26E-02	3.07E-02	7.11E-15	5.24E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.61E+01	5.63E+01	6.86E+01	8.12E+01	1.06E+02	1.53E+02	2.81E+02	4.55E+02	5.90E+02	6.95E+02	7.75E+02
am242m	4.87E+00	4.87E+00	4.86E+00	4.86E+00	4.85E+00	4.82E+00	4.75E+00	4.64E+00	4.52E+00	4.41E+00	4.31E+00
am242	2.14E+04	7.58E+03	4.84E+00	4.84E+00	4.83E+00	4.80E+00	4.73E+00	4.62E+00	4.50E+00	4.39E+00	4.29E+00
am243	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.24E+00	6.23E+00	6.23E+00
am244	1.98E+04	3.80E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	7.12E-08	7.09E-08	5.84E-08	4.78E-08	3.22E-08	1.46E-08	1.36E-09	2.60E-11	4.98E-13	9.54E-15	1.83E-16
am246	7.27E-14	6.98E-14	2.33E-14	2.32E-14	2.32E-14	2.32E-14	2.32E-14	2.32E-14	2.32E-14	2.31E-14	2.31E-14
cm241	3.97E-05	3.89E-05	5.93E-06	8.40E-07	1.77E-08	7.85E-12	6.90E-22	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.43E+04	1.43E+04	9.82E+03	6.63E+03	3.05E+03	6.48E+02	1.00E+01	3.82E+00	3.73E+00	3.64E+00	3.55E+00
cm243	8.63E+00	8.63E+00	8.58E+00	8.53E+00	8.43E+00	8.22E+00	7.65E+00	6.77E+00	5.99E+00	5.31E+00	4.70E+00
cm244	8.31E+02	8.32E+02	8.24E+02	8.16E+02	8.01E+02	7.71E+02	6.87E+02	5.67E+02	4.69E+02	3.87E+02	3.19E+02
cm245	8.03E-02	8.03E-02	8.03E-02	8.02E-02	8.02E-02	8.02E-02	8.02E-02	8.02E-02	8.02E-02	8.01E-02	8.01E-02
cm246	2.45E-02	2.45E-02	2.45E-02	2.45E-02	2.45E-02	2.45E-02	2.44E-02	2.44E-02	2.44E-02	2.44E-02	2.44E-02
cm247	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07	1.49E-07
cm248	7.98E-07	7.98E-07	7.98E-07	7.98E-07	7.98E-07	7.98E-07	7.99E-07	7.99E-07	7.99E-07	7.99E-07	7.99E-07
cm249	2.14E-02	2.95E-08	8.06E-10	2.20E-11	1.80E-14	1.21E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	9.26E-14	9.26E-14	9.26E-14	9.26E-14	9.27E-14	9.26E-14	9.26E-14	9.26E-14	9.26E-14	9.26E-14	9.26E-14
bk249	4.89E-03	4.88E-03	4.03E-03	3.30E-03	2.22E-03	1.01E-03	9.37E-05	1.79E-06	3.44E-08	6.58E-10	1.26E-11
bk250	6.10E-03	3.46E-05	1.83E-08	1.45E-08	9.17E-09	3.66E-09	2.33E-10	2.37E-12	3.69E-14	1.32E-14	1.30E-14
bk251	4.66E-07	1.73E-10	3.55E-11	6.86E-12	2.66E-13	4.04E-16	1.41E-24	.00E+00	.00E+00	.00E+00	.00E+00
cf249	2.74E-06	2.76E-06	4.90E-06	6.73E-06	9.41E-06	1.24E-05	1.46E-05	1.47E-05	1.46E-05	1.44E-05	1.43E-05

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BWR SNF Assembly - Fuel - decay actinides page 13

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cf250	5.40E-05	5.41E-05	5.34E-05	5.27E-05	5.13E-05	4.87E-05	4.15E-05	3.19E-05	2.44E-05	1.88E-05	1.44E-05
cf251	5.15E-07	5.15E-07	5.15E-07	5.15E-07	5.14E-07	5.14E-07	5.13E-07	5.11E-07	5.09E-07	5.07E-07	5.05E-07
cf252	1.22E-04	1.22E-04	1.15E-04	1.07E-04	9.41E-05	7.24E-05	3.30E-05	8.90E-06	2.40E-06	6.47E-07	1.75E-07
cf253	8.61E-06	8.28E-06	2.59E-07	7.09E-09	5.79E-12	3.89E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	1.88E-09	1.86E-09	6.70E-10	2.32E-10	2.86E-11	4.35E-13	1.54E-18	1.26E-27	.00E+00	.00E+00	.00E+00

cf255	2.41E-10	3.68E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
es253	7.22E-06	7.26E-06	1.34E-06	8.68E-08	2.37E-10	1.15E-15	9.13E-32	.00E+00	.00E+00	.00E+00	.00E+00
es254	2.30E-08	2.29E-08	1.83E-08	1.45E-08	9.16E-09	3.66E-09	2.33E-10	2.36E-12	2.39E-14	2.42E-16	2.46E-18
es255	1.75E-10	1.72E-10	3.55E-11	6.85E-12	2.66E-13	4.04E-16	1.41E-24	.00E+00	.00E+00	.00E+00	.00E+00
total	5.07E+06	2.01E+06	4.35E+04	3.99E+04	3.56E+04	3.18E+04	2.73E+04	2.20E+04	1.78E+04	1.44E+04	1.18E+04

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BWR SNF Assembly - Fuel - decay fission products page 14

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.36E-02	1.36E-02	1.34E-02	1.32E-02	1.28E-02	1.21E-02	1.02E-02	7.74E-03	5.84E-03	4.41E-03	3.33E-03
li 6	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05
li 7	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06	3.09E-06
be 9	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06	5.95E-06
be 10	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05	3.97E-05
c 14	8.02E-06	8.02E-06	8.02E-06	8.02E-06	8.02E-06	8.02E-06	8.02E-06	8.01E-06	8.01E-06	8.00E-06	8.00E-06
ni 66	3.52E-10	2.60E-10	4.37E-22	2.53E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	5.51E-13	4.05E-13	6.81E-25	3.94E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 66	1.89E-07	1.89E-07	1.89E-07	1.89E-07	1.89E-07	1.89E-07	1.89E-07	1.89E-07	1.89E-07	1.89E-07	1.89E-07
cu 67	4.71E-11	3.60E-11	1.44E-21	2.24E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 67	2.48E-08	2.48E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08	2.49E-08
zn 68	2.23E-09	2.23E-09	2.23E-09	2.23E-09	2.23E-09	2.23E-09	2.23E-09	2.23E-09	2.23E-09	2.23E-09	2.23E-09
zn 69	2.91E-12	7.56E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	3.46E-11	1.03E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 69	8.20E-08	8.21E-08	8.21E-08	8.21E-08	8.21E-08	8.21E-08	8.21E-08	8.21E-08	8.21E-08	8.21E-08	8.21E-08
zn 70	2.19E-06	2.19E-06	2.19E-06	2.19E-06	2.19E-06	2.19E-06	2.19E-06	2.19E-06	2.19E-06	2.19E-06	2.19E-06
ge 70	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09	3.00E-09
zn 71m	2.51E-09	3.76E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 71	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05	2.15E-05
ge 71	5.03E-13	4.73E-13	2.15E-15	7.89E-18	1.22E-22	2.96E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 72	2.09E-06	1.46E-06	2.17E-20	9.21E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	6.35E-07	5.51E-07	9.44E-21	4.01E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 72	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03
ga 73	6.08E-07	1.99E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03	4.26E-03
ge 73m	1.71E-11	5.60E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 74	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03	3.86E-03
ge 75	1.18E-06	7.02E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 75	3.48E-02	3.48E-02	3.48E-02	3.48E-02	3.48E-02	3.48E-02	3.48E-02	3.48E-02	3.48E-02	3.48E-02	3.48E-02
ge 76	1.09E-01	1.09E-01	1.09E-01	1.09E-01	1.09E-01	1.09E-01	1.09E-01	1.09E-01	1.09E-01	1.09E-01	1.09E-01
as 76	2.32E-06	1.24E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 76	1.37E-03	1.37E-03	1.37E-03	1.37E-03	1.37E-03	1.37E-03	1.37E-03	1.37E-03	1.37E-03	1.37E-03	1.37E-03
ge 77	2.12E-05	4.88E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.24E-04	1.59E-04	4.59E-21	2.83E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 77	2.39E-01	2.39E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01
se 77m	1.02E-10	6.35E-11	1.83E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	2.81E-05	3.33E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	2.94E-05	4.99E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 78	7.82E-01	7.82E-01	7.82E-01	7.82E-01	7.82E-01	7.82E-01	7.82E-01	7.82E-01	7.82E-01	7.82E-01	7.82E-01
se 79	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00	1.49E+00
br 79	9.50E-05	9.51E-05	1.03E-04	1.11E-04	1.26E-04	1.58E-04	2.51E-04	4.07E-04	5.64E-04	7.20E-04	8.76E-04
kr 79	7.55E-14	4.69E-14	2.06E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 80	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00
br 80	3.49E-10	4.54E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80m	2.74E-09	6.35E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 80	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05	1.99E-05
se 81	4.48E-05	1.29E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81m	1.01E-05	2.72E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 81	6.10E+00	6.10E+00	6.10E+00	6.10E+00	6.10E+00	6.10E+00	6.10E+00	6.10E+00	6.10E+00	6.10E+00	6.10E+00
kr 81	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06	1.50E-06

se 82	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
br 82	4.98E-04	3.12E-04	1.91E-22	2.25E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 15

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
kr 82	2.31E-01	2.31E-01	2.31E-01	2.31E-01	2.31E-01	2.31E-01	2.31E-01	2.31E-01	2.31E-01	2.31E-01	2.31E-01
br 83	8.44E-04	9.00E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
kr 83m	6.43E-04	2.96E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 84	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01
kr 85	6.45E+00	6.45E+00	6.35E+00	6.25E+00	6.05E+00	5.67E+00	4.67E+00	3.38E+00	2.45E+00	1.77E+00	1.28E+00
kr 85m	3.31E-03	8.17E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 85	3.03E+01	3.03E+01	3.04E+01	3.05E+01	3.07E+01	3.11E+01	3.21E+01	3.34E+01	3.43E+01	3.50E+01	3.55E+01
kr 86	5.89E+01	5.89E+01	5.89E+01	5.89E+01	5.89E+01	5.89E+01	5.89E+01	5.89E+01	5.89E+01	5.89E+01	5.89E+01
rb 86	3.90E-03	3.76E-03	1.37E-04	4.40E-06	4.91E-09	6.17E-15	1.23E-32	.00E+00	.00E+00	.00E+00	.00E+00
sr 86	1.46E-01	1.46E-01	1.49E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01
kr 87	1.92E-03	4.04E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	7.69E+01	7.69E+01	7.69E+01	7.69E+01	7.69E+01	7.69E+01	7.69E+01	7.69E+01	7.69E+01	7.69E+01	7.69E+01
sr 87	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04	7.91E-04
sr 87m	1.70E-07	4.57E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	5.98E-03	1.71E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	6.41E-04	1.99E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 88	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02
sr 89	3.55E+00	3.50E+00	1.03E+00	2.91E-01	2.37E-02	1.59E-04	4.74E-11	6.33E-22	8.45E-33	1.25E-43	.00E+00
y 89	1.44E+02	1.44E+02	1.47E+02	1.47E+02	1.48E+02	1.48E+02	1.48E+02	1.48E+02	1.48E+02	1.48E+02	1.48E+02
y 89m	1.22E-09	1.20E-09	3.53E-10	9.94E-11	8.11E-12	5.42E-14	1.62E-20	2.16E-31	2.87E-42	.00E+00	.00E+00
sr 90	1.66E+02	1.66E+02	1.65E+02	1.64E+02	1.62E+02	1.58E+02	1.47E+02	1.30E+02	1.15E+02	1.01E+02	8.97E+01
y 90	4.43E-02	4.40E-02	4.29E-02	4.26E-02	4.21E-02	4.11E-02	3.82E-02	3.37E-02	2.98E-02	2.64E-02	2.33E-02
y 90m	5.88E-08	3.19E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	1.47E+01	1.47E+01	1.57E+01	1.67E+01	1.88E+01	2.27E+01	3.40E+01	5.10E+01	6.60E+01	7.93E+01	9.11E+01
sr 91	3.66E-02	6.39E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	5.52E+00	5.48E+00	1.91E+00	6.39E-01	7.34E-02	9.69E-04	2.23E-09	8.95E-19	3.59E-28	1.44E-37	.00E+00
y 91m	1.85E-03	3.53E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 91	1.84E+02	1.84E+02	1.88E+02	1.89E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02	1.90E+02
nb 91	2.86E-10	2.86E-10	2.86E-10	2.86E-10	2.86E-10	2.85E-10	2.85E-10	2.83E-10	2.82E-10	2.80E-10	2.79E-10
sr 92	1.13E-02	2.45E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.49E-02	4.71E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 92	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02
nb 92	3.53E-08	3.53E-08	3.53E-08	3.53E-08	3.53E-08	3.53E-08	3.53E-08	3.53E-08	3.53E-08	3.53E-08	3.53E-08
y 93	3.31E-02	6.46E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.46E+02	1.46E+02	1.46E+02	1.46E+02	1.46E+02	1.46E+02	1.46E+02	1.46E+02	1.46E+02	1.46E+02	1.46E+02
nb 93	2.20E-05	2.21E-05	2.43E-05	2.67E-05	3.19E-05	4.42E-05	9.42E-05	2.16E-04	3.79E-04	5.73E-04	7.94E-04
nb 93m	2.02E-04	2.03E-04	2.16E-04	2.31E-04	2.58E-04	3.12E-04	4.60E-04	6.68E-04	8.36E-04	9.71E-04	1.08E-03
zr 94	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02
nb 94	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04
zr 95	8.88E+00	8.79E+00	3.35E+00	1.23E+00	1.70E-01	3.26E-03	2.30E-08	5.93E-17	1.53E-25	3.96E-34	1.06E-42
nb 95	4.87E+00	4.87E+00	3.06E+00	1.33E+00	2.01E-01	4.05E-03	2.76E-08	7.14E-17	1.84E-25	4.76E-34	.00E+00
nb 95m	5.57E-03	5.56E-03	2.22E-03	8.17E-04	1.13E-04	2.16E-06	1.52E-11	3.93E-20	1.02E-28	2.54E-37	.00E+00
mo 95	2.16E+02	2.17E+02	2.24E+02	2.28E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02
zr 96	2.47E+02	2.47E+02	2.47E+02	2.47E+02	2.47E+02	2.47E+02	2.47E+02	2.47E+02	2.47E+02	2.47E+02	2.47E+02
nb 96	2.01E-04	9.87E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 96	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01	1.65E+01
zr 97	9.72E-02	3.63E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	6.97E-03	2.60E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	9.10E-05	3.40E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 97	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02
nb 98m	4.30E-05	1.53E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 16

nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 98	2.51E+02	2.51E+02	2.51E+02	2.51E+02	2.51E+02	2.51E+02	2.51E+02	2.51E+02	2.51E+02	2.51E+02	2.51E+02
tc 98	2.90E-03	2.90E-03	2.90E-03	2.90E-03	2.90E-03	2.90E-03	2.90E-03	2.90E-03	2.90E-03	2.90E-03	2.90E-03
mo 99	4.52E-01	3.52E-01	6.24E-11	4.58E-21	4.36E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02
tc 99m	3.63E-02	3.08E-02	5.51E-12	4.05E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru 99	1.05E-02	1.05E-02	1.07E-02	1.09E-02	1.12E-02	1.20E-02	1.42E-02	1.80E-02	2.18E-02	2.55E-02	2.93E-02
mo100	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02
ru100	3.97E+01	3.97E+01	3.97E+01	3.97E+01	3.97E+01	3.97E+01	3.97E+01	3.97E+01	3.97E+01	3.97E+01	3.97E+01
ru101	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02	2.29E+02
ru102	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02	2.32E+02
rh102	3.56E-04	3.56E-04	3.35E-04	3.16E-04	2.80E-04	2.21E-04	1.08E-04	3.26E-05	9.87E-06	2.99E-06	9.04E-07
ru103	5.86E+00	5.76E+00	1.20E+00	2.34E-01	9.27E-03	1.47E-05	5.81E-14	5.77E-28	5.77E-42	.00E+00	.00E+00
rh103	1.14E+02	1.14E+02	1.19E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02
rh103m	5.80E-03	5.70E-03	1.18E-03	2.31E-04	9.19E-06	1.45E-08	5.76E-17	5.72E-31	.00E+00	.00E+00	.00E+00
ru104	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02	1.52E+02
pd104	7.94E+01	7.94E+01	7.94E+01	7.94E+01	7.94E+01	7.94E+01	7.94E+01	7.94E+01	7.94E+01	7.94E+01	7.94E+01
ru105	1.99E-02	4.84E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.53E-01	1.10E-01	7.23E-20	9.13E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	1.59E-05	3.88E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd105	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02
ru106	2.62E+01	2.62E+01	2.22E+01	1.87E+01	1.33E+01	6.71E+00	8.70E-01	2.88E-02	9.57E-04	3.17E-05	1.05E-06
rh106	2.52E-05	2.43E-05	2.06E-05	1.73E-05	1.23E-05	6.23E-06	8.07E-07	2.68E-08	8.88E-10	2.95E-11	9.77E-13
rh106m	1.05E-04	4.86E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd106	6.74E+01	6.75E+01	7.15E+01	7.50E+01	8.04E+01	8.69E+01	9.28E+01	9.36E+01	9.37E+01	9.37E+01	9.37E+01
pd107	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01	5.84E+01
ag107	1.40E-05	1.40E-05	1.55E-05	1.71E-05	2.02E-05	2.64E-05	4.51E-05	7.62E-05	1.07E-04	1.39E-04	1.70E-04
pd108	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01	3.78E+01
ag108	2.77E-10	2.80E-13	2.79E-13	2.79E-13	2.78E-13	2.77E-13	2.72E-13	2.65E-13	2.58E-13	2.51E-13	2.44E-13
ag108m	9.06E-05	9.06E-05	9.05E-05	9.03E-05	9.01E-05	8.96E-05	8.82E-05	8.58E-05	8.35E-05	8.12E-05	7.90E-05
cd108	9.18E-05	9.18E-05	9.18E-05	9.18E-05	9.18E-05	9.18E-05	9.20E-05	9.22E-05	9.24E-05	9.25E-05	9.27E-05
pd109	2.34E-02	6.95E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109	2.12E+01	2.12E+01	2.12E+01	2.12E+01	2.12E+01	2.12E+01	2.12E+01	2.12E+01	2.12E+01	2.12E+01	2.12E+01
ag109m	1.88E-05	5.58E-06	8.46E-14	7.36E-14	5.60E-14	3.24E-14	6.27E-15	4.07E-16	2.63E-17	1.71E-18	1.11E-19
cd109	9.77E-08	9.76E-08	8.54E-08	7.43E-08	5.65E-08	3.27E-08	6.33E-09	4.10E-10	2.66E-11	1.72E-12	1.12E-13
pd110	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01
ag110	6.38E-06	2.55E-09	1.99E-09	1.54E-09	9.27E-10	3.36E-10	1.61E-11	1.01E-13	6.37E-16	4.01E-18	2.52E-20
ag110m	1.65E-01	1.64E-01	1.28E-01	9.93E-02	5.98E-02	2.17E-02	1.04E-03	6.53E-06	4.11E-08	2.59E-10	1.63E-12
cd110	1.25E+01	1.25E+01	1.26E+01	1.26E+01	1.26E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01
pd111	1.06E-04	1.69E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	6.23E-05	3.03E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	4.87E-02	4.46E-02	1.13E-05	2.07E-09	8.53E-17	1.49E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	4.91E-06	9.67E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111	6.00E+00	6.00E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00	6.04E+00
pd112	2.60E-03	1.18E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	3.88E-04	2.06E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd112	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00	3.17E+00
ag113	3.73E-04	1.69E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	2.07E-02	2.11E-02	2.11E-02	2.11E-02	2.11E-02	2.11E-02	2.11E-02	2.11E-02	2.11E-02	2.11E-02	2.11E-02
cd113m	3.51E-02	3.51E-02	3.47E-02	3.42E-02	3.34E-02	3.18E-02	2.74E-02	2.15E-02	1.68E-02	1.31E-02	1.03E-02
in113	3.94E-03	3.94E-03	4.36E-03	4.79E-03	5.62E-03	7.22E-03	1.16E-02	1.75E-02	2.22E-02	2.59E-02	2.87E-02
cd114	3.33E+00	3.33E+00	3.33E+00	3.33E+00	3.33E+00	3.33E+00	3.33E+00	3.33E+00	3.33E+00	3.33E+00	3.33E+00
in114	6.03E-10	4.18E-10	1.20E-10	3.30E-11	2.55E-12	1.54E-14	3.35E-21	2.64E-32	.00E+00	.00E+00	.00E+00

BWR SNF Assembly - Fuel - decay fission products page 17

nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
in114m	2.64E-05	2.60E-05	7.48E-06	2.05E-06	1.59E-07	9.55E-10	2.08E-16	1.64E-27	1.29E-38	.00E+00	.00E+00
sn114	2.97E-04	2.98E-04	3.15E-04	3.20E-04	3.22E-04	3.22E-04	3.22E-04	3.22E-04	3.22E-04	3.22E-04	3.22E-04
cd115	2.00E-03	1.47E-03	1.39E-15	4.41E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.91E-03	1.88E-03	4.72E-04	1.12E-04	6.55E-06	2.24E-08	8.99E-16	4.23E-28	1.99E-40	.00E+00	.00E+00
in115	2.88E-01	2.88E-01	2.91E-01	2.91E-01	2.92E-01	2.92E-01	2.92E-01	2.92E-01	2.92E-01	2.92E-01	2.92E-01
in115m	1.68E-04	1.34E-04	2.19E-10	5.19E-11	3.03E-12	1.04E-14	4.16E-22	1.96E-34	.00E+00	.00E+00	.00E+00
sn115	4.91E-02	4.91E-02	4.92E-02	4.92E-02	4.92E-02	4.92E-02	4.92E-02	4.92E-02	4.92E-02	4.92E-02	4.92E-02
cd116	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00
in116m	2.58E-05	2.55E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn116	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01	7.52E-01
cd117	9.16E-05	1.15E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.83E-05	2.01E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.00E-05	1.29E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	6.52E-05	3.89E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00
sn117m	1.42E-04	1.35E-04	1.45E-06	1.30E-08	1.17E-12	9.61E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	2.85E-05	6.89E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00	1.04E+00
sn119	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00	1.10E+00
sn119m	2.42E-03	2.42E-03	1.96E-03	1.57E-03	1.02E-03	4.30E-04	3.22E-05	4.29E-07	5.71E-09	7.59E-11	1.01E-12
sn120	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00	1.08E+00
sn121	1.00E-03	5.44E-04	4.97E-07	4.95E-07	4.92E-07	4.86E-07	4.68E-07	4.39E-07	4.13E-07	3.87E-07	3.64E-07
sn121m	1.14E-02	1.14E-02	1.14E-02	1.14E-02	1.13E-02	1.12E-02	1.07E-02	1.01E-02	9.47E-03	8.89E-03	8.35E-03
sb121	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00
sn122	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00	1.40E+00
sb122	4.49E-04	3.47E-04	4.15E-14	2.02E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.00E-01	1.00E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
sn123	9.31E-03	9.26E-03	5.74E-03	3.50E-03	1.31E-03	1.85E-04	5.16E-07	2.86E-11	1.59E-15	8.79E-20	4.87E-24
sb123	1.26E+00	1.26E+00	1.26E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00	1.27E+00
te123	8.88E-04	8.89E-04	9.77E-04	1.03E-03	1.08E-03	1.10E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03	1.11E-03
te123m	2.18E-04	2.17E-04	1.30E-04	7.58E-05	2.63E-05	3.17E-06	5.56E-09	1.42E-13	3.61E-18	9.20E-23	2.34E-27
sn124	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00
sb124	7.70E-03	7.61E-03	2.73E-03	9.42E-04	1.15E-04	1.71E-06	5.67E-12	4.18E-21	3.08E-30	2.27E-39	.00E+00
te124	8.05E-02	8.05E-02	8.54E-02	8.72E-02	8.80E-02	8.81E-02	8.82E-02	8.82E-02	8.82E-02	8.82E-02	8.82E-02
sn125	5.52E-03	5.14E-03	8.54E-06	1.10E-08	2.17E-14	8.52E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb125	1.54E+00	1.54E+00	1.46E+00	1.37E+00	1.20E+00	9.33E-01	4.35E-01	1.22E-01	3.44E-02	9.66E-03	2.71E-03
te125	1.29E+00	1.30E+00	1.39E+00	1.48E+00	1.65E+00	1.92E+00	2.42E+00	2.74E+00	2.83E+00	2.86E+00	2.86E+00
te125m	2.01E-02	2.02E-02	2.00E-02	1.92E-02	1.71E-02	1.32E-02	6.19E-03	1.74E-03	4.88E-04	1.37E-04	3.85E-05
sn126	5.29E+00	5.29E+00	5.29E+00	5.29E+00	5.29E+00	5.29E+00	5.29E+00	5.29E+00	5.29E+00	5.29E+00	5.29E+00
sb126	5.70E-04	5.40E-04	3.97E-06	2.72E-07	2.51E-07	2.51E-07	2.51E-07	2.51E-07	2.51E-07	2.51E-07	2.51E-07
sb126m	7.27E-07	1.91E-09	1.91E-09	1.91E-09	1.91E-09	1.91E-09	1.91E-09	1.91E-09	1.91E-09	1.91E-09	1.91E-09
te126	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01	1.05E-01
xe126	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09	5.00E-09
sn127	3.56E-04	1.29E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	3.88E-02	3.27E-02	3.59E-09	2.10E-16	1.07E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te127	3.90E-03	3.62E-03	3.83E-04	2.13E-04	6.65E-05	6.52E-06	6.14E-09	5.56E-14	5.03E-19	4.55E-24	4.12E-29
te127m	1.87E-01	1.87E-01	1.09E-01	6.08E-02	1.90E-02	1.86E-03	1.75E-06	1.59E-11	1.44E-16	1.30E-21	1.18E-26
i127	1.14E+01	1.14E+01	1.15E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01
xe127	4.46E-07	4.37E-07	8.03E-08	1.38E-08	4.25E-10	4.05E-13	3.51E-22	2.77E-37	.00E+00	.00E+00	.00E+00
sn128	6.63E-04	3.07E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	6.50E-04	1.08E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128m	1.24E-04	6.55E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 18

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te128	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01	2.61E+01
xe128	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01

sb129	6.83E-03	1.58E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	1.71E-03	2.64E-04	3.48E-05	5.15E-06	1.19E-07	6.35E-11	9.67E-21	4.20E-37	.00E+00	.00E+00	.00E+00
te129m	2.40E-01	2.36E-01	3.77E-02	5.59E-03	1.29E-04	6.88E-08	1.05E-17	4.55E-34	.00E+00	.00E+00	.00E+00
i129	5.19E+01	5.19E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01	5.21E+01
xe129	5.72E-03	5.72E-03	5.79E-03	5.79E-03	5.79E-03	5.79E-03	5.80E-03	5.81E-03	5.82E-03	5.83E-03	5.84E-03
xe129m	6.66E-05	6.16E-05	5.97E-08	4.41E-11	2.86E-17	1.22E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	3.43E-04	3.63E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te130	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02	1.09E+02
i130	1.92E-03	5.04E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	2.62E+00	2.62E+00	2.62E+00	2.62E+00	2.62E+00	2.62E+00	2.62E+00	2.62E+00	2.62E+00	2.62E+00	2.62E+00
te131	1.70E-03	5.30E-05	1.95E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	2.94E-02	1.70E-02	6.25E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	9.31E-01	8.68E-01	4.14E-04	1.42E-07	2.05E-14	4.33E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131	1.20E+02	1.20E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02	1.21E+02
xe131m	1.56E-02	1.55E-02	2.40E-04	1.15E-06	2.75E-11	1.58E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	5.47E-01	4.42E-01	2.65E-09	7.52E-18	9.79E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.63E-02	1.33E-02	7.96E-11	2.26E-19	2.94E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02	3.31E+02
cs132	5.12E-05	4.60E-05	3.37E-09	1.70E-13	5.49E-22	5.88E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba132	1.04E-04	1.04E-04	1.04E-04	1.04E-04	1.04E-04	1.04E-04	1.04E-04	1.04E-04	1.04E-04	1.04E-04	1.04E-04
te133	1.13E-03	3.17E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	4.13E-03	6.22E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.10E-01	9.69E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	1.95E-06	1.72E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.22E+00	1.18E+00	1.03E-05	5.02E-11	1.61E-21	1.68E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	1.69E-02	1.52E-02	1.15E-14	2.22E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs133	3.33E+02	3.34E+02	3.35E+02	3.35E+02	3.35E+02	3.35E+02	3.35E+02	3.35E+02	3.35E+02	3.35E+02	3.35E+02
ba133	2.54E-08	2.54E-08	2.50E-08	2.46E-08	2.38E-08	2.22E-08	1.83E-08	1.31E-08	9.45E-09	6.80E-09	4.89E-09
te134	6.14E-03	2.62E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	9.83E-03	2.27E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe134	4.59E+02	4.59E+02	4.59E+02	4.59E+02	4.59E+02	4.59E+02	4.59E+02	4.59E+02	4.59E+02	4.59E+02	4.59E+02
cs134	3.32E+01	3.32E+01	3.06E+01	2.81E+01	2.37E+01	1.70E+01	6.19E+00	1.15E+00	2.15E-01	4.00E-02	7.44E-03
cs134m	8.43E-04	2.78E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba134	2.60E+01	2.60E+01	2.87E+01	3.12E+01	3.55E+01	4.23E+01	5.31E+01	5.81E+01	5.90E+01	5.92E+01	5.92E+01
i135	6.43E-02	5.12E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	3.49E-02	2.46E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.52E-04	3.24E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02	1.79E+02
cs135m	2.40E-04	1.59E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.49E-01	2.50E-01	2.50E-01	2.50E-01	2.50E-01	2.51E-01
ba135m	1.27E-04	7.14E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe136	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02
cs136	1.67E-01	1.58E-01	1.46E-03	1.12E-05	7.37E-10	3.25E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136	9.32E+00	9.33E+00	9.48E+00	9.48E+00	9.48E+00	9.48E+00	9.48E+00	9.48E+00	9.48E+00	9.48E+00	9.48E+00
ba136m	5.07E-09	4.81E-09	4.43E-11	3.39E-13	2.24E-17	9.88E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	3.61E+02	3.61E+02	3.59E+02	3.57E+02	3.53E+02	3.45E+02	3.22E+02	2.86E+02	2.55E+02	2.27E+02	2.03E+02
ba137	2.69E+01	2.70E+01	2.90E+01	3.11E+01	3.52E+01	4.32E+01	6.63E+01	1.01E+02	1.33E+02	1.60E+02	1.85E+02
ba137m	5.53E-05	5.51E-05	5.48E-05	5.45E-05	5.39E-05	5.26E-05	4.91E-05	4.37E-05	3.90E-05	3.47E-05	3.09E-05
ba138	3.93E+02	3.93E+02	3.93E+02	3.93E+02	3.93E+02	3.93E+02	3.93E+02	3.93E+02	3.93E+02	3.93E+02	3.93E+02
la138	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03	2.35E-03

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BWR SNF Assembly - Fuel - decay fission products page 19

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ba139	1.30E-02	1.11E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la139	3.69E+02	3.69E+02	3.69E+02	3.69E+02	3.69E+02	3.69E+02	3.69E+02	3.69E+02	3.69E+02	3.69E+02	3.69E+02
ce139	2.99E-06	2.98E-06	1.90E-06	1.19E-06	4.75E-07	7.55E-08	3.03E-10	3.06E-14	3.10E-18	3.14E-22	3.17E-26
pr139	3.04E-10	6.99E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	2.85E+00	2.70E+00	2.14E-02	1.40E-04	6.83E-09	1.64E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

la140	4.07E-01	3.93E-01	3.25E-03	2.13E-05	1.03E-09	2.48E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce140	3.94E+02	3.94E+02	3.97E+02	3.97E+02	3.97E+02	3.97E+02	3.97E+02	3.97E+02	3.97E+02	3.97E+02	3.97E+02
la141	3.35E-02	5.21E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	6.69E+00	6.58E+00	9.87E-01	1.37E-01	2.78E-03	1.15E-06	8.17E-17	9.92E-34	.00E+00	.00E+00	.00E+00
pr141	3.33E+02	3.33E+02	3.39E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02	3.40E+02
nd141	6.33E-10	7.91E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.27E-02	2.50E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	3.47E+02	3.47E+02	3.47E+02	3.47E+02	3.47E+02	3.47E+02	3.47E+02	3.47E+02	3.47E+02	3.47E+02	3.47E+02
pr142	9.55E-03	4.00E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd142	7.85E+00	7.86E+00	7.86E+00	7.86E+00	7.86E+00	7.86E+00	7.86E+00	7.86E+00	7.86E+00	7.86E+00	7.86E+00
ce143	2.65E-01	1.61E-01	5.29E-21	2.97E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	2.53E+00	2.50E+00	2.84E-02	2.52E-04	2.21E-08	1.74E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd143	2.31E+02	2.31E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02	2.34E+02
ce144	5.15E+01	5.14E+01	4.14E+01	3.30E+01	2.12E+01	8.71E+00	6.06E-01	7.13E-03	8.40E-05	9.88E-07	1.16E-08
pr144	2.18E-03	2.16E-03	1.74E-03	1.39E-03	8.92E-04	3.67E-04	2.55E-05	3.01E-07	3.54E-09	4.16E-11	4.90E-13
pr144m	1.27E-05	1.26E-05	1.02E-05	8.12E-06	5.21E-06	2.14E-06	1.49E-07	1.75E-09	2.06E-11	2.43E-13	2.86E-15
nd144	3.69E+02	3.69E+02	3.79E+02	3.88E+02	3.99E+02	4.12E+02	4.20E+02	4.21E+02	4.21E+02	4.21E+02	4.21E+02
pr145	3.32E-02	2.08E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd145	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02	2.03E+02
pm145	2.87E-04	2.87E-04	3.14E-04	3.37E-04	3.69E-04	3.99E-04	3.88E-04	3.23E-04	2.66E-04	2.18E-04	1.80E-04
sm145	1.81E-04	1.81E-04	1.51E-04	1.25E-04	8.60E-05	4.09E-05	4.38E-06	1.06E-07	2.56E-09	6.18E-11	1.49E-12
nd146	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02	2.16E+02
pm146	2.52E-03	2.52E-03	2.45E-03	2.37E-03	2.22E-03	1.96E-03	1.35E-03	7.20E-04	3.85E-04	2.06E-04	1.10E-04
sm146	5.50E-03	5.50E-03	5.52E-03	5.55E-03	5.60E-03	5.69E-03	5.90E-03	6.11E-03	6.22E-03	6.28E-03	6.32E-03
nd147	9.62E-01	9.04E-01	3.28E-03	9.55E-06	9.33E-11	9.04E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	3.50E+01	3.51E+01	3.37E+01	3.16E+01	2.76E+01	2.12E+01	9.61E+00	2.56E+00	6.84E-01	1.83E-01	4.87E-02
sm147	3.33E+01	3.33E+01	3.56E+01	3.77E+01	4.17E+01	4.81E+01	5.97E+01	6.67E+01	6.86E+01	6.91E+01	6.93E+01
nd148	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02
pm148	1.38E-01	1.21E-01	3.60E-04	7.60E-05	3.54E-06	7.69E-09	7.91E-17	3.85E-30	.00E+00	.00E+00	.00E+00
pm148m	2.36E-01	2.32E-01	5.22E-02	1.10E-02	5.14E-04	1.12E-06	1.15E-14	5.60E-28	2.74E-41	.00E+00	.00E+00
sm148	4.86E+01	4.86E+01	4.90E+01	4.90E+01	4.90E+01	4.90E+01	4.90E+01	4.90E+01	4.90E+01	4.90E+01	4.90E+01
nd149	3.75E-03	2.48E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	1.76E-01	1.32E-01	1.01E-13	2.61E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	5.20E-01	5.68E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01	7.00E-01
eu149	2.36E-11	2.34E-11	1.20E-11	6.05E-12	1.55E-12	1.02E-13	2.91E-17	3.60E-23	4.45E-29	5.50E-35	6.81E-41
nd150	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01
pm150	6.10E-05	1.23E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm150	8.68E+01	8.68E+01	8.68E+01	8.68E+01	8.68E+01	8.68E+01	8.68E+01	8.68E+01	8.68E+01	8.68E+01	8.68E+01
eu150	2.79E-07	2.79E-07	2.78E-07	2.77E-07	2.74E-07	2.69E-07	2.54E-07	2.30E-07	2.09E-07	1.90E-07	1.72E-07
pm151	3.30E-02	1.85E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	3.94E+00	3.95E+00	3.97E+00	3.96E+00	3.94E+00	3.91E+00	3.82E+00	3.68E+00	3.54E+00	3.41E+00	3.28E+00
eu151	7.02E-03	7.11E-03	1.46E-02	2.23E-02	3.75E-02	6.78E-02	1.57E-01	3.02E-01	4.41E-01	5.74E-01	7.03E-01
sm152	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01
eu152	1.63E-02	1.63E-02	1.61E-02	1.59E-02	1.55E-02	1.47E-02	1.26E-02	9.69E-03	7.47E-03	5.76E-03	4.44E-03
eu152m	1.70E-05	2.85E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	3.15E-02	3.15E-02	3.15E-02	3.16E-02	3.17E-02	3.19E-02	3.25E-02	3.33E-02	3.39E-02	3.44E-02	3.48E-02
sm153	1.54E-01	1.08E-01	1.37E-15	4.98E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 20

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
eu153	3.13E+01	3.13E+01	3.14E+01	3.14E+01	3.14E+01	3.14E+01	3.14E+01	3.14E+01	3.14E+01	3.14E+01	3.14E+01
gd153	1.71E-03	1.71E-03	1.32E-03	1.02E-03	6.01E-04	2.11E-04	9.08E-06	4.81E-08	2.55E-10	1.35E-12	7.15E-15
sm154	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
eu154	1.27E+01	1.27E+01	1.24E+01	1.22E+01	1.17E+01	1.08E+01	8.47E+00	5.66E+00	3.78E+00	2.52E+00	1.69E+00
gd154	1.97E+00	1.97E+00	2.22E+00	2.47E+00	2.95E+00	3.86E+00	6.18E+00	8.99E+00	1.09E+01	1.21E+01	1.30E+01
eu155	4.69E+00	4.69E+00	4.52E+00	4.36E+00	4.05E+00	3.49E+00	2.24E+00	1.07E+00	5.09E-01	2.43E-01	1.16E-01
gd155	6.50E-02	6.69E-02	2.33E-01	4.00E-01	7.11E-01	1.27E+00	2.52E+00	3.69E+00	4.25E+00	4.51E+00	4.64E+00
sm156	1.37E-03	2.33E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

eu156	5.92E-01	5.67E-01	9.75E-03	1.43E-04	3.41E-08	1.96E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd156	2.19E+01	2.19E+01	2.24E+01	2.24E+01	2.24E+01	2.24E+01	2.24E+01	2.24E+01	2.24E+01	2.24E+01	2.24E+01
eu157	2.18E-03	7.33E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd157	2.44E-02	2.59E-02	2.66E-02	2.66E-02	2.66E-02	2.66E-02	2.66E-02	2.66E-02	2.66E-02	2.66E-02	2.66E-02
eu158	4.22E-05	1.70E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd158	4.61E+00	4.61E+00	4.61E+00	4.61E+00	4.61E+00	4.61E+00	4.61E+00	4.61E+00	4.61E+00	4.61E+00	4.61E+00
gd159	6.79E-04	2.81E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb159	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01	5.79E-01
gd160	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01	2.67E-01
tb160	1.39E-02	1.38E-02	5.87E-03	2.42E-03	4.19E-04	1.26E-05	3.46E-10	8.63E-18	2.15E-25	5.36E-33	1.33E-40
dy160	6.18E-02	6.20E-02	6.99E-02	7.33E-02	7.53E-02	7.57E-02	7.57E-02	7.57E-02	7.57E-02	7.57E-02	7.57E-02
tb161	1.17E-03	1.06E-03	1.39E-07	1.28E-11	1.37E-19	1.59E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy161	8.83E-02	8.85E-02	8.95E-02	8.95E-02	8.95E-02	8.95E-02	8.95E-02	8.95E-02	8.95E-02	8.95E-02	8.95E-02
tb162m	9.50E-08	5.47E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy162	6.82E-02	6.82E-02	6.82E-02	6.82E-02	6.82E-02	6.82E-02	6.82E-02	6.82E-02	6.82E-02	6.82E-02	6.82E-02
dy163	5.85E-02	5.85E-02	5.85E-02	5.85E-02	5.85E-02	5.85E-02	5.85E-02	5.85E-02	5.85E-02	5.85E-02	5.85E-02
dy164	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02	1.60E-02
dy165	6.73E-06	5.44E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho165	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02	2.50E-02
dy166	1.82E-06	1.48E-06	1.96E-14	1.27E-22	8.42E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	1.91E-05	1.05E-05	9.58E-15	6.20E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	9.26E-05	9.26E-05	9.26E-05	9.26E-05	9.26E-05	9.25E-05	9.23E-05	9.21E-05	9.18E-05	9.15E-05	9.13E-05
er166	5.84E-03	5.85E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03	5.86E-03
er167	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04	1.17E-04
er168	1.75E-04	1.75E-04	1.75E-04	1.75E-04	1.75E-04	1.75E-04	1.75E-04	1.75E-04	1.75E-04	1.75E-04	1.75E-04
er169	7.95E-09	7.39E-09	1.04E-11	1.14E-14	1.60E-20	3.22E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm169	8.06E-07	8.06E-07	8.14E-07	8.14E-07	8.14E-07	8.14E-07	8.14E-07	8.14E-07	8.14E-07	8.14E-07	8.14E-07
er170	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07
tm170	6.37E-10	6.34E-10	3.92E-10	2.38E-10	8.89E-11	1.24E-11	3.38E-14	1.79E-18	9.51E-23	5.04E-27	2.68E-31
yb170	4.39E-09	4.39E-09	4.64E-09	4.79E-09	4.94E-09	5.01E-09	5.03E-09	5.03E-09	5.03E-09	5.03E-09	5.03E-09
er171	3.77E-10	4.13E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	5.79E-07	5.79E-07	5.30E-07	4.84E-07	4.04E-07	2.82E-07	9.54E-08	1.57E-08	2.58E-09	4.25E-10	6.99E-11
yb171	5.86E-07	5.87E-07	6.35E-07	6.82E-07	7.62E-07	8.84E-07	1.07E-06	1.15E-06	1.16E-06	1.17E-06	1.17E-06
er172	1.62E-09	1.16E-09	1.05E-22	2.94E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm172	1.93E-09	1.89E-09	5.48E-19	1.71E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
yb172	8.02E-07	8.02E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07
total	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04	1.03E+04

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BWR SNF Assembly - Fuel - decay fission products page 21

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.31E+02	1.31E+02	1.29E+02	1.28E+02	1.24E+02	1.17E+02	9.91E+01	7.48E+01	5.65E+01	4.26E+01	3.22E+01
be 10	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07	8.87E-07
c 14	3.58E-05	3.58E-05	3.58E-05	3.58E-05	3.58E-05	3.58E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05	3.57E-05
ni 66	3.06E-04	2.26E-04	3.80E-16	2.20E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	3.08E-04	2.26E-04	3.81E-16	2.20E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	3.57E-05	2.73E-05	1.09E-15	1.69E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69	1.41E-04	3.66E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.14E-04	3.41E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 71m	2.80E-02	4.19E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	8.09E-08	7.61E-08	3.46E-10	1.27E-12	1.96E-17	4.76E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 72	1.95E+00	1.37E+00	2.03E-14	8.62E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	1.96E+00	1.70E+00	2.91E-14	1.24E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 73	5.38E+00	1.76E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73m	5.31E+00	1.73E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 75	3.56E+01	2.13E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 76	3.64E+00	1.94E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 77	7.65E+01	1.76E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.35E+02	1.67E+02	4.81E-15	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

se 77m	8.60E-01	5.33E-01	1.54E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	7.70E+02	9.14E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	7.81E+02	1.33E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 79	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01	2.04E-01
kr 79	8.55E-08	5.32E-08	2.34E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80	4.65E-02	6.04E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80m	2.43E-02	5.63E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81	5.65E+03	1.62E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81m	4.09E+02	1.10E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 81	3.11E-08	3.11E-08	3.11E-08	3.11E-08	3.11E-08	3.11E-08	3.11E-08	3.11E-08	3.11E-08	3.11E-08	3.11E-08
br 82	5.39E+02	3.38E+02	2.07E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 83	1.33E+04	1.42E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83m	1.33E+04	6.11E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 84	2.45E+04	6.36E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 85	2.53E+03	2.53E+03	2.49E+03	2.45E+03	2.37E+03	2.23E+03	1.83E+03	1.33E+03	9.60E+02	6.95E+02	5.03E+02
kr 85m	2.72E+04	6.72E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 86	3.18E+02	3.07E+02	1.12E+01	3.59E-01	4.00E-04	5.03E-10	1.00E-27	.00E+00	.00E+00	.00E+00	.00E+00
kr 87	5.43E+04	1.15E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	6.58E-06	6.58E-06	6.58E-06	6.58E-06	6.58E-06	6.58E-06	6.58E-06	6.58E-06	6.58E-06	6.58E-06	6.58E-06
sr 87m	2.18E+00	5.86E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	7.50E+04	2.14E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	7.70E+04	2.39E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	1.03E+05	1.02E+05	3.00E+04	8.44E+03	6.89E+02	4.60E+00	1.38E-06	1.84E-17	2.45E-28	.00E+00	.00E+00
y 89m	9.63E+00	9.45E+00	2.79E+00	7.85E-01	6.40E-02	4.28E-04	1.28E-10	1.71E-21	2.28E-32	.00E+00	.00E+00
sr 90	2.34E+04	2.34E+04	2.33E+04	2.32E+04	2.29E+04	2.23E+04	2.07E+04	1.83E+04	1.62E+04	1.43E+04	1.27E+04
y 90	2.41E+04	2.39E+04	2.33E+04	2.32E+04	2.29E+04	2.23E+04	2.07E+04	1.83E+04	1.62E+04	1.43E+04	1.27E+04
y 90m	6.43E-01	3.49E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 91	1.33E+05	2.31E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.35E+05	1.35E+05	4.69E+04	1.57E+04	1.80E+03	2.38E+01	5.47E-05	2.20E-14	8.81E-24	.00E+00	.00E+00
y 91m	7.69E+04	1.47E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.65E-09	1.65E-09	1.65E-09	1.65E-09	1.65E-09	1.65E-09	1.64E-09	1.64E-09	1.63E-09	1.62E-09	1.61E-09
sr 92	1.42E+05	3.08E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.43E+05	4.53E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	3.93E-12	3.93E-12	3.93E-12	3.93E-12	3.93E-12	3.93E-12	3.93E-12	3.93E-12	3.93E-12	3.93E-12	3.93E-12

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 93	1.11E+05	2.16E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01	3.66E-01
nb 93m	4.82E-02	4.83E-02	5.16E-02	5.50E-02	6.16E-02	7.44E-02	1.10E-01	1.59E-01	1.99E-01	2.32E-01	2.58E-01
nb 94	2.42E-05	2.42E-05	2.42E-05	2.42E-05	2.42E-05	2.42E-05	2.42E-05	2.42E-05	2.42E-05	2.42E-05	2.42E-05
zr 95	1.91E+05	1.89E+05	7.20E+04	2.65E+04	3.66E+03	7.01E+01	4.93E-04	1.27E-12	3.29E-21	8.51E-30	.00E+00
nb 95	1.92E+05	1.92E+05	1.20E+05	5.21E+04	7.89E+03	1.59E+02	1.09E-03	2.81E-12	7.25E-21	1.87E-29	.00E+00
nb 95m	2.12E+03	2.12E+03	8.47E+02	3.11E+02	4.30E+01	8.24E-01	5.80E-06	1.50E-14	3.87E-23	9.13E-32	.00E+00
nb 96	2.81E+02	1.38E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 97	1.86E+05	6.95E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.87E+05	6.98E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.77E+05	6.59E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 98m	1.61E+03	5.71E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06
mo 99	2.17E+05	1.69E+05	3.00E-05	2.20E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	3.91E+00	3.91E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00	3.92E+00
tc 99m	1.91E+05	1.62E+05	2.90E-05	2.13E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh102	4.30E-01	4.30E-01	4.06E-01	3.82E-01	3.39E-01	2.67E-01	1.30E-01	3.94E-02	1.19E-02	3.61E-03	1.09E-03
ru103	1.89E+05	1.86E+05	3.86E+04	7.55E+03	2.99E+02	4.74E-01	1.88E-09	1.86E-23	.00E+00	.00E+00	.00E+00
rh103m	1.89E+05	1.86E+05	3.86E+04	7.53E+03	2.99E+02	4.73E-01	1.88E-09	1.86E-23	.00E+00	.00E+00	.00E+00
ru105	1.34E+05	3.26E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.29E+05	9.28E+04	6.11E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

rh105m	3.81E+04	9.28E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	8.69E+04	8.68E+04	7.35E+04	6.19E+04	4.40E+04	2.23E+04	2.88E+03	9.56E+01	3.17E+00	1.05E-01	3.49E-03
rh106	9.01E+04	8.68E+04	7.35E+04	6.19E+04	4.40E+04	2.23E+04	2.88E+03	9.56E+01	3.17E+00	1.05E-01	3.49E-03
rh106m	1.43E+03	6.63E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh107	8.02E+04	1.04E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd107	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02	3.00E-02
ag108	2.04E-01	2.05E-04	2.05E-04	2.05E-04	2.04E-04	2.03E-04	2.00E-04	1.95E-04	1.89E-04	1.84E-04	1.79E-04
ag108m	2.36E-03	2.36E-03	2.36E-03	2.36E-03	2.35E-03	2.34E-03	2.30E-03	2.24E-03	2.18E-03	2.12E-03	2.06E-03
pd109	4.90E+04	1.46E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109m	4.91E+04	1.46E+04	2.21E-04	1.93E-04	1.46E-04	8.47E-05	1.64E-05	1.06E-06	6.89E-08	4.47E-09	2.89E-10
cd109	2.53E-04	2.53E-04	2.21E-04	1.93E-04	1.46E-04	8.47E-05	1.64E-05	1.06E-06	6.89E-08	4.47E-09	2.89E-10
ag110	2.66E+04	1.06E+01	8.30E+00	6.42E+00	3.87E+00	1.40E+00	6.71E-02	4.22E-04	2.66E-06	1.67E-08	1.05E-10
ag110m	7.83E+02	7.81E+02	6.10E+02	4.72E+02	2.84E+02	1.03E+02	4.93E+00	3.10E-02	1.95E-04	1.23E-06	7.74E-09
pd111	7.69E+03	1.22E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	3.20E+02	1.55E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	7.70E+03	7.04E+03	1.78E+00	3.26E-04	1.35E-11	2.35E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	7.70E+03	1.52E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111m	2.58E+01	3.11E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd112	3.45E+03	1.57E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	3.46E+03	1.84E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag113	1.93E+03	8.74E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	7.05E-15	7.17E-15	7.18E-15	7.18E-15	7.18E-15	7.18E-15	7.18E-15	7.18E-15	7.19E-15	7.19E-15	7.19E-15
cd113m	7.88E+00	7.88E+00	7.78E+00	7.69E+00	7.50E+00	7.14E+00	6.16E+00	4.82E+00	3.77E+00	2.95E+00	2.30E+00
in113m	1.87E-06	8.20E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in114	8.31E-01	5.76E-01	1.66E-01	4.54E-02	3.51E-03	2.11E-05	4.61E-12	3.63E-23	.00E+00	.00E+00	.00E+00
in114m	6.10E-01	6.02E-01	1.73E-01	4.74E-02	3.67E-03	2.21E-05	4.81E-12	3.80E-23	.00E+00	.00E+00	.00E+00
cd115	1.02E+03	7.50E+02	7.08E-10	2.25E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	4.87E+01	4.80E+01	1.20E+01	2.86E+00	1.67E-01	5.71E-04	2.29E-11	1.08E-23	.00E+00	.00E+00	.00E+00
in115	2.03E-12	2.03E-12	2.05E-12	2.05E-12	2.06E-12	2.06E-12	2.06E-12	2.06E-12	2.06E-12	2.06E-12	2.06E-12
in115m	1.02E+03	8.16E+02	1.33E-03	3.16E-04	1.84E-05	6.31E-08	2.53E-15	1.19E-27	.00E+00	.00E+00	.00E+00
in116m	7.72E+02	7.62E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cd117	9.86E+02	1.24E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.25E+02	1.60E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	7.35E+02	4.75E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	9.00E+02	5.36E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117m	1.16E+01	1.11E+01	1.19E-01	1.06E-03	9.59E-08	7.89E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	9.05E+02	2.18E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in118	9.06E+02	2.19E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	9.07E+00	9.05E+00	7.33E+00	5.89E+00	3.82E+00	1.61E+00	1.21E-01	1.61E-03	2.14E-05	2.84E-07	3.78E-09
sn121	9.60E+02	5.21E+02	4.76E-01	4.74E-01	4.71E-01	4.65E-01	4.48E-01	4.21E-01	3.95E-01	3.71E-01	3.48E-01
sn121m	6.15E-01	6.15E-01	6.13E-01	6.11E-01	6.07E-01	6.00E-01	5.77E-01	5.42E-01	5.09E-01	4.78E-01	4.49E-01
sb122	1.78E+02	1.38E+02	1.65E-08	8.03E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn123	7.65E+01	7.61E+01	4.72E+01	2.87E+01	1.08E+01	1.52E+00	4.24E-03	2.35E-07	1.30E-11	7.23E-16	4.01E-20
sn123m	1.01E+03	1.57E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	2.08E-13	2.09E-13	2.29E-13	2.42E-13	2.53E-13	2.59E-13	2.59E-13	2.59E-13	2.59E-13	2.59E-13	2.59E-13
te123m	1.94E+00	1.92E+00	1.15E+00	6.73E-01	2.33E-01	2.81E-02	4.93E-05	1.26E-09	3.20E-14	8.16E-19	2.08E-23
sb124	1.35E+02	1.33E+02	4.78E+01	1.65E+01	2.01E+00	3.00E-02	9.93E-08	7.32E-17	5.39E-26	.00E+00	.00E+00
sn125	5.98E+02	5.57E+02	9.26E-01	1.20E-03	2.35E-09	9.24E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb125	1.62E+03	1.62E+03	1.53E+03	1.43E+03	1.26E+03	9.78E+02	4.56E+02	1.28E+02	3.60E+01	1.01E+01	2.84E+00
te125m	3.63E+02	3.63E+02	3.61E+02	3.46E+02	3.07E+02	2.39E+02	1.11E+02	3.13E+01	8.80E+00	2.47E+00	6.95E-01
sn126	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01
sb126	4.77E+01	4.51E+01	3.32E-01	2.28E-02	2.10E-02	2.10E-02	2.10E-02	2.10E-02	2.10E-02	2.10E-02	2.10E-02
sb126m	5.71E+01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01
sn127	4.18E+03	1.52E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	1.04E+04	8.74E+03	9.58E-04	5.60E-11	2.87E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

te127	1.03E+04	9.57E+03	1.01E+03	5.62E+02	1.76E+02	1.72E+01	1.62E-02	1.47E-07	1.33E-12	1.20E-17	1.09E-22
te127m	1.76E+03	1.76E+03	1.03E+03	5.73E+02	1.79E+02	1.76E+01	1.66E-02	1.50E-07	1.36E-12	1.23E-17	1.11E-22
xe127	1.26E-02	1.24E-02	2.27E-03	3.90E-04	1.20E-05	1.14E-08	9.93E-18	.00E+00	.00E+00	.00E+00	.00E+00
sn128	1.65E+04	7.63E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	1.77E+03	2.93E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128m	1.75E+04	9.25E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i128	1.63E+03	7.28E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb129	3.77E+04	8.72E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	3.58E+04	5.54E+03	7.28E+02	1.08E+02	2.49E+00	1.33E-03	2.03E-13	8.81E-30	.00E+00	.00E+00	.00E+00
te129m	7.24E+03	7.12E+03	1.14E+03	1.69E+02	3.88E+00	2.07E-03	3.16E-13	1.37E-29	.00E+00	.00E+00	.00E+00
i129	9.16E-03	9.16E-03	9.20E-03	9.20E-03	9.20E-03	9.20E-03	9.20E-03	9.20E-03	9.20E-03	9.20E-03	9.20E-03
xe129m	7.59E+00	7.02E+00	6.80E-03	5.02E-06	3.25E-12	1.39E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	1.26E+04	1.33E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	3.75E+03	9.83E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb131	9.05E+04	1.30E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131	9.78E+04	3.05E+03	1.12E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	2.35E+04	1.35E+04	4.99E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.15E+05	1.08E+05	5.13E+01	1.77E-02	2.54E-09	5.37E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.31E+03	1.30E+03	2.01E+01	9.67E-02	2.31E-06	1.33E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	1.66E+05	1.34E+05	8.04E-04	2.28E-12	2.97E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.69E+05	1.38E+05	8.28E-04	2.35E-12	3.06E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs132	7.82E+00	7.03E+00	5.15E-04	2.60E-08	8.38E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133	1.28E+05	3.59E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	1.05E+05	1.59E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.38E+05	1.10E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	1.84E+04	1.62E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	2.28E+05	2.21E+05	1.92E+00	9.41E-06	3.03E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	7.57E+03	6.81E+03	5.17E-09	9.95E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ba133	6.49E-06	6.49E-06	6.38E-06	6.28E-06	6.07E-06	5.69E-06	4.67E-06	3.36E-06	2.41E-06	1.74E-06	1.25E-06
te134	2.06E+05	8.80E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	2.62E+05	6.07E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.30E+04	4.30E+04	3.96E+04	3.64E+04	3.07E+04	2.20E+04	8.01E+03	1.49E+03	2.78E+02	5.17E+01	9.63E+00
cs134m	6.78E+03	2.24E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	2.27E+05	1.81E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	8.87E+04	6.26E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.03E+04	2.95E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	2.06E-01	2.06E-01	2.06E-01	2.06E-01	2.06E-01	2.06E-01	2.06E-01	2.06E-01	2.06E-01	2.06E-01	2.06E-01
cs135m	6.30E+03	4.17E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135m	1.03E+02	5.78E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	1.22E+04	1.16E+04	1.06E+02	8.15E-01	5.38E-05	2.37E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136m	1.36E+03	1.29E+03	1.19E+01	9.13E-02	6.02E-06	2.66E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	3.14E+04	3.14E+04	3.12E+04	3.10E+04	3.07E+04	3.00E+04	2.80E+04	2.49E+04	2.22E+04	1.98E+04	1.76E+04
ba137m	2.97E+04	2.97E+04	2.95E+04	2.93E+04	2.90E+04	2.83E+04	2.64E+04	2.35E+04	2.10E+04	1.87E+04	1.66E+04
cs138	2.19E+05	1.30E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la138	5.81E-11	5.81E-11	5.81E-11	5.81E-11	5.81E-11	5.81E-11	5.81E-11	5.81E-11	5.81E-11	5.81E-11	5.81E-11
ba139	2.08E+05	1.77E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce139	2.04E-02	2.03E-02	1.30E-02	8.15E-03	3.24E-03	5.15E-04	2.07E-06	2.09E-10	2.12E-14	2.14E-18	2.17E-22
pr139	1.55E-03	3.58E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	2.09E+05	1.98E+05	1.57E+03	1.03E+01	5.00E-04	1.20E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.26E+05	2.18E+05	1.80E+03	1.18E+01	5.75E-04	1.38E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la141	1.90E+05	2.96E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.91E+05	1.88E+05	2.81E+04	3.91E+03	7.93E+01	3.28E-02	2.33E-12	2.83E-29	.00E+00	.00E+00	.00E+00
nd141	5.65E-03	7.07E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.85E+05	3.64E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	8.33E-06	8.33E-06	8.33E-06	8.33E-06	8.33E-06	8.33E-06	8.33E-06	8.33E-06	8.33E-06	8.33E-06	8.33E-06

pr142	1.10E+04	4.62E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.76E+05	1.07E+05	3.51E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	1.70E+05	1.69E+05	1.91E+03	1.70E+01	1.49E-03	1.17E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	1.64E+05	1.64E+05	1.32E+05	1.05E+05	6.75E+04	2.77E+04	1.93E+03	2.27E+01	2.67E-01	3.15E-03	3.70E-05
pr144	1.65E+05	1.64E+05	1.32E+05	1.05E+05	6.75E+04	2.77E+04	1.93E+03	2.27E+01	2.67E-01	3.15E-03	3.70E-05
pr144m	2.30E+03	2.29E+03	1.84E+03	1.47E+03	9.44E+02	3.88E+02	2.70E+01	3.18E-01	3.74E-03	4.40E-05	5.18E-07
nd144	4.38E-10	4.38E-10	4.50E-10	4.60E-10	4.74E-10	4.89E-10	4.99E-10	4.99E-10	4.99E-10	4.99E-10	4.99E-10
pr145	1.20E+05	7.52E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm145	4.00E-02	4.00E-02	4.38E-02	4.69E-02	5.14E-02	5.56E-02	5.41E-02	4.50E-02	3.70E-02	3.04E-02	2.50E-02
sm145	4.80E-01	4.79E-01	3.99E-01	3.31E-01	2.28E-01	1.08E-01	1.16E-02	2.80E-04	6.78E-06	1.64E-07	3.96E-09
pr146	9.70E+04	2.47E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm146	1.12E+00	1.12E+00	1.08E+00	1.05E+00	9.86E-01	8.70E-01	5.97E-01	3.19E-01	1.70E-01	9.11E-02	4.87E-02
sm146	1.31E-07	1.31E-07	1.31E-07	1.32E-07	1.33E-07	1.35E-07	1.40E-07	1.45E-07	1.48E-07	1.49E-07	1.50E-07
nd147	7.78E+04	7.31E+04	2.66E+02	7.73E-01	7.55E-06	7.32E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	3.25E+04	3.25E+04	3.13E+04	2.93E+04	2.56E+04	1.97E+04	8.91E+03	2.38E+03	6.35E+02	1.69E+02	4.52E+01
sm147	7.64E-07	7.65E-07	8.16E-07	8.66E-07	9.56E-07	1.10E-06	1.37E-06	1.53E-06	1.58E-06	1.59E-06	1.59E-06
pm148	2.26E+04	1.99E+04	5.92E+01	1.25E+01	5.81E-01	1.26E-03	1.30E-11	6.33E-25	.00E+00	.00E+00	.00E+00
pm148m	5.05E+03	4.97E+03	1.12E+03	2.36E+02	1.10E+01	2.39E-02	2.46E-10	1.20E-23	.00E+00	.00E+00	.00E+00
sm148	1.48E-11	1.48E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11	1.49E-11
nd149	4.58E+04	3.03E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	6.98E+04	5.21E+04	4.02E-08	1.03E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	1.25E-13	1.36E-13	1.68E-13	1.68E-13	1.68E-13	1.68E-13	1.68E-13	1.68E-13	1.68E-13	1.68E-13	1.68E-13
eu149	2.22E-07	2.20E-07	1.14E-07	5.70E-08	1.46E-08	9.62E-10	2.74E-13	3.39E-19	4.19E-25	5.25E-31	.00E+00
pm150	4.76E+02	9.58E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu150	1.86E-05	1.86E-05	1.85E-05	1.84E-05	1.83E-05	1.79E-05	1.69E-05	1.53E-05	1.39E-05	1.26E-05	1.15E-05

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pm151	2.41E+04	1.35E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.04E+02	1.03E+02	1.01E+02	9.68E+01	9.32E+01	8.96E+01	8.62E+01
eu152	2.88E+00	2.88E+00	2.84E+00	2.80E+00	2.73E+00	2.59E+00	2.22E+00	1.71E+00	1.32E+00	1.02E+00	7.84E-01
eu152m	3.76E+01	6.32E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	6.86E-13	6.86E-13	6.87E-13	6.88E-13	6.91E-13	6.96E-13	7.09E-13	7.26E-13	7.40E-13	7.50E-13	7.58E-13
sm153	6.83E+04	4.77E+04	6.08E-10	2.20E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd153	6.06E+00	6.04E+00	4.68E+00	3.59E+00	2.12E+00	7.45E-01	3.21E-02	1.70E-04	9.01E-07	4.77E-09	2.53E-11
eu154	3.43E+03	3.43E+03	3.36E+03	3.29E+03	3.16E+03	2.92E+03	2.29E+03	1.53E+03	1.02E+03	6.82E+02	4.56E+02
eu155	2.31E+03	2.31E+03	2.23E+03	2.15E+03	1.99E+03	1.72E+03	1.10E+03	5.26E+02	2.51E+02	1.20E+02	5.70E+01
sm156	2.93E+03	4.99E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	3.26E+04	3.13E+04	5.38E+02	7.89E+00	1.88E-03	1.08E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu157	2.87E+03	9.64E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu158	1.10E+03	4.42E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd159	7.21E+02	2.98E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb160	1.57E+02	1.55E+02	6.62E+01	2.73E+01	4.73E+00	1.43E-01	3.91E-06	9.75E-14	2.43E-21	6.05E-29	.00E+00
tb161	1.38E+02	1.25E+02	1.63E-02	1.51E-06	1.61E-14	1.87E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb162m	8.24E-01	4.75E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy165	5.48E+01	4.43E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy166	4.21E-01	3.43E-01	4.53E-09	2.94E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	1.35E+01	7.41E+00	6.75E-09	4.37E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.65E-04	1.65E-04	1.64E-04	1.64E-04
er169	6.54E-04	6.08E-04	8.58E-07	9.36E-10	1.32E-15	2.65E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm170	3.81E-06	3.79E-06	2.34E-06	1.42E-06	5.31E-07	7.42E-08	2.02E-10	1.07E-14	5.68E-19	3.01E-23	1.60E-27
er171	9.20E-04	1.01E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	6.31E-04	6.31E-04	5.78E-04	5.27E-04	4.40E-04	3.07E-04	1.04E-04	1.71E-05	2.81E-06	4.63E-07	7.61E-08
er172	6.01E-04	4.29E-04	3.90E-17	1.10E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm172	5.52E-04	5.41E-04	1.57E-13	4.91E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.07E+07	4.44E+06	9.88E+05	6.42E+05	4.10E+05	2.54E+05	1.28E+05	9.29E+04	7.89E+04	6.90E+04	6.08E+04

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photon spectrum as a function of time for light elements, cladding and structural materials

BWR SNF Assembly - Fuel - decay
spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.53E+14	2.38E+14	2.35E+13	1.11E+13	3.79E+12	1.65E+12	6.29E+11	2.44E+11	1.11E+11	5.50E+10	2.92E+10
3.00E-02	2.58E+14	1.60E+14	4.18E+13	3.13E+13	2.04E+13	1.08E+13	3.07E+12	7.83E+11	2.28E+11	6.92E+10	2.21E+10
5.50E-02	1.08E+14	4.31E+13	2.21E+12	9.56E+11	2.70E+11	1.17E+11	6.05E+10	2.61E+10	1.22E+10	5.93E+09	2.98E+09
8.50E-02	5.90E+13	2.33E+13	8.48E+11	3.58E+11	9.89E+10	4.31E+10	2.35E+10	1.01E+10	4.68E+09	2.26E+09	1.13E+09
1.20E-01	4.02E+13	1.57E+13	4.54E+11	2.14E+11	8.50E+10	4.89E+10	2.40E+10	8.25E+09	3.10E+09	1.28E+09	5.70E+08
1.70E-01	1.12E+14	8.38E+13	1.95E+12	9.42E+11	7.26E+11	5.45E+11	2.54E+11	7.21E+10	2.06E+10	5.94E+09	1.76E+09
3.00E-01	9.31E+13	2.97E+13	1.23E+12	6.19E+11	3.30E+11	2.11E+11	9.64E+10	2.73E+10	7.78E+09	2.25E+09	6.64E+08
6.50E-01	2.51E+15	1.58E+15	5.24E+14	2.19E+14	3.72E+13	5.17E+12	2.06E+12	5.78E+11	1.64E+11	4.82E+10	1.55E+10
1.13E+00	7.25E+13	4.34E+13	2.54E+13	2.45E+13	2.30E+13	2.01E+13	1.36E+13	7.03E+12	3.64E+12	1.89E+12	9.77E+11
1.58E+00	1.67E+13	5.86E+12	6.89E+10	2.43E+10	3.15E+09	5.58E+07	1.93E+04	1.48E+04	1.24E+04	1.06E+04	9.17E+03
2.00E+00	2.98E+12	8.60E+11	6.51E+09	2.32E+09	3.90E+08	1.11E+08	7.24E+07	3.75E+07	1.94E+07	1.01E+07	5.21E+06
2.40E+00	5.21E+10	1.17E+09	4.26E+07	1.44E+07	2.09E+06	3.65E+05	2.29E+05	1.19E+05	6.15E+04	3.18E+04	1.65E+04
2.80E+00	5.73E+10	7.16E+08	4.06E+06	1.40E+06	1.71E+05	2.54E+03	8.43E-03	1.28E-10	6.55E-11	5.74E-11	5.16E-11
3.25E+00	1.35E+10	7.42E+06	6.75E-09	5.68E-09	4.04E-09	2.05E-09	2.73E-10	1.63E-11	7.02E-12	6.07E-12	5.45E-12
3.75E+00	1.02E+10	4.37E+05	2.98E-12	2.51E-12	1.79E-12	9.11E-13	1.27E-13	1.29E-14	8.27E-15	7.33E-15	6.59E-15
4.25E+00	3.64E+09	5.68E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.14E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	5.31E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	3.82E+15	2.22E+15	6.21E+14	2.89E+14	8.59E+13	3.87E+13	1.98E+13	8.78E+12	4.19E+12	2.08E+12	1.05E+12
mev/sec	1.82E+15	1.12E+15	3.72E+14	1.71E+14	5.09E+13	2.65E+13	1.68E+13	8.33E+12	4.22E+12	2.16E+12	1.11E+12

spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.27E+06	5.48E+05	5.40E+04	2.54E+04	8.71E+03	3.79E+03	1.45E+03	5.62E+02	2.56E+02	1.26E+02	6.71E+01
3.00E-02	1.78E+06	1.10E+06	2.89E+05	2.16E+05	1.41E+05	7.44E+04	2.12E+04	5.40E+03	1.58E+03	4.78E+02	1.53E+02
5.50E-02	1.36E+06	5.45E+05	2.80E+04	1.21E+04	3.42E+03	1.48E+03	7.65E+02	3.30E+02	1.54E+02	7.50E+01	3.76E+01
8.50E-02	1.15E+06	4.55E+05	1.66E+04	7.00E+03	1.93E+03	8.43E+02	4.60E+02	1.98E+02	9.14E+01	4.43E+01	2.21E+01
1.20E-01	1.11E+06	4.32E+05	1.25E+04	5.91E+03	2.35E+03	1.35E+03	6.63E+02	2.28E+02	8.55E+01	3.52E+01	1.57E+01
1.70E-01	4.36E+06	3.27E+06	7.62E+04	3.68E+04	2.84E+04	2.13E+04	9.94E+03	2.82E+03	8.04E+02	2.32E+02	6.86E+01
3.00E-01	6.42E+06	2.05E+06	8.47E+04	4.27E+04	2.28E+04	1.46E+04	6.65E+03	1.88E+03	5.37E+02	1.55E+02	4.58E+01
6.50E-01	3.75E+08	2.35E+08	7.83E+07	3.27E+07	5.56E+06	7.72E+05	3.09E+05	8.64E+04	2.46E+04	7.20E+03	2.31E+03
1.13E+00	1.87E+07	1.12E+07	6.56E+06	6.34E+06	5.94E+06	5.21E+06	3.51E+06	1.82E+06	9.42E+05	4.88E+05	2.53E+05
1.58E+00	6.05E+06	2.12E+06	2.49E+04	8.81E+03	1.14E+03	2.02E+01	7.00E-03	5.37E-03	4.49E-03	3.83E-03	3.32E-03
2.00E+00	1.37E+06	3.95E+05	2.99E+03	1.07E+03	1.79E+02	5.12E+01	3.33E+01	1.72E+01	8.93E+00	4.63E+00	2.40E+00
2.40E+00	2.88E+04	6.48E+02	2.35E+01	7.94E+00	1.15E+00	2.01E-01	1.26E-01	6.55E-02	3.39E-02	1.76E-02	9.10E-03
2.80E+00	3.69E+04	4.61E+02	2.61E+00	9.01E-01	1.10E-01	1.64E-03	5.43E-09	8.24E-17	4.21E-17	3.70E-17	3.32E-17
3.25E+00	1.01E+04	5.54E+00	5.04E-15	4.25E-15	3.02E-15	1.53E-15	2.04E-16	1.21E-17	5.25E-18	4.53E-18	4.07E-18
3.75E+00	8.82E+03	3.76E-01	2.57E-18	2.17E-18	1.54E-18	7.85E-19	1.09E-19	1.11E-20	7.13E-21	6.32E-21	5.68E-21
4.25E+00	3.56E+03	5.55E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.43E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	6.71E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	4.18E+08	2.58E+08	8.54E+07	3.94E+07	1.17E+07	6.10E+06	3.86E+06	1.92E+06	9.70E+05	4.96E+05	2.55E+05
gamma watts	2.92E+02	1.80E+02	5.96E+01	2.75E+01	8.16E+00	4.25E+00	2.69E+00	1.34E+00	6.76E-01	3.46E-01	1.78E-01

photon spectrum as a function of time for fission products

BWR SNF Assembly - Fuel - decay
spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean	time after discharge

	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	2.51E+17	3.23E+16	8.31E+15	6.08E+15	4.05E+15	2.21E+15	8.07E+14	5.64E+14	4.87E+14	4.27E+14	3.76E+14
	3.00E-02	1.11E+17	2.53E+16	3.58E+15	2.56E+15	1.72E+15	9.38E+14	3.52E+14	2.48E+14	2.14E+14	1.88E+14	1.66E+14
	5.50E-02	5.94E+16	8.71E+15	1.89E+15	1.42E+15	9.63E+14	5.27E+14	1.92E+14	1.29E+14	1.09E+14	9.31E+13	8.06E+13
	8.50E-02	4.06E+16	7.46E+15	1.15E+15	8.79E+14	5.96E+14	3.18E+14	1.06E+14	6.89E+13	5.74E+13	4.94E+13	4.30E+13
	1.20E-01	3.33E+16	7.01E+15	1.36E+15	1.07E+15	7.26E+14	3.72E+14	1.13E+14	6.94E+13	5.41E+13	4.36E+13	3.59E+13
	1.70E-01	5.33E+16	8.41E+15	1.17E+15	6.24E+14	3.83E+14	2.01E+14	6.28E+13	4.15E+13	3.59E+13	3.15E+13	2.78E+13
	3.00E-01	1.14E+17	1.75E+16	8.84E+14	6.61E+14	4.46E+14	2.33E+14	7.04E+13	4.55E+13	3.89E+13	3.38E+13	2.95E+13
	6.50E-01	2.34E+17	6.44E+16	1.52E+16	8.82E+15	4.90E+15	3.26E+15	1.68E+15	9.74E+14	7.69E+14	6.64E+14	5.85E+14
	1.13E+00	7.43E+16	5.02E+15	2.93E+14	2.31E+14	1.84E+14	1.32E+14	7.15E+13	4.19E+13	2.76E+13	1.87E+13	1.28E+13
	1.58E+00	3.85E+16	8.99E+15	1.55E+14	7.72E+13	5.79E+13	3.52E+13	1.12E+13	3.14E+12	1.44E+12	8.84E+11	6.13E+11
	2.00E+00	1.13E+16	5.63E+14	5.28E+13	3.86E+13	2.50E+13	1.06E+13	8.46E+11	3.09E+10	1.51E+10	1.30E+10	1.14E+10
	2.40E+00	9.08E+15	4.31E+14	6.64E+12	2.73E+12	1.90E+12	9.42E+11	1.17E+11	3.76E+09	1.31E+08	1.15E+07	6.67E+06
	2.80E+00	3.79E+15	6.84E+12	5.53E+11	4.28E+11	3.02E+11	1.51E+11	1.92E+10	6.27E+08	2.07E+07	6.84E+05	2.27E+04
	3.25E+00	1.89E+15	2.53E+12	1.02E+11	6.92E+10	4.91E+10	2.49E+10	3.22E+09	1.07E+08	3.54E+06	1.18E+05	3.90E+03
	3.75E+00	8.79E+14	1.34E+10	3.62E+07	3.05E+07	2.17E+07	1.10E+07	1.42E+06	4.71E+04	1.56E+03	5.18E+01	1.72E+00
	4.25E+00	8.46E+14	1.83E+09	1.04E-05	1.04E-05	1.05E-05	1.07E-05	1.10E-05	1.12E-05	1.12E-05	1.12E-05	1.13E-05
	4.75E+00	2.50E+14	1.36E+10	5.20E-06	5.23E-06	5.28E-06	5.36E-06	5.52E-06	5.61E-06	5.63E-06	5.64E-06	5.64E-06
	5.50E+00	1.93E+14	8.69E+07	3.86E-06	3.88E-06	3.92E-06	3.98E-06	4.09E-06	4.16E-06	4.18E-06	4.18E-06	4.19E-06
0	total	1.04E+18	1.86E+17	3.41E+16	2.25E+16	1.40E+16	8.23E+15	3.47E+15	2.19E+15	1.79E+15	1.55E+15	1.36E+15
0	mev/sec	4.27E+17	7.36E+16	1.16E+16	6.92E+15	4.02E+15	2.60E+15	1.28E+15	7.40E+14	5.80E+14	4.94E+14	4.30E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean		time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.78E+08	7.42E+07	1.91E+07	1.40E+07	9.31E+06	5.08E+06	1.86E+06	1.30E+06	1.12E+06	9.82E+05	8.65E+05
3.00E-02	7.66E+08	1.74E+08	2.47E+07	1.77E+07	1.19E+07	6.47E+06	2.42E+06	1.71E+06	1.48E+06	1.30E+06	1.15E+06
5.50E-02	7.52E+08	1.10E+08	2.39E+07	1.79E+07	1.22E+07	6.66E+06	2.42E+06	1.64E+06	1.37E+06	1.18E+06	1.02E+06
8.50E-02	7.94E+08	1.46E+08	2.25E+07	1.72E+07	1.16E+07	6.21E+06	2.07E+06	1.35E+06	1.12E+06	9.65E+05	8.40E+05
1.20E-01	9.19E+08	1.93E+08	3.75E+07	2.96E+07	2.00E+07	1.03E+07	3.13E+06	1.91E+06	1.49E+06	1.20E+06	9.91E+05
1.70E-01	2.08E+09	3.29E+08	4.56E+07	2.44E+07	1.50E+07	7.85E+06	2.45E+06	1.62E+06	1.40E+06	1.23E+06	1.09E+06
3.00E-01	7.83E+09	1.21E+09	6.10E+07	4.56E+07	3.08E+07	1.60E+07	4.85E+06	3.14E+06	2.68E+06	2.33E+06	2.03E+06
6.50E-01	3.50E+10	9.63E+09	2.28E+09	1.32E+09	7.31E+08	4.87E+08	2.52E+08	1.46E+08	1.15E+08	9.92E+07	8.74E+07
1.13E+00	1.92E+10	1.30E+09	7.59E+07	5.98E+07	4.77E+07	3.40E+07	1.85E+07	1.08E+07	7.14E+06	4.84E+06	3.32E+06
1.58E+00	1.39E+10	3.26E+09	5.61E+07	2.80E+07	2.10E+07	1.28E+07	4.05E+06	1.14E+06	5.21E+05	3.20E+05	2.22E+05
2.00E+00	5.21E+09	2.59E+08	2.43E+07	1.78E+07	1.15E+07	4.87E+06	3.89E+05	1.42E+04	6.96E+03	5.98E+03	5.25E+03
2.40E+00	5.01E+09	2.38E+08	3.66E+06	1.51E+06	1.05E+06	5.20E+05	6.45E+04	2.08E+03	7.24E+01	6.32E+00	3.68E+00
2.80E+00	2.44E+09	4.40E+06	3.56E+05	2.76E+05	1.95E+05	9.75E+04	1.24E+04	4.04E+02	1.33E+01	4.41E-01	1.46E-02
3.25E+00	1.41E+09	1.89E+06	7.60E+04	5.17E+04	3.67E+04	1.86E+04	2.41E+03	7.98E+01	2.65E+00	8.78E-02	2.91E-03
3.75E+00	7.58E+08	1.15E+04	3.12E+01	2.63E+01	1.87E+01	9.45E+00	1.22E+00	4.06E-02	1.35E-03	4.47E-05	1.48E-06
4.25E+00	8.26E+08	1.79E+03	1.01E-11	1.02E-11	1.03E-11	1.04E-11	1.07E-11	1.09E-11	1.10E-11	1.10E-11	1.10E-11
4.75E+00	2.73E+08	1.48E+04	5.68E-12	5.71E-12	5.76E-12	5.86E-12	6.02E-12	6.12E-12	6.15E-12	6.16E-12	6.16E-12
5.50E+00	2.44E+08	1.10E+02	4.88E-12	4.90E-12	4.95E-12	5.03E-12	5.17E-12	5.26E-12	5.28E-12	5.29E-12	5.29E-12
0 total	9.81E+10	1.69E+10	2.67E+09	1.59E+09	9.24E+08	5.98E+08	2.94E+08	1.70E+08	1.33E+08	1.14E+08	9.89E+07
0 gamma watts	6.84E+04	1.18E+04	1.86E+03	1.11E+03	6.44E+02	4.17E+02	2.05E+02	1.19E+02	9.29E+01	7.92E+01	6.90E+01

0 principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.23E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 91	1.75E+15	1.74E+15	6.07E+14	2.03E+14	2.33E+13	3.07E+11	7.07E+05	2.84E-04	1.14E-13	4.57E-23	.00E+00
mo 99	2.26E+15	1.76E+15	3.12E+05	2.29E-05	2.18E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.68E+15	2.58E+15	2.19E+15	1.84E+15	1.31E+15	6.62E+14	8.58E+13	2.85E+12	9.44E+10	3.13E+09	1.04E+08
ba140	1.93E+15	1.83E+15	1.45E+13	9.52E+10	4.63E+06	1.11E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.62E+15	2.53E+15	2.09E+13	1.37E+11	6.67E+06	1.60E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.20E+15	4.17E+15	3.36E+15	2.68E+15	1.72E+15	7.08E+14	4.92E+13	5.79E+11	6.82E+09	8.02E+07	9.44E+05

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	time after discharge

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.23E+15	3.42E+15	2.05E+07	5.81E-02	7.57E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.28E+15	4.14E+15	3.61E+10	1.76E+05	5.67E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.61E+15	1.53E+15	1.21E+13	7.94E+10	3.86E+06	9.25E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.47E+15	1.45E+15	2.17E+14	3.01E+13	6.11E+11	2.53E+08	1.79E-02	2.18E-19	.00E+00	.00E+00	.00E+00
ce143	4.87E+15	2.96E+15	9.69E-05	5.44E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.39E+15	1.38E+15	1.11E+15	8.88E+14	5.69E+14	2.34E+14	1.63E+13	1.92E+11	2.26E+09	2.65E+07	3.12E+05
nd147	1.44E+15	1.35E+15	4.92E+12	1.43E+10	1.40E+05	1.36E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec
mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.71E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.34E+14	6.11E+14	5.17E+14	4.35E+14	3.10E+14	1.57E+14	2.03E+13	6.73E+11	2.23E+10	7.41E+08	2.46E+07
te132	8.15E+14	6.59E+14	3.94E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.53E+14	5.33E+14	4.41E+12	2.89E+10	1.41E+06	3.37E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.39E+15	8.43E+14	2.76E-05	1.55E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.76E+14	9.69E+14	7.81E+14	6.23E+14	4.00E+14	1.64E+14	1.14E+13	1.35E+11	1.58E+09	1.86E+07	2.19E+05
sm153	1.33E+15	9.26E+14	1.18E+01	4.28E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec
mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.46E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
xe133	3.02E+15	2.93E+15	2.55E+10	1.25E+05	4.01E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.74E+14	5.71E+14	4.59E+14	3.67E+14	2.35E+14	9.67E+13	6.73E+12	7.92E+10	9.32E+08	1.10E+07	1.29E+05
nd147	8.96E+14	8.42E+14	3.06E+12	8.90E+09	8.69E+04	8.43E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec
mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.01E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.68E+15	3.13E+15	5.59E+05	4.11E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.34E+14	7.33E+14	5.90E+14	4.71E+14	3.02E+14	1.24E+14	8.64E+12	1.02E+11	1.20E+09	1.41E+07	1.66E+05
pr144	4.11E+14	4.08E+14	3.29E+14	2.63E+14	1.68E+14	6.92E+13	4.82E+12	5.67E+10	6.67E+08	7.85E+06	9.24E+04
sm153	6.31E+14	4.41E+14	5.62E+00	2.04E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.41E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.97E+14	6.19E+14	1.10E+05	8.07E-06	7.67E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.60E+15	2.21E+15	3.95E+05	2.90E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.81E+14	4.55E+14	3.61E+12	2.37E+10	1.15E+06	2.76E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.91E+15	2.86E+15	4.29E+14	5.97E+13	1.21E+12	5.01E+08	3.55E-02	4.31E-19	.00E+00	.00E+00	.00E+00
pr144	4.35E+14	4.32E+14	3.48E+14	2.78E+14	1.78E+14	7.32E+13	5.09E+12	5.99E+10	7.05E+08	8.30E+06	9.77E+04

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.24E+15	8.89E+14	5.85E-04	7.38E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.49E+15	4.19E+15	1.99E+12	6.86E+08	9.88E+01	2.09E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.12E+15	3.33E+15	1.99E+07	5.66E-02	7.38E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.50E+15	1.76E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.96E+15	1.89E+15	1.56E+13	1.02E+11	4.97E+06	1.19E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.21E+15	1.95E+15	6.39E-05	3.58E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.44E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	8.02E+15	7.94E+15	3.03E+15	1.11E+15	1.54E+14	2.95E+12	2.07E+07	5.36E-02	1.38E-10	3.57E-19	9.62E-28
nb 95	8.35E+15	8.35E+15	5.24E+15	2.27E+15	3.44E+14	6.94E+12	4.74E+07	1.22E-01	3.16E-10	8.15E-19	.00E+00
ru103	5.26E+15	5.17E+15	1.07E+15	2.10E+14	8.33E+12	1.32E+10	5.22E+01	5.18E-13	5.18E-27	.00E+00	.00E+00

i132	1.65E+16	1.35E+16	8.07E+07	2.29E-01	2.99E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.40E+15	3.41E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.63E+15	3.62E+15	3.34E+15	3.07E+15	2.59E+15	1.85E+15	6.75E+14	1.26E+14	2.34E+13	4.36E+12	8.12E+11
la140	6.27E+15	6.05E+15	5.00E+13	3.28E+11	1.60E+07	3.82E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.02E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
sr 91	1.74E+15	3.04E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.79E+06	2.50E-02	3.25E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.04E+15	4.80E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.33E+14	4.11E+14	3.78E+12	2.90E+10	1.91E+06	8.44E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.84E+14	6.60E+14	5.45E+12	3.58E+10	1.74E+06	4.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	5.89E+14	5.64E+14	9.71E+12	1.42E+11	3.39E+07	1.95E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.99E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
i132	6.79E+14	5.55E+14	3.32E+06	9.43E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	8.11E+15	7.82E+15	6.46E+13	4.24E+11	2.06E+07	4.94E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (5.63E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
i132	1.74E+14	1.43E+14	8.53E+05	2.42E-03	3.16E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.50E+14	3.57E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.36E+13	5.33E+13	4.29E+13	3.42E+13	2.20E+13	9.03E+12	6.28E+11	7.39E+09	8.70E+07	1.02E+06	1.20E+04
eu156	2.88E+14	2.76E+14	4.74E+12	6.96E+10	1.66E+07	9.53E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.31E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
la140	3.84E+14	3.71E+14	3.06E+12	2.01E+10	9.77E+05	2.34E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.84E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rh106	5.85E+11	5.64E+11	4.77E+11	4.02E+11	2.86E+11	1.45E+11	1.87E+10	6.21E+08	2.06E+07	6.84E+05	2.27E+04
ag112	1.12E+12	5.96E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.39E+12	5.19E+12	4.29E+10	2.82E+08	1.37E+04	3.28E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
la140	2.46E+12	2.37E+12	1.96E+10	1.28E+08	6.25E+03	1.50E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.34E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	3.18E+12	9.86E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.75E+14	3.45E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.83E+09) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	5.90E+11	1.83E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.36E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	4.37E+12	1.36E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.69E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.80E+10	8.69E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Fuel - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.26E+17	6.59E+16	7.35E+13	5.40E+13	3.27E+13	1.84E+13	1.49E+13	1.53E+13	1.55E+13	1.56E+13	1.56E+13
3.00E-02	7.94E+15	1.35E+15	8.31E+10	7.76E+10	9.80E+10	1.37E+11	2.44E+11	3.90E+11	5.02E+11	5.89E+11	6.56E+11
5.50E-02	1.15E+16	3.66E+15	1.35E+12	1.29E+12	1.61E+12	2.26E+12	4.09E+12	6.61E+12	8.55E+12	1.01E+13	1.12E+13
8.50E-02	5.01E+16	7.21E+15	3.79E+11	2.01E+11	2.01E+11	2.00E+11	1.99E+11	1.97E+11	1.94E+11	1.93E+11	1.91E+11
1.20E-01	5.08E+16	3.71E+16	3.99E+11	2.78E+11	2.73E+11	2.69E+11	2.61E+11	2.49E+11	2.38E+11	2.28E+11	2.20E+11
1.70E-01	1.68E+15	2.70E+14	1.77E+10	5.99E+09	4.27E+09	3.10E+09	2.76E+09	2.70E+09	2.64E+09	2.59E+09	2.54E+09
3.00E-01	2.70E+16	1.95E+16	2.50E+11	1.51E+11	1.49E+11	1.47E+11	1.42E+11	1.33E+11	1.26E+11	1.19E+11	1.13E+11
6.50E-01	1.46E+15	4.44E+13	1.63E+09	1.30E+09	9.57E+08	7.71E+08	8.85E+08	1.05E+09	1.11E+09	1.11E+09	1.10E+09
1.13E+00	1.56E+15	9.77E+14	6.04E+08	5.69E+08	5.30E+08	5.01E+08	4.85E+08	4.68E+08	4.49E+08	4.32E+08	4.15E+08
1.58E+00	9.48E+07	9.02E+07	7.81E+07	7.01E+07	6.16E+07	5.75E+07	6.17E+07	6.44E+07	6.16E+07	5.70E+07	5.22E+07
2.00E+00	1.49E+06	9.66E+05	9.38E+05	9.61E+05	1.01E+06	1.11E+06	1.38E+06	1.61E+06	1.67E+06	1.66E+06	1.63E+06
2.40E+00	4.00E+07	4.00E+07	3.40E+07	2.97E+07	2.46E+07	2.08E+07	1.78E+07	1.47E+07	1.22E+07	1.02E+07	8.45E+06
2.80E+00	7.40E+07	7.51E+07	7.82E+07	8.35E+07	9.73E+07	1.30E+08	2.23E+08	3.03E+08	3.23E+08	3.18E+08	3.06E+08
3.25E+00	1.43E+07	1.43E+07	1.22E+07	1.06E+07	8.83E+06	7.44E+06	6.38E+06	5.28E+06	4.38E+06	3.64E+06	3.03E+06
3.75E+00	8.31E+06	8.31E+06	7.06E+06	6.16E+06	5.12E+06	4.31E+06	3.70E+06	3.06E+06	2.54E+06	2.11E+06	1.75E+06
4.25E+00	4.81E+06	4.81E+06	4.09E+06	3.57E+06	2.97E+06	2.50E+06	2.14E+06	1.77E+06	1.47E+06	1.22E+06	1.02E+06
4.75E+00	2.79E+06	2.79E+06	2.37E+06	2.07E+06	1.72E+06	1.45E+06	1.24E+06	1.03E+06	8.53E+05	7.09E+05	5.89E+05
5.50E+00	2.52E+06	2.52E+06	2.14E+06	1.87E+06	1.56E+06	1.31E+06	1.12E+06	9.31E+05	7.72E+05	6.41E+05	5.33E+05
0 total	2.78E+17	1.36E+17	7.60E+13	5.60E+13	3.50E+13	2.14E+13	1.99E+13	2.29E+13	2.51E+13	2.68E+13	2.79E+13
0 mev/sec	2.36E+16	1.30E+16	9.73E+11	7.12E+11	5.15E+11	4.08E+11	4.75E+11	6.17E+11	7.26E+11	8.08E+11	8.71E+11

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.90E+08	1.51E+08	1.69E+05	1.24E+05	7.51E+04	4.24E+04	3.44E+04	3.51E+04	3.56E+04	3.58E+04	3.58E+04
3.00E-02	5.47E+07	9.30E+06	5.73E+02	5.35E+02	6.76E+02	9.47E+02	1.68E+03	2.69E+03	3.47E+03	4.07E+03	4.53E+03
5.50E-02	1.45E+08	4.63E+07	1.71E+04	1.63E+04	2.03E+04	2.86E+04	5.18E+04	8.35E+04	1.08E+05	1.27E+05	1.42E+05
8.50E-02	9.78E+08	1.41E+08	7.40E+03	3.92E+03	3.92E+03	3.91E+03	3.88E+03	3.84E+03	3.80E+03	3.76E+03	3.73E+03
1.20E-01	1.40E+09	1.02E+09	1.10E+04	7.66E+03	7.54E+03	7.42E+03	7.19E+03	6.86E+03	6.56E+03	6.30E+03	6.06E+03
1.70E-01	6.55E+07	1.06E+07	6.91E+02	2.34E+02	1.67E+02	1.21E+02	1.08E+02	1.05E+02	1.03E+02	1.01E+02	9.94E+01
3.00E-01	1.86E+09	1.35E+09	1.72E+04	1.04E+04	1.03E+04	1.02E+04	9.78E+03	9.19E+03	8.67E+03	8.22E+03	7.81E+03
6.50E-01	2.18E+08	6.63E+06	2.43E+02	1.95E+02	1.43E+02	1.15E+02	1.32E+02	1.57E+02	1.65E+02	1.66E+02	1.65E+02
1.13E+00	4.04E+08	2.53E+08	1.56E+02	1.47E+02	1.37E+02	1.30E+02	1.25E+02	1.21E+02	1.16E+02	1.12E+02	1.07E+02
1.58E+00	3.43E+01	3.26E+01	2.83E+01	2.54E+01	2.23E+01	2.08E+01	2.23E+01	2.33E+01	2.23E+01	2.06E+01	1.89E+01
2.00E+00	6.86E-01	4.44E-01	4.31E-01	4.42E-01	4.64E-01	5.10E-01	6.34E-01	7.42E-01	7.70E-01	7.65E-01	7.51E-01
2.40E+00	2.21E+01	2.21E+01	1.88E+01	1.64E+01	1.36E+01	1.15E+01	9.81E+00	8.13E+00	6.75E+00	5.60E+00	4.66E+00
2.80E+00	4.76E+01	4.83E+01	5.03E+01	5.38E+01	6.26E+01	8.38E+01	1.43E+02	1.95E+02	2.08E+02	2.05E+02	1.97E+02
3.25E+00	1.07E+01	1.07E+01	9.10E+00	7.94E+00	6.60E+00	5.56E+00	4.76E+00	3.95E+00	3.27E+00	2.72E+00	2.26E+00
3.75E+00	7.16E+00	7.16E+00	6.09E+00	5.31E+00	4.41E+00	3.72E+00	3.19E+00	2.64E+00	2.19E+00	1.82E+00	1.51E+00
4.25E+00	4.70E+00	4.70E+00	4.00E+00	3.49E+00	2.90E+00	2.44E+00	2.09E+00	1.73E+00	1.44E+00	1.19E+00	9.93E-01
4.75E+00	3.05E+00	3.05E+00	2.59E+00	2.26E+00	1.88E+00	1.58E+00	1.36E+00	1.12E+00	9.32E-01	7.74E-01	6.43E-01
5.50E+00	3.19E+00	3.19E+00	2.71E+00	2.37E+00	1.97E+00	1.66E+00	1.42E+00	1.18E+00	9.76E-01	8.11E-01	6.74E-01

0 total	5.42E+09	2.99E+09	2.24E+05	1.64E+05	1.18E+05	9.39E+04	1.09E+05	1.42E+05	1.67E+05	1.86E+05	2.00E+05
0 gamma watts	3.78E+03	2.08E+03	1.56E-01	1.14E-01	8.26E-02	6.55E-02	7.62E-02	9.89E-02	1.16E-01	1.30E-01	1.40E-01

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pb210	1.19E-14	1.19E-14	1.26E-14	1.30E-14	1.38E-14	1.57E-14	2.43E-14	5.30E-14	1.07E-13	1.94E-13	3.22E-13
bi210	3.00E-12	3.00E-12	3.23E-12	3.33E-12	3.53E-12	4.00E-12	6.19E-12	1.35E-11	2.73E-11	4.95E-11	8.21E-11
bi211	2.74E-03	2.74E-03	2.98E-03	3.22E-03	3.76E-03	4.77E-03	7.46E-03	1.15E-02	1.50E-02	1.82E-02	2.09E-02
bi212	1.76E+00	1.80E+00	2.04E+00	2.32E+00	2.91E+00	4.16E+00	7.49E+00	1.04E+01	1.12E+01	1.10E+01	1.06E+01
bi213	7.69E-06	7.70E-06	1.78E-06	1.53E-06	1.54E-06	1.55E-06	1.61E-06	1.74E-06	1.88E-06	2.06E-06	2.26E-06
bi214	6.32E-09	6.33E-09	6.66E-09	7.02E-09	7.78E-09	9.55E-09	1.69E-08	3.60E-08	6.41E-08	1.02E-07	1.49E-07
po210	2.78E-06	2.79E-06	3.16E-06	3.47E-06	3.89E-06	4.53E-06	7.00E-06	1.67E-05	3.36E-05	6.10E-05	1.01E-04
po211	1.08E-05	1.08E-05	1.18E-05	1.28E-05	1.49E-05	1.89E-05	2.95E-05	4.55E-05	5.95E-05	7.19E-05	8.30E-05
po212	9.00E+00	9.20E+00	1.04E+01	1.19E+01	1.49E+01	2.13E+01	3.84E+01	5.33E+01	5.71E+01	5.65E+01	5.44E+01
po213	1.02E-03	1.02E-03	2.36E-04	2.02E-04	2.03E-04	2.05E-04	2.13E-04	2.29E-04	2.49E-04	2.71E-04	2.98E-04
po214	2.35E-04	2.30E-04	6.83E-05	6.29E-05	6.93E-05	8.51E-05	1.50E-04	3.20E-04	5.71E-04	9.05E-04	1.33E-03
po215	3.87E-03	3.87E-03	4.21E-03	4.56E-03	5.31E-03	6.74E-03	1.05E-02	1.62E-02	2.13E-02	2.57E-02	2.96E-02
po216	7.02E+00	7.04E+00	8.14E+00	9.26E+00	1.16E+01	1.66E+01	2.99E+01	4.16E+01	4.46E+01	4.41E+01	4.25E+01
po218	2.68E-05	2.68E-05	2.82E-05	2.97E-05	3.30E-05	4.05E-05	7.15E-05	1.52E-04	2.72E-04	4.31E-04	6.32E-04
at217	6.58E-04	6.58E-04	1.53E-04	1.31E-04	1.31E-04	1.33E-04	1.38E-04	1.48E-04	1.61E-04	1.76E-04	1.93E-04
rn218	1.45E-04	1.41E-04	7.25E-06	3.32E-07	7.53E-10	3.89E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	3.07E-03	3.08E-03	3.34E-03	3.62E-03	4.22E-03	5.36E-03	8.38E-03	1.29E-02	1.69E-02	2.04E-02	2.35E-02
rn220	5.56E+00	5.57E+00	6.44E+00	7.34E+00	9.21E+00	1.32E+01	2.37E+01	3.30E+01	3.53E+01	3.49E+01	3.36E+01
rn222	1.96E-05	1.96E-05	2.06E-05	2.17E-05	2.41E-05	2.96E-05	5.22E-05	1.11E-04	1.98E-04	3.15E-04	4.61E-04
fr221	4.80E-04	4.80E-04	1.11E-04	9.54E-05	9.59E-05	9.69E-05	1.01E-04	1.08E-04	1.18E-04	1.28E-04	1.41E-04
fr223	1.21E-09	1.22E-09	1.32E-09	1.42E-09	1.63E-09	2.03E-09	3.17E-09	4.89E-09	6.40E-09	7.73E-09	8.91E-09
ra222	1.13E-04	1.09E-04	5.61E-06	2.57E-07	5.82E-10	3.01E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	1.78E-03	1.78E-03	1.94E-03	2.10E-03	2.44E-03	3.10E-03	4.85E-03	7.47E-03	9.78E-03	1.18E-02	1.36E-02
ra224	3.93E+00	3.94E+00	4.56E+00	5.19E+00	6.51E+00	9.31E+00	1.68E+01	2.33E+01	2.50E+01	2.47E+01	2.38E+01
ra226	1.15E-05	1.15E-05	1.21E-05	1.27E-05	1.41E-05	1.73E-05	3.05E-05	6.51E-05	1.16E-04	1.84E-04	2.70E-04
ac225	3.45E-04	3.45E-04	8.01E-05	6.86E-05	6.89E-05	6.97E-05	7.24E-05	7.79E-05	8.45E-05	9.23E-05	1.01E-04
ac227	1.37E-05	1.37E-05	1.48E-05	1.60E-05	1.83E-05	2.28E-05	3.57E-05	5.50E-05	7.20E-05	8.70E-05	1.00E-04
ac228	6.98E-17	6.99E-17	7.67E-17	8.42E-17	1.00E-16	1.36E-16	2.69E-16	5.55E-16	8.87E-16	1.25E-15	1.62E-15
th226	1.02E-04	9.83E-05	5.06E-06	2.32E-07	5.25E-10	2.72E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	1.99E-03	2.00E-03	2.17E-03	2.34E-03	2.69E-03	3.43E-03	5.35E-03	8.25E-03	1.08E-02	1.30E-02	1.50E-02
th228	3.34E+00	3.35E+00	3.83E+00	4.36E+00	5.48E+00	7.83E+00	1.41E+01	1.96E+01	2.10E+01	2.08E+01	2.00E+01
th229	3.98E-05	3.98E-05	3.99E-05	4.00E-05	4.02E-05	4.07E-05	4.23E-05	4.55E-05	4.94E-05	5.39E-05	5.91E-05
th230	4.93E-03	4.94E-03	5.24E-03	5.56E-03	6.20E-03	7.47E-03	1.14E-02	1.82E-02	2.54E-02	3.28E-02	4.07E-02
th232	3.77E-09	3.77E-09	4.01E-09	4.26E-09	4.76E-09	5.76E-09	8.74E-09	1.37E-08	1.87E-08	2.36E-08	2.86E-08
pa231	1.29E-02	1.29E-02	1.29E-02	1.29E-02	1.29E-02	1.30E-02	1.32E-02	1.34E-02	1.37E-02	1.40E-02	1.43E-02
u230	8.00E-05	7.73E-05	3.98E-06	1.83E-07	4.13E-10	2.14E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u231	3.00E-07	2.54E-07	1.07E-13	2.51E-20	2.12E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	7.97E+00	7.98E+00	8.80E+00	9.60E+00	1.10E+01	1.34E+01	1.76E+01	1.98E+01	1.98E+01	1.91E+01	1.83E+01
u233	4.31E-03	4.31E-03	4.38E-03	4.44E-03	4.58E-03	4.87E-03	5.69E-03	7.02E-03	8.35E-03	9.70E-03	1.11E-02
u234	1.47E+02	1.47E+02	1.47E+02	1.47E+02	1.48E+02	1.50E+02	1.55E+02	1.63E+02	1.71E+02	1.79E+02	1.86E+02
u235	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00	1.60E+00
u236	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01	3.55E+01
u238	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01	1.77E+01
np235	7.82E-05	7.81E-05	6.68E-05	5.68E-05	4.13E-05	2.18E-05	3.20E-06	1.31E-07	5.38E-09	2.20E-10	9.02E-12
np237	5.40E+01	5.41E+01	5.46E+01	5.46E+01	5.46E+01	5.46E+01	5.47E+01	5.50E+01	5.54E+01	5.59E+01	5.65E+01
pu236	4.76E+02	4.76E+02	4.50E+02	4.24E+02	3.76E+02	2.96E+02	1.44E+02	4.37E+01	1.32E+01	4.01E+00	1.21E+00
pu237	9.06E-03	8.92E-03	2.28E-03	5.51E-04	3.34E-05	1.23E-07	6.13E-15	4.14E-27	.00E+00	.00E+00	.00E+00
pu238	1.00E+06	1.00E+06	1.02E+06	1.04E+06	1.05E+06	1.05E+06	1.03E+06	9.88E+05	9.50E+05	9.13E+05	8.78E+05

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neutron source intensity as a function of time

BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pu239	4.73E+04	4.74E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04
pu240	7.99E+04	7.99E+04	7.99E+04	8.00E+04	8.00E+04	8.00E+04	8.02E+04	8.03E+04	8.05E+04	8.06E+04	8.07E+04
pu241	4.21E+02	4.21E+02	4.16E+02	4.11E+02	4.02E+02	3.83E+02	3.31E+02	2.60E+02	2.04E+02	1.60E+02	1.26E+02
pu242	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02
pu244	1.59E-12	1.60E-12	2.26E-12	2.94E-12	4.30E-12	7.00E-12	1.51E-11	2.87E-11	4.22E-11	5.58E-11	6.93E-11
am239	4.32E-05	1.07E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	6.46E-05	4.66E-05	1.08E-17	7.96E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	4.83E+04	4.85E+04	5.91E+04	6.99E+04	9.10E+04	1.32E+05	2.42E+05	3.92E+05	5.08E+05	5.98E+05	6.67E+05
am242m	1.57E+01	1.57E+01	1.57E+01	1.57E+01	1.56E+01	1.56E+01	1.53E+01	1.50E+01	1.46E+01	1.42E+01	1.39E+01
am243	4.68E+03	4.68E+03	4.68E+03	4.68E+03	4.68E+03	4.68E+03	4.68E+03	4.68E+03	4.68E+03	4.67E+03	4.67E+03
cm241	4.46E-04	4.36E-04	6.65E-05	9.42E-06	1.98E-07	8.81E-11	7.74E-21	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.74E+07	1.74E+07	1.19E+07	8.05E+06	3.70E+06	7.87E+05	1.22E+04	4.64E+03	4.52E+03	4.41E+03	4.31E+03
cm243	9.38E+03	9.38E+03	9.33E+03	9.27E+03	9.16E+03	8.94E+03	8.31E+03	7.36E+03	6.52E+03	5.77E+03	5.11E+03
cm244	8.78E+05	8.79E+05	8.71E+05	8.63E+05	8.47E+05	8.15E+05	7.26E+05	6.00E+05	4.95E+05	4.09E+05	3.38E+05
cm245	6.68E+01	6.68E+01	6.68E+01	6.68E+01	6.68E+01	6.68E+01	6.68E+01	6.68E+01	6.67E+01	6.67E+01	6.67E+01
cm246	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.96E+01	1.96E+01	1.96E+01
cm247	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05	8.78E-05
cm248	4.69E-04	4.69E-04	4.69E-04	4.69E-04	4.69E-04	4.69E-04	4.69E-04	4.69E-04	4.69E-04	4.69E-04	4.69E-04
cm250	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11	1.62E-11
bk249	5.62E-05	5.62E-05	4.63E-05	3.79E-05	2.55E-05	1.16E-05	1.08E-06	2.06E-08	3.95E-10	7.57E-12	1.45E-13
cf249	3.02E-03	3.05E-03	5.40E-03	7.41E-03	1.04E-02	1.37E-02	1.61E-02	1.62E-02	1.60E-02	1.59E-02	1.57E-02
cf250	6.47E-02	6.49E-02	6.41E-02	6.32E-02	6.16E-02	5.84E-02	4.98E-02	3.82E-02	2.93E-02	2.25E-02	1.73E-02
cf251	5.51E-04	5.51E-04	5.51E-04	5.50E-04	5.50E-04	5.50E-04	5.49E-04	5.46E-04	5.44E-04	5.42E-04	5.40E-04
cf252	1.50E-01	1.50E-01	1.41E-01	1.32E-01	1.16E-01	8.90E-02	4.05E-02	1.09E-02	2.95E-03	7.96E-04	2.15E-04
cf253	3.22E-05	3.10E-05	9.71E-07	2.65E-08	2.17E-11	1.45E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	6.26E-09	6.19E-09	2.23E-09	7.74E-10	9.54E-11	1.45E-12	5.13E-18	4.20E-27	.00E+00	.00E+00	.00E+00
es253	1.18E-02	1.19E-02	2.19E-03	1.42E-04	3.88E-07	1.88E-12	1.49E-28	.00E+00	.00E+00	.00E+00	.00E+00
es254	3.23E-05	3.23E-05	2.58E-05	2.04E-05	1.29E-05	5.15E-06	3.28E-07	3.32E-09	3.37E-11	3.41E-13	3.46E-15
es255	3.72E-07	3.67E-07	7.54E-08	1.46E-08	5.66E-10	8.58E-13	2.99E-21	.00E+00	.00E+00	.00E+00	.00E+00
total	1.95E+07	1.95E+07	1.40E+07	1.02E+07	5.83E+06	2.93E+06	2.15E+06	2.13E+06	2.10E+06	2.06E+06	2.03E+06

neutron source intensity as a function of time

BWR SNF Assembly - Fuel - decay
spontaneous fission neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
th230	1.27E-07	1.27E-07	1.35E-07	1.43E-07	1.59E-07	1.92E-07	2.92E-07	4.67E-07	6.51E-07	8.43E-07	1.04E-06
pa231	1.61E-06	1.62E-06	1.62E-06	1.62E-06	1.62E-06	1.63E-06	1.65E-06	1.69E-06	1.72E-06	1.76E-06	1.79E-06
u232	4.89E-04	4.90E-04	5.41E-04	5.90E-04	6.78E-04	8.23E-04	1.08E-03	1.22E-03	1.21E-03	1.17E-03	1.12E-03
u234	3.16E-01	3.16E-01	3.16E-01	3.17E-01	3.19E-01	3.23E-01	3.34E-01	3.52E-01	3.69E-01	3.85E-01	4.01E-01
u235	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02
u236	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.32E+00	5.33E+00	5.33E+00
u237	3.01E-06	2.72E-06	3.07E-10	1.51E-11	1.47E-11	1.40E-11	1.21E-11	9.52E-12	7.48E-12	5.87E-12	4.61E-12
u238	2.49E+03	2.49E+03	2.49E+03	2.49E+03	2.49E+03	2.49E+03	2.49E+03	2.49E+03	2.49E+03	2.49E+03	2.49E+03
u239	8.92E-07	3.01E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07	1.58E-07
np238	1.61E-05	1.16E-05	4.61E-12	4.60E-12	4.59E-12	4.57E-12	4.50E-12	4.39E-12	4.28E-12	4.18E-12	4.08E-12
np239	1.82E-02	1.37E-02	4.85E-08	4.85E-08	4.85E-08	4.85E-08	4.85E-08	4.85E-08	4.85E-08	4.84E-08	4.84E-08
pu236	3.22E+01	3.22E+01	3.05E+01	2.87E+01	2.54E+01	2.00E+01	9.78E+00	2.96E+00	8.96E-01	2.71E-01	8.22E-02

	pu238	1.85E+05	1.85E+05	1.89E+05	1.91E+05	1.93E+05	1.94E+05	1.90E+05	1.82E+05	1.75E+05	1.69E+05	1.62E+05
	pu239	2.53E+01	2.54E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01
	pu240	5.31E+05	5.31E+05	5.31E+05	5.32E+05	5.32E+05	5.32E+05	5.33E+05	5.34E+05	5.35E+05	5.36E+05	5.36E+05
	pu241	1.52E+01	1.52E+01	1.50E+01	1.48E+01	1.44E+01	1.38E+01	1.19E+01	9.35E+00	7.35E+00	5.77E+00	4.53E+00
	pu242	2.15E+05	2.15E+05	2.15E+05	2.15E+05	2.15E+05	2.15E+05	2.15E+05	2.15E+05	2.15E+05	2.15E+05	2.15E+05
	pu243	1.41E-03	4.90E-05	3.79E-15	3.79E-15	3.79E-15	3.79E-15	3.79E-15	3.79E-15	3.79E-15	3.79E-15	3.79E-15
	pu244	3.80E-07	3.82E-07	5.40E-07	7.04E-07	1.03E-06	1.67E-06	3.62E-06	6.86E-06	1.01E-05	1.33E-05	1.66E-05
	am241	1.86E+01	1.86E+01	2.27E+01	2.69E+01	3.50E+01	5.06E+01	9.30E+01	1.51E+02	1.96E+02	2.30E+02	2.57E+02
	am242m	7.47E+01	7.47E+01	7.46E+01	7.45E+01	7.43E+01	7.40E+01	7.29E+01	7.11E+01	6.94E+01	6.77E+01	6.61E+01
	am242	3.58E+02	1.27E+02	8.10E-02	8.09E-02	8.07E-02	8.03E-02	7.91E-02	7.72E-02	7.53E-02	7.35E-02	7.17E-02
	am243	2.15E+01	2.16E+01	2.16E+01	2.16E+01	2.16E+01	2.16E+01	2.15E+01	2.15E+01	2.15E+01	2.15E+01	2.15E+01
	am244	2.83E-02	5.45E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	cm242	8.69E+07	8.68E+07	5.96E+07	4.02E+07	1.85E+07	3.93E+06	6.07E+04	2.32E+04	2.26E+04	2.20E+04	2.15E+04
	cm243	2.04E+02	2.04E+02	2.03E+02	2.01E+02	1.99E+02	1.94E+02	1.80E+02	1.60E+02	1.42E+02	1.25E+02	1.11E+02
	cm244	1.15E+08	1.15E+08	1.14E+08	1.13E+08	1.10E+08	1.06E+08	9.48E+07	7.82E+07	6.46E+07	5.34E+07	4.41E+07
	cm245	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01
	cm246	7.09E+05	7.09E+05	7.09E+05	7.09E+05	7.09E+05	7.09E+05	7.09E+05	7.08E+05	7.08E+05	7.07E+05	7.07E+05
	cm248	7.67E+03	7.67E+03	7.67E+03	7.67E+03	7.67E+03	7.68E+03	7.68E+03	7.68E+03	7.68E+03	7.68E+03	7.68E+03
	cm250	6.92E-03	6.92E-03	6.92E-03	6.93E-03	6.93E-03	6.93E-03	6.92E-03	6.92E-03	6.92E-03	6.92E-03	6.92E-03
	bk249	3.10E-01	3.10E-01	2.55E-01	2.09E-01	1.41E-01	6.38E-02	5.94E-03	1.14E-04	2.18E-06	4.17E-08	7.99E-10
	cf249	1.84E-03	1.85E-03	3.29E-03	4.51E-03	6.31E-03	8.32E-03	9.80E-03	9.85E-03	9.76E-03	9.66E-03	9.57E-03
	cf250	5.42E+03	5.44E+03	5.37E+03	5.30E+03	5.16E+03	4.89E+03	4.17E+03	3.20E+03	2.46E+03	1.88E+03	1.45E+03
	cf252	5.26E+05	5.26E+05	4.93E+05	4.62E+05	4.05E+05	3.12E+05	1.42E+05	3.83E+04	1.03E+04	2.79E+03	7.51E+02
	cf254	2.69E+02	2.66E+02	9.59E+01	3.32E+01	4.09E+00	6.23E-02	2.20E-07	1.80E-16	1.47E-25	.00E+00	.00E+00
	es253	8.79E-02	8.84E-02	1.63E-02	1.06E-03	2.89E-06	1.40E-11	1.09E-27	.00E+00	.00E+00	.00E+00	.00E+00
	es255	1.07E-03	1.06E-03	2.17E-04	4.19E-05	1.63E-06	2.47E-09	8.61E-18	5.75E-32	.00E+00	.00E+00	.00E+00
0	total	2.04E+08	2.04E+08	1.75E+08	1.55E+08	1.31E+08	1.12E+08	9.66E+07	8.00E+07	6.63E+07	5.50E+07	4.57E+07
0	total	2.23E+08	2.23E+08	1.89E+08	1.65E+08	1.37E+08	1.15E+08	9.88E+07	8.21E+07	6.84E+07	5.71E+07	4.77E+07

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alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	8.360E+06	8.353E+06	5.893E+06	4.143E+06	2.177E+06	8.438E+05	4.724E+05	4.605E+05	4.504E+05	4.391E+05	4.273E+05
3	1.85E+00 - 3.00E+00	9.250E+06	9.243E+06	6.701E+06	4.893E+06	2.867E+06	1.512E+06	1.156E+06	1.145E+06	1.133E+06	1.116E+06	1.097E+06
4	1.40E+00 - 1.85E+00	1.287E+06	1.287E+06	9.727E+05	7.495E+05	5.005E+05	3.388E+05	3.009E+05	2.994E+05	2.968E+05	2.931E+05	2.886E+05
5	9.00E-01 - 1.40E+00	4.682E+05	4.681E+05	3.699E+05	3.001E+05	2.228E+05	1.746E+05	1.656E+05	1.653E+05	1.641E+05	1.623E+05	1.601E+05
6	4.00E-01 - 9.00E-01	8.597E+04	8.598E+04	7.286E+04	6.354E+04	5.341E+04	4.787E+04	4.767E+04	4.763E+04	4.732E+04	4.684E+04	4.623E+04
7	1.00E-01 - 4.00E-01	1.571E+04	1.571E+04	1.306E+04	1.118E+04	9.116E+03	7.929E+03	7.799E+03	7.758E+03	7.678E+03	7.571E+03	7.446E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		1.947E+07	1.945E+07	1.402E+07	1.016E+07	5.830E+06	2.925E+06	2.150E+06	2.126E+06	2.099E+06	2.065E+06	2.027E+06

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spontaneous fission neutron source spectrum as a function of time

0 BWR SNF Assembly - Fuel - decay
spontaneous fission neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	3.857E+06	3.858E+06	3.318E+06	2.927E+06	2.471E+06	2.113E+06	1.819E+06	1.505E+06	1.248E+06	1.035E+06	8.603E+05
2	3.00E+00 - 6.43E+00	4.266E+07	4.267E+07	3.674E+07	3.245E+07	2.745E+07	2.351E+07	2.025E+07	1.676E+07	1.389E+07	1.153E+07	9.579E+06
3	1.85E+00 - 3.00E+00	4.628E+07	4.628E+07	3.983E+07	3.516E+07	2.971E+07	2.543E+07	2.189E+07	1.812E+07	1.502E+07	1.246E+07	1.036E+07
4	1.40E+00 - 1.85E+00	2.650E+07	2.651E+07	2.285E+07	2.020E+07	1.711E+07	1.467E+07	1.264E+07	1.046E+07	8.671E+06	7.197E+06	5.979E+06
5	9.00E-01 - 1.40E+00	3.633E+07	3.634E+07	3.132E+07	2.768E+07	2.344E+07	2.009E+07	1.731E+07	1.432E+07	1.188E+07	9.856E+06	8.189E+06
6	4.00E-01 - 9.00E-01	4.013E+07	4.014E+07	3.454E+07	3.049E+07	2.577E+07	2.206E+07	1.899E+07	1.572E+07	1.303E+07	1.081E+07	8.985E+06
7	1.00E-01 - 4.00E-01	7.886E+06	7.887E+06	6.783E+06	5.984E+06	5.052E+06	4.320E+06	3.719E+06	3.077E+06	2.551E+06	2.117E+06	1.759E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		2.036E+08	2.037E+08	1.754E+08	1.549E+08	1.310E+08	1.122E+08	9.662E+07	7.996E+07	6.629E+07	5.501E+07	4.571E+07

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total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	3.857E+06	3.858E+06	3.318E+06	2.927E+06	2.471E+06	2.113E+06	1.819E+06	1.505E+06	1.248E+06	1.035E+06	8.603E+05
2	3.00E+00 - 6.43E+00	5.102E+07	5.102E+07	4.263E+07	3.659E+07	2.963E+07	2.436E+07	2.072E+07	1.722E+07	1.434E+07	1.197E+07	1.001E+07
3	1.85E+00 - 3.00E+00	5.553E+07	5.553E+07	4.653E+07	4.005E+07	3.258E+07	2.694E+07	2.305E+07	1.926E+07	1.615E+07	1.358E+07	1.145E+07
4	1.40E+00 - 1.85E+00	2.779E+07	2.780E+07	2.382E+07	2.095E+07	1.761E+07	1.501E+07	1.294E+07	1.076E+07	8.968E+06	7.490E+06	6.268E+06
5	9.00E-01 - 1.40E+00	3.680E+07	3.681E+07	3.169E+07	2.798E+07	2.366E+07	2.027E+07	1.748E+07	1.449E+07	1.204E+07	1.002E+07	8.349E+06
6	4.00E-01 - 9.00E-01	4.021E+07	4.022E+07	3.462E+07	3.056E+07	2.582E+07	2.211E+07	1.904E+07	1.576E+07	1.308E+07	1.086E+07	9.031E+06

7	1.00E-01 - 4.00E-01	7.901E+06	7.903E+06	6.796E+06	5.995E+06	5.061E+06	4.328E+06	3.727E+06	3.085E+06	2.559E+06	2.125E+06	1.767E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		2.231E+08	2.231E+08	1.894E+08	1.651E+08	1.368E+08	1.151E+08	9.877E+07	8.208E+07	6.839E+07	5.708E+07	4.773E+07

1

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements
actinides
fission products

1 gamma source spectrum for decay step for BWR source term - fuel ds2 - discharge

0 1.00 day time of the requested nuclides

0

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	6.2628E+16	1.8788E+15
	5.0000E-02 to	1.0000E-01	2.2418E+16	1.6813E+15
	1.0000E-01 to	2.0000E-01	4.5296E+16	6.7945E+15
	2.0000E-01 to	3.0000E-01	3.0809E+16	7.7021E+15
	3.0000E-01 to	4.0000E-01	9.7382E+15	3.4084E+15
	4.0000E-01 to	6.0000E-01	2.1865E+16	1.0932E+16
	6.0000E-01 to	8.0000E-01	4.0116E+16	2.8081E+16
	8.0000E-01 to	1.0000E+00	7.3628E+15	6.6265E+15
	1.0000E+00 to	1.3300E+00	3.5289E+15	4.1112E+15
	1.3300E+00 to	1.6600E+00	9.2774E+15	1.3870E+16
	1.6600E+00 to	2.0000E+00	4.7459E+14	8.6849E+14
	2.0000E+00 to	2.5000E+00	4.1052E+14	9.2368E+14
	2.5000E+00 to	3.0000E+00	2.7278E+14	7.5014E+14
	3.0000E+00 to	4.0000E+00	2.3647E+12	8.2763E+12
	4.0000E+00 to	5.0000E+00	1.6086E+10	7.2387E+10
	5.0000E+00 to	6.5000E+00	8.6217E+07	4.9575E+08
	6.5000E+00 to	8.0000E+00	5.8955E+05	4.2743E+06
	8.0000E+00 to	1.0000E+01	1.2511E+05	1.1260E+06
0	totals		2.5420E+17	8.7637E+16

0

0 total energy from nuclides with spectrum data = 8.7539E+16

0 total energy from nuclides with no spectrum data = 9.7714E+13

1 gamma source spectrum for decay step for BWR source term - fuel ds2 - 0.25 year

0 90.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.7179E+15	2.0154E+14
5.0000E-02	to	1.0000E-01	2.0975E+15	1.5731E+14
1.0000E-01	to	2.0000E-01	2.4130E+15	3.6195E+14
2.0000E-01	to	3.0000E-01	5.0893E+14	1.2723E+14
3.0000E-01	to	4.0000E-01	3.9116E+14	1.3690E+14
4.0000E-01	to	6.0000E-01	3.5731E+15	1.7866E+15
6.0000E-01	to	8.0000E-01	1.1160E+16	7.8123E+15
8.0000E-01	to	1.0000E+00	7.8974E+14	7.1076E+14
1.0000E+00	to	1.3300E+00	2.4482E+14	2.8522E+14
1.3300E+00	to	1.6600E+00	1.6211E+14	2.4235E+14
1.6600E+00	to	2.0000E+00	1.1817E+13	2.1625E+13
2.0000E+00	to	2.5000E+00	4.5911E+13	1.0330E+14
2.5000E+00	to	3.0000E+00	2.8434E+12	7.8193E+12
3.0000E+00	to	4.0000E+00	9.3544E+10	3.2740E+11
4.0000E+00	to	5.0000E+00	6.3687E+06	2.8659E+07
5.0000E+00	to	6.5000E+00	2.5543E+06	1.4687E+07
6.5000E+00	to	8.0000E+00	5.0076E+05	3.6305E+06
8.0000E+00	to	1.0000E+01	1.0628E+05	9.5650E+05
totals			2.8119E+16	1.1955E+16

total energy from nuclides with spectrum data = 1.1952E+16
total energy from nuclides with no spectrum data = 3.4013E+12
gamma source spectrum for decay step for BWR source term - fuel ds2 - 0.50 year
182.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	4.8842E+15	1.4653E+14
5.0000E-02	to	1.0000E-01	1.5892E+15	1.1919E+14
1.0000E-01	to	2.0000E-01	1.5669E+15	2.3504E+14
2.0000E-01	to	3.0000E-01	3.8492E+14	9.6231E+13
3.0000E-01	to	4.0000E-01	2.9170E+14	1.0209E+14
4.0000E-01	to	6.0000E-01	2.1806E+15	1.0903E+15
6.0000E-01	to	8.0000E-01	6.0265E+15	4.2186E+15
8.0000E-01	to	1.0000E+00	6.8055E+14	6.1249E+14
1.0000E+00	to	1.3300E+00	2.0129E+14	2.3451E+14
1.3300E+00	to	1.6600E+00	8.1589E+13	1.2198E+14
1.6600E+00	to	2.0000E+00	7.9108E+12	1.4477E+13
2.0000E+00	to	2.5000E+00	3.3858E+13	7.6180E+13
2.5000E+00	to	3.0000E+00	5.4012E+11	1.4853E+12
3.0000E+00	to	4.0000E+00	6.3526E+10	2.2234E+11
4.0000E+00	to	5.0000E+00	5.5577E+06	2.5010E+07
5.0000E+00	to	6.5000E+00	2.2293E+06	1.2818E+07
6.5000E+00	to	8.0000E+00	4.3710E+05	3.1690E+06
8.0000E+00	to	1.0000E+01	9.2776E+04	8.3498E+05
totals			1.7930E+16	7.0693E+15

total energy from nuclides with spectrum data = 7.0678E+15
total energy from nuclides with no spectrum data = 1.4823E+12
gamma source spectrum for decay step for BWR source term - fuel ds2 - 1 year
365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.2821E+15	9.8463E+13
5.0000E-02	to	1.0000E-01	1.0737E+15	8.0529E+13
1.0000E-01	to	2.0000E-01	1.0161E+15	1.5242E+14
2.0000E-01	to	3.0000E-01	2.5934E+14	6.4835E+13
3.0000E-01	to	4.0000E-01	1.9743E+14	6.9099E+13
4.0000E-01	to	6.0000E-01	1.5298E+15	7.6492E+14

6.0000E-01 to	8.0000E-01	2.8145E+15	1.9702E+15
8.0000E-01 to	1.0000E+00	5.6226E+14	5.0604E+14
1.0000E+00 to	1.3300E+00	1.6451E+14	1.9166E+14
1.3300E+00 to	1.6600E+00	6.2595E+13	9.3580E+13
1.6600E+00 to	2.0000E+00	5.2965E+12	9.6926E+12
2.0000E+00 to	2.5000E+00	2.1926E+13	4.9333E+13
2.5000E+00 to	3.0000E+00	3.7191E+11	1.0228E+12
3.0000E+00 to	4.0000E+00	4.5091E+10	1.5782E+11
4.0000E+00 to	5.0000E+00	4.6172E+06	2.0777E+07
5.0000E+00 to	6.5000E+00	1.8524E+06	1.0651E+07
6.5000E+00 to	8.0000E+00	3.6328E+05	2.6337E+06
8.0000E+00 to	1.0000E+01	7.7115E+04	6.9404E+05
totals		1.0990E+16	4.0519E+15

total energy from nuclides with spectrum data = 4.0514E+15
total energy from nuclides with no spectrum data = 5.1097E+11
gamma source spectrum for decay step for BWR source term - fuel ds2 - 2 year
730.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.8020E+15	5.4060E+13
5.0000E-02 to	1.0000E-01	5.7455E+14	4.3092E+13
1.0000E-01 to	2.0000E-01	5.2589E+14	7.8884E+13
2.0000E-01 to	3.0000E-01	1.3732E+14	3.4330E+13
3.0000E-01 to	4.0000E-01	1.0154E+14	3.5537E+13
4.0000E-01 to	6.0000E-01	9.8688E+14	4.9344E+14
6.0000E-01 to	8.0000E-01	1.8518E+15	1.2963E+15
8.0000E-01 to	1.0000E+00	3.9526E+14	3.5574E+14
1.0000E+00 to	1.3300E+00	1.2070E+14	1.4062E+14
1.3300E+00 to	1.6600E+00	3.9686E+13	5.9331E+13
1.6600E+00 to	2.0000E+00	2.5575E+12	4.6802E+12
2.0000E+00 to	2.5000E+00	9.2765E+12	2.0872E+13
2.5000E+00 to	3.0000E+00	1.8664E+11	5.1325E+11
3.0000E+00 to	4.0000E+00	2.2818E+10	7.9864E+10
4.0000E+00 to	5.0000E+00	3.8912E+06	1.7511E+07
5.0000E+00 to	6.5000E+00	1.5615E+06	8.9785E+06
6.5000E+00 to	8.0000E+00	3.0627E+05	2.2204E+06
8.0000E+00 to	1.0000E+01	6.5021E+04	5.8519E+05
totals		6.5477E+15	2.6175E+15

total energy from nuclides with spectrum data = 2.6174E+15
total energy from nuclides with no spectrum data = 7.8300E+10
gamma source spectrum for decay step for BWR source term - fuel ds2 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	6.7849E+14	2.0355E+13
5.0000E-02 to	1.0000E-01	1.9615E+14	1.4711E+13
1.0000E-01 to	2.0000E-01	1.6244E+14	2.4365E+13
2.0000E-01 to	3.0000E-01	4.4393E+13	1.1098E+13
3.0000E-01 to	4.0000E-01	2.8793E+13	1.0077E+13
4.0000E-01 to	6.0000E-01	3.1725E+14	1.5863E+14
6.0000E-01 to	8.0000E-01	1.1626E+15	8.1382E+14
8.0000E-01 to	1.0000E+00	1.5286E+14	1.3758E+14
1.0000E+00 to	1.3300E+00	6.6679E+13	7.7681E+13
1.3300E+00 to	1.6600E+00	1.4305E+13	2.1386E+13
1.6600E+00 to	2.0000E+00	3.4335E+11	6.2832E+11
2.0000E+00 to	2.5000E+00	7.3105E+11	1.6449E+12
2.5000E+00 to	3.0000E+00	2.3968E+10	6.5913E+10
3.0000E+00 to	4.0000E+00	2.9645E+09	1.0376E+10

	4.0000E+00 to	5.0000E+00	3.3351E+06	1.5008E+07
	5.0000E+00 to	6.5000E+00	1.3384E+06	7.6956E+06
	6.5000E+00 to	8.0000E+00	2.6251E+05	1.9032E+06
	8.0000E+00 to	1.0000E+01	5.5733E+04	5.0160E+05
0	totals		2.8251E+15	1.2920E+15

0
0 total energy from nuclides with spectrum data = 1.2920E+15
0 total energy from nuclides with no spectrum data = 1.2390E+10
1 gamma source spectrum for decay step for BWR source term - fuel ds2 - 10 year
0 3652.50 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	4.7059E+14	1.4118E+13
	5.0000E-02 to	1.0000E-01	1.3313E+14	9.9850E+12
	1.0000E-01 to	2.0000E-01	1.0281E+14	1.5422E+13
	2.0000E-01 to	3.0000E-01	2.9204E+13	7.3009E+12
	3.0000E-01 to	4.0000E-01	1.8274E+13	6.3959E+12
	4.0000E-01 to	6.0000E-01	6.8255E+13	3.4127E+13
	6.0000E-01 to	8.0000E-01	8.1538E+14	5.7077E+14
	8.0000E-01 to	1.0000E+00	4.1822E+13	3.7639E+13
	1.0000E+00 to	1.3300E+00	3.7597E+13	4.3800E+13
	1.3300E+00 to	1.6600E+00	4.6700E+12	6.9817E+12
	1.6600E+00 to	2.0000E+00	5.5983E+10	1.0245E+11
	2.0000E+00 to	2.5000E+00	1.4754E+10	3.3196E+10
	2.5000E+00 to	3.0000E+00	1.0859E+09	2.9862E+09
	3.0000E+00 to	4.0000E+00	1.0618E+08	3.7165E+08
	4.0000E+00 to	5.0000E+00	2.7619E+06	1.2429E+07
	5.0000E+00 to	6.5000E+00	1.1082E+06	6.3724E+06
	6.5000E+00 to	8.0000E+00	2.1736E+05	1.5759E+06
	8.0000E+00 to	1.0000E+01	4.6145E+04	4.1531E+05
0	totals		1.7218E+15	7.4668E+14

0
0 total energy from nuclides with spectrum data = 7.4667E+14
0 total energy from nuclides with no spectrum data = 3.8015E+09
1 gamma source spectrum for decay step for BWR source term - fuel ds2 - 15 year
0 5478.75 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	4.0056E+14	1.2017E+13
	5.0000E-02 to	1.0000E-01	1.1491E+14	8.6181E+12
	1.0000E-01 to	2.0000E-01	8.4180E+13	1.2627E+13
	2.0000E-01 to	3.0000E-01	2.4665E+13	6.1663E+12
	3.0000E-01 to	4.0000E-01	1.5818E+13	5.5363E+12
	4.0000E-01 to	6.0000E-01	2.3307E+13	1.1653E+13
	6.0000E-01 to	8.0000E-01	6.8449E+14	4.7914E+14
	8.0000E-01 to	1.0000E+00	1.7316E+13	1.5585E+13
	1.0000E+00 to	1.3300E+00	2.3877E+13	2.7817E+13
	1.3300E+00 to	1.6600E+00	2.2125E+12	3.3077E+12
	1.6600E+00 to	2.0000E+00	4.1513E+10	7.5968E+10
	2.0000E+00 to	2.5000E+00	2.3254E+09	5.2322E+09
	2.5000E+00 to	3.0000E+00	3.5420E+08	9.7404E+08
	3.0000E+00 to	4.0000E+00	1.0040E+07	3.5139E+07
	4.0000E+00 to	5.0000E+00	2.2911E+06	1.0310E+07
	5.0000E+00 to	6.5000E+00	9.1928E+05	5.2858E+06
	6.5000E+00 to	8.0000E+00	1.8029E+05	1.3071E+06
	8.0000E+00 to	1.0000E+01	3.8272E+04	3.4445E+05
0	totals		1.3914E+15	5.8255E+14

0
0 total energy from nuclides with spectrum data = 5.8255E+14
0 total energy from nuclides with no spectrum data = 1.2444E+09

gamma source spectrum for decay step for BWR source term - fuel ds2 - 20 year
7305.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.4859E+14	1.0458E+13
5.0000E-02	to	1.0000E-01	1.0162E+14	7.6215E+12
1.0000E-01	to	2.0000E-01	7.0837E+13	1.0626E+13
2.0000E-01	to	3.0000E-01	2.1211E+13	5.3027E+12
3.0000E-01	to	4.0000E-01	1.3907E+13	4.8675E+12
4.0000E-01	to	6.0000E-01	1.3177E+13	6.5887E+12
6.0000E-01	to	8.0000E-01	6.0027E+14	4.2019E+14
8.0000E-01	to	1.0000E+00	9.9340E+12	8.9406E+12
1.0000E+00	to	1.3300E+00	1.5681E+13	1.8269E+13
1.3300E+00	to	1.6600E+00	1.2795E+12	1.9129E+12
1.6600E+00	to	2.0000E+00	3.6099E+10	6.6061E+10
2.0000E+00	to	2.5000E+00	1.8144E+09	4.0825E+09
2.5000E+00	to	3.0000E+00	3.2458E+08	8.9260E+08
3.0000E+00	to	4.0000E+00	5.7467E+06	2.0113E+07
4.0000E+00	to	5.0000E+00	1.9028E+06	8.5624E+06
5.0000E+00	to	6.5000E+00	7.6338E+05	4.3894E+06
6.5000E+00	to	8.0000E+00	1.4970E+05	1.0853E+06
8.0000E+00	to	1.0000E+01	3.1777E+04	2.8600E+05
totals			1.1965E+15	4.9484E+14

total energy from nuclides with spectrum data = 4.9484E+14
total energy from nuclides with no spectrum data = 4.7199E+08

gamma source spectrum for decay step for BWR source term - fuel ds2 - 25 year
9131.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.0574E+14	9.1721E+12
5.0000E-02	to	1.0000E-01	9.0704E+13	6.8028E+12
1.0000E-01	to	2.0000E-01	6.0415E+13	9.0622E+12
2.0000E-01	to	3.0000E-01	1.8369E+13	4.5923E+12
3.0000E-01	to	4.0000E-01	1.2257E+13	4.2900E+12
4.0000E-01	to	6.0000E-01	9.8939E+12	4.9469E+12
6.0000E-01	to	8.0000E-01	5.3183E+14	3.7228E+14
8.0000E-01	to	1.0000E+00	6.6313E+12	5.9682E+12
1.0000E+00	to	1.3300E+00	1.0474E+13	1.2202E+13
1.3300E+00	to	1.6600E+00	8.1543E+11	1.2191E+12
1.6600E+00	to	2.0000E+00	3.1664E+10	5.7945E+10
2.0000E+00	to	2.5000E+00	1.5940E+09	3.5866E+09
2.5000E+00	to	3.0000E+00	3.1116E+08	8.5568E+08
3.0000E+00	to	4.0000E+00	4.6928E+06	1.6425E+07
4.0000E+00	to	5.0000E+00	1.5821E+06	7.1195E+06
5.0000E+00	to	6.5000E+00	6.3466E+05	3.6493E+06
6.5000E+00	to	8.0000E+00	1.2445E+05	9.0224E+05
8.0000E+00	to	1.0000E+01	2.6415E+04	2.3774E+05
totals			1.0472E+15	4.3060E+14

total energy from nuclides with spectrum data = 4.3060E+14
total energy from nuclides with no spectrum data = 2.3466E+08

* normal termination of execution *

table of contents for material tables

case or subcase printed	page
1	1

Ondset 33

33 4 1 27 6 0 0 0 0 0

```
           0           0           0           0           0           2          -1        1698         690         130
         880        7935           0           5          99           7           9          93          18          18
          18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     19 entries read
0   74* array     19 entries read
0   75$ array     19 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt          12
           0           0           0           0           0           0           0           0           0           0
           0           0
0therm          4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
        7935          20           6          18        1697
0mmn           19
          10          10           0           0           1           3           0           0           0           0
          21         100          19           4           3           0           2           1           0
0tconst         5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero          4
           0         689         129         879
0pow            3
   .000000E+00  .000000E+00  .000000E+00
0 linp          9
           6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =          3.7581E+00  1.9421E+02  1.9797E+02
 start of interval flux =        1.58779E+13
 n-gamma, fission and total mev/fission =          4.1325E+00  1.9431E+02  1.9844E+02
 start of interval flux =        1.59187E+13
 n-gamma, fission and total mev/fission =          4.2236E+00  1.9441E+02  1.9863E+02
 start of interval flux =        1.59696E+13
 n-gamma, fission and total mev/fission =          4.3139E+00  1.9451E+02  1.9882E+02
 start of interval flux =        1.60310E+13
 n-gamma, fission and total mev/fission =          4.4070E+00  1.9460E+02  1.9900E+02
 start of interval flux =        1.61016E+13
 n-gamma, fission and total mev/fission =          4.5027E+00  1.9469E+02  1.9919E+02
 start of interval flux =        1.61804E+13
 n-gamma, fission and total mev/fission =          4.6007E+00  1.9477E+02  1.9937E+02
 start of interval flux =        1.62666E+13
 n-gamma, fission and total mev/fission =          4.7006E+00  1.9485E+02  1.9956E+02
 start of interval flux =        1.63595E+13
 n-gamma, fission and total mev/fission =          4.8021E+00  1.9494E+02  1.9974E+02
 start of interval flux =        1.64584E+13
 n-gamma, fission and total mev/fission =          4.9050E+00  1.9502E+02  1.9992E+02
 start of interval flux =        1.65631E+13
```

```
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
0ndset           33
            33            4            2           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
           21          689          129          879
0pow              3
  4.349999E+00 1.799989E+03 1.622187E+13
0 linp            9
            6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              4.9780E+00   1.9507E+02   2.0005E+02
 start of interval flux =         1.65139E+13
 n-gamma, fission and total mev/fission =              5.0718E+00   1.9514E+02   2.0022E+02
 start of interval flux =         1.66374E+13
 n-gamma, fission and total mev/fission =              5.1724E+00   1.9522E+02   2.0039E+02
 start of interval flux =         1.67648E+13
 n-gamma, fission and total mev/fission =              5.2749E+00   1.9529E+02   2.0057E+02
 start of interval flux =         1.68965E+13
 n-gamma, fission and total mev/fission =              5.3785E+00   1.9536E+02   2.0074E+02
 start of interval flux =         1.70324E+13
 n-gamma, fission and total mev/fission =              5.4833E+00   1.9543E+02   2.0092E+02
 start of interval flux =         1.71722E+13
 n-gamma, fission and total mev/fission =              5.5890E+00   1.9551E+02   2.0109E+02
 start of interval flux =         1.73158E+13
 n-gamma, fission and total mev/fission =              5.6957E+00   1.9558E+02   2.0127E+02
 start of interval flux =         1.74630E+13
 n-gamma, fission and total mev/fission =              5.8033E+00   1.9565E+02   2.0145E+02
 start of interval flux =         1.76137E+13
 n-gamma, fission and total mev/fission =              5.9116E+00   1.9572E+02   2.0163E+02
 start of interval flux =         1.77677E+13
```

```
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
0ndset          33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 3.599977E+03 1.720146E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =          5.8180E+00   1.9575E+02   2.0157E+02
 start of interval flux =        1.78425E+13
 n-gamma, fission and total mev/fission =          5.9156E+00   1.9581E+02   2.0173E+02
 start of interval flux =        1.80312E+13
 n-gamma, fission and total mev/fission =          6.0266E+00   1.9588E+02   2.0190E+02
 start of interval flux =        1.82224E+13
 n-gamma, fission and total mev/fission =          6.1392E+00   1.9594E+02   2.0208E+02
 start of interval flux =        1.84164E+13
 n-gamma, fission and total mev/fission =          6.2528E+00   1.9600E+02   2.0226E+02
 start of interval flux =        1.86129E+13
 n-gamma, fission and total mev/fission =          6.3675E+00   1.9607E+02   2.0244E+02
 start of interval flux =        1.88120E+13
 n-gamma, fission and total mev/fission =          6.4830E+00   1.9613E+02   2.0262E+02
 start of interval flux =        1.90136E+13
 n-gamma, fission and total mev/fission =          6.5995E+00   1.9620E+02   2.0280E+02
 start of interval flux =        1.92176E+13
 n-gamma, fission and total mev/fission =          6.7169E+00   1.9626E+02   2.0298E+02
 start of interval flux =        1.94240E+13
 n-gamma, fission and total mev/fission =          6.8352E+00   1.9633E+02   2.0316E+02
 start of interval flux =        1.96327E+13
```

```
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
0ndset           33
            33            4            4           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 5.399966E+03 1.884016E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              6.7684E+00   1.9638E+02   2.0315E+02
 start of interval flux =         1.97990E+13
 n-gamma, fission and total mev/fission =              6.8861E+00   1.9644E+02   2.0332E+02
 start of interval flux =         2.00429E+13
 n-gamma, fission and total mev/fission =              7.0118E+00   1.9650E+02   2.0351E+02
 start of interval flux =         2.02884E+13
 n-gamma, fission and total mev/fission =              7.1387E+00   1.9656E+02   2.0370E+02
 start of interval flux =         2.05353E+13
 n-gamma, fission and total mev/fission =              7.2664E+00   1.9662E+02   2.0389E+02
 start of interval flux =         2.07836E+13
 n-gamma, fission and total mev/fission =              7.3950E+00   1.9669E+02   2.0408E+02
 start of interval flux =         2.10332E+13
 n-gamma, fission and total mev/fission =              7.5243E+00   1.9675E+02   2.0428E+02
 start of interval flux =         2.12841E+13
 n-gamma, fission and total mev/fission =              7.6544E+00   1.9682E+02   2.0447E+02
 start of interval flux =         2.15362E+13
 n-gamma, fission and total mev/fission =              7.7851E+00   1.9688E+02   2.0467E+02
 start of interval flux =         2.17893E+13
 n-gamma, fission and total mev/fission =              7.9165E+00   1.9695E+02   2.0486E+02
 start of interval flux =         2.20436E+13
```

```
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
0ndset          33
            33              4              5             27              6              0              0              0              0              0
             0              0              0              0              0              2             -1           1698            690            130
           880           7935              0              5             99              7              9             93             18             18
            18              0              0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0              0              0              0              0              0              0              0              0              0
             0              0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935             20              6             18           1697
0mmn            19
            10             10              0              0              1              3              0              0              0             10
            21            100              0              4              3              0              2              1              0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21            689            129            879
0pow             3
  4.349999E+00 7.199954E+03 2.106112E+13
0 linp           9
             6              0             51             26              2           3000           1000           1697              5
 n-gamma, fission and total mev/fission =              7.8538E+00     1.9700E+02     2.0486E+02
 start of interval flux =         2.22939E+13
 n-gamma, fission and total mev/fission =              7.9881E+00     1.9706E+02     2.0505E+02
 start of interval flux =         2.25901E+13
 n-gamma, fission and total mev/fission =              8.1299E+00     1.9713E+02     2.0526E+02
 start of interval flux =         2.28861E+13
 n-gamma, fission and total mev/fission =              8.2722E+00     1.9719E+02     2.0546E+02
 start of interval flux =         2.31814E+13
 n-gamma, fission and total mev/fission =              8.4149E+00     1.9725E+02     2.0567E+02
 start of interval flux =         2.34760E+13
 n-gamma, fission and total mev/fission =              8.5578E+00     1.9732E+02     2.0587E+02
 start of interval flux =         2.37697E+13
 n-gamma, fission and total mev/fission =              8.7009E+00     1.9738E+02     2.0608E+02
 start of interval flux =         2.40625E+13
 n-gamma, fission and total mev/fission =              8.8440E+00     1.9745E+02     2.0629E+02
 start of interval flux =         2.43542E+13
 n-gamma, fission and total mev/fission =              8.9872E+00     1.9751E+02     2.0650E+02
 start of interval flux =         2.46449E+13
 n-gamma, fission and total mev/fission =              9.1304E+00     1.9758E+02     2.0671E+02
 start of interval flux =         2.49343E+13
```

```
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
0ndset           33
            33             4             5            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935            20             6            18          1697
0mmn             19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21           689           129           879
0pow              3
  4.349999E+00 8.999942E+03 2.379376E+13
0 linp            9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              9.2868E+00    1.9765E+02    2.0694E+02
 start of interval flux =         2.52490E+13
 n-gamma, fission and total mev/fission =              9.3654E+00    1.9769E+02    2.0706E+02
 start of interval flux =         2.54080E+13
 n-gamma, fission and total mev/fission =              9.4450E+00    1.9773E+02    2.0717E+02
 start of interval flux =         2.55666E+13
 n-gamma, fission and total mev/fission =              9.5245E+00    1.9777E+02    2.0729E+02
 start of interval flux =         2.57246E+13
 n-gamma, fission and total mev/fission =              9.6039E+00    1.9780E+02    2.0741E+02
 start of interval flux =         2.58822E+13
 n-gamma, fission and total mev/fission =              9.6832E+00    1.9784E+02    2.0752E+02
 start of interval flux =         2.60394E+13
 n-gamma, fission and total mev/fission =              9.7625E+00    1.9788E+02    2.0764E+02
 start of interval flux =         2.61960E+13
 n-gamma, fission and total mev/fission =              9.8416E+00    1.9792E+02    2.0776E+02
 start of interval flux =         2.63520E+13
 n-gamma, fission and total mev/fission =              9.9206E+00    1.9795E+02    2.0787E+02
 start of interval flux =         2.65075E+13
 n-gamma, fission and total mev/fission =              9.9995E+00    1.9799E+02    2.0799E+02
 start of interval flux =         2.66625E+13
```

```
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 50000 MWd/MTU
0ndset           33
            33             4             5            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  87495
     used   107477 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935            20             6            18          1697
0mmn            19
             0            10             0             0             1             1             0             0             0            10
            21           100             0             4             3             0             2             0             0
0tconst          5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero           4
            21           689           129           879
0pow             3
  4.349999E+00 9.999936E+03 2.008701E+13
0 linp           9
             6             2             0            26             1         18418          1000          1697             5
0 case or subcase    1  BWR SNF Assembly - Fuel - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1        primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     8000     140000
       240000    250000    260000
       280000    400000    500000
74**     89.4    10100.0      46.5  189764.1
           0.2       0.2      17.8
         193.8      12.7     672.9
         122.3     171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 50000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1000000 e
   5t
BWR SNF Assembly - Bottom - deplete to 50000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Bottom - decay
per ONE BWR Fuel Assembly - Bottom Region - ds2b
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - bot ds2 - discharge
  decay step for BWR source term - bot ds2 - 0.25 year
  decay step for BWR source term - bot ds2 - 0.50 year
  decay step for BWR source term - bot ds2 - 1 year
  decay step for BWR source term - bot ds2 - 2 year
  decay step for BWR source term - bot ds2 - 5 year
  decay step for BWR source term - bot ds2 - 10 year
  decay step for BWR source term - bot ds2 - 15 year
  decay step for BWR source term - bot ds2 - 20 year
  decay step for BWR source term - bot ds2 - 25 year
56$$ f0
   5t
```

```
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooo    rrrrrrrrrrrrr   iiiiiiiiiiii    ggggggggggggg   eeeeeeeeeeeee   nnn         nn  sssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn    nn    nn  sssssssssssss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn     nn   nn   sssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooo    rr          rr  iiiiiiiiiiii    ggggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
     ooooooooooo    rr          rr  iiiiiiiiiiii     gggggggggggg   eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooo   tttttttttttt    zzzzzzzzzzzzz
    ll             oo         oo        tt                   zz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    lllllllllllll  oooooooooooo        tt          zzzzzzzzzzzzz
    lllllllllllll   ooooooooooo        tt         zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666                //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666               //   9999999999999  6666666666666
       1111       22         22              //    00       00  66                          //   99         99  66
         11                  22             //    00         00  66                         //    99         99  66
         11                  22            //     00         00  66                        //     99         99  66
         11                22             //      00         00  666666666666             //      9999999999999  666666666666
         11               22             //       00         00  6666666666666           //       999999999999  6666666666666
         11             22              //        00         00  66         66          //                  99  66         66
         11           22               //         00         00  66         66         //                   99  66         66
         11         22                //          00       00  66         66        //                    99  66         66
      11111111     2222222222222     //            000000000    6666666666666     //           9999999999999  6666666666666
      11111111     2222222222222    //              0000000      66666666666     //            999999999999    66666666666
0

         11             11                          0000000      88888888888                    5555555555555   22222222222
        111            111                         000000000    8888888888888                   5555555555555  2222222222222
       1111           1111              :::       00       00  88         88          :::      55             22         22
         11             11              :::      00         00  88         88          :::      55                        22
         11             11              :::      00         00  88         88          :::      55                        22
         11             11                       00         00   88888888888                    555555555555            22
         11             11                       00         00   88888888888                    5555555555555         22
         11             11              :::      00         00  88         88          :::                  55       22
         11             11              :::      00         00  88         88          :::                  55     22
         11             11              :::       00       00  88         88          :::      55         55   22
      11111111       11111111                     000000000    8888888888888                   5555555555555  2222222222222
      11111111       11111111                      0000000      88888888888                     55555555555   2222222222222
1
0                                 sssssssssss     cccccccccccc     aaaaaaaaa     ll              eeeeeeeeeeeee
                                 sssssssssssss   cccccccccccccc   aaaaaaaaaaa    ll              eeeeeeeeeeeee
                                 ss         ss   cc         cc   aa         aa   ll              ee
                                 ss              cc              aa         aa   ll              ee
```

```
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
           ss   cc              aa         aa   ll              ee
           ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     cccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  11:08:52                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0.............................columns 1-72.............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1800000 e
```

```
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000      8000    140000
       240000    250000    260000
       280000    400000    500000
74**     89.4    10100.0      46.5  189764.1
          0.2       0.2      17.8
        193.8      12.7     672.9
        122.3     171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds2b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
```

```
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1800000 e
    5t
 BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Bottom Region - ds2b
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 50000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1000000 e
    5t
 BWR SNF Assembly - Bottom - deplete to 50000 MWd/MTU
 per ONE BWR Fuel Assembly - Bottom Region - ds2b
 58** 10r4.35
 60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Bottom - decay
 per ONE BWR Fuel Assembly - Bottom Region - ds2b
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - bot ds2 - discharge
   decay step for BWR source term - bot ds2 - 0.25 year
   decay step for BWR source term - bot ds2 - 0.50 year
   decay step for BWR source term - bot ds2 - 1 year
   decay step for BWR source term - bot ds2 - 2 year
   decay step for BWR source term - bot ds2 - 5 year
   decay step for BWR source term - bot ds2 - 10 year
   decay step for BWR source term - bot ds2 - 15 year
   decay step for BWR source term - bot ds2 - 20 year
   decay step for BWR source term - bot ds2 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0     0$ array      12 entries read
0     1$ array       1 entries read
0     1t
0          dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0              short-lived split test fraction, qxn =    9.1188E-04
```

```
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
```

```
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
```

```
           pass n applies mid time densities of nth library interval
         first library updated was...
         ********************************************************************************
         *                                                                              *
         *            prelim lwr origen-s binary working library--id = 1143             *
         *          made from modified card-image origen-s libraries of scale 4.2       *
         *       data from the light element, actinide, and fission product libraries   *
         *         decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                              *
         *       neutron flux spectrum factors and cross sections were produced from    *
         *      the "presas2" case updating all nuclides on the scale "burnup" library  *
         *                                                                              *
         *                    fission product yields are from endf/b-v                  *
         *                                                                              *
         *               photon libraries use an 18-energy-group structure              *
         *              the photon data are from the master photon data base,           *
         *               produced to include bremsstrahlung from uo2 matrix             *
         *                                                                              *
         *         see information above this box (if present) for later updates        *
         *                                                                              *
         ********************************************************************************
         *                                                                              *
0        ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0        ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  4 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ********************************************************************************
         *                                                                              *
         *            prelim lwr origen-s binary working library--id = 1143             *
         *          made from modified card-image origen-s libraries of scale 4.2       *
         *       data from the light element, actinide, and fission product libraries   *
         *         decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                              *
         *       neutron flux spectrum factors and cross sections were produced from    *
```

```
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
```

```
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
```

```
0                    7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  5 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *            prelim lwr origen-s binary working library--id = 1143            *
         *         made from modified card-image origen-s libraries of scale 4.2       *
         *      data from the light element, actinide, and fission product libraries   *
         *        decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                            *
         *      neutron flux spectrum factors and cross sections were produced from    *
         *     the "presas2" case updating all nuclides on the scale "burnup" library  *
         *                                                                            *
         *                  fission product yields are from endf/b-v                  *
         *                                                                            *
         *              photon libraries use an 18-energy-group structure             *
         *             the photon data are from the master photon data base,          *
         *              produced to include bremsstrahlung from uo2 matrix            *
         *                                                                            *
         *        see information above this box (if present) for later updates       *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0               7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
1
    BWR SNF Assembly - Bottom - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Bottom Regio
            initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     h  1  2.64E-03  2.64E-03  2.64E-03  2.64E-03  2.64E-03  2.64E-03  2.64E-03  2.64E-03  2.64E-03  2.64E-03  2.64E-03
     h  2  3.08E-06  3.08E-06  3.08E-06  3.08E-06  3.08E-06  3.08E-06  3.08E-06  3.08E-06  3.08E-06  3.08E-06  3.08E-06
     h  3  6.93E-10  6.93E-10  6.84E-10  6.74E-10  6.55E-10  6.20E-10  5.23E-10  3.95E-10  2.98E-10  2.25E-10  1.70E-10
```

he 3	3.64E-11	3.65E-11	4.59E-11	5.56E-11	7.43E-11	1.10E-10	2.06E-10	3.34E-10	4.31E-10	5.04E-10	5.60E-10
he 4	1.16E-03	1.16E-03	1.16E-03	1.16E-03	1.16E-03	1.16E-03	1.16E-03	1.16E-03	1.16E-03	1.16E-03	1.16E-03
li 6	1.79E-10	1.79E-10	1.79E-10	1.79E-10	1.79E-10	1.79E-10	1.79E-10	1.79E-10	1.79E-10	1.79E-10	1.79E-10
li 7	1.41E-13	1.41E-13	1.41E-13	1.41E-13	1.41E-13	1.41E-13	1.41E-13	1.41E-13	1.41E-13	1.41E-13	1.41E-13
be 9	2.56E-06	2.56E-06	2.56E-06	2.56E-06	2.56E-06	2.56E-06	2.56E-06	2.56E-06	2.56E-06	2.56E-06	2.56E-06
be 10	5.64E-08	5.64E-08	5.64E-08	5.64E-08	5.64E-08	5.64E-08	5.64E-08	5.64E-08	5.64E-08	5.64E-08	5.64E-08
b 10	8.52E-15	8.59E-15	1.45E-14	2.07E-14	3.30E-14	5.74E-14	1.31E-13	2.53E-13	3.75E-13	4.97E-13	6.20E-13
b 11	6.15E-14	6.15E-14	6.15E-14	6.15E-14	6.15E-14	6.15E-14	6.15E-14	6.15E-14	6.15E-14	6.15E-14	6.15E-14
c 12	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
c 13	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03
c 14	9.60E-09	9.60E-09	9.60E-09	9.60E-09	9.60E-09	9.60E-09	9.60E-09	9.59E-09	9.59E-09	9.58E-09	9.57E-09
n 14	3.31E-12	3.32E-12	3.60E-12	3.89E-12	4.47E-12	5.64E-12	9.12E-12	1.49E-11	2.07E-11	2.65E-11	3.23E-11
ne 20	2.45E-15	2.45E-15	2.45E-15	2.45E-15	2.45E-15	2.45E-15	2.45E-15	2.45E-15	2.45E-15	2.45E-15	2.45E-15
ne 22	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08
na 23	9.01E-10	9.01E-10	9.01E-10	9.01E-10	9.01E-10	9.01E-10	9.01E-10	9.01E-10	9.01E-10	9.01E-10	9.01E-10
na 24	3.36E-15	1.08E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	3.17E-12	3.17E-12	3.17E-12	3.17E-12	3.17E-12	3.17E-12	3.17E-12	3.17E-12	3.17E-12	3.17E-12	3.17E-12
mg 25	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04	1.27E-04
mg 26	5.80E-05	5.80E-05	5.80E-05	5.80E-05	5.80E-05	5.80E-05	5.80E-05	5.80E-05	5.80E-05	5.80E-05	5.80E-05
al 27	6.25E-07	6.25E-07	6.25E-07	6.25E-07	6.25E-07	6.25E-07	6.25E-07	6.25E-07	6.25E-07	6.25E-07	6.25E-07
si 28	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01
si 29	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01	8.65E-01
si 30	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01
si 31	2.04E-08	3.58E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	1.46E-11	1.46E-11	1.46E-11	1.46E-11	1.46E-11	1.45E-11	1.43E-11	1.40E-11	1.38E-11	1.35E-11	1.32E-11
p 31	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04	2.23E-04
p 32	1.99E-09	1.89E-09	2.50E-11	2.82E-13	3.34E-15	3.29E-15	3.25E-15	3.19E-15	3.12E-15	3.06E-15	3.00E-15
p 33	3.45E-13	3.36E-13	2.94E-14	2.34E-15	1.58E-17	7.22E-22	6.91E-35	.00E+00	.00E+00	.00E+00	.00E+00
s 32	8.19E-08	8.20E-08	8.38E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08	8.39E-08
s 33	2.37E-11	2.37E-11	2.40E-11	2.40E-11	2.41E-11	2.41E-11	2.41E-11	2.41E-11	2.41E-11	2.41E-11	2.41E-11
ca 44	1.72E-09	1.72E-09	1.72E-09	1.72E-09	1.72E-09	1.72E-09	1.72E-09	1.72E-09	1.72E-09	1.72E-09	1.72E-09
ca 45	5.05E-13	5.03E-13	3.45E-13	2.33E-13	1.08E-13	2.29E-14	2.22E-16	9.77E-20	4.29E-23	1.89E-26	8.30E-30
ca 46	5.83E-10	5.83E-10	5.83E-10	5.83E-10	5.83E-10	5.83E-10	5.83E-10	5.83E-10	5.83E-10	5.83E-10	5.83E-10
ca 47	1.41E-14	1.21E-14	1.50E-20	1.09E-26	8.11E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.17E-12	1.17E-12	1.33E-12	1.44E-12	1.56E-12	1.65E-12	1.67E-12	1.67E-12	1.67E-12	1.67E-12	1.67E-12
sc 46	4.57E-15	4.53E-15	2.17E-15	1.01E-15	2.23E-16	1.09E-17	1.26E-21	3.47E-28	9.56E-35	2.64E-41	.00E+00
sc 47	4.05E-11	3.29E-11	3.64E-19	3.21E-26	1.12E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	1.38E-10	9.41E-11	1.81E-25	9.18E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	1.51E-14	1.51E-14	1.75E-14	1.86E-14	1.94E-14	1.96E-14	1.96E-14	1.96E-14	1.96E-14	1.96E-14	1.96E-14
ti 47	5.67E-05	5.67E-05	5.67E-05	5.67E-05	5.67E-05	5.67E-05	5.67E-05	5.67E-05	5.67E-05	5.67E-05	5.67E-05
ti 48	2.22E-07	2.22E-07	2.22E-07	2.22E-07	2.22E-07	2.22E-07	2.22E-07	2.22E-07	2.22E-07	2.22E-07	2.22E-07
ti 49	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04
ti 50	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04	6.15E-04
v 50	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03
v 51	3.29E-01	3.29E-01	3.36E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01	3.37E-01
cr 50	7.76E+00	7.76E+00	7.76E+00	7.76E+00	7.76E+00	7.76E+00	7.76E+00	7.76E+00	7.76E+00	7.76E+00	7.76E+00
cr 51	7.74E-03	7.55E-03	8.15E-04	8.06E-05	8.33E-07	8.97E-11	1.12E-22	1.64E-42	.00E+00	.00E+00	.00E+00
cr 52	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02
cr 53	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01

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BWR SNF Assembly - Bottom - decay light elements page 2

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cr 54	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00	5.67E+00
mn 54	6.56E-03	6.54E-03	5.37E-03	4.37E-03	2.91E-03	1.29E-03	1.14E-04	1.97E-06	3.41E-08	5.91E-10	1.02E-11
mn 55	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01	1.23E+01
mn 56	5.77E-05	9.11E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01
fe 55	1.26E-01	1.26E-01	1.19E-01	1.11E-01	9.79E-02	7.59E-02	3.55E-02	9.96E-03	2.80E-03	7.86E-04	2.21E-04

fe 56	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02	6.15E+02
fe 57	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
fe 58	2.19E+00	2.19E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00	2.20E+00
fe 59	3.28E-04	3.23E-04	8.08E-05	1.91E-05	1.11E-06	3.76E-09	1.45E-16	6.44E-29	2.85E-41	.00E+00	.00E+00
co 58m	1.93E-11	3.12E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.32E-03	3.29E-03	1.38E-03	5.58E-04	9.36E-05	2.63E-06	5.88E-11	1.04E-18	1.84E-26	3.25E-34	5.77E-42
co 59	4.59E-02	4.59E-02	4.61E-02	4.62E-02	4.62E-02	4.62E-02	4.63E-02	4.63E-02	4.63E-02	4.64E-02	4.64E-02
co 60	3.65E-03	3.65E-03	3.53E-03	3.42E-03	3.20E-03	2.81E-03	1.89E-03	9.80E-04	5.08E-04	2.63E-04	1.36E-04
co 61	4.05E-09	1.69E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.13E+01	8.13E+01	8.13E+01	8.13E+01	8.13E+01	8.13E+01	8.13E+01	8.13E+01	8.13E+01	8.13E+01	8.13E+01
ni 59	8.27E-01	8.27E-01	8.27E-01	8.27E-01	8.27E-01	8.27E-01	8.27E-01	8.27E-01	8.27E-01	8.27E-01	8.27E-01
ni 60	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01
ni 61	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00	1.68E+00
ni 62	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00
ni 63	1.66E-01	1.66E-01	1.65E-01	1.65E-01	1.65E-01	1.63E-01	1.60E-01	1.55E-01	1.49E-01	1.44E-01	1.39E-01
ni 64	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
ni 65	4.91E-07	6.67E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	6.01E-11	4.43E-11	7.46E-23	4.32E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	3.29E-03	3.29E-03	3.57E-03	3.86E-03	4.43E-03	5.57E-03	8.93E-03	1.44E-02	1.96E-02	2.47E-02	2.96E-02
cu 64	2.38E-08	6.42E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03	5.53E-03
cu 66	1.30E-10	6.91E-14	1.16E-25	6.73E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	7.48E-14	5.72E-14	2.28E-24	3.55E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	7.36E-06	7.36E-06	7.36E-06	7.36E-06	7.36E-06	7.36E-06	7.36E-06	7.36E-06	7.36E-06	7.36E-06	7.36E-06
zn 65	3.24E-09	3.23E-09	2.51E-09	1.93E-09	1.15E-09	4.07E-10	1.81E-11	1.01E-13	5.60E-16	3.12E-18	1.74E-20
zn 66	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05
zn 67	2.09E-08	2.09E-08	2.09E-08	2.09E-08	2.09E-08	2.09E-08	2.09E-08	2.09E-08	2.09E-08	2.09E-08	2.09E-08
zn 68	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10	2.29E-10
ga 69	3.26E-13	3.26E-13	3.26E-13	3.26E-13	3.26E-13	3.26E-13	3.26E-13	3.26E-13	3.26E-13	3.26E-13	3.26E-13
ge 70	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15
sr 87	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06	3.35E-06
sr 88	3.26E-04	3.26E-04	3.26E-04	3.26E-04	3.26E-04	3.26E-04	3.26E-04	3.26E-04	3.26E-04	3.26E-04	3.26E-04
sr 89	1.00E-06	9.88E-07	2.92E-07	8.20E-08	6.70E-09	4.48E-11	1.34E-17	1.79E-28	2.39E-39	.00E+00	.00E+00
sr 90	1.49E-08	1.49E-08	1.48E-08	1.47E-08	1.45E-08	1.42E-08	1.32E-08	1.16E-08	1.03E-08	9.10E-09	8.04E-09
sr 91	1.56E-09	2.72E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	2.39E-05	2.39E-05	2.46E-05	2.48E-05	2.49E-05	2.49E-05	2.49E-05	2.49E-05	2.49E-05	2.49E-05	2.49E-05
y 90	1.98E-06	1.53E-06	3.85E-12	3.82E-12	3.77E-12	3.68E-12	3.42E-12	3.02E-12	2.67E-12	2.36E-12	2.09E-12
y 91	2.99E-06	2.96E-06	1.03E-06	3.45E-07	3.95E-08	5.22E-10	1.20E-15	4.82E-25	1.94E-34	1.28E-43	.00E+00
y 92	6.64E-09	6.04E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	3.81E-12	7.43E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01
zr 91	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
zr 92	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01
zr 93	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.08E-02	5.08E-02
zr 94	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01
zr 95	1.04E-03	1.03E-03	3.93E-04	1.45E-04	2.00E-05	3.83E-07	2.69E-12	6.96E-21	1.80E-29	4.64E-38	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 96	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00	5.03E+00
zr 97	1.81E-05	6.76E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	2.75E-14	2.75E-14	2.75E-14	2.75E-14	2.75E-14	2.75E-14	2.75E-14	2.75E-14	2.75E-14	2.75E-14	2.75E-14
nb 93	5.42E-09	5.42E-09	6.09E-09	6.84E-09	8.48E-09	1.24E-08	2.88E-08	6.99E-08	1.25E-07	1.92E-07	2.69E-07
nb 93m	6.14E-08	6.14E-08	6.64E-08	7.14E-08	8.13E-08	1.00E-07	1.53E-07	2.27E-07	2.87E-07	3.35E-07	3.74E-07
nb 94	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11
nb 95	5.61E-04	5.61E-04	3.57E-04	1.55E-04	2.35E-05	4.75E-07	3.24E-12	8.38E-21	2.16E-29	6.21E-40	.00E+00
nb 95m	6.52E-07	6.51E-07	2.61E-07	9.59E-08	1.33E-08	2.54E-10	1.79E-15	4.62E-24	1.19E-32	.00E+00	.00E+00
nb 96	1.33E-08	6.53E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

nb 97	1.29E-06	4.83E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.69E-08	6.33E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 95	1.77E-02	1.77E-02	1.86E-02	1.90E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
mo 96	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03
mo 97	3.18E-02	3.18E-02	3.18E-02	3.18E-02	3.18E-02	3.18E-02	3.18E-02	3.18E-02	3.18E-02	3.18E-02	3.18E-02
mo 98	3.70E-04	3.70E-04	3.70E-04	3.70E-04	3.70E-04	3.70E-04	3.70E-04	3.70E-04	3.70E-04	3.70E-04	3.70E-04
mo 99	6.88E-09	5.35E-09	9.49E-19	6.97E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	7.16E-11	7.16E-11	7.16E-11	7.16E-11	7.16E-11	7.16E-11	7.16E-11	7.16E-11	7.16E-11	7.16E-11	7.16E-11
tc 98	6.55E-13	6.55E-13	6.55E-13	6.55E-13	6.55E-13	6.55E-13	6.55E-13	6.55E-13	6.55E-13	6.55E-13	6.55E-13
tc 99	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07	1.16E-07
ru 99	5.09E-13	5.10E-13	6.03E-13	7.00E-13	8.92E-13	1.27E-12	2.42E-12	4.33E-12	6.25E-12	8.16E-12	1.01E-11
ru100	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09	8.91E-09
ru101	4.22E-11	4.22E-11	4.22E-11	4.22E-11	4.22E-11	4.22E-11	4.22E-11	4.22E-11	4.22E-11	4.22E-11	4.22E-11
ru102	7.28E-13	7.28E-13	7.28E-13	7.28E-13	7.28E-13	7.28E-13	7.28E-13	7.28E-13	7.28E-13	7.28E-13	7.28E-13
cd111	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09
cd112	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08
cd113	8.54E-11	8.54E-11	8.54E-11	8.54E-11	8.54E-11	8.55E-11	8.55E-11	8.55E-11	8.55E-11	8.55E-11	8.55E-11
cd113m	8.98E-11	8.98E-11	8.88E-11	8.77E-11	8.55E-11	8.14E-11	7.03E-11	5.50E-11	4.30E-11	3.36E-11	2.63E-11
cd114	3.32E-06	3.32E-06	3.50E-06	3.55E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06
cd115	1.33E-10	9.76E-11	9.21E-23	2.93E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	2.86E-10	2.81E-10	7.05E-11	1.68E-11	9.78E-13	3.35E-15	1.34E-22	6.31E-35	.00E+00	.00E+00	.00E+00
cd116	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08
cd117	1.57E-12	1.97E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	8.33E-04	8.33E-04	8.69E-04	8.91E-04	9.10E-04	9.19E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04
in113m	5.22E-08	5.19E-08	3.04E-08	1.74E-08	5.78E-09	6.41E-10	8.73E-13	1.46E-17	2.44E-22	4.08E-27	6.83E-32
in114	1.32E-10	8.30E-11	2.39E-11	6.54E-12	5.07E-13	3.05E-15	6.64E-22	5.24E-33	.00E+00	.00E+00	.00E+00
in114m	5.24E-06	5.16E-06	1.49E-06	4.07E-07	3.15E-08	1.90E-10	4.13E-17	3.26E-28	2.57E-39	.00E+00	.00E+00
in115	9.06E-09	9.07E-09	9.28E-09	9.33E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09
in117	5.18E-12	1.26E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.11E-12	6.56E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02
sn113	8.69E-05	8.64E-05	5.05E-05	2.89E-05	9.63E-06	1.07E-06	1.45E-09	2.43E-14	4.06E-19	6.80E-24	1.14E-28
sn114	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02
sn115	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03
sn116	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
sn117m	5.45E-05	5.18E-05	5.55E-07	4.97E-09	4.48E-13	3.68E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
sn119	2.17E-01	2.17E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
sn119m	1.05E-03	1.05E-03	8.48E-04	6.81E-04	4.42E-04	1.86E-04	1.40E-05	1.86E-07	2.47E-09	3.29E-11	4.37E-13
sn120	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01
sn121	1.57E-06	8.52E-07	5.16E-10	5.15E-10	5.12E-10	5.05E-10	4.86E-10	4.57E-10	4.29E-10	4.03E-10	3.78E-10
sn121m	1.19E-05	1.19E-05	1.19E-05	1.18E-05	1.17E-05	1.16E-05	1.12E-05	1.05E-05	9.85E-06	9.25E-06	8.68E-06

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BWR SNF Assembly - Bottom - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.68E-05	1.68E-05	1.04E-05	6.33E-06	2.37E-06	3.34E-07	9.34E-10	5.18E-14	2.87E-18	1.59E-22	8.82E-27
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	2.61E-07	2.43E-07	4.04E-10	5.23E-13	1.03E-18	4.03E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03
sb122	6.73E-07	5.20E-07	6.23E-17	3.03E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.42E-04	1.42E-04	1.49E-04	1.53E-04	1.57E-04	1.59E-04	1.59E-04	1.59E-04	1.59E-04	1.59E-04	1.59E-04
sb124	8.62E-07	8.52E-07	3.06E-07	1.05E-07	1.28E-08	1.92E-10	6.35E-16	4.68E-25	3.45E-34	1.74E-43	.00E+00
sb125	5.94E-04	5.94E-04	5.59E-04	5.24E-04	4.61E-04	3.58E-04	1.67E-04	4.69E-05	1.32E-05	3.71E-06	1.04E-06
sb126	8.19E-08	7.74E-08	5.34E-10	3.03E-12	1.10E-16	1.49E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.51E-04	1.51E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04
te123	1.33E-06	1.33E-06	1.48E-06	1.58E-06	1.67E-06	1.71E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06

te123m	3.89E-07	3.87E-07	2.31E-07	1.35E-07	4.69E-08	5.66E-09	9.92E-12	2.53E-16	6.44E-21	1.64E-25	4.19E-30
te124	1.08E-05	1.08E-05	1.14E-05	1.16E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05
te125	5.18E-04	5.18E-04	5.54E-04	5.89E-04	6.53E-04	7.57E-04	9.51E-04	1.07E-03	1.11E-03	1.12E-03	1.12E-03
te125m	7.72E-06	7.72E-06	7.69E-06	7.36E-06	6.54E-06	5.08E-06	2.37E-06	6.67E-07	1.87E-07	5.26E-08	1.48E-08
te126	1.48E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05
te127	6.59E-11	1.69E-11	3.96E-12	2.20E-12	6.89E-13	6.75E-14	6.36E-17	5.75E-22	5.20E-27	4.71E-32	4.25E-37
te127m	2.01E-09	1.99E-09	1.13E-09	6.29E-10	1.97E-10	1.93E-11	1.82E-14	1.64E-19	1.49E-24	1.34E-29	1.22E-34
te128	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10
te129m	1.58E-15	1.54E-15	2.46E-16	3.65E-17	8.42E-19	4.49E-22	6.85E-32	.00E+00	.00E+00	.00E+00	.00E+00
i127	6.59E-08	6.59E-08	6.68E-08	6.73E-08	6.77E-08	6.79E-08	6.79E-08	6.79E-08	6.79E-08	6.79E-08	6.79E-08
i129	1.83E-13	1.83E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13
xe127	1.24E-15	1.21E-15	2.23E-16	3.83E-17	1.18E-18	1.12E-21	9.75E-31	.00E+00	.00E+00	.00E+00	.00E+00
xe128	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09
xe129	1.04E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11
xe129m	2.58E-14	2.38E-14	2.31E-17	1.70E-20	1.10E-26	4.74E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13
xe131	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15
total	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03

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BWR SNF Assembly - Bottom - decay light elements page 5

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	6.70E-06	6.70E-06	6.61E-06	6.52E-06	6.34E-06	5.99E-06	5.06E-06	3.82E-06	2.88E-06	2.18E-06	1.64E-06
be 10	1.26E-09	1.26E-09	1.26E-09	1.26E-09	1.26E-09	1.26E-09	1.26E-09	1.26E-09	1.26E-09	1.26E-09	1.26E-09
c 14	4.28E-08	4.28E-08	4.28E-08	4.28E-08	4.28E-08	4.28E-08	4.28E-08	4.28E-08	4.27E-08	4.27E-08	4.27E-08
na 24	2.99E-08	9.62E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.06E-12	4.76E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	2.89E+00	4.77E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	7.86E-01	1.38E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	9.49E-10	9.49E-10	9.48E-10	9.47E-10	9.45E-10	9.42E-10	9.30E-10	9.12E-10	8.94E-10	8.76E-10	8.58E-10
p 32	5.68E-04	5.41E-04	7.16E-06	8.07E-08	9.57E-10	9.42E-10	9.31E-10	9.12E-10	8.94E-10	8.76E-10	8.59E-10
p 33	5.40E-08	5.25E-08	4.60E-09	3.66E-10	2.47E-12	1.13E-16	1.08E-29	.00E+00	.00E+00	.00E+00	.00E+00
k 42	4.10E-15	1.07E-15	3.08E-21	3.06E-21	3.03E-21	2.97E-21	2.79E-21	2.51E-21	2.26E-21	2.03E-21	1.83E-21
ca 45	8.95E-09	8.92E-09	6.12E-09	4.14E-09	1.91E-09	4.07E-10	3.94E-12	1.73E-15	7.61E-19	3.35E-22	1.47E-25
ca 47	8.64E-09	7.42E-09	9.19E-15	6.68E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	1.55E-10	1.53E-10	7.35E-11	3.42E-11	7.54E-12	3.68E-13	4.26E-17	1.18E-23	3.24E-30	.00E+00	.00E+00
sc 47	3.36E-05	2.74E-05	3.02E-13	2.67E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	2.06E-04	1.41E-04	2.71E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	7.60E-06	2.01E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	7.16E+02	6.98E+02	7.54E+01	7.45E+00	7.70E-02	8.29E-06	1.03E-17	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	5.08E+01	5.07E+01	4.16E+01	3.39E+01	2.26E+01	1.00E+01	8.80E-01	1.53E-02	2.64E-04	4.58E-06	7.94E-08
mn 56	1.25E+03	1.98E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	3.01E+02	3.00E+02	2.82E+02	2.65E+02	2.33E+02	1.81E+02	8.45E+01	2.37E+01	6.67E+00	1.87E+00	5.26E-01
fe 59	1.63E+01	1.61E+01	4.02E+00	9.51E-01	5.52E-02	1.87E-04	7.23E-12	3.21E-24	.00E+00	.00E+00	.00E+00
co 58m	1.14E-04	1.85E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.06E+02	1.05E+02	4.38E+01	1.77E+01	2.97E+00	8.37E-02	1.87E-06	3.30E-14	5.84E-22	1.03E-29	.00E+00
co 60	4.13E+00	4.13E+00	4.00E+00	3.87E+00	3.62E+00	3.17E+00	2.14E+00	1.11E+00	5.74E-01	2.97E-01	1.54E-01
co 61	1.26E-01	5.27E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	6.68E-02	6.68E-02	6.68E-02	6.68E-02	6.68E-02	6.68E-02	6.68E-02	6.68E-02	6.68E-02	6.68E-02	6.68E-02
ni 63	9.40E+00	9.40E+00	9.38E+00	9.36E+00	9.33E+00	9.27E+00	9.08E+00	8.77E+00	8.47E+00	8.18E+00	7.90E+00
ni 65	9.39E+00	1.28E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	5.23E-05	3.86E-05	6.49E-17	3.76E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	9.17E-02	2.47E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	7.26E-02	3.86E-05	6.50E-17	3.76E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	5.66E-08	4.33E-08	1.73E-18	2.69E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	2.67E-05	2.67E-05	2.07E-05	1.59E-05	9.47E-06	3.35E-06	1.49E-07	8.29E-10	4.61E-12	2.57E-14	1.43E-16
zn 69	2.57E-09	5.54E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.73E-10	5.16E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	2.22E-14	2.09E-14	9.49E-17	3.49E-19	5.39E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

sr 89	2.91E-02	2.87E-02	8.47E-03	2.38E-03	1.94E-04	1.30E-06	3.88E-13	5.19E-24	.00E+00	.00E+00	.00E+00
sr 90	2.10E-06	2.10E-06	2.09E-06	2.08E-06	2.05E-06	2.00E-06	1.86E-06	1.64E-06	1.45E-06	1.28E-06	1.14E-06
sr 91	5.66E-03	9.86E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	2.70E-06	2.67E-06	7.87E-07	2.22E-07	1.81E-08	1.21E-10	3.61E-17	4.82E-28	.00E+00	.00E+00	.00E+00
y 90	1.08E+00	8.32E-01	2.09E-06	2.08E-06	2.05E-06	2.00E-06	1.86E-06	1.64E-06	1.45E-06	1.28E-06	1.14E-06
y 90m	8.33E-08	4.52E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	7.34E-02	7.26E-02	2.53E-02	8.45E-03	9.70E-04	1.28E-05	2.95E-11	1.18E-20	4.75E-30	.00E+00	.00E+00
y 92	6.40E-02	5.81E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.27E-05	2.48E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04	1.28E-04
zr 95	2.24E+01	2.22E+01	8.45E+00	3.10E+00	4.29E-01	8.22E-03	5.79E-08	1.49E-16	3.86E-25	.00E+00	.00E+00
zr 97	3.46E+01	1.29E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 93m	1.46E-05	1.46E-05	1.58E-05	1.70E-05	1.94E-05	2.39E-05	3.65E-05	5.41E-05	6.84E-05	7.98E-05	8.91E-05
nb 94	3.95E-12	3.95E-12	3.95E-12	3.95E-12	3.95E-12	3.95E-12	3.95E-12	3.95E-12	3.95E-12	3.95E-12	3.95E-12
nb 95	2.21E+01	2.21E+01	1.40E+01	6.11E+00	9.26E-01	1.87E-02	1.27E-07	3.29E-16	8.51E-25	.00E+00	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 6

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 95m	2.48E-01	2.48E-01	9.94E-02	3.65E-02	5.05E-03	9.67E-05	6.81E-10	1.76E-18	4.54E-27	.00E+00	.00E+00
nb 96	1.86E-02	9.13E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	3.46E+01	1.30E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.28E+01	1.23E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	3.30E-03	2.57E-03	4.56E-13	3.35E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	1.98E-09	1.98E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09	1.99E-09
ru103	5.21E-12	5.12E-12	1.06E-12	2.08E-13	8.25E-15	1.31E-17	5.17E-26	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	2.02E-08	2.02E-08	1.99E-08	1.97E-08	1.92E-08	1.83E-08	1.58E-08	1.23E-08	9.65E-09	7.54E-09	5.90E-09
cd115	6.79E-05	4.98E-05	4.70E-17	1.49E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	7.28E-06	7.17E-06	1.80E-06	4.27E-07	2.49E-08	8.53E-11	3.42E-18	1.60E-30	.00E+00	.00E+00	.00E+00
cd117	1.69E-05	2.12E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.56E-08	1.82E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	8.73E-01	8.68E-01	5.08E-01	2.91E-01	9.68E-02	1.07E-02	1.46E-05	2.44E-10	4.08E-15	6.83E-20	1.14E-24
in114	1.82E-01	1.14E-01	3.29E-02	9.01E-03	6.98E-04	4.20E-06	9.15E-13	7.21E-24	.00E+00	.00E+00	.00E+00
in114m	1.21E-01	1.19E-01	3.44E-02	9.42E-03	7.29E-04	4.39E-06	9.56E-13	7.54E-24	.00E+00	.00E+00	.00E+00
in116m	2.40E-05	2.37E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	1.90E-04	4.64E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.54E-05	9.06E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	8.73E-01	8.68E-01	5.08E-01	2.91E-01	9.67E-02	1.07E-02	1.46E-05	2.44E-10	4.08E-15	6.83E-20	1.14E-24
sn117m	4.47E+00	4.25E+00	4.55E-02	4.08E-04	3.68E-08	3.02E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	3.93E+00	3.92E+00	3.18E+00	2.55E+00	1.66E+00	6.98E-01	5.23E-02	6.96E-04	9.26E-06	1.23E-07	1.64E-09
sn121	1.51E+00	8.16E-01	4.94E-04	4.93E-04	4.90E-04	4.84E-04	4.66E-04	4.37E-04	4.11E-04	3.86E-04	3.62E-04
sn121m	6.39E-04	6.39E-04	6.37E-04	6.35E-04	6.31E-04	6.23E-04	6.00E-04	5.63E-04	5.29E-04	4.97E-04	4.66E-04
sn123	1.39E-01	1.38E-01	8.55E-02	5.20E-02	1.95E-02	2.75E-03	7.68E-06	4.26E-10	2.36E-14	1.31E-18	7.25E-23
sn123m	8.02E-04	1.23E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	2.83E-02	2.64E-02	4.38E-05	5.67E-08	1.11E-13	4.37E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	2.67E-01	2.06E-01	2.47E-11	1.20E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	1.51E-02	1.49E-02	5.35E-03	1.84E-03	2.25E-04	3.35E-06	1.11E-11	8.18E-21	6.02E-30	.00E+00	.00E+00
sb125	6.23E-01	6.23E-01	5.85E-01	5.49E-01	4.83E-01	3.75E-01	1.75E-01	4.92E-02	1.38E-02	3.88E-03	1.09E-03
sb126	6.85E-03	6.48E-03	4.47E-05	2.53E-07	9.24E-12	1.25E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	3.46E-03	3.44E-03	2.05E-03	1.20E-03	4.17E-04	5.02E-05	8.81E-08	2.24E-12	5.72E-17	1.46E-21	3.71E-26
te125m	1.39E-01	1.39E-01	1.38E-01	1.33E-01	1.18E-01	9.16E-02	4.28E-02	1.20E-02	3.38E-03	9.48E-04	2.66E-04
te127	1.74E-04	4.47E-05	1.05E-05	5.81E-06	1.82E-06	1.78E-07	1.68E-10	1.52E-15	1.37E-20	1.24E-25	1.12E-30
te127m	1.89E-05	1.88E-05	1.07E-05	5.93E-06	1.86E-06	1.82E-07	1.71E-10	1.55E-15	1.40E-20	1.27E-25	1.14E-30
te129	7.37E-10	2.98E-11	4.75E-12	7.05E-13	1.63E-14	8.68E-18	1.32E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	4.75E-11	4.65E-11	7.42E-12	1.10E-12	2.54E-14	1.35E-17	2.06E-27	.00E+00	.00E+00	.00E+00	.00E+00
i130	1.26E-11	3.31E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.11E-15	1.02E-15	4.76E-19	1.64E-22	2.36E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	3.49E-11	3.43E-11	6.29E-12	1.08E-12	3.33E-14	3.18E-17	2.76E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	2.94E-09	2.72E-09	2.63E-12	1.94E-15	1.26E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

xe131m	3.89E-13	3.67E-13	2.06E-15	9.39E-18	2.23E-22	1.37E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.67E+03	1.28E+03	4.88E+02	3.51E+02	2.76E+02	2.05E+02	9.69E+01	3.38E+01	1.58E+01	1.04E+01	8.65E+00

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Bottom - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.79E+13	4.53E+12	9.46E+11	3.81E+11	1.55E+11	6.18E+10	1.09E+10	4.08E+09	2.83E+09	2.22E+09	1.88E+09
3.00E-02	7.95E+12	3.94E+11	1.12E+11	7.35E+10	4.27E+10	2.22E+10	6.89E+09	2.08E+09	7.91E+08	3.69E+08	2.17E+08
5.50E-02	5.36E+12	1.39E+11	2.48E+10	1.04E+10	2.53E+09	9.09E+08	5.55E+08	2.80E+08	1.45E+08	7.62E+07	4.13E+07
8.50E-02	3.09E+12	7.57E+10	1.28E+10	5.30E+09	1.18E+09	3.46E+08	2.09E+08	1.05E+08	5.31E+07	2.72E+07	1.40E+07
1.20E-01	2.17E+12	5.07E+10	8.33E+09	3.46E+09	7.64E+08	2.11E+08	1.16E+08	5.21E+07	2.47E+07	1.22E+07	6.12E+06
1.70E-01	2.38E+12	1.81E+11	1.08E+10	4.69E+09	1.91E+09	1.10E+09	5.17E+08	1.53E+08	4.71E+07	1.53E+07	5.40E+06
3.00E-01	5.40E+12	2.77E+12	3.00E+11	3.27E+10	1.41E+09	4.34E+08	1.95E+08	5.78E+07	1.77E+07	5.75E+06	2.02E+06
6.50E-01	7.38E+13	1.12E+13	5.36E+12	2.99E+12	1.30E+12	4.91E+11	4.58E+10	1.83E+09	3.25E+08	8.86E+07	2.51E+07
1.13E+00	7.42E+11	3.73E+11	3.29E+11	3.18E+11	2.98E+11	2.61E+11	1.76E+11	9.13E+10	4.73E+10	2.45E+10	1.27E+10
1.58E+00	8.02E+12	4.39E+10	9.02E+09	3.65E+09	6.09E+08	1.71E+07	4.57E+02	4.96E+01	3.46E+01	2.58E+01	2.03E+01
2.00E+00	1.27E+13	2.17E+10	1.40E+07	5.92E+06	2.10E+06	1.40E+06	9.40E+05	4.87E+05	2.52E+05	1.31E+05	6.77E+04
2.40E+00	4.88E+11	7.72E+08	8.68E+04	3.23E+04	8.31E+03	4.46E+03	2.97E+03	1.54E+03	7.98E+02	4.13E+02	2.14E+02
2.80E+00	4.41E+11	6.97E+08	7.82E+03	2.69E+03	3.28E+02	4.90E+00	1.62E-05	2.23E-14	8.93E-15	7.92E-15	7.10E-15
3.25E+00	8.08E+10	1.28E+08	1.27E-15	1.26E-15	1.24E-15	1.22E-15	1.14E-15	1.03E-15	9.23E-16	8.31E-16	7.48E-16
3.75E+00	8.45E+05	5.75E+00	1.53E-18	1.52E-18	1.50E-18	1.47E-18	1.38E-18	1.24E-18	1.12E-18	1.01E-18	9.05E-19
4.25E+00	9.50E+05	2.98E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	8.12E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	2.45E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	1.51E+14	1.98E+13	7.12E+12	3.83E+12	1.81E+12	8.39E+11	2.41E+11	9.99E+10	5.15E+10	2.73E+10	1.49E+10
0 mev/sec	9.29E+13	8.76E+12	3.98E+12	2.33E+12	1.19E+12	6.15E+11	2.28E+11	1.04E+11	5.35E+10	2.77E+10	1.43E+10

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	6.41E+04	1.04E+04	2.18E+03	8.75E+02	3.56E+02	1.42E+02	2.52E+01	9.39E+00	6.51E+00	5.10E+00	4.33E+00
3.00E-02	5.48E+04	2.71E+03	7.71E+02	5.07E+02	2.94E+02	1.53E+02	4.75E+01	1.43E+01	5.45E+00	2.55E+00	1.50E+00
5.50E-02	6.78E+04	1.76E+03	3.13E+02	1.31E+02	3.19E+01	1.15E+01	7.02E+00	3.54E+00	1.83E+00	9.64E-01	5.22E-01
8.50E-02	6.04E+04	1.48E+03	2.51E+02	1.04E+02	2.30E+01	6.77E+00	4.09E+00	2.04E+00	1.04E+00	5.31E-01	2.73E-01
1.20E-01	6.00E+04	1.40E+03	2.30E+02	9.54E+01	2.11E+01	5.82E+00	3.20E+00	1.44E+00	6.82E-01	3.36E-01	1.69E-01
1.70E-01	9.30E+04	7.07E+03	4.24E+02	1.83E+02	7.47E+01	4.31E+01	2.02E+01	5.98E+00	1.84E+00	5.99E-01	2.11E-01
3.00E-01	3.72E+05	1.91E+05	2.07E+04	2.26E+03	9.71E+01	2.99E+01	1.35E+01	3.98E+00	1.22E+00	3.97E-01	1.39E-01
6.50E-01	1.10E+07	1.67E+06	8.02E+05	4.47E+05	1.95E+05	7.33E+04	6.84E+03	2.74E+02	4.86E+01	1.32E+01	3.75E+00
1.13E+00	1.92E+05	9.65E+04	8.52E+04	8.24E+04	7.71E+04	6.76E+04	4.56E+04	2.36E+04	1.22E+04	6.33E+03	3.28E+03
1.58E+00	2.90E+06	1.59E+04	3.27E+03	1.32E+03	2.21E+02	6.19E+00	1.66E-04	1.80E-05	1.25E-05	9.34E-06	7.35E-06
2.00E+00	5.86E+06	9.99E+03	6.45E+00	2.72E+00	9.68E-01	6.45E-01	4.32E-01	2.24E-01	1.16E-01	6.01E-02	3.11E-02
2.40E+00	2.69E+05	4.26E+02	4.79E-02	1.78E-02	4.59E-03	2.46E-03	1.64E-03	8.50E-04	4.40E-04	2.28E-04	1.18E-04
2.80E+00	2.84E+05	4.49E+02	5.03E-03	1.73E-03	2.11E-04	3.15E-06	1.04E-11	1.44E-20	5.74E-21	5.10E-21	4.57E-21
3.25E+00	6.04E+04	9.53E+01	9.47E-22	9.41E-22	9.30E-22	9.09E-22	8.52E-22	7.66E-22	6.90E-22	6.21E-22	5.59E-22
3.75E+00	7.28E-01	4.96E-06	1.32E-24	1.31E-24	1.29E-24	1.27E-24	1.19E-24	1.07E-24	9.63E-25	8.67E-25	7.80E-25
4.25E+00	9.29E-01	2.91E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	8.87E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	3.09E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.14E+07	2.01E+06	9.15E+05	5.35E+05	2.73E+05	1.41E+05	5.25E+04	2.39E+04	1.23E+04	6.36E+03	3.29E+03
0 gamma watts	1.49E+01	1.40E+00	6.38E-01	3.73E-01	1.91E-01	9.85E-02	3.66E-02	1.67E-02	8.57E-03	4.43E-03	2.30E-03

1

photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Bottom - decay

spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	2.52E+17	3.24E+16	8.33E+15	6.09E+15	4.06E+15	2.21E+15	8.09E+14	5.64E+14	4.88E+14	4.28E+14	3.77E+14
3.00E-02	1.11E+17	2.53E+16	3.59E+15	2.57E+15	1.72E+15	9.40E+14	3.52E+14	2.48E+14	2.14E+14	1.88E+14	1.66E+14
5.50E-02	5.96E+16	8.73E+15	1.89E+15	1.42E+15	9.65E+14	5.28E+14	1.92E+14	1.30E+14	1.09E+14	9.32E+13	8.07E+13
8.50E-02	4.07E+16	7.48E+15	1.16E+15	8.81E+14	5.97E+14	3.18E+14	1.06E+14	6.90E+13	5.75E+13	4.95E+13	4.31E+13
1.20E-01	3.34E+16	7.03E+15	1.36E+15	1.07E+15	7.27E+14	3.73E+14	1.14E+14	6.95E+13	5.42E+13	4.37E+13	3.60E+13
1.70E-01	5.34E+16	8.43E+15	1.17E+15	6.26E+14	3.84E+14	2.01E+14	6.29E+13	4.15E+13	3.59E+13	3.16E+13	2.78E+13
3.00E-01	1.14E+17	1.75E+16	8.86E+14	6.63E+14	4.47E+14	2.33E+14	7.05E+13	4.56E+13	3.89E+13	3.38E+13	2.95E+13
6.50E-01	2.35E+17	6.46E+16	1.53E+16	8.84E+15	4.91E+15	3.27E+15	1.69E+15	9.76E+14	7.71E+14	6.65E+14	5.86E+14
1.13E+00	7.45E+16	5.03E+15	2.94E+14	2.32E+14	1.85E+14	1.32E+14	7.17E+13	4.20E+13	2.77E+13	1.88E+13	1.29E+13
1.58E+00	3.85E+16	9.01E+15	1.55E+14	7.75E+13	5.81E+13	3.54E+13	1.12E+13	3.15E+12	1.44E+12	8.86E+11	6.14E+11
2.00E+00	1.14E+16	5.65E+14	5.30E+13	3.87E+13	2.51E+13	1.06E+13	8.48E+11	3.10E+10	1.51E+10	1.30E+10	1.14E+10
2.40E+00	9.10E+15	4.32E+14	6.65E+12	2.74E+12	1.91E+12	9.45E+11	1.17E+11	3.77E+09	1.32E+08	1.15E+07	6.68E+06
2.80E+00	3.79E+15	6.86E+12	5.55E+11	4.30E+11	3.03E+11	1.52E+11	1.93E+10	6.29E+08	2.07E+07	6.87E+05	2.28E+04
3.25E+00	1.89E+15	2.54E+12	1.02E+11	6.95E+10	4.93E+10	2.49E+10	3.23E+09	1.07E+08	3.56E+06	1.18E+05	3.91E+03
3.75E+00	8.81E+14	1.34E+10	3.63E+07	3.06E+07	2.17E+07	1.10E+07	1.42E+06	4.73E+04	1.57E+03	5.20E+01	1.72E+00
4.25E+00	8.47E+14	1.83E+09	1.04E-05	1.04E-05	1.05E-05	1.07E-05	1.10E-05	1.12E-05	1.12E-05	1.13E-05	1.13E-05
4.75E+00	2.50E+14	1.36E+10	5.21E-06	5.24E-06	5.29E-06	5.37E-06	5.52E-06	5.62E-06	5.64E-06	5.65E-06	5.65E-06
5.50E+00	1.93E+14	8.70E+07	3.86E-06	3.88E-06	3.92E-06	3.98E-06	4.10E-06	4.17E-06	4.19E-06	4.19E-06	4.19E-06
total	1.04E+18	1.87E+17	3.42E+16	2.25E+16	1.41E+16	8.25E+15	3.48E+15	2.19E+15	1.80E+15	1.55E+15	1.36E+15
mev/sec	4.27E+17	7.38E+16	1.16E+16	6.94E+15	4.03E+15	2.61E+15	1.28E+15	7.42E+14	5.81E+14	4.95E+14	4.31E+14

spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	5.79E+08	7.44E+07	1.91E+07	1.40E+07	9.34E+06	5.09E+06	1.86E+06	1.30E+06	1.12E+06	9.83E+05	8.66E+05
3.00E-02	7.68E+08	1.75E+08	2.47E+07	1.77E+07	1.19E+07	6.49E+06	2.43E+06	1.71E+06	1.48E+06	1.30E+06	1.15E+06
5.50E-02	7.53E+08	1.10E+08	2.39E+07	1.80E+07	1.22E+07	6.67E+06	2.43E+06	1.64E+06	1.37E+06	1.18E+06	1.02E+06
8.50E-02	7.95E+08	1.46E+08	2.26E+07	1.72E+07	1.17E+07	6.22E+06	2.08E+06	1.35E+06	1.12E+06	9.66E+05	8.41E+05
1.20E-01	9.21E+08	1.94E+08	3.76E+07	2.96E+07	2.01E+07	1.03E+07	3.14E+06	1.92E+06	1.50E+06	1.21E+06	9.93E+05
1.70E-01	2.09E+09	3.30E+08	4.57E+07	2.45E+07	1.50E+07	7.86E+06	2.46E+06	1.62E+06	1.40E+06	1.23E+06	1.09E+06
3.00E-01	7.85E+09	1.21E+09	6.11E+07	4.57E+07	3.08E+07	1.61E+07	4.86E+06	3.14E+06	2.69E+06	2.33E+06	2.04E+06
6.50E-01	3.51E+10	9.65E+09	2.28E+09	1.32E+09	7.34E+08	4.88E+08	2.52E+08	1.46E+08	1.15E+08	9.93E+07	8.75E+07
1.13E+00	1.93E+10	1.30E+09	7.61E+07	6.00E+07	4.78E+07	3.41E+07	1.86E+07	1.09E+07	7.17E+06	4.86E+06	3.33E+06
1.58E+00	1.40E+10	3.26E+09	5.63E+07	2.80E+07	2.10E+07	1.28E+07	4.07E+06	1.14E+06	5.23E+05	3.21E+05	2.22E+05
2.00E+00	5.22E+09	2.60E+08	2.43E+07	1.78E+07	1.15E+07	4.88E+06	3.90E+05	1.42E+04	6.97E+03	5.99E+03	5.26E+03
2.40E+00	5.02E+09	2.39E+08	3.67E+06	1.51E+06	1.05E+06	5.21E+05	6.47E+04	2.08E+03	7.27E+01	6.33E+00	3.69E+00
2.80E+00	2.44E+09	4.41E+06	3.57E+05	2.76E+05	1.95E+05	9.78E+04	1.24E+04	4.05E+02	1.34E+01	4.42E-01	1.46E-02
3.25E+00	1.42E+09	1.89E+06	7.62E+04	5.19E+04	3.68E+04	1.86E+04	2.41E+03	8.01E+01	2.66E+00	8.81E-02	2.92E-03
3.75E+00	7.59E+08	1.16E+04	3.13E+01	2.63E+01	1.87E+01	9.48E+00	1.23E+00	4.07E-02	1.35E-03	4.48E-05	1.49E-06
4.25E+00	8.27E+08	1.79E+03	1.01E-11	1.02E-11	1.03E-11	1.05E-11	1.08E-11	1.09E-11	1.10E-11	1.10E-11	1.10E-11
4.75E+00	2.73E+08	1.48E+04	5.69E-12	5.72E-12	5.77E-12	5.86E-12	6.03E-12	6.13E-12	6.16E-12	6.17E-12	6.17E-12
5.50E+00	2.44E+08	1.10E+02	4.88E-12	4.91E-12	4.96E-12	5.04E-12	5.18E-12	5.27E-12	5.29E-12	5.30E-12	5.30E-12
total	9.83E+10	1.70E+10	2.68E+09	1.60E+09	9.26E+08	6.00E+08	2.95E+08	1.71E+08	1.34E+08	1.14E+08	9.91E+07
gamma watts	6.85E+04	1.18E+04	1.87E+03	1.11E+03	6.46E+02	4.18E+02	2.05E+02	1.19E+02	9.31E+01	7.93E+01	6.91E+01

principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
y 91	1.75E+15	1.74E+15	6.08E+14	2.03E+14	2.33E+13	3.08E+11	7.08E+05	2.84E-04	1.14E-13	4.58E-23	.00E+00
mo 99	2.27E+15	1.76E+15	3.13E+05	2.30E-05	2.19E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.69E+15	2.59E+15	2.19E+15	1.85E+15	1.31E+15	6.65E+14	8.61E+13	2.86E+12	9.47E+10	3.14E+09	1.04E+08
ba140	1.94E+15	1.83E+15	1.45E+13	9.54E+10	4.64E+06	1.11E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.63E+15	2.54E+15	2.10E+13	1.37E+11	6.68E+06	1.60E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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     pr144   4.21E+15  4.18E+15  3.37E+15  2.69E+15  1.72E+15  7.09E+14  4.93E+13  5.80E+11  6.83E+09  8.04E+07  9.46E+05
0                  principal photon sources in group  2, photons/sec
       mean energy =   .0300 mev.  nuclides exceeding  5.0E-02 of total group release rate (2.53E+16) at     1.0 d
    nuclide                                          time after discharge
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     te132   4.24E+15  3.43E+15  2.05E+07  5.83E-02  7.59E-19   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     xe133   4.29E+15  4.15E+15  3.62E+10  1.77E+05  5.68E-06  5.89E-27   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ba140   1.61E+15  1.53E+15  1.21E+13  7.96E+10  3.87E+06  9.27E-03   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ce141   1.47E+15  1.45E+15  2.17E+14  3.02E+13  6.13E+11  2.54E+08  1.80E-02  2.18E-19   .00E+00   .00E+00   .00E+00
     ce143   4.88E+15  2.97E+15  9.71E-05  5.44E-25   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pr144   1.39E+15  1.38E+15  1.11E+15  8.90E+14  5.70E+14  2.35E+14  1.63E+13  1.92E+11  2.26E+09  2.66E+07  3.13E+05
     nd147   1.45E+15  1.36E+15  4.93E+12  1.44E+10  1.40E+05  1.36E-05   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
0                  principal photon sources in group  3, photons/sec
       mean energy =   .0550 mev.  nuclides exceeding  5.0E-02 of total group release rate (8.73E+15) at     1.0 d
    nuclide                                          time after discharge
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     rh106   6.37E+14  6.13E+14  5.19E+14  4.37E+14  3.11E+14  1.57E+14  2.04E+13  6.76E+11  2.24E+10  7.43E+08  2.47E+07
     te132   8.17E+14  6.60E+14  3.95E+06  1.12E-02  1.46E-19   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     la140   5.54E+14  5.35E+14  4.42E+12  2.90E+10  1.41E+06  3.38E-03   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ce143   1.39E+15  8.45E+14  2.77E-05  1.55E-25   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pr144   9.78E+14  9.71E+14  7.82E+14  6.25E+14  4.00E+14  1.65E+14  1.15E+13  1.35E+11  1.59E+09  1.87E+07  2.20E+05
     sm153   1.33E+15  9.30E+14  1.19E+01  4.30E-14   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
0                  principal photon sources in group  4, photons/sec
       mean energy =   .0850 mev.  nuclides exceeding  5.0E-02 of total group release rate (7.48E+15) at     1.0 d
    nuclide                                          time after discharge
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     xe133   3.03E+15  2.93E+15  2.56E+10  1.25E+05  4.02E-06  4.16E-27   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     pr144   5.75E+14  5.72E+14  4.60E+14  3.68E+14  2.36E+14  9.69E+13  6.74E+12  7.93E+10  9.34E+08  1.10E+07  1.29E+05
     nd147   8.98E+14  8.44E+14  3.06E+12  8.92E+09  8.71E+04  8.44E-06   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
1                                                                                                                  page  10
0                  principal photon sources in group  5, photons/sec
       mean energy =   .1200 mev.  nuclides exceeding  5.0E-02 of total group release rate (7.03E+15) at     1.0 d
    nuclide                                          time after discharge
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     tc 99m  3.69E+15  3.13E+15  5.60E+05  4.12E-05   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ce144   7.36E+14  7.34E+14  5.91E+14  4.72E+14  3.03E+14  1.24E+14  8.66E+12  1.02E+11  1.20E+09  1.41E+07  1.66E+05
     pr144   4.12E+14  4.09E+14  3.29E+14  2.63E+14  1.69E+14  6.93E+13  4.82E+12  5.68E+10  6.68E+08  7.86E+06  9.25E+04
     sm153   6.34E+14  4.43E+14  5.65E+00  2.05E-14   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
0                  principal photon sources in group  6, photons/sec
       mean energy =   .1700 mev.  nuclides exceeding  5.0E-02 of total group release rate (8.43E+15) at     1.0 d
    nuclide                                          time after discharge
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     mo 99   7.98E+14  6.21E+14  1.10E+05  8.09E-06  7.70E-26   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     tc 99m  2.61E+15  2.21E+15  3.96E+05  2.91E-05   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ba140   4.82E+14  4.56E+14  3.62E+12  2.37E+10  1.15E+06  2.77E-03   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ce141   2.92E+15  2.87E+15  4.30E+14  5.98E+13  1.21E+12  5.02E+08  3.56E-02  4.32E-19   .00E+00   .00E+00   .00E+00
     pr144   4.35E+14  4.32E+14  3.48E+14  2.78E+14  1.78E+14  7.33E+13  5.10E+12  6.00E+10  7.07E+08  8.31E+06  9.78E+04
0                  principal photon sources in group  7, photons/sec
       mean energy =   .3000 mev.  nuclides exceeding  5.0E-02 of total group release rate (1.75E+16) at     1.0 d
    nuclide                                          time after discharge
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     rh105   1.24E+15  8.92E+14  5.87E-04  7.41E-23   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
      i131   4.50E+15  4.20E+15  2.00E+12  6.88E+08  9.90E+01  2.09E-12   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     te132   4.13E+15  3.34E+15  2.00E+07  5.68E-02  7.40E-19   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     xe135   2.50E+15  1.77E+15   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     la140   1.96E+15  1.89E+15  1.56E+13  1.03E+11  4.98E+06  1.19E-02   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
     ce143   3.21E+15  1.96E+15  6.40E-05  3.58E-25   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00   .00E+00
0                  principal photon sources in group  8, photons/sec
       mean energy =   .6500 mev.  nuclides exceeding  5.0E-02 of total group release rate (6.46E+16) at     1.0 d
    nuclide                                          time after discharge
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	8.04E+15	7.95E+15	3.03E+15	1.11E+15	1.54E+14	2.95E+12	2.08E+07	5.37E-02	1.39E-10	3.58E-19	9.62E-28
nb 95	8.37E+15	8.37E+15	5.25E+15	2.28E+15	3.44E+14	6.95E+12	4.74E+07	1.23E-01	3.17E-10	8.18E-19	.00E+00
ru103	5.28E+15	5.18E+15	1.08E+15	2.10E+14	8.35E+12	1.32E+10	5.24E+01	5.20E-13	5.18E-27	.00E+00	.00E+00
i132	1.66E+16	1.35E+16	8.09E+07	2.30E-01	2.99E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.42E+15	3.42E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.64E+15	3.64E+15	3.35E+15	3.08E+15	2.60E+15	1.86E+15	6.78E+14	1.26E+14	2.35E+13	4.38E+12	8.15E+11
la140	6.29E+15	6.07E+15	5.01E+13	3.29E+11	1.60E+07	3.83E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.03E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
sr 91	1.75E+15	3.05E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.81E+06	2.50E-02	3.26E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.06E+15	4.81E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.35E+14	4.12E+14	3.80E+12	2.91E+10	1.92E+06	8.47E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.85E+14	6.61E+14	5.46E+12	3.58E+10	1.74E+06	4.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	5.93E+14	5.68E+14	9.77E+12	1.43E+11	3.41E+07	1.96E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (9.01E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
i132	6.81E+14	5.57E+14	3.33E+06	9.45E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	8.13E+15	7.84E+15	6.48E+13	4.25E+11	2.07E+07	4.95E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (5.65E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
i132	1.75E+14	1.43E+14	8.55E+05	2.43E-03	3.16E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.51E+14	3.58E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.37E+13	5.33E+13	4.30E+13	3.43E+13	2.20E+13	9.05E+12	6.29E+11	7.41E+09	8.72E+07	1.03E+06	1.21E+04
eu156	2.90E+14	2.77E+14	4.78E+12	7.00E+10	1.67E+07	9.59E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.32E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
la140	3.85E+14	3.71E+14	3.07E+12	2.01E+10	9.79E+05	2.35E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.86E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rh106	5.87E+11	5.66E+11	4.79E+11	4.03E+11	2.87E+11	1.45E+11	1.88E+10	6.23E+08	2.07E+07	6.86E+05	2.27E+04
ag112	1.13E+12	5.98E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.40E+12	5.21E+12	4.30E+10	2.82E+08	1.37E+04	3.29E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.54E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
la140	2.46E+12	2.38E+12	1.96E+10	1.29E+08	6.26E+03	1.50E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.34E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	3.18E+12	9.87E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.76E+14	3.46E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.83E+09) at 1.0 d

nuclide	time after discharge

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.90E+11	1.83E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.36E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	4.38E+12	1.36E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.70E+07) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.80E+10	8.70E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Bottom - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio
0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.27E+17	6.61E+16	7.38E+13	5.42E+13	3.28E+13	1.85E+13	1.50E+13	1.54E+13	1.56E+13	1.56E+13	1.56E+13
3.00E-02	7.96E+15	1.35E+15	8.32E+10	7.77E+10	9.81E+10	1.38E+11	2.44E+11	3.90E+11	5.03E+11	5.90E+11	6.57E+11
5.50E-02	1.15E+16	3.68E+15	1.36E+12	1.29E+12	1.61E+12	2.26E+12	4.10E+12	6.62E+12	8.56E+12	1.01E+13	1.12E+13
8.50E-02	5.02E+16	7.23E+15	3.81E+11	2.02E+11	2.02E+11	2.01E+11	2.00E+11	1.98E+11	1.96E+11	1.94E+11	1.92E+11
1.20E-01	5.10E+16	3.72E+16	4.01E+11	2.79E+11	2.75E+11	2.70E+11	2.62E+11	2.50E+11	2.39E+11	2.30E+11	2.21E+11
1.70E-01	1.68E+15	2.71E+14	1.78E+10	6.01E+09	4.28E+09	3.12E+09	2.77E+09	2.71E+09	2.65E+09	2.60E+09	2.55E+09
3.00E-01	2.71E+16	1.96E+16	2.51E+11	1.51E+11	1.50E+11	1.48E+11	1.43E+11	1.34E+11	1.26E+11	1.20E+11	1.14E+11
6.50E-01	1.46E+15	4.46E+13	1.63E+09	1.31E+09	9.61E+08	7.74E+08	8.89E+08	1.06E+09	1.11E+09	1.12E+09	1.11E+09
1.13E+00	1.57E+15	9.82E+14	6.05E+08	5.71E+08	5.31E+08	5.02E+08	4.86E+08	4.68E+08	4.50E+08	4.32E+08	4.16E+08
1.58E+00	9.54E+07	9.07E+07	7.86E+07	7.06E+07	6.21E+07	5.79E+07	6.21E+07	6.48E+07	6.19E+07	5.73E+07	5.25E+07
2.00E+00	1.50E+06	9.67E+05	9.39E+05	9.62E+05	1.01E+06	1.11E+06	1.38E+06	1.62E+06	1.68E+06	1.67E+06	1.64E+06
2.40E+00	4.03E+07	4.03E+07	3.43E+07	2.99E+07	2.48E+07	2.09E+07	1.80E+07	1.49E+07	1.23E+07	1.02E+07	8.53E+06
2.80E+00	7.43E+07	7.54E+07	7.85E+07	8.39E+07	9.76E+07	1.31E+08	2.24E+08	3.05E+08	3.24E+08	3.19E+08	3.07E+08
3.25E+00	1.44E+07	1.44E+07	1.23E+07	1.07E+07	8.90E+06	7.51E+06	6.43E+06	5.33E+06	4.42E+06	3.67E+06	3.05E+06
3.75E+00	8.36E+06	8.36E+06	7.11E+06	6.21E+06	5.16E+06	4.35E+06	3.73E+06	3.09E+06	2.56E+06	2.13E+06	1.77E+06
4.25E+00	4.85E+06	4.85E+06	4.12E+06	3.60E+06	2.99E+06	2.52E+06	2.16E+06	1.79E+06	1.49E+06	1.23E+06	1.03E+06
4.75E+00	2.81E+06	2.81E+06	2.39E+06	2.09E+06	1.73E+06	1.46E+06	1.25E+06	1.04E+06	8.61E+05	7.15E+05	5.95E+05
5.50E+00	2.54E+06	2.54E+06	2.16E+06	1.89E+06	1.57E+06	1.32E+06	1.13E+06	9.39E+05	7.79E+05	6.47E+05	5.38E+05
0 total	2.79E+17	1.36E+17	7.63E+13	5.62E+13	3.51E+13	2.15E+13	2.00E+13	2.29E+13	2.52E+13	2.68E+13	2.80E+13
0 mev/sec	2.37E+16	1.30E+16	9.76E+11	7.15E+11	5.17E+11	4.10E+11	4.77E+11	6.19E+11	7.28E+11	8.10E+11	8.73E+11

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio
0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.91E+08	1.52E+08	1.70E+05	1.25E+05	7.54E+04	4.26E+04	3.45E+04	3.53E+04	3.58E+04	3.59E+04	3.59E+04
3.00E-02	5.49E+07	9.33E+06	5.74E+02	5.36E+02	6.77E+02	9.48E+02	1.69E+03	2.69E+03	3.47E+03	4.07E+03	4.53E+03
5.50E-02	1.46E+08	4.65E+07	1.71E+04	1.63E+04	2.03E+04	2.86E+04	5.18E+04	8.36E+04	1.08E+05	1.27E+05	1.42E+05
8.50E-02	9.81E+08	1.41E+08	7.44E+03	3.95E+03	3.94E+03	3.93E+03	3.91E+03	3.86E+03	3.82E+03	3.78E+03	3.75E+03
1.20E-01	1.41E+09	1.03E+09	1.11E+04	7.70E+03	7.58E+03	7.46E+03	7.22E+03	6.89E+03	6.60E+03	6.33E+03	6.10E+03
1.70E-01	6.57E+07	1.06E+07	6.94E+02	2.35E+02	1.67E+02	1.22E+02	1.08E+02	1.06E+02	1.04E+02	1.02E+02	9.98E+01
3.00E-01	1.87E+09	1.35E+09	1.73E+04	1.04E+04	1.04E+04	1.02E+04	9.83E+03	9.24E+03	8.72E+03	8.26E+03	7.86E+03
6.50E-01	2.19E+08	6.66E+06	2.44E+02	1.96E+02	1.44E+02	1.16E+02	1.33E+02	1.58E+02	1.66E+02	1.67E+02	1.65E+02
1.13E+00	4.06E+08	2.54E+08	1.57E+02	1.48E+02	1.37E+02	1.30E+02	1.26E+02	1.21E+02	1.16E+02	1.12E+02	1.08E+02
1.58E+00	3.45E+01	3.28E+01	2.85E+01	2.56E+01	2.25E+01	2.10E+01	2.25E+01	2.35E+01	2.24E+01	2.07E+01	1.90E+01
2.00E+00	6.88E-01	4.45E-01	4.32E-01	4.42E-01	4.64E-01	5.11E-01	6.35E-01	7.44E-01	7.71E-01	7.67E-01	7.52E-01
2.40E+00	2.22E+01	2.22E+01	1.89E+01	1.65E+01	1.37E+01	1.16E+01	9.90E+00	8.20E+00	6.81E+00	5.66E+00	4.70E+00
2.80E+00	4.78E+01	4.85E+01	5.05E+01	5.40E+01	6.29E+01	8.41E+01	1.44E+02	1.96E+02	2.09E+02	2.06E+02	1.98E+02
3.25E+00	1.08E+01	1.08E+01	9.17E+00	8.00E+00	6.65E+00	5.61E+00	4.81E+00	3.98E+00	3.30E+00	2.74E+00	2.28E+00

	3.75E+00	7.21E+00	7.21E+00	6.13E+00	5.35E+00	4.45E+00	3.75E+00	3.22E+00	2.66E+00	2.21E+00	1.83E+00	1.53E+00
	4.25E+00	4.73E+00	4.73E+00	4.03E+00	3.51E+00	2.92E+00	2.46E+00	2.11E+00	1.75E+00	1.45E+00	1.21E+00	1.00E+00
	4.75E+00	3.07E+00	3.07E+00	2.61E+00	2.28E+00	1.89E+00	1.60E+00	1.37E+00	1.13E+00	9.40E-01	7.81E-01	6.49E-01
	5.50E+00	3.21E+00	3.21E+00	2.73E+00	2.38E+00	1.98E+00	1.67E+00	1.43E+00	1.19E+00	9.85E-01	8.18E-01	6.80E-01
0	total	5.44E+09	3.00E+09	2.24E+05	1.64E+05	1.19E+05	9.42E+04	1.10E+05	1.42E+05	1.67E+05	1.86E+05	2.01E+05
0	gamma watts	3.79E+03	2.09E+03	1.57E-01	1.15E-01	8.29E-02	6.57E-02	7.64E-02	9.92E-02	1.17E-01	1.30E-01	1.40E-01

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - bot ds2 - discharge

0 1.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.3561E+11	1.9068E+10
5.0000E-02	to	1.0000E-01	1.4703E+11	1.1027E+10
1.0000E-01	to	2.0000E-01	2.4619E+11	3.6929E+10
2.0000E-01	to	3.0000E-01	4.1261E+10	1.0315E+10
3.0000E-01	to	4.0000E-01	2.3546E+12	8.2411E+11
4.0000E-01	to	6.0000E-01	1.2518E+12	6.2592E+11
6.0000E-01	to	8.0000E-01	2.7060E+12	1.8942E+12
8.0000E-01	to	1.0000E+00	5.3194E+12	4.7875E+12
1.0000E+00	to	1.3300E+00	2.6825E+11	3.1251E+11
1.3300E+00	to	1.6600E+00	7.5117E+10	1.1230E+11
1.6600E+00	to	2.0000E+00	4.6276E+10	8.4684E+10
2.0000E+00	to	2.5000E+00	9.9327E+09	2.2349E+10
2.5000E+00	to	3.0000E+00	1.3841E+09	3.8063E+09
3.0000E+00	to	4.0000E+00	1.1880E+08	4.1580E+08
4.0000E+00	to	5.0000E+00	2.8252E-03	1.2714E-02
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			1.3103E+13	8.7451E+12

0
0 total energy from nuclides with spectrum data = 8.7183E+12
0 total energy from nuclides with no spectrum data = 2.6781E+10

1 gamma source spectrum for decay step for BWR source term - bot ds2 - 0.25 year

0 90.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.5768E+11	4.7303E+09
5.0000E-02	to	1.0000E-01	2.5419E+10	1.9065E+09
1.0000E-01	to	2.0000E-01	1.9021E+10	2.8531E+09
2.0000E-01	to	3.0000E-01	5.8845E+09	1.4711E+09
3.0000E-01	to	4.0000E-01	2.5455E+11	8.9094E+10
4.0000E-01	to	6.0000E-01	5.1129E+11	2.5565E+11
6.0000E-01	to	8.0000E-01	9.0893E+11	6.3625E+11
8.0000E-01	to	1.0000E+00	2.9051E+12	2.6145E+12
1.0000E+00	to	1.3300E+00	2.3469E+11	2.7341E+11
1.3300E+00	to	1.6600E+00	6.6273E+10	9.9078E+10
1.6600E+00	to	2.0000E+00	7.7991E+09	1.4272E+10
2.0000E+00	to	2.5000E+00	1.2527E+07	2.8185E+07
2.5000E+00	to	3.0000E+00	1.0441E+04	2.8713E+04
3.0000E+00	to	4.0000E+00	1.1846E-15	4.1462E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00

	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		5.0966E+12	3.9933E+12
0				
0	total energy from nuclides with spectrum data =			3.9710E+12
0	total energy from nuclides with no spectrum data =			2.2246E+10
1	gamma source spectrum for decay step for BWR source term - bot ds2 - 0.50 year			
0	182.50 day time of the requested nuclides			
0	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	9.3319E+10	2.7996E+09
	5.0000E-02 to	1.0000E-01	1.0596E+10	7.9470E+08
	1.0000E-01 to	2.0000E-01	8.1079E+09	1.2162E+09
	2.0000E-01 to	3.0000E-01	2.4811E+09	6.2028E+08
	3.0000E-01 to	4.0000E-01	2.6509E+10	9.2782E+09
	4.0000E-01 to	6.0000E-01	2.1287E+11	1.0643E+11
	6.0000E-01 to	8.0000E-01	3.7644E+11	2.6350E+11
	8.0000E-01 to	1.0000E+00	1.7683E+12	1.5915E+12
	1.0000E+00 to	1.3300E+00	2.2756E+11	2.6511E+11
	1.3300E+00 to	1.6600E+00	6.4260E+10	9.6069E+10
	1.6600E+00 to	2.0000E+00	3.1605E+09	5.7838E+09
	2.0000E+00 to	2.5000E+00	5.3039E+06	1.1934E+07
	2.5000E+00 to	3.0000E+00	5.1301E+03	1.4108E+04
	3.0000E+00 to	4.0000E+00	1.1804E-15	4.1314E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		2.7936E+12	2.3431E+12
0				
0	total energy from nuclides with spectrum data =			2.3240E+12
0	total energy from nuclides with no spectrum data =			1.9099E+10
1	gamma source spectrum for decay step for BWR source term - bot ds2 - 1 year			
0	365.25 day time of the requested nuclides			
0	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	4.8325E+10	1.4497E+09
	5.0000E-02 to	1.0000E-01	2.4518E+09	1.8388E+08
	1.0000E-01 to	2.0000E-01	2.7794E+09	4.1691E+08
	2.0000E-01 to	3.0000E-01	5.3235E+08	1.3309E+08
	3.0000E-01 to	4.0000E-01	8.4299E+08	2.9505E+08
	4.0000E-01 to	6.0000E-01	4.2551E+10	2.1276E+10
	6.0000E-01 to	8.0000E-01	5.9248E+10	4.1473E+10
	8.0000E-01 to	1.0000E+00	8.8488E+11	7.9639E+11
	1.0000E+00 to	1.3300E+00	2.1404E+11	2.4935E+11
	1.3300E+00 to	1.6600E+00	6.0442E+10	9.0361E+10
	1.6600E+00 to	2.0000E+00	5.3068E+08	9.7115E+08
	2.0000E+00 to	2.5000E+00	1.8973E+06	4.2689E+06
	2.5000E+00 to	3.0000E+00	2.5629E+03	7.0480E+03
	3.0000E+00 to	4.0000E+00	1.1719E-15	4.1017E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.3166E+12	1.2023E+12
0				
0	total energy from nuclides with spectrum data =			1.1870E+12
0	total energy from nuclides with no spectrum data =			1.5306E+10
1	gamma source spectrum for decay step for BWR source term - bot ds2 - 2 year			
0	730.50 day time of the requested nuclides			

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.4820E+10	7.4460E+08
5.0000E-02	to	1.0000E-01	7.8591E+08	5.8943E+07
1.0000E-01	to	2.0000E-01	1.4177E+09	2.1265E+08
2.0000E-01	to	3.0000E-01	1.0043E+08	2.5107E+07
3.0000E-01	to	4.0000E-01	3.0703E+08	1.0746E+08
4.0000E-01	to	6.0000E-01	7.4385E+09	3.7192E+09
6.0000E-01	to	8.0000E-01	4.4468E+09	3.1127E+09
8.0000E-01	to	1.0000E+00	3.5331E+11	3.1797E+11
1.0000E+00	to	1.3300E+00	1.8866E+11	2.1979E+11
1.3300E+00	to	1.6600E+00	5.3277E+10	7.9649E+10
1.6600E+00	to	2.0000E+00	1.4970E+07	2.7394E+07
2.0000E+00	to	2.5000E+00	1.2713E+06	2.8604E+06
2.5000E+00	to	3.0000E+00	1.9656E+03	5.4053E+03
3.0000E+00	to	4.0000E+00	1.1518E-15	4.0314E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			6.3457E+11	6.2542E+11

total energy from nuclides with spectrum data = 6.1416E+11
total energy from nuclides with no spectrum data = 1.1264E+10
gamma source spectrum for decay step for BWR source term - bot ds2 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	8.5549E+09	2.5665E+08
5.0000E-02	to	1.0000E-01	4.7499E+08	3.5624E+07
1.0000E-01	to	2.0000E-01	6.8160E+08	1.0224E+08
2.0000E-01	to	3.0000E-01	3.9685E+07	9.9213E+06
3.0000E-01	to	4.0000E-01	1.4310E+08	5.0084E+07
4.0000E-01	to	6.0000E-01	3.0334E+09	1.5167E+09
6.0000E-01	to	8.0000E-01	1.5705E+09	1.0993E+09
8.0000E-01	to	1.0000E+00	3.0897E+10	2.7807E+10
1.0000E+00	to	1.3300E+00	1.2771E+11	1.4878E+11
1.3300E+00	to	1.6600E+00	3.6065E+10	5.3917E+10
1.6600E+00	to	2.0000E+00	3.3903E+02	6.2042E+02
2.0000E+00	to	2.5000E+00	8.5587E+05	1.9257E+06
2.5000E+00	to	3.0000E+00	1.3271E+03	3.6496E+03
3.0000E+00	to	4.0000E+00	1.0844E-15	3.7955E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			2.0917E+11	2.3358E+11

total energy from nuclides with spectrum data = 2.2836E+11
total energy from nuclides with no spectrum data = 5.2150E+09
gamma source spectrum for decay step for BWR source term - bot ds2 - 10 year
3652.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.9751E+09	8.9252E+07
5.0000E-02	to	1.0000E-01	2.3520E+08	1.7640E+07
1.0000E-01	to	2.0000E-01	2.1468E+08	3.2202E+07
2.0000E-01	to	3.0000E-01	1.2284E+07	3.0710E+06
3.0000E-01	to	4.0000E-01	4.1479E+07	1.4518E+07
4.0000E-01	to	6.0000E-01	8.4512E+08	4.2256E+08

6.0000E-01 to	8.0000E-01	4.3752E+08	3.0627E+08
8.0000E-01 to	1.0000E+00	5.3373E+08	4.8036E+08
1.0000E+00 to	1.3300E+00	6.5597E+10	7.6421E+10
1.3300E+00 to	1.6600E+00	1.8525E+10	2.7694E+10
1.6600E+00 to	2.0000E+00	4.0635E+00	7.4361E+00
2.0000E+00 to	2.5000E+00	4.3962E+05	9.8914E+05
2.5000E+00 to	3.0000E+00	6.8167E+02	1.8746E+03
3.0000E+00 to	4.0000E+00	9.6746E-16	3.3861E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		8.9417E+10	1.0548E+11

total energy from nuclides with spectrum data = 1.0401E+11
total energy from nuclides with no spectrum data = 1.4705E+09
gamma source spectrum for decay step for BWR source term - bot ds2 - 15 year
5478.75 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.3509E+09	4.0528E+07
5.0000E-02 to	1.0000E-01	1.1893E+08	8.9201E+06
1.0000E-01 to	2.0000E-01	7.2716E+07	1.0907E+07
2.0000E-01 to	3.0000E-01	4.0652E+06	1.0163E+06
3.0000E-01 to	4.0000E-01	1.2415E+07	4.3451E+06
4.0000E-01 to	6.0000E-01	2.3602E+08	1.1801E+08
6.0000E-01 to	8.0000E-01	1.2218E+08	8.5527E+07
8.0000E-01 to	1.0000E+00	1.0647E+07	9.5822E+06
1.0000E+00 to	1.3300E+00	3.3772E+10	3.9344E+10
1.3300E+00 to	1.6600E+00	9.5371E+09	1.4258E+10
1.6600E+00 to	2.0000E+00	3.5704E+00	6.5338E+00
2.0000E+00 to	2.5000E+00	2.2633E+05	5.0924E+05
2.5000E+00 to	3.0000E+00	3.5095E+02	9.6510E+02
3.0000E+00 to	4.0000E+00	8.6528E-16	3.0285E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		4.5237E+10	5.3881E+10

total energy from nuclides with spectrum data = 5.3463E+10
total energy from nuclides with no spectrum data = 4.1846E+08
gamma source spectrum for decay step for BWR source term - bot ds2 - 20 year
7305.00 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	7.6306E+08	2.2892E+07
5.0000E-02 to	1.0000E-01	6.0954E+07	4.5716E+06
1.0000E-01 to	2.0000E-01	2.6959E+07	4.0439E+06
2.0000E-01 to	3.0000E-01	1.4669E+06	3.6672E+05
3.0000E-01 to	4.0000E-01	3.9067E+06	1.3673E+06
4.0000E-01 to	6.0000E-01	6.6118E+07	3.3059E+07
6.0000E-01 to	8.0000E-01	3.4223E+07	2.3956E+07
8.0000E-01 to	1.0000E+00	9.3489E+05	8.4140E+05
1.0000E+00 to	1.3300E+00	1.7437E+10	2.0314E+10
1.3300E+00 to	1.6600E+00	4.9242E+09	7.3616E+09
1.6600E+00 to	2.0000E+00	3.1462E+00	5.7575E+00
2.0000E+00 to	2.5000E+00	1.1686E+05	2.6293E+05
2.5000E+00 to	3.0000E+00	1.8120E+02	4.9830E+02
3.0000E+00 to	4.0000E+00	7.7613E-16	2.7164E-15

```
                      4.0000E+00 to      5.0000E+00        .0000E+00        .0000E+00
                      5.0000E+00 to      6.5000E+00        .0000E+00        .0000E+00
                      6.5000E+00 to      8.0000E+00        .0000E+00        .0000E+00
                      8.0000E+00 to      1.0000E+01        .0000E+00        .0000E+00
0                     totals                             2.3319E+10       2.7767E+10
0
0                     total energy from nuclides with spectrum data    =   2.7644E+10
0                     total energy from nuclides with no spectrum data =   1.2288E+08
1                     gamma source spectrum for   decay step for BWR source term - bot ds2 - 25 year
0                                  9131.25  day time of the requested nuclides
0                          energy interval in mev      photons / second     mev / second
0
                      1.0000E-02 to      5.0000E-02       5.2385E+08       1.5715E+07
                      5.0000E-02 to      1.0000E-01       3.1541E+07       2.3656E+06
                      1.0000E-01 to      2.0000E-01       1.0975E+07       1.6463E+06
                      2.0000E-01 to      3.0000E-01       5.8178E+05       1.4544E+05
                      3.0000E-01 to      4.0000E-01       1.3187E+06       4.6155E+05
                      4.0000E-01 to      6.0000E-01       1.8560E+07       9.2802E+06
                      6.0000E-01 to      8.0000E-01       9.6044E+06       6.7231E+06
                      8.0000E-01 to      1.0000E+00       4.0464E+05       3.6418E+05
                      1.0000E+00 to      1.3300E+00       9.0183E+09       1.0506E+10
                      1.3300E+00 to      1.6600E+00       2.5468E+09       3.8074E+09
                      1.6600E+00 to      2.0000E+00       2.7771E+00       5.0821E+00
                      2.0000E+00 to      2.5000E+00       6.0439E+04       1.3599E+05
                      2.5000E+00 to      3.0000E+00       9.3716E+01       2.5772E+02
                      3.0000E+00 to      4.0000E+00       6.9735E-16       2.4407E-15
                      4.0000E+00 to      5.0000E+00        .0000E+00        .0000E+00
                      5.0000E+00 to      6.5000E+00        .0000E+00        .0000E+00
                      6.5000E+00 to      8.0000E+00        .0000E+00        .0000E+00
                      8.0000E+00 to      1.0000E+01        .0000E+00        .0000E+00
0                     totals                             1.2162E+10       1.4351E+10
0
0                     total energy from nuclides with spectrum data    =   1.4311E+10
0                     total energy from nuclides with no spectrum data =   3.9828E+07
1
1  * normal termination of execution *
0                                    table of contents for material tables
0                                      case or subcase printed      page

                                                      1                1
0ndset           33
           33             4             1            27             6             0             0             0             0             0
            0             0             0             0             0             2            -1          1698           690           130
          880          7935             0             5            99             7             9            93            18            18
           18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     13 entries read
0   74* array     13 entries read
```

```
0   75$ array     13 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0            0
            21          100           13            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero            4
             0          689          129          879
0pow              3
   .000000E+00  .000000E+00  .000000E+00
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              3.4750E+00       1.9421E+02       1.9769E+02
 start of interval flux =         1.59007E+13
 n-gamma, fission and total mev/fission =              3.8483E+00       1.9431E+02       1.9816E+02
 start of interval flux =         1.59416E+13
 n-gamma, fission and total mev/fission =              3.9383E+00       1.9441E+02       1.9835E+02
 start of interval flux =         1.59928E+13
 n-gamma, fission and total mev/fission =              4.0273E+00       1.9451E+02       1.9853E+02
 start of interval flux =         1.60545E+13
 n-gamma, fission and total mev/fission =              4.1190E+00       1.9460E+02       1.9872E+02
 start of interval flux =         1.61255E+13
 n-gamma, fission and total mev/fission =              4.2132E+00       1.9469E+02       1.9890E+02
 start of interval flux =         1.62047E+13
 n-gamma, fission and total mev/fission =              4.3095E+00       1.9477E+02       1.9908E+02
 start of interval flux =         1.62913E+13
 n-gamma, fission and total mev/fission =              4.4076E+00       1.9486E+02       1.9926E+02
 start of interval flux =         1.63846E+13
 n-gamma, fission and total mev/fission =              4.5072E+00       1.9494E+02       1.9944E+02
 start of interval flux =         1.64841E+13
 n-gamma, fission and total mev/fission =              4.6080E+00       1.9502E+02       1.9962E+02
 start of interval flux =         1.65893E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
0ndset           33
            33            4            2           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
```

```
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 1.799989E+03 1.624619E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              4.6759E+00       1.9507E+02       1.9975E+02
 start of interval flux =         1.65408E+13
 n-gamma, fission and total mev/fission =              4.7673E+00       1.9515E+02       1.9991E+02
 start of interval flux =         1.66649E+13
 n-gamma, fission and total mev/fission =              4.8655E+00       1.9522E+02       2.0009E+02
 start of interval flux =         1.67930E+13
 n-gamma, fission and total mev/fission =              4.9653E+00       1.9529E+02       2.0026E+02
 start of interval flux =         1.69254E+13
 n-gamma, fission and total mev/fission =              5.0664E+00       1.9536E+02       2.0043E+02
 start of interval flux =         1.70620E+13
 n-gamma, fission and total mev/fission =              5.1684E+00       1.9544E+02       2.0060E+02
 start of interval flux =         1.72026E+13
 n-gamma, fission and total mev/fission =              5.2714E+00       1.9551E+02       2.0078E+02
 start of interval flux =         1.73470E+13
 n-gamma, fission and total mev/fission =              5.3752E+00       1.9558E+02       2.0095E+02
 start of interval flux =         1.74950E+13
 n-gamma, fission and total mev/fission =              5.4798E+00       1.9565E+02       2.0113E+02
 start of interval flux =         1.76465E+13
 n-gamma, fission and total mev/fission =              5.5852E+00       1.9572E+02       2.0130E+02
 start of interval flux =         1.78013E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
0ndset           33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
```

```
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 3.599977E+03 1.723178E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              5.4980E+00       1.9575E+02       2.0125E+02
 start of interval flux =         1.78762E+13
 n-gamma, fission and total mev/fission =              5.5921E+00       1.9581E+02       2.0141E+02
 start of interval flux =         1.80660E+13
 n-gamma, fission and total mev/fission =              5.6995E+00       1.9588E+02       2.0158E+02
 start of interval flux =         1.82583E+13
 n-gamma, fission and total mev/fission =              5.8085E+00       1.9594E+02       2.0175E+02
 start of interval flux =         1.84533E+13
 n-gamma, fission and total mev/fission =              5.9184E+00       1.9601E+02       2.0192E+02
 start of interval flux =         1.86510E+13
 n-gamma, fission and total mev/fission =              6.0293E+00       1.9607E+02       2.0210E+02
 start of interval flux =         1.88512E+13
 n-gamma, fission and total mev/fission =              6.1411E+00       1.9614E+02       2.0228E+02
 start of interval flux =         1.90540E+13
 n-gamma, fission and total mev/fission =              6.2538E+00       1.9620E+02       2.0245E+02
 start of interval flux =         1.92592E+13
 n-gamma, fission and total mev/fission =              6.3673E+00       1.9627E+02       2.0263E+02
 start of interval flux =         1.94668E+13
 n-gamma, fission and total mev/fission =              6.4816E+00       1.9633E+02       2.0281E+02
 start of interval flux =         1.96767E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
0ndset           33
            33            4            4           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
```

```
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
           0           0           0           0           0           0           0           0           0           0
           0           0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
        7935          20           6          18        1697
0mmn             19
          10          10           0           0           1           3           0           0           0          10
          21         100           0           4           3           0           2           1           0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
          21         689         129         879
0pow              3
  4.349999E+00 5.399966E+03 1.887921E+13
0 linp            9
           6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =            6.4185E+00  1.9638E+02  2.0280E+02
 start of interval flux =         1.98437E+13
 n-gamma, fission and total mev/fission =            6.5318E+00  1.9644E+02  2.0297E+02
 start of interval flux =         2.00890E+13
 n-gamma, fission and total mev/fission =            6.6530E+00  1.9650E+02  2.0315E+02
 start of interval flux =         2.03360E+13
 n-gamma, fission and total mev/fission =            6.7754E+00  1.9656E+02  2.0334E+02
 start of interval flux =         2.05844E+13
 n-gamma, fission and total mev/fission =            6.8985E+00  1.9663E+02  2.0353E+02
 start of interval flux =         2.08343E+13
 n-gamma, fission and total mev/fission =            7.0225E+00  1.9669E+02  2.0371E+02
 start of interval flux =         2.10854E+13
 n-gamma, fission and total mev/fission =            7.1472E+00  1.9676E+02  2.0390E+02
 start of interval flux =         2.13379E+13
 n-gamma, fission and total mev/fission =            7.2725E+00  1.9682E+02  2.0409E+02
 start of interval flux =         2.15915E+13
 n-gamma, fission and total mev/fission =            7.3986E+00  1.9689E+02  2.0428E+02
 start of interval flux =         2.18463E+13
 n-gamma, fission and total mev/fission =            7.5252E+00  1.9695E+02  2.0448E+02
 start of interval flux =         2.21022E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
0ndset           33
          33           4           5          27           6           0           0           0           0           0
           0           0           0           0           0           2          -1        1698         690         130
         880        7935           0           5          99           7           9          93          18          18
          18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
```

```
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
                 0            0            0            0            0            0            0            0            0            0
                 0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
                10           10            0            0            1            3            0            0            0           10
                21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
                21          689          129          879
0pow              3
  4.349999E+00 7.199954E+03 2.111307E+13
0 linp            9
                 6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              7.4667E+00       1.9701E+02       2.0447E+02
 start of interval flux =         2.23534E+13
 n-gamma, fission and total mev/fission =              7.5956E+00       1.9707E+02       2.0466E+02
 start of interval flux =         2.26515E+13
 n-gamma, fission and total mev/fission =              7.7321E+00       1.9713E+02       2.0486E+02
 start of interval flux =         2.29495E+13
 n-gamma, fission and total mev/fission =              7.8691E+00       1.9719E+02       2.0506E+02
 start of interval flux =         2.32468E+13
 n-gamma, fission and total mev/fission =              8.0063E+00       1.9726E+02       2.0526E+02
 start of interval flux =         2.35433E+13
 n-gamma, fission and total mev/fission =              8.1439E+00       1.9732E+02       2.0547E+02
 start of interval flux =         2.38389E+13
 n-gamma, fission and total mev/fission =              8.2816E+00       1.9739E+02       2.0567E+02
 start of interval flux =         2.41336E+13
 n-gamma, fission and total mev/fission =              8.4193E+00       1.9745E+02       2.0587E+02
 start of interval flux =         2.44273E+13
 n-gamma, fission and total mev/fission =              8.5572E+00       1.9752E+02       2.0608E+02
 start of interval flux =         2.47199E+13
 n-gamma, fission and total mev/fission =              8.6950E+00       1.9759E+02       2.0628E+02
 start of interval flux =         2.50112E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
0ndset           33
                33            4            5           27            6            0            0            0            0            0
                 0            0            0            0            0            2           -1         1698          690          130
               880         7935            0            5           99            7            9           93           18           18
                18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
```

```
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
              0            0            0            0            0            0            0            0            0            0
              0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
           7935           20            6           18         1697
0mmn             19
             10           10            0            0            1            3            0            0            0           10
             21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
             21          689          129          879
0pow              3
  4.349999E+00 8.999942E+03 2.386250E+13
0 linp            9
              6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              8.8456E+00       1.9766E+02       2.0650E+02
 start of interval flux =         2.53279E+13
 n-gamma, fission and total mev/fission =              8.9212E+00       1.9770E+02       2.0662E+02
 start of interval flux =         2.54880E+13
 n-gamma, fission and total mev/fission =              8.9979E+00       1.9773E+02       2.0673E+02
 start of interval flux =         2.56476E+13
 n-gamma, fission and total mev/fission =              9.0743E+00       1.9777E+02       2.0685E+02
 start of interval flux =         2.58067E+13
 n-gamma, fission and total mev/fission =              9.1508E+00       1.9781E+02       2.0696E+02
 start of interval flux =         2.59653E+13
 n-gamma, fission and total mev/fission =              9.2271E+00       1.9785E+02       2.0707E+02
 start of interval flux =         2.61235E+13
 n-gamma, fission and total mev/fission =              9.3034E+00       1.9788E+02       2.0719E+02
 start of interval flux =         2.62811E+13
 n-gamma, fission and total mev/fission =              9.3796E+00       1.9792E+02       2.0730E+02
 start of interval flux =         2.64382E+13
 n-gamma, fission and total mev/fission =              9.4556E+00       1.9796E+02       2.0741E+02
 start of interval flux =         2.65947E+13
 n-gamma, fission and total mev/fission =              9.5316E+00       1.9800E+02       2.0753E+02
 start of interval flux =         2.67506E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 50000 MWd/MTU
0ndset           33
             33            4            5           27            6            0            0            0            0            0
              0            0            0            0            0            2           -1         1698          690          130
            880         7935            0            5           99            7            9           93           18           18
             18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
```

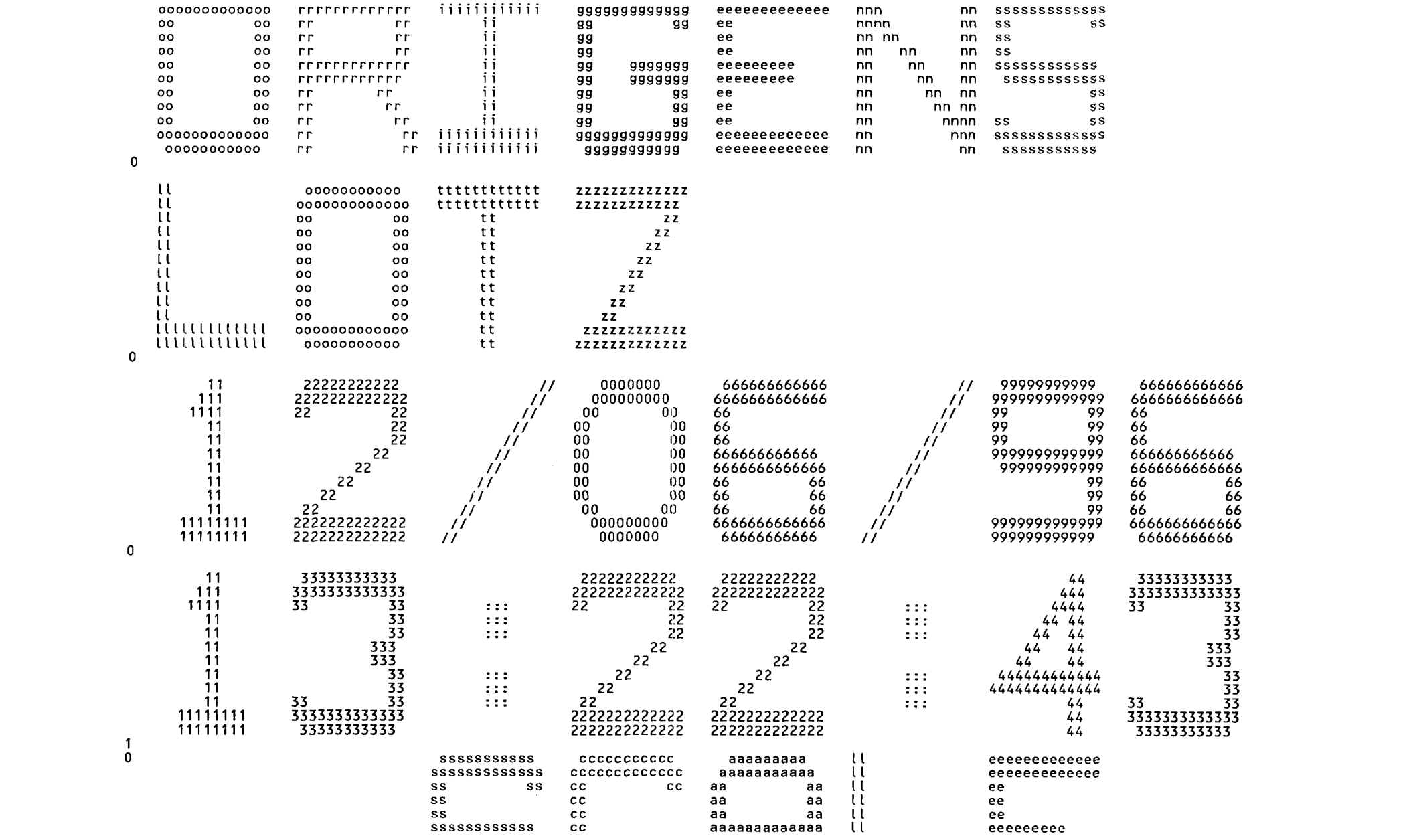
```
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
             0           10            0            0            1            1            0            0            0           10
            21          100            0            4            3            0            2            0            0
0tconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 9.999936E+03 2.013393E+13
0 linp            9
             6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Bottom - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
*                                                                               *
*                    scale4.2  bulletin  board                                  *
*                    --------  --------  -----                                  *
*                                                                               *
*      welcome to the configuration controlled version of scale4.2.             *
*      any problems should be reported to kay martin at 4-9213.                 *
*                                                                               *
*      updates that have been made from version 4.1 to 4.2 include:             *
*                                                                               *
*      nitawl:  parameter added to prevent exponent underflows for very         *
*      dilute resonance calculations on workstation.  (mrr 93-011)              *
*                                                                               *
*      nitawl:   corrected discrepancies in maximum fractional energy loss      *
*      of neutron in admixed moderator calculation and simpson rule             *
*      calculation of collision density as documented in "improved              *
*      calculation of flux shapes with the resonance shielding code             *
*      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
*      impact will vary, but is insignificant for hydrogen-moderated            *
*      systems. (mrr 93-030)                                                    *
*                                                                               *
*      sas4:  added option of axial source profile input for both radial        *
*      and axial dose calculations. also added option idr = 2 for               *
*      estimation to point detectors from collisions in both top and            *
*      bottom halves of geometry.  (mrr 92-016)                                 *
*                                                                               *
*      morse:  modifications made for compatibility with the new options in     *
*      sas4 (i.e., the axial source profile input option and                    *
*      the option idr = 2 for estimation to point detectors from collisions     *
*      in both top and bottom halves of geometry).  (mrr 92-016)                *
*                                                                               *
*      csas & keno-v.a:  error checking during input processing was added       *
*      so that these modules terminate with an error message if input           *
*      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
*                                                                               *
*      keno-v.a:  corrections made for applying differential albedo             *
*      boundary conditions to supergrouped problems where global unit           *
*      contains only an array specification.  effect on keff is very large      *
*      for this type of problem.  (mrr 93-033)                                  *
*                                                                               *
*      keno-v.a:  corrected an error introduced with modification on may 24,    *
*      1993 (mrr 93-033). this error affected problems with mirror or           *
*      periodic boundary conditions and could cause problem to loop, fail,      *
*      or run incorrectly.                                                      *
*                                                                               *
*      xsdrnpm:  corrected calculation of number of direct access data          *
*      blocks needed to weight the cross sections to prevent occasional         *
*      failure.  improved calculation of balance tables.  (mrr 93-021)          *
*                                                                               *
*      origen-s:  modified program to read combined binary libraries that       *
*      include multi-cycle cross sections.  add option to edit binary           *
*      library.  (mrr 93-026)                                                   *
*                                                                               *
*      sas2:  modified to produce combined binary libraries for origen-s.       *
*      (mrr 93-027)                                                             *
*                                                                               *
*      couple:  modified to allow combined binary libraries to be made by       *
*      sas2.  (mrr 93-031)                                                      *
*                                                                               *
*      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
       0$$  a4 33 a8 26 e
       1$$  1
          1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        80000    220000    240000     250000     260000
       270000    280000    400000     410000     500000
74**     89.4    10100.0      46.5  189764.1
          2.6        0.2       3.2        0.1        4.9
          0.1        4.5    2160.1        0.1       30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
```

```
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 45000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.1800000 e
         5t
      BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds2p
      58** 10r4.35
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 50000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.1000000 e
         5t
      BWR SNF Assembly - Plenum - deplete to 50000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds2p
      58** 10r4.35
      60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
      66$$ 12r0 e
         6t
       BWR SNF Assembly Decay
      3$$  33 0 5 a33 -88 e
         2t
      35$$ 0
         4t
      56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
         5t
      BWR SNF Assembly - Plenum - decay
      per ONE BWR Fuel Assembly - Plenum Region - ds2p
      60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
      61** f1-15
      65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
      81$$ 2 0 26 1 e
      82$$ f4
         6t
        decay step for BWR source term - plen ds2 - discharge
        decay step for BWR source term - plen ds2 - 0.25 year
        decay step for BWR source term - plen ds2 - 0.50 year
        decay step for BWR source term - plen ds2 - 1 year
        decay step for BWR source term - plen ds2 - 2 year
        decay step for BWR source term - plen ds2 - 5 year
        decay step for BWR source term - plen ds2 - 10 year
        decay step for BWR source term - plen ds2 - 15 year
        decay step for BWR source term - plen ds2 - 20 year
        decay step for BWR source term - plen ds2 - 25 year
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1   ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiii    ggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
```


oooooooooooo rrrrrrrrrrrr iiiiiiiiiiii gggggggggggg eeeeeeeeeeee nnn nn ssssssssssss
oo oo rr rr ii gg gg ee nnnn nn ss ss
oo oo rr rr ii gg ee nn nn nn ss
oo oo rr rr ii gg ee nn nn nn ss
oo oo rrrrrrrrrrrr ii gg ggggggg eeeeeeeee nn nn nn ssssssssssss
oo oo rrrrrrrrrrrr ii gg ggggggg eeeeeeeee nn nn nn sssssssssss
oo oo rr rr ii gg gg ee nn nn nn ss
oo oo rr rr ii gg gg ee nn nn nn ss
oo oo rr rr ii gg gg ee nn nnnn ss ss
oooooooooooo rr rr iiiiiiiiiiii gggggggggggg eeeeeeeeeeeee nn nnn ssssssssssss
oooooooooo rr rr iiiiiiiiiiii gggggggggg eeeeeeeeeeeee nn nn ssssssssss
0
ll oooooooooo ttttttttttt zzzzzzzzzzzzz
ll oooooooooooo ttttttttttt zzzzzzzzzzzz
ll oo oo tt zz
ll oo oo tt zz
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ll oo oo tt zz
ll oo oo tt zz
ll oo oo tt zz
ll oo oo tt zz
llllllllllll oooooooooooo tt zzzzzzzzzzzz
llllllllllll oooooooooo tt zzzzzzzzzzzz
0
11 22222222222 // 0000000 666666666666 // 99999999999 666666666666
111 2222222222222 // 000000000 6666666666666 // 9999999999999 6666666666666
1111 22 22 // 00 00 66 // 99 99 66
11 22 // 00 00 66 // 99 99 66
11 22 // 00 00 66 // 99 99 66
11 22 // 00 00 666666666666 // 9999999999999 666666666666
11 22 // 00 00 6666666666666 // 999999999999 6666666666666
11 22 // 00 00 66 66 // 99 66 66
11 22 // 00 00 66 66 // 99 66 66
11 22 // 00 00 66 66 // 99 66 66
11111111 2222222222222 // 000000000 6666666666666 // 9999999999999 6666666666666
11111111 2222222222222 // 0000000 66666666666 // 999999999999 66666666666
0
11 33333333333 22222222222 22222222222 44 33333333333
111 3333333333333 2222222222222 2222222222222 444 3333333333333
1111 33 33 ::: 22 22 22 22 ::: 4444 33 33
11 33 ::: 22 22 ::: 44 44 33
11 33 ::: 22 22 ::: 44 44 33
11 333 22 22 44 44 333
11 333 22 22 44 44 333
11 33 ::: 22 22 ::: 444444444444 33
11 33 ::: 22 22 ::: 4444444444444 33
11 33 33 ::: 22 22 ::: 44 33 33
11111111 3333333333333 2222222222222 2222222222222 44 3333333333333
11111111 33333333333 2222222222222 2222222222222 44 33333333333
1
0
ssssssssss ccccccccccc aaaaaaaaa ll eeeeeeeeeeeee
sssssssssssss ccccccccccccc aaaaaaaaaaa ll eeeeeeeeeeeeee
ss ss cc cc aa aa ll ee
ss cc aa aa ll ee
ss cc aa aa ll ee
sssssssssssss cc aaaaaaaaaaaaa ll eeeeeeeee

```
                 sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
                           ss   cc              aa         aa   ll              ee
                           ss   cc              aa         aa   ll              ee
                ss         ss   cc         cc   aa         aa   ll              ee
                sssssssssssss   cccccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
                 sssssssssss     cccccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  13:22:44                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1800000 e
    5t
 BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        80000    220000    240000    250000    260000
       270000    280000    400000    410000    500000
74**     89.4   10100.0      46.5  189764.1
          2.6       0.2       3.2       0.1       4.9
          0.1       4.5    2160.1       0.1      30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds2p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
```

```
 57** 0.0 0.0 1.0-5 0.1800000 e
    5t
 BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds2p
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 50000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1000000 e
    5t
 BWR SNF Assembly - Plenum - deplete to 50000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds2p
 58** 10r4.35
 60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Plenum - decay
 per ONE BWR Fuel Assembly - Plenum Region - ds2p
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - plen ds2 - discharge
   decay step for BWR source term - plen ds2 - 0.25 year
   decay step for BWR source term - plen ds2 - 0.50 year
   decay step for BWR source term - plen ds2 - 1 year
   decay step for BWR source term - plen ds2 - 2 year
   decay step for BWR source term - plen ds2 - 5 year
   decay step for BWR source term - plen ds2 - 10 year
   decay step for BWR source term - plen ds2 - 15 year
   decay step for BWR source term - plen ds2 - 20 year
   decay step for BWR source term - plen ds2 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
```

```
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                    .other identification and sizes of library.
0                     data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                   7/ 9/1993    date library was produced
0                        1697    total number of nuclides in library
                          689    number of light-element nuclides
                          129    number of actinide nuclides
                          879    number of fission product nuclides
0                        7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
```

```
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
```

```
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries  *
          *         decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                             *
          *       neutron flux spectrum factors and cross sections were produced from   *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                             *
          *                   fission product yields are from endf/b-v                  *
          *                                                                             *
          *              photon libraries use an 18-energy-group structure              *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix             *
          *                                                                             *
          *        see information above this box (if present) for later updates        *
          *                                                                             *
          *******************************************************************************
          *                                                                             *
0         *******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         *******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          *******************************************************************************
          *                                                                             *
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries  *
          *         decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                             *
          *       neutron flux spectrum factors and cross sections were produced from   *
          *      the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                             *
          *                   fission product yields are from endf/b-v                  *
          *                                                                             *
```

```
          *              photon libraries use an 18-energy-group structure              *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix             *
          *                                                                             *
          *        see information above this box (if present) for later updates        *
          *                                                                             *
          *******************************************************************************
          *                                                                             *
0         *******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         *******************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          *******************************************************************************
          *                                                                             *
          *            prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                             *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                             *
          *                    fission product yields are from endf/b-v                 *
          *                                                                             *
          *              photon libraries use an 18-energy-group structure              *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix             *
          *                                                                             *
          *        see information above this box (if present) for later updates        *
          *                                                                             *
          *******************************************************************************
          *                                                                             *
0         *******************************************************************************
0                   .other identification and sizes of library.
```

```
0                  data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0       ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0       ********************************************************************************
0    3$ array     33 entries read
0    2t
```

```
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix             *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
    BWR SNF Assembly - Plenum - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Plenum Regio
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04	2.20E-04
h 2	2.75E-07	2.75E-07	2.75E-07	2.75E-07	2.75E-07	2.75E-07	2.75E-07	2.75E-07	2.75E-07	2.75E-07	2.75E-07
h 3	6.09E-11	6.09E-11	6.01E-11	5.92E-11	5.76E-11	5.44E-11	4.60E-11	3.47E-11	2.62E-11	1.98E-11	1.49E-11
he 3	1.30E-12	1.31E-12	2.13E-12	2.98E-12	4.63E-12	7.78E-12	1.62E-11	2.75E-11	3.60E-11	4.24E-11	4.73E-11
he 4	2.98E-04	2.98E-04	2.98E-04	2.98E-04	2.98E-04	2.98E-04	2.98E-04	2.98E-04	2.98E-04	2.98E-04	2.98E-04
li 7	1.07E-15	1.07E-15	1.07E-15	1.07E-15	1.07E-15	1.07E-15	1.07E-15	1.07E-15	1.07E-15	1.07E-15	1.07E-15
be 10	2.32E-09	2.32E-09	2.32E-09	2.32E-09	2.32E-09	2.32E-09	2.32E-09	2.32E-09	2.32E-09	2.32E-09	2.32E-09

b 11	4.75E-14	4.75E-14	4.75E-14	4.75E-14	4.75E-14	4.75E-14	4.75E-14	4.75E-14	4.75E-14	4.75E-14	4.75E-14
c 12	7.78E-12	7.78E-12	7.78E-12	7.78E-12	7.78E-12	7.78E-12	7.78E-12	7.78E-12	7.78E-12	7.78E-12	7.78E-12
c 13	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04
c 14	5.24E-07	5.24E-07	5.24E-07	5.24E-07	5.24E-07	5.24E-07	5.24E-07	5.23E-07	5.23E-07	5.23E-07	5.23E-07
n 14	1.79E-10	1.79E-10	1.94E-10	2.10E-10	2.42E-10	3.05E-10	4.96E-10	8.12E-10	1.13E-09	1.45E-09	1.76E-09
n 15	2.40E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07	2.40E-07
o 16	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00
o 17	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03
o 18	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03
f 19	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09	9.80E-09
ne 20	1.96E-13	1.96E-13	1.96E-13	1.96E-13	1.96E-13	1.96E-13	1.96E-13	1.96E-13	1.96E-13	1.96E-13	1.96E-13
ar 40	5.23E-12	5.23E-12	5.23E-12	5.23E-12	5.23E-12	5.23E-12	5.23E-12	5.23E-12	5.23E-12	5.23E-12	5.23E-12
k 41	1.72E-13	1.72E-13	1.72E-13	1.72E-13	1.72E-13	1.72E-13	1.72E-13	1.72E-13	1.72E-13	1.72E-13	1.72E-13
k 43	3.40E-15	1.61E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	3.31E-15	3.31E-15	3.31E-15	3.31E-15	3.31E-15	3.31E-15	3.31E-15	3.31E-15	3.31E-15	3.31E-15	3.31E-15
ca 43	1.14E-07	1.14E-07	1.14E-07	1.14E-07	1.14E-07	1.14E-07	1.14E-07	1.14E-07	1.14E-07	1.14E-07	1.14E-07
ca 44	8.81E-07	8.81E-07	8.81E-07	8.81E-07	8.81E-07	8.81E-07	8.81E-07	8.81E-07	8.81E-07	8.81E-07	8.81E-07
ca 45	2.48E-09	2.47E-09	1.70E-09	1.15E-09	5.30E-10	1.13E-10	1.09E-12	4.80E-16	2.11E-19	9.29E-23	4.08E-26
ca 46	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07
ca 47	9.69E-13	8.32E-13	1.03E-18	7.49E-25	5.57E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.60E-08	1.61E-08	1.68E-08	1.74E-08	1.80E-08	1.84E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08
sc 46	1.56E-07	1.55E-07	7.43E-08	3.46E-08	7.63E-09	3.72E-10	4.31E-14	1.19E-20	3.27E-27	9.02E-34	2.49E-40
sc 47	1.01E-08	8.24E-09	8.35E-17	2.49E-24	1.57E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.26E-10	3.59E-10	6.91E-25	3.51E-40	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02
ti 47	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02
ti 48	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
ti 49	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02	1.40E-02
ti 50	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02	1.09E-02
v 50	3.46E-05	3.46E-05	3.46E-05	3.46E-05	3.46E-05	3.46E-05	3.46E-05	3.46E-05	3.46E-05	3.46E-05	3.46E-05
v 51	5.43E-03	5.43E-03	5.54E-03	5.55E-03	5.56E-03	5.56E-03	5.56E-03	5.56E-03	5.56E-03	5.56E-03	5.56E-03
cr 50	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01
cr 51	1.28E-04	1.25E-04	1.34E-05	1.33E-06	1.37E-08	1.48E-12	1.84E-24	.00E+00	.00E+00	.00E+00	.00E+00
cr 52	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
cr 53	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.01E-01	3.01E-01
cr 54	9.34E-02	9.34E-02	9.34E-02	9.34E-02	9.34E-02	9.34E-02	9.34E-02	9.34E-02	9.34E-02	9.34E-02	9.34E-02
mn 54	4.77E-05	4.76E-05	3.91E-05	3.18E-05	2.12E-05	9.43E-06	8.28E-07	1.43E-08	2.49E-10	4.31E-12	7.47E-14
mn 55	9.59E-02	9.59E-02	9.59E-02	9.60E-02	9.61E-02	9.63E-02	9.66E-02	9.67E-02	9.68E-02	9.68E-02	9.68E-02
mn 56	4.54E-07	7.17E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01
fe 55	9.24E-04	9.23E-04	8.68E-04	8.14E-04	7.17E-04	5.56E-04	2.60E-04	7.29E-05	2.05E-05	5.76E-06	1.62E-06
fe 56	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00
fe 57	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01	1.39E-01
fe 58	1.79E-02	1.79E-02	1.79E-02	1.80E-02	1.80E-02	1.80E-02	1.80E-02	1.80E-02	1.80E-02	1.80E-02	1.80E-02
fe 59	2.76E-06	2.72E-06	6.79E-07	1.61E-07	9.33E-09	3.16E-11	1.22E-18	5.42E-31	2.48E-43	.00E+00	.00E+00

1

BWR SNF Assembly - Plenum - decay light elements page 2

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
co 58m	3.60E-11	5.83E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.22E-04	1.21E-04	5.08E-05	2.05E-05	3.44E-06	9.69E-08	2.16E-12	3.83E-20	6.76E-28	1.20E-35	2.44E-43
co 59	8.57E-02	8.57E-02	8.57E-02	8.57E-02	8.57E-02	8.57E-02	8.57E-02	8.57E-02	8.57E-02	8.57E-02	8.57E-02
co 60	1.12E-02	1.12E-02	1.09E-02	1.05E-02	9.86E-03	8.65E-03	5.83E-03	3.02E-03	1.56E-03	8.10E-04	4.20E-04
co 61	6.83E-09	2.86E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00
ni 59	3.04E-02	3.04E-02	3.04E-02	3.04E-02	3.04E-02	3.04E-02	3.04E-02	3.04E-02	3.04E-02	3.04E-02	3.04E-02
ni 60	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
ni 61	6.17E-02	6.17E-02	6.17E-02	6.17E-02	6.17E-02	6.17E-02	6.17E-02	6.17E-02	6.17E-02	6.17E-02	6.17E-02
ni 62	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01	1.65E-01

ni 63	6.10E-03	6.10E-03	6.09E-03	6.08E-03	6.06E-03	6.01E-03	5.89E-03	5.69E-03	5.50E-03	5.31E-03	5.13E-03
ni 64	4.45E-02	4.45E-02	4.45E-02	4.45E-02	4.45E-02	4.45E-02	4.45E-02	4.45E-02	4.45E-02	4.45E-02	4.45E-02
ni 65	1.81E-08	2.45E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.21E-12	1.63E-12	2.74E-24	1.59E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.21E-04	1.21E-04	1.31E-04	1.42E-04	1.63E-04	2.05E-04	3.29E-04	5.29E-04	7.23E-04	9.10E-04	1.09E-03
cu 64	8.75E-10	2.36E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04	2.04E-04
cu 66	4.78E-12	2.54E-15	4.28E-27	2.49E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.75E-15	2.10E-15	8.40E-26	1.31E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07	2.71E-07
zn 65	1.19E-10	1.19E-10	9.25E-11	7.11E-11	4.23E-11	1.50E-11	6.65E-13	3.70E-15	2.06E-17	1.15E-19	6.39E-22
zn 66	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07	8.05E-07
zn 67	7.68E-10	7.68E-10	7.68E-10	7.68E-10	7.68E-10	7.68E-10	7.68E-10	7.68E-10	7.68E-10	7.68E-10	7.68E-10
zn 68	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12
ga 69	1.20E-14	1.20E-14	1.20E-14	1.20E-14	1.20E-14	1.20E-14	1.20E-14	1.20E-14	1.20E-14	1.20E-14	1.20E-14
sr 87	4.21E-05	4.21E-05	4.21E-05	4.21E-05	4.21E-05	4.21E-05	4.21E-05	4.21E-05	4.21E-05	4.21E-05	4.21E-05
sr 88	4.10E-03	4.10E-03	4.10E-03	4.10E-03	4.10E-03	4.10E-03	4.10E-03	4.10E-03	4.10E-03	4.10E-03	4.10E-03
sr 89	1.26E-05	1.24E-05	3.67E-06	1.03E-06	8.42E-08	5.63E-10	1.68E-16	2.25E-27	3.00E-38	.00E+00	.00E+00
sr 90	1.87E-07	1.87E-07	1.86E-07	1.85E-07	1.83E-07	1.78E-07	1.65E-07	1.46E-07	1.29E-07	1.14E-07	1.01E-07
sr 91	1.97E-08	3.42E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	3.00E-04	3.00E-04	3.09E-04	3.11E-04	3.12E-04	3.12E-04	3.12E-04	3.12E-04	3.12E-04	3.12E-04	3.12E-04
y 89m	4.30E-15	4.25E-15	1.25E-15	3.53E-16	2.88E-17	1.92E-19	5.75E-26	7.68E-37	.00E+00	.00E+00	.00E+00
y 90	2.49E-05	1.92E-05	4.83E-11	4.80E-11	4.74E-11	4.63E-11	4.30E-11	3.80E-11	3.36E-11	2.97E-11	2.63E-11
y 91	3.76E-05	3.72E-05	1.30E-05	4.33E-06	4.97E-07	6.56E-09	1.51E-14	6.06E-24	2.43E-33	1.02E-42	.00E+00
y 92	8.35E-08	7.59E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	4.79E-11	9.34E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03
zr 91	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02
zr 92	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02
zr 93	6.39E-01	6.39E-01	6.39E-01	6.39E-01	6.39E-01	6.39E-01	6.39E-01	6.39E-01	6.39E-01	6.39E-01	6.39E-01
zr 94	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02
zr 95	1.31E-02	1.30E-02	4.95E-03	1.82E-03	2.51E-04	4.81E-06	3.39E-11	8.75E-20	2.26E-28	5.84E-37	.00E+00
zr 96	6.32E+01	6.32E+01	6.32E+01	6.32E+01	6.32E+01	6.32E+01	6.32E+01	6.32E+01	6.32E+01	6.32E+01	6.32E+01
zr 97	2.27E-04	8.50E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	9.18E-10	9.18E-10	9.17E-10	9.17E-10	9.17E-10	9.16E-10	9.13E-10	9.08E-10	9.04E-10	8.99E-10	8.94E-10
nb 92	1.77E-06	1.77E-06	1.77E-06	1.77E-06	1.77E-06	1.77E-06	1.77E-06	1.77E-06	1.77E-06	1.77E-06	1.77E-06
nb 93	9.86E-02	9.86E-02	9.86E-02	9.86E-02	9.86E-02	9.86E-02	9.86E-02	9.86E-02	9.86E-02	9.87E-02	9.87E-02
nb 93m	4.09E-05	4.09E-05	4.05E-05	4.02E-05	3.95E-05	3.81E-05	3.43E-05	2.90E-05	2.47E-05	2.12E-05	1.84E-05
nb 94	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03
nb 95	7.06E-03	7.06E-03	4.49E-03	1.95E-03	2.96E-04	5.97E-06	4.07E-11	1.05E-19	2.72E-28	1.29E-36	.00E+00
nb 95m	8.19E-06	8.19E-06	3.28E-06	1.20E-06	1.67E-07	3.19E-09	2.25E-14	5.80E-23	1.50E-31	.00E+00	.00E+00
nb 96	1.67E-07	8.21E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 97	1.62E-05	6.07E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	2.13E-07	7.95E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	1.32E-07	1.32E-07	1.43E-07	1.54E-07	1.76E-07	2.20E-07	3.53E-07	5.74E-07	7.96E-07	1.02E-06	1.24E-06
mo 95	2.22E-01	2.23E-01	2.33E-01	2.39E-01	2.42E-01	2.43E-01	2.43E-01	2.43E-01	2.43E-01	2.43E-01	2.43E-01
mo 96	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02	1.52E-02
mo 97	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
mo 98	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03
mo 99	8.65E-08	6.72E-08	1.19E-17	8.76E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	9.00E-10	9.00E-10	9.00E-10	9.00E-10	9.00E-10	9.00E-10	9.00E-10	9.00E-10	9.00E-10	9.00E-10	9.00E-10
tc 98	8.24E-12	8.24E-12	8.24E-12	8.24E-12	8.24E-12	8.24E-12	8.24E-12	8.24E-12	8.24E-12	8.24E-12	8.24E-12
tc 99	1.45E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
ru 99	6.40E-12	6.41E-12	7.58E-12	8.80E-12	1.12E-11	1.60E-11	3.04E-11	5.45E-11	7.85E-11	1.03E-10	1.27E-10
ru100	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07	1.12E-07

ru101	5.31E-10	5.31E-10	5.31E-10	5.31E-10	5.31E-10	5.31E-10	5.31E-10	5.31E-10	5.31E-10	5.31E-10	5.31E-10
ru102	9.15E-12	9.15E-12	9.15E-12	9.15E-12	9.15E-12	9.15E-12	9.15E-12	9.15E-12	9.15E-12	9.15E-12	9.15E-12
ru103	2.03E-15	1.99E-15	4.14E-16	8.09E-17	3.21E-18	5.08E-21	2.01E-29	1.44E-43	.00E+00	.00E+00	.00E+00
cd111	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08
cd112	3.54E-07	3.54E-07	3.54E-07	3.54E-07	3.54E-07	3.54E-07	3.54E-07	3.54E-07	3.54E-07	3.54E-07	3.54E-07
cd113	1.05E-09	1.05E-09	1.05E-09	1.05E-09	1.05E-09	1.05E-09	1.05E-09	1.05E-09	1.05E-09	1.05E-09	1.05E-09
cd113m	1.11E-09	1.11E-09	1.09E-09	1.08E-09	1.05E-09	1.00E-09	8.66E-10	6.77E-10	5.30E-10	4.14E-10	3.24E-10
cd114	4.09E-05	4.09E-05	4.31E-05	4.37E-05	4.39E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05	4.40E-05
cd115	1.64E-09	1.20E-09	1.14E-21	3.61E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	3.52E-09	3.47E-09	8.69E-10	2.06E-10	1.21E-11	4.13E-14	1.66E-21	7.78E-34	.00E+00	.00E+00	.00E+00
cd116	2.65E-07	2.65E-07	2.65E-07	2.65E-07	2.65E-07	2.65E-07	2.65E-07	2.65E-07	2.65E-07	2.65E-07	2.65E-07
cd117	1.94E-11	2.43E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	1.03E-02	1.03E-02	1.07E-02	1.10E-02	1.12E-02	1.13E-02	1.13E-02	1.13E-02	1.13E-02	1.13E-02	1.13E-02
in113m	6.43E-07	6.39E-07	3.74E-07	2.14E-07	7.13E-08	7.90E-09	1.08E-11	1.80E-16	3.01E-21	5.03E-26	8.41E-31
in114	1.63E-09	1.02E-09	2.94E-10	8.06E-11	6.24E-12	3.76E-14	8.18E-21	6.46E-32	.00E+00	.00E+00	.00E+00
in114m	6.45E-05	6.36E-05	1.83E-05	5.01E-06	3.88E-07	2.34E-09	5.09E-16	4.01E-27	3.17E-38	.00E+00	.00E+00
in115	1.12E-07	1.12E-07	1.14E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07	1.15E-07
in117	6.39E-11	1.56E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.37E-11	8.09E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01	2.78E-01
sn113	1.07E-03	1.06E-03	6.23E-04	3.57E-04	1.19E-04	1.32E-05	1.79E-08	2.99E-13	5.01E-18	8.38E-23	1.40E-27
sn114	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
sn115	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01	1.01E-01
sn116	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00
sn117	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00
sn117m	6.71E-04	6.38E-04	6.83E-06	6.13E-08	5.52E-12	4.54E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00
sn119	2.68E+00	2.68E+00	2.68E+00	2.68E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00
sn119m	1.29E-02	1.29E-02	1.04E-02	8.39E-03	5.45E-03	2.30E-03	1.72E-04	2.29E-06	3.04E-08	4.05E-10	5.39E-12
sn120	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
sn121	1.94E-05	1.05E-05	6.36E-09	6.34E-09	6.30E-09	6.22E-09	5.99E-09	5.63E-09	5.28E-09	4.96E-09	4.66E-09
sn121m	1.47E-04	1.47E-04	1.46E-04	1.46E-04	1.45E-04	1.43E-04	1.38E-04	1.29E-04	1.21E-04	1.14E-04	1.07E-04
sn122	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00
sn123	2.08E-04	2.06E-04	1.28E-04	7.80E-05	2.92E-05	4.12E-06	1.15E-08	6.38E-13	3.54E-17	1.96E-21	1.09E-25
sn124	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00	1.79E+00
sn125	3.22E-06	3.00E-06	4.98E-09	6.44E-12	1.27E-17	4.97E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02	1.93E-02
sb122	8.29E-06	6.41E-06	7.67E-16	3.74E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.75E-03	1.75E-03	1.83E-03	1.88E-03	1.93E-03	1.96E-03	1.96E-03	1.96E-03	1.96E-03	1.96E-03	1.96E-03

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BWR SNF Assembly - Plenum - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sb124	1.06E-05	1.05E-05	3.77E-06	1.30E-06	1.58E-07	2.36E-09	7.82E-15	5.76E-24	4.25E-33	3.13E-42	.00E+00
sb125	7.32E-03	7.32E-03	6.88E-03	6.45E-03	5.68E-03	4.41E-03	2.06E-03	5.78E-04	1.62E-04	4.57E-05	1.28E-05
sb126	1.01E-06	9.54E-07	6.58E-09	3.73E-11	1.36E-15	1.84E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.86E-03	1.86E-03	1.87E-03	1.87E-03	1.87E-03	1.87E-03	1.87E-03	1.87E-03	1.87E-03	1.87E-03	1.87E-03
te123	1.63E-05	1.64E-05	1.83E-05	1.95E-05	2.06E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05	2.11E-05
te123m	4.80E-06	4.77E-06	2.85E-06	1.67E-06	5.79E-07	6.98E-08	1.22E-10	3.12E-15	7.94E-20	2.02E-24	5.16E-29
te124	1.33E-04	1.33E-04	1.40E-04	1.43E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04	1.44E-04
te125	6.38E-03	6.39E-03	6.83E-03	7.26E-03	8.04E-03	9.33E-03	1.17E-02	1.32E-02	1.36E-02	1.38E-02	1.38E-02
te125m	9.51E-05	9.51E-05	9.47E-05	9.07E-05	8.06E-05	6.26E-05	2.92E-05	8.22E-06	2.31E-06	6.49E-07	1.82E-07
te126	1.83E-04	1.83E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04	1.84E-04
te127	8.12E-10	2.08E-10	4.89E-11	2.71E-11	8.49E-12	8.32E-13	7.83E-16	7.09E-21	6.41E-26	5.80E-31	5.25E-36
te127m	2.47E-08	2.46E-08	1.40E-08	7.75E-09	2.42E-09	2.38E-10	2.24E-13	2.02E-18	1.83E-23	1.66E-28	1.50E-33
te128	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09
te129m	1.94E-14	1.90E-14	3.03E-15	4.50E-16	1.04E-17	5.54E-21	8.44E-31	.00E+00	.00E+00	.00E+00	.00E+00
i127	8.12E-07	8.13E-07	8.23E-07	8.30E-07	8.35E-07	8.37E-07	8.37E-07	8.37E-07	8.37E-07	8.37E-07	8.37E-07
i129	2.26E-12	2.26E-12	2.28E-12	2.28E-12	2.28E-12	2.28E-12	2.28E-12	2.28E-12	2.28E-12	2.28E-12	2.28E-12

xe127	1.52E-14	1.50E-14	2.75E-15	4.72E-16	1.45E-17	1.39E-20	1.20E-29	.00E+00	.00E+00	.00E+00	.00E+00
xe128	3.26E-08	3.26E-08	3.26E-08	3.26E-08	3.26E-08	3.26E-08	3.26E-08	3.26E-08	3.26E-08	3.26E-08	3.26E-08
xe129	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10	1.29E-10
xe129m	3.18E-13	2.94E-13	2.85E-16	2.10E-19	1.36E-25	5.84E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	5.49E-12	5.49E-12	5.49E-12	5.49E-12	5.49E-12	5.49E-12	5.49E-12	5.49E-12	5.49E-12	5.49E-12	5.49E-12
xe131	1.24E-14	1.24E-14	1.25E-14	1.25E-14	1.25E-14	1.25E-14	1.25E-14	1.25E-14	1.25E-14	1.25E-14	1.25E-14
xe132	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15	1.29E-15
total	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03

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BWR SNF Assembly - Plenum - decay light elements page 5

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	5.89E-07	5.89E-07	5.81E-07	5.73E-07	5.57E-07	5.26E-07	4.45E-07	3.36E-07	2.53E-07	1.91E-07	1.44E-07
be 10	5.18E-11	5.18E-11	5.18E-11	5.18E-11	5.18E-11	5.18E-11	5.18E-11	5.18E-11	5.18E-11	5.18E-11	5.18E-11
c 14	2.34E-06	2.34E-06	2.34E-06	2.34E-06	2.34E-06	2.34E-06	2.34E-06	2.33E-06	2.33E-06	2.33E-06	2.33E-06
ar 41	8.92E-10	9.91E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	1.87E-11	4.86E-12	2.26E-18	2.25E-18	2.23E-18	2.18E-18	2.05E-18	1.84E-18	1.66E-18	1.49E-18	1.34E-18
k 43	1.11E-08	5.27E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	4.40E-05	4.39E-05	3.01E-05	2.03E-05	9.39E-06	2.00E-06	1.94E-08	8.52E-12	3.74E-15	1.65E-18	7.24E-22
ca 47	5.94E-07	5.10E-07	6.32E-13	4.59E-19	3.42E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	5.30E-03	5.26E-03	2.52E-03	1.17E-03	2.58E-04	1.26E-05	1.46E-09	4.02E-16	1.11E-22	3.06E-29	.00E+00
sc 47	8.43E-03	6.85E-03	6.94E-11	2.07E-18	1.30E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	7.86E-04	5.37E-04	1.03E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	8.14E-04	2.15E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	1.18E+01	1.15E+01	1.24E+00	1.23E-01	1.27E-03	1.37E-07	1.70E-19	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	3.70E-01	3.69E-01	3.03E-01	2.47E-01	1.64E-01	7.31E-02	6.41E-03	1.11E-04	1.93E-06	3.34E-08	5.79E-10
mn 56	9.86E+00	1.56E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	2.20E+00	2.20E+00	2.07E+00	1.94E+00	1.71E+00	1.32E+00	6.18E-01	1.74E-01	4.88E-02	1.37E-02	3.85E-03
fe 59	1.37E-01	1.35E-01	3.38E-02	8.00E-03	4.64E-04	1.57E-06	6.08E-14	2.70E-26	.00E+00	.00E+00	.00E+00
co 58m	2.13E-04	3.45E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.88E+00	3.85E+00	1.61E+00	6.53E-01	1.09E-01	3.08E-03	6.87E-08	1.21E-15	2.15E-23	3.88E-31	.00E+00
co 60	1.27E+01	1.27E+01	1.23E+01	1.19E+01	1.12E+01	9.78E+00	6.59E+00	3.41E+00	1.77E+00	9.16E-01	4.75E-01
co 61	2.13E-01	8.90E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03
ni 63	3.46E-01	3.46E-01	3.45E-01	3.45E-01	3.43E-01	3.41E-01	3.34E-01	3.23E-01	3.12E-01	3.01E-01	2.91E-01
ni 65	3.46E-01	4.69E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	1.92E-06	1.42E-06	2.39E-18	1.39E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	3.38E-03	9.11E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	2.67E-03	1.42E-06	2.39E-18	1.39E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.08E-09	1.59E-09	6.35E-20	9.81E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	9.84E-07	9.81E-07	7.62E-07	5.86E-07	3.48E-07	1.23E-07	5.48E-09	3.05E-11	1.70E-13	9.45E-16	5.26E-18
zn 69	9.48E-11	2.04E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	6.37E-12	1.90E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.65E-01	3.61E-01	1.06E-01	2.99E-02	2.44E-03	1.63E-05	4.88E-12	6.52E-23	.00E+00	.00E+00	.00E+00
sr 90	2.64E-05	2.64E-05	2.63E-05	2.61E-05	2.58E-05	2.51E-05	2.34E-05	2.06E-05	1.83E-05	1.61E-05	1.43E-05
sr 91	7.12E-02	1.24E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.40E-05	3.35E-05	9.90E-06	2.78E-06	2.27E-07	1.52E-09	4.54E-16	6.06E-27	.00E+00	.00E+00	.00E+00
y 90	1.35E+01	1.05E+01	2.63E-05	2.61E-05	2.58E-05	2.52E-05	2.34E-05	2.07E-05	1.83E-05	1.61E-05	1.43E-05
y 90m	1.05E-06	5.68E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	9.23E-01	9.12E-01	3.18E-01	1.06E-01	1.22E-02	1.61E-04	3.71E-10	1.49E-19	5.97E-29	.00E+00	.00E+00
y 92	8.04E-01	7.31E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.60E-04	3.12E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03	1.61E-03
zr 95	2.81E+02	2.78E+02	1.06E+02	3.90E+01	5.39E+00	1.03E-01	7.27E-07	1.88E-15	4.85E-24	2.28E-32	.00E+00
zr 97	4.35E+02	1.63E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	5.30E-09	5.30E-09	5.30E-09	5.30E-09	5.30E-09	5.29E-09	5.28E-09	5.25E-09	5.22E-09	5.20E-09	5.17E-09
nb 92	1.96E-10	1.96E-10	1.96E-10	1.96E-10	1.96E-10	1.96E-10	1.96E-10	1.96E-10	1.96E-10	1.96E-10	1.96E-10
nb 93m	9.75E-03	9.75E-03	9.66E-03	9.58E-03	9.41E-03	9.08E-03	8.18E-03	6.90E-03	5.88E-03	5.05E-03	4.39E-03
nb 94	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04

nb 95	2.78E+02	2.78E+02	1.76E+02	7.67E+01	1.16E+01	2.35E-01	1.60E-06	4.14E-15	1.07E-23	4.56E-32	.00E+00
nb 95m	3.12E+00	3.12E+00	1.25E+00	4.59E-01	6.34E-02	1.22E-03	8.55E-09	2.21E-17	5.71E-26	.00E+00	.00E+00
nb 96	2.34E-01	1.15E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	4.35E+02	1.63E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	4.12E+02	1.54E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 6

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	4.15E-02	3.23E-02	5.73E-12	4.21E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	7.16E-15	7.16E-15	7.16E-15	7.16E-15	7.16E-15	7.16E-15	7.16E-15	7.16E-15	7.16E-15	7.16E-15	7.16E-15
tc 99	2.49E-08	2.49E-08	2.51E-08	2.51E-08	2.51E-08	2.51E-08	2.51E-08	2.51E-08	2.51E-08	2.51E-08	2.51E-08
ru103	6.56E-11	6.44E-11	1.34E-11	2.61E-12	1.04E-13	1.64E-16	6.51E-25	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	2.48E-07	2.48E-07	2.46E-07	2.42E-07	2.37E-07	2.25E-07	1.94E-07	1.52E-07	1.19E-07	9.30E-08	7.27E-08
cd115	8.37E-04	6.13E-04	5.79E-16	1.84E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	8.97E-05	8.83E-05	2.21E-05	5.26E-06	3.07E-07	1.05E-09	4.22E-17	1.98E-29	.00E+00	.00E+00	.00E+00
cd117	2.08E-04	2.61E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.16E-07	2.24E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	1.08E+01	1.07E+01	6.26E+00	3.59E+00	1.19E+00	1.32E-01	1.80E-04	3.01E-09	5.03E-14	8.42E-19	1.41E-23
in114	2.25E+00	1.41E+00	4.05E-01	1.11E-01	8.60E-03	5.17E-05	1.13E-11	8.89E-23	.00E+00	.00E+00	.00E+00
in114m	1.49E+00	1.47E+00	4.24E-01	1.16E-01	8.98E-03	5.41E-05	1.18E-11	9.29E-23	.00E+00	.00E+00	.00E+00
in116m	2.96E-04	2.92E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.34E-03	5.72E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.90E-04	1.12E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	1.08E+01	1.07E+01	6.25E+00	3.58E+00	1.19E+00	1.32E-01	1.80E-04	3.01E-09	5.03E-14	8.41E-19	1.41E-23
sn117m	5.51E+01	5.24E+01	5.61E-01	5.03E-03	4.53E-07	3.73E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	4.84E+01	4.83E+01	3.91E+01	3.14E+01	2.04E+01	8.60E+00	6.44E-01	8.57E-03	1.14E-04	1.52E-06	2.02E-08
sn121	1.86E+01	1.00E+01	6.09E-03	6.07E-03	6.03E-03	5.96E-03	5.74E-03	5.39E-03	5.06E-03	4.75E-03	4.46E-03
sn121m	7.87E-03	7.87E-03	7.85E-03	7.83E-03	7.78E-03	7.68E-03	7.39E-03	6.94E-03	6.52E-03	6.12E-03	5.75E-03
sn123	1.71E+00	1.70E+00	1.05E+00	6.41E-01	2.40E-01	3.39E-02	9.46E-05	5.25E-09	2.91E-13	1.61E-17	8.94E-22
sn123m	9.88E-03	1.51E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	3.49E-01	3.25E-01	5.40E-04	6.98E-07	1.37E-12	5.39E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.29E+00	2.54E+00	3.04E-10	1.48E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	1.86E-01	1.84E-01	6.59E-02	2.27E-02	2.77E-03	4.13E-05	1.37E-10	1.01E-19	7.43E-29	.00E+00	.00E+00
sb125	7.68E+00	7.67E+00	7.21E+00	6.76E+00	5.96E+00	4.62E+00	2.16E+00	6.06E-01	1.70E-01	4.79E-02	1.34E-02
sb126	8.44E-02	7.98E-02	5.51E-04	3.12E-06	1.14E-10	1.54E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	3.83E-15	3.84E-15	4.29E-15	4.57E-15	4.82E-15	4.94E-15	4.96E-15	4.96E-15	4.96E-15	4.96E-15	4.96E-15
te123m	4.26E-02	4.23E-02	2.53E-02	1.48E-02	5.13E-03	6.19E-04	1.09E-06	2.77E-11	7.05E-16	1.80E-20	4.58E-25
te125m	1.71E+00	1.71E+00	1.71E+00	1.63E+00	1.45E+00	1.13E+00	5.27E-01	1.48E-01	4.16E-02	1.17E-02	3.28E-03
te127	2.14E-03	5.50E-04	1.29E-04	7.16E-05	2.24E-05	2.20E-06	2.07E-09	1.87E-14	1.69E-19	1.53E-24	1.39E-29
te127m	2.33E-04	2.32E-04	1.32E-04	7.31E-05	2.29E-05	2.24E-06	2.11E-09	1.91E-14	1.73E-19	1.56E-24	1.41E-29
te129	9.09E-09	3.68E-10	5.86E-11	8.69E-12	2.00E-13	1.07E-16	1.63E-26	.00E+00	.00E+00	.00E+00	.00E+00
te129m	5.85E-10	5.74E-10	9.14E-11	1.36E-11	3.13E-13	1.67E-16	2.54E-26	.00E+00	.00E+00	.00E+00	.00E+00
i126	7.65E-15	7.25E-15	6.35E-17	4.62E-19	2.75E-23	9.13E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	1.56E-10	4.09E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.37E-14	1.26E-14	5.87E-18	2.02E-21	2.91E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	4.31E-10	4.23E-10	7.76E-11	1.33E-11	4.11E-13	3.92E-16	3.40E-25	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	3.62E-08	3.35E-08	3.24E-11	2.39E-14	1.55E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	4.80E-12	4.53E-12	2.54E-14	1.16E-16	2.75E-21	1.57E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	3.29E-15	2.91E-15	2.35E-20	1.15E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.09E+03	1.23E+03	3.65E+02	1.80E+02	6.11E+01	2.65E+01	1.09E+01	4.70E+00	2.36E+00	1.31E+00	8.05E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Plenum - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean time after discharge

(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.32E+13	5.66E+12	5.69E+11	2.73E+11	9.85E+10	4.65E+10	1.99E+10	8.36E+09	3.95E+09	1.97E+09	1.03E+09
3.00E-02	6.12E+12	3.79E+12	9.93E+11	7.44E+11	4.85E+11	2.57E+11	7.40E+10	1.92E+10	5.75E+09	1.82E+09	6.16E+08
5.50E-02	2.56E+12	1.02E+12	5.38E+10	2.39E+10	7.49E+09	3.72E+09	2.07E+09	9.50E+08	4.60E+08	2.29E+08	1.16E+08
8.50E-02	1.40E+12	5.52E+11	2.06E+10	8.97E+09	2.76E+09	1.38E+09	7.99E+08	3.65E+08	1.76E+08	8.72E+07	4.42E+07
1.20E-01	9.55E+11	3.71E+11	1.10E+10	5.29E+09	2.19E+09	1.31E+09	6.72E+08	2.49E+08	1.01E+08	4.45E+07	2.09E+07
1.70E-01	2.64E+12	1.98E+12	4.63E+10	2.24E+10	1.73E+10	1.30E+10	6.06E+09	1.73E+09	4.98E+08	1.46E+08	4.45E+07
3.00E-01	2.20E+12	7.03E+11	2.90E+10	1.47E+10	7.85E+09	5.02E+09	2.30E+09	6.54E+08	1.88E+08	5.53E+07	1.68E+07
6.50E-01	5.98E+13	3.74E+13	1.24E+13	5.19E+12	8.82E+11	1.22E+11	4.88E+10	1.37E+10	3.85E+09	1.10E+09	3.25E+08
1.13E+00	2.14E+12	1.46E+12	1.01E+12	9.81E+11	9.19E+11	8.05E+11	5.43E+11	2.81E+11	1.46E+11	7.55E+10	3.91E+10
1.58E+00	4.38E+11	1.39E+11	1.73E+09	6.17E+08	8.13E+07	1.51E+06	5.24E+02	3.83E+02	3.10E+02	2.60E+02	2.22E+02
2.00E+00	1.54E+11	2.05E+10	1.57E+08	5.72E+07	1.12E+07	4.39E+06	2.90E+06	1.50E+06	7.77E+05	4.03E+05	2.09E+05
2.40E+00	3.93E+09	3.29E+07	1.02E+06	3.48E+05	5.59E+04	1.42E+04	9.16E+03	4.75E+03	2.46E+03	1.27E+03	6.60E+02
2.80E+00	3.50E+09	5.80E+06	9.63E+04	3.32E+04	4.05E+03	6.04E+01	2.00E-04	7.29E-12	6.43E-12	5.78E-12	5.21E-12
3.25E+00	6.39E+08	1.02E+06	9.26E-13	9.21E-13	9.11E-13	8.92E-13	8.37E-13	7.54E-13	6.78E-13	6.10E-13	5.49E-13
3.75E+00	1.14E+06	6.94E+01	1.12E-15	1.11E-15	1.10E-15	1.08E-15	1.01E-15	9.12E-16	8.20E-16	7.38E-16	6.64E-16
4.25E+00	4.11E+05	2.24E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.05E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	5.14E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	9.16E+13	5.31E+13	1.52E+13	7.26E+12	2.42E+12	1.26E+12	6.97E+11	3.26E+11	1.61E+11	8.09E+10	4.13E+10
0 mev/sec	4.41E+13	2.70E+13	9.28E+12	4.51E+12	1.63E+12	9.98E+11	6.47E+11	3.26E+11	1.67E+11	8.58E+10	4.42E+10

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.04E+04	1.30E+04	1.31E+03	6.27E+02	2.26E+02	1.07E+02	4.57E+01	1.92E+01	9.09E+00	4.54E+00	2.37E+00
3.00E-02	4.22E+04	2.62E+04	6.85E+03	5.13E+03	3.34E+03	1.77E+03	5.10E+02	1.32E+02	3.96E+01	1.25E+01	4.25E+00
5.50E-02	3.24E+04	1.29E+04	6.81E+02	3.02E+02	9.47E+01	4.71E+01	2.62E+01	1.20E+01	5.82E+00	2.90E+00	1.47E+00
8.50E-02	2.74E+04	1.08E+04	4.03E+02	1.75E+02	5.39E+01	2.70E+01	1.56E+01	7.14E+00	3.43E+00	1.70E+00	8.63E-01
1.20E-01	2.63E+04	1.02E+04	3.04E+02	1.46E+02	6.05E+01	3.61E+01	1.85E+01	6.86E+00	2.79E+00	1.23E+00	5.76E-01
1.70E-01	1.03E+05	7.75E+04	1.81E+03	8.76E+02	6.74E+02	5.07E+02	2.37E+02	6.75E+01	1.95E+01	5.72E+00	1.74E+00
3.00E-01	1.52E+05	4.85E+04	2.00E+03	1.01E+03	5.41E+02	3.46E+02	1.58E+02	4.51E+01	1.30E+01	3.81E+00	1.16E+00
6.50E-01	8.93E+06	5.58E+06	1.86E+06	7.75E+05	1.32E+05	1.82E+04	7.29E+03	2.04E+03	5.76E+02	1.64E+02	4.86E+01
1.13E+00	5.54E+05	3.76E+05	2.62E+05	2.54E+05	2.38E+05	2.08E+05	1.40E+05	7.27E+04	3.77E+04	1.95E+04	1.01E+04
1.58E+00	1.58E+05	5.03E+04	6.28E+02	2.23E+02	2.94E+01	5.47E-01	1.90E-04	1.39E-04	1.12E-04	9.40E-05	8.04E-05
2.00E+00	7.07E+04	9.42E+03	7.20E+01	2.63E+01	5.17E+00	2.02E+00	1.33E+00	6.90E-01	3.57E-01	1.85E-01	9.59E-02
2.40E+00	2.17E+03	1.82E+01	5.62E-01	1.92E-01	3.09E-02	7.83E-03	5.05E-03	2.62E-03	1.36E-03	7.03E-04	3.64E-04
2.80E+00	2.25E+03	3.73E+00	6.20E-02	2.14E-02	2.61E-03	3.88E-05	1.29E-10	4.69E-18	4.14E-18	3.72E-18	3.35E-18
3.25E+00	4.77E+02	7.63E-01	6.92E-19	6.88E-19	6.81E-19	6.66E-19	6.26E-19	5.07E-19	4.56E-19	4.16E-19	4.10E-19
3.75E+00	9.79E-01	5.98E-05	9.65E-22	9.60E-22	9.50E-22	9.30E-22	8.73E-22	7.86E-22	7.07E-22	6.36E-22	5.73E-22
4.25E+00	4.02E-01	2.19E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.33E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	6.50E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	1.01E+07	6.22E+06	2.13E+06	1.04E+06	3.74E+05	2.29E+05	1.49E+05	7.50E+04	3.83E+04	1.97E+04	1.02E+04
0 gamma watts	7.07E+00	4.34E+00	1.49E+00	7.23E-01	2.61E-01	1.60E-01	1.04E-01	5.23E-02	2.67E-02	1.37E-02	7.09E-03

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photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Plenum - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.52E+17	3.24E+16	8.33E+15	6.09E+15	4.06E+15	2.21E+15	8.09E+14	5.64E+14	4.88E+14	4.28E+14	3.77E+14
3.00E-02	1.11E+17	2.53E+16	3.59E+15	2.57E+15	1.72E+15	9.41E+14	3.52E+14	2.48E+14	2.14E+14	1.88E+14	1.66E+14
5.50E-02	5.96E+16	8.73E+15	1.89E+15	1.42E+15	9.65E+14	5.28E+14	1.92E+14	1.30E+14	1.09E+14	9.32E+13	8.07E+13
8.50E-02	4.07E+16	7.48E+15	1.16E+15	8.81E+14	5.97E+14	3.18E+14	1.06E+14	6.90E+13	5.75E+13	4.95E+13	4.31E+13
1.20E-01	3.34E+16	7.03E+15	1.36E+15	1.07E+15	7.27E+14	3.73E+14	1.14E+14	6.95E+13	5.42E+13	4.37E+13	3.60E+13

	1.70E-01	5.34E+16	8.43E+15	1.17E+15	6.26E+14	3.84E+14	2.01E+14	6.29E+13	4.16E+13	3.59E+13	3.16E+13	2.78E+13
	3.00E-01	1.14E+17	1.75E+16	8.86E+14	6.63E+14	4.47E+14	2.33E+14	7.05E+13	4.56E+13	3.89E+13	3.38E+13	2.95E+13
	6.50E-01	2.35E+17	6.46E+16	1.53E+16	8.84E+15	4.91E+15	3.27E+15	1.69E+15	9.76E+14	7.71E+14	6.65E+14	5.86E+14
	1.13E+00	7.45E+16	5.03E+15	2.94E+14	2.32E+14	1.85E+14	1.32E+14	7.18E+13	4.20E+13	2.77E+13	1.88E+13	1.29E+13
	1.58E+00	3.85E+16	9.01E+15	1.55E+14	7.75E+13	5.81E+13	3.54E+13	1.12E+13	3.15E+12	1.44E+12	8.86E+11	6.14E+11
	2.00E+00	1.14E+16	5.65E+14	5.30E+13	3.87E+13	2.51E+13	1.06E+13	8.48E+11	3.10E+10	1.51E+10	1.30E+10	1.14E+10
	2.40E+00	9.10E+15	4.32E+14	6.65E+12	2.74E+12	1.91E+12	9.45E+11	1.17E+11	3.77E+09	1.32E+08	1.15E+07	6.68E+06
	2.80E+00	3.79E+15	6.86E+12	5.55E+11	4.30E+11	3.03E+11	1.52E+11	1.93E+10	6.29E+08	2.07E+07	6.87E+05	2.28E+04
	3.25E+00	1.89E+15	2.54E+12	1.02E+11	6.95E+10	4.93E+10	2.49E+10	3.23E+09	1.07E+08	3.56E+06	1.18E+05	3.91E+03
	3.75E+00	8.81E+14	1.34E+10	3.63E+07	3.06E+07	2.17E+07	1.10E+07	1.43E+06	4.73E+04	1.57E+03	5.20E+01	1.72E+00
	4.25E+00	8.47E+14	1.83E+09	1.04E-05	1.04E-05	1.05E-05	1.07E-05	1.10E-05	1.12E-05	1.12E-05	1.13E-05	1.13E-05
	4.75E+00	2.50E+14	1.36E+10	5.21E-06	5.24E-06	5.29E-06	5.37E-06	5.52E-06	5.62E-06	5.64E-06	5.65E-06	5.65E-06
	5.50E+00	1.93E+14	8.70E+07	3.86E-06	3.88E-06	3.92E-06	3.98E-06	4.10E-06	4.17E-06	4.19E-06	4.19E-06	4.19E-06
0	total	1.04E+18	1.87E+17	3.42E+16	2.25E+16	1.41E+16	8.26E+15	3.48E+15	2.19E+15	1.80E+15	1.55E+15	1.36E+15
0	mev/sec	4.28E+17	7.38E+16	1.16E+16	6.94E+15	4.03E+15	2.61E+15	1.28E+15	7.42E+14	5.81E+14	4.95E+14	4.31E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean		time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.79E+08	7.44E+07	1.91E+07	1.40E+07	9.34E+06	5.09E+06	1.86E+06	1.30E+06	1.12E+06	9.84E+05	8.66E+05
3.00E-02	7.68E+08	1.75E+08	2.47E+07	1.77E+07	1.19E+07	6.49E+06	2.43E+06	1.71E+06	1.48E+06	1.30E+06	1.15E+06
5.50E-02	7.53E+08	1.10E+08	2.39E+07	1.80E+07	1.22E+07	6.67E+06	2.43E+06	1.64E+06	1.37E+06	1.18E+06	1.02E+06
8.50E-02	7.95E+08	1.46E+08	2.26E+07	1.72E+07	1.17E+07	6.22E+06	2.08E+06	1.35E+06	1.12E+06	9.66E+05	8.41E+05
1.20E-01	9.21E+08	1.94E+08	3.76E+07	2.96E+07	2.01E+07	1.03E+07	3.14E+06	1.92E+06	1.50E+06	1.21E+06	9.93E+05
1.70E-01	2.09E+09	3.30E+08	4.57E+07	2.45E+07	1.50E+07	7.86E+06	2.46E+06	1.62E+06	1.40E+06	1.23E+06	1.09E+06
3.00E-01	7.85E+09	1.21E+09	6.11E+07	4.57E+07	3.08E+07	1.61E+07	4.86E+06	3.14E+06	2.69E+06	2.33E+06	2.04E+06
6.50E-01	3.51E+10	9.65E+09	2.28E+09	1.32E+09	7.34E+08	4.89E+08	2.52E+08	1.46E+08	1.15E+08	9.93E+07	8.76E+07
1.13E+00	1.93E+10	1.30E+09	7.61E+07	6.00E+07	4.78E+07	3.41E+07	1.86E+07	1.09E+07	7.17E+06	4.86E+06	3.33E+06
1.58E+00	1.40E+10	3.26E+09	5.63E+07	2.81E+07	2.11E+07	1.28E+07	4.07E+06	1.14E+06	5.23E+05	3.21E+05	2.22E+05
2.00E+00	5.22E+09	2.60E+08	2.43E+07	1.78E+07	1.15E+07	4.88E+06	3.90E+05	1.42E+04	6.97E+03	5.99E+03	5.26E+03
2.40E+00	5.02E+09	2.39E+08	3.67E+06	1.51E+06	1.05E+06	5.22E+05	6.47E+04	2.08E+03	7.27E+01	6.33E+00	3.69E+00
2.80E+00	2.44E+09	4.41E+06	3.57E+05	2.77E+05	1.95E+05	9.78E+04	1.24E+04	4.05E+02	1.34E+01	4.42E-01	1.47E-02
3.25E+00	1.42E+09	1.89E+06	7.62E+04	5.19E+04	3.68E+04	1.86E+04	2.41E+03	8.01E+01	2.66E+00	8.81E-02	2.92E-03
3.75E+00	7.59E+08	1.16E+04	3.13E+01	2.64E+01	1.87E+01	9.48E+00	1.23E+00	4.07E-02	1.35E-03	4.48E-05	1.49E-06
4.25E+00	8.27E+08	1.79E+03	1.01E-11	1.02E-11	1.03E-11	1.05E-11	1.08E-11	1.09E-11	1.10E-11	1.10E-11	1.10E-11
4.75E+00	2.73E+08	1.48E+04	5.69E-12	5.72E-12	5.77E-12	5.86E-12	6.03E-12	6.13E-12	6.16E-12	6.17E-12	6.17E-12
5.50E+00	2.44E+08	1.10E+02	4.88E-12	4.91E-12	4.96E-12	5.04E-12	5.18E-12	5.27E-12	5.29E-12	5.30E-12	5.30E-12
0 total	9.83E+10	1.70E+10	2.68E+09	1.60E+09	9.27E+08	6.00E+08	2.95E+08	1.71E+08	1.34E+08	1.14E+08	9.91E+07
0 gamma watts	6.85E+04	1.18E+04	1.87E+03	1.11E+03	6.46E+02	4.18E+02	2.05E+02	1.19E+02	9.31E+01	7.93E+01	6.91E+01

1

0 principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 91	1.75E+15	1.74E+15	6.08E+14	2.03E+14	2.33E+13	3.08E+11	7.08E+05	2.84E-04	1.14E-13	4.58E-23	.00E+00
mo 99	2.27E+15	1.76E+15	3.13E+05	2.30E-05	2.19E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.69E+15	2.59E+15	2.19E+15	1.85E+15	1.31E+15	6.65E+14	8.61E+13	2.86E+12	9.47E+10	3.14E+09	1.04E+08
ba140	1.94E+15	1.83E+15	1.45E+13	9.54E+10	4.64E+06	1.11E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.63E+15	2.54E+15	2.10E+13	1.37E+11	6.68E+06	1.60E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.21E+15	4.18E+15	3.37E+15	2.69E+15	1.72E+15	7.09E+14	4.93E+13	5.80E+11	6.83E+09	8.04E+07	9.46E+05

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.24E+15	3.43E+15	2.05E+07	5.83E-02	7.59E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.29E+15	4.15E+15	3.62E+10	1.77E+05	5.69E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.61E+15	1.53E+15	1.21E+13	7.96E+10	3.87E+06	9.27E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.47E+15	1.45E+15	2.17E+14	3.02E+13	6.13E+11	2.54E+08	1.80E-02	2.18E-19	.00E+00	.00E+00	.00E+00
ce143	4.88E+15	2.97E+15	9.71E-05	5.44E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

pr144	1.39E+15	1.38E+15	1.11E+15	8.90E+14	5.70E+14	2.35E+14	1.63E+13	1.92E+11	2.26E+09	2.66E+07	3.13E+05
nd147	1.45E+15	1.36E+15	4.93E+12	1.44E+10	1.40E+05	1.36E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.73E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.37E+14	6.13E+14	5.19E+14	4.37E+14	3.11E+14	1.57E+14	2.04E+13	6.76E+11	2.24E+10	7.43E+08	2.47E+07
te132	8.17E+14	6.60E+14	3.95E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.54E+14	5.35E+14	4.42E+12	2.90E+10	1.41E+06	3.38E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.39E+15	8.45E+14	2.77E-05	1.55E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.78E+14	9.71E+14	7.82E+14	6.25E+14	4.00E+14	1.65E+14	1.15E+13	1.35E+11	1.59E+09	1.87E+07	2.20E+05
sm153	1.33E+15	9.31E+14	1.19E+01	4.30E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.48E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
xe133	3.03E+15	2.93E+15	2.56E+10	1.25E+05	4.02E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.75E+14	5.72E+14	4.60E+14	3.68E+14	2.36E+14	9.69E+13	6.74E+12	7.94E+10	9.34E+08	1.10E+07	1.29E+05
nd147	8.98E+14	8.44E+14	3.06E+12	8.92E+09	8.71E+04	8.44E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.03E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.69E+15	3.13E+15	5.60E+05	4.12E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.36E+14	7.34E+14	5.91E+14	4.72E+14	3.03E+14	1.24E+14	8.66E+12	1.02E+11	1.20E+09	1.41E+07	1.66E+05
pr144	4.12E+14	4.09E+14	3.29E+14	2.63E+14	1.69E+14	6.94E+13	4.82E+12	5.68E+10	6.68E+08	7.86E+06	9.25E+04
sm153	6.34E+14	4.43E+14	5.65E+00	2.05E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.43E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.99E+14	6.21E+14	1.10E+05	8.09E-06	7.70E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.61E+15	2.21E+15	3.96E+05	2.91E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.82E+14	4.56E+14	3.62E+12	2.38E+10	1.15E+06	2.77E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.92E+15	2.87E+15	4.30E+14	5.98E+13	1.21E+12	5.02E+08	3.56E-02	4.32E-19	.00E+00	.00E+00	.00E+00
pr144	4.35E+14	4.32E+14	3.48E+14	2.78E+14	1.78E+14	7.33E+13	5.10E+12	6.00E+10	7.07E+08	8.32E+06	9.79E+04

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.24E+15	8.92E+14	5.87E-04	7.41E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.50E+15	4.20E+15	2.00E+12	6.88E+08	9.90E+01	2.09E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.13E+15	3.34E+15	2.00E+07	5.68E-02	7.40E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.50E+15	1.77E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.96E+15	1.89E+15	1.56E+13	1.03E+11	4.98E+06	1.19E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.21E+15	1.96E+15	6.40E-05	3.58E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.46E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	8.04E+15	7.95E+15	3.03E+15	1.11E+15	1.54E+14	2.95E+12	2.08E+07	5.37E-02	1.39E-10	3.58E-19	9.62E-28
nb 95	8.37E+15	8.37E+15	5.25E+15	2.28E+15	3.45E+14	6.95E+12	4.74E+07	1.23E-01	3.17E-10	8.18E-19	.00E+00
ru103	5.28E+15	5.18E+15	1.08E+15	2.10E+14	8.35E+12	1.32E+10	5.24E+01	5.20E-13	5.18E-27	.00E+00	.00E+00
i132	1.66E+16	1.35E+16	8.09E+07	2.30E-01	3.00E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.42E+15	3.42E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.64E+15	3.64E+15	3.35E+15	3.08E+15	2.60E+15	1.86E+15	6.78E+14	1.26E+14	2.35E+13	4.38E+12	8.16E+11
la140	6.29E+15	6.07E+15	5.01E+13	3.29E+11	1.60E+07	3.83E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.03E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.75E+15	3.05E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.81E+06	2.50E-02	3.26E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.06E+15	4.82E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.35E+14	4.12E+14	3.80E+12	2.91E+10	1.92E+06	8.47E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.85E+14	6.61E+14	5.46E+12	3.58E+10	1.74E+06	4.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	5.93E+14	5.68E+14	9.77E+12	1.43E+11	3.41E+07	1.96E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (9.01E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.81E+14	5.57E+14	3.33E+06	9.45E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	8.13E+15	7.84E+15	6.48E+13	4.25E+11	2.07E+07	4.95E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (5.65E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.75E+14	1.43E+14	8.55E+05	2.43E-03	3.16E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.51E+14	3.58E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.37E+13	5.33E+13	4.30E+13	3.43E+13	2.20E+13	9.05E+12	6.29E+11	7.41E+09	8.72E+07	1.03E+06	1.21E+04
eu156	2.90E+14	2.78E+14	4.78E+12	7.00E+10	1.67E+07	9.59E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.32E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.85E+14	3.71E+14	3.07E+12	2.01E+10	9.79E+05	2.35E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.86E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	5.88E+11	5.66E+11	4.79E+11	4.03E+11	2.87E+11	1.45E+11	1.88E+10	6.23E+08	2.07E+07	6.86E+05	2.28E+04
ag112	1.13E+12	5.98E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.40E+12	5.21E+12	4.30E+10	2.82E+08	1.37E+04	3.29E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.54E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.46E+12	2.38E+12	1.96E+10	1.29E+08	6.26E+03	1.50E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.34E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	3.18E+12	9.87E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.76E+14	3.46E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.83E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.90E+11	1.83E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.36E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	4.38E+12	1.36E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec

mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.70E+07) at 1.0 d

nuclide	time after discharge

		initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	rb 88	2.80E+10	8.70E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Plenum - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

	emean	time after discharge										
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	1.27E+17	6.61E+16	7.38E+13	5.42E+13	3.28E+13	1.85E+13	1.50E+13	1.54E+13	1.56E+13	1.56E+13	1.56E+13
	3.00E-02	7.96E+15	1.35E+15	8.32E+10	7.77E+10	9.81E+10	1.38E+11	2.44E+11	3.90E+11	5.03E+11	5.90E+11	6.57E+11
	5.50E-02	1.15E+16	3.68E+15	1.36E+12	1.29E+12	1.61E+12	2.26E+12	4.10E+12	6.62E+12	8.56E+12	1.01E+13	1.12E+13
	8.50E-02	5.02E+16	7.23E+15	3.81E+11	2.02E+11	2.02E+11	2.01E+11	2.00E+11	1.98E+11	1.96E+11	1.94E+11	1.92E+11
	1.20E-01	5.10E+16	3.73E+16	4.01E+11	2.79E+11	2.75E+11	2.70E+11	2.62E+11	2.50E+11	2.39E+11	2.30E+11	2.21E+11
	1.70E-01	1.68E+15	2.71E+14	1.78E+10	6.01E+09	4.28E+09	3.12E+09	2.77E+09	2.71E+09	2.65E+09	2.60E+09	2.55E+09
	3.00E-01	2.71E+16	1.96E+16	2.51E+11	1.51E+11	1.50E+11	1.48E+11	1.43E+11	1.34E+11	1.26E+11	1.20E+11	1.14E+11
	6.50E-01	1.46E+15	4.46E+13	1.63E+09	1.31E+09	9.62E+08	7.75E+08	8.89E+08	1.06E+09	1.11E+09	1.12E+09	1.11E+09
	1.13E+00	1.57E+15	9.82E+14	6.05E+08	5.71E+08	5.31E+08	5.02E+08	4.86E+08	4.68E+08	4.50E+08	4.32E+08	4.16E+08
	1.58E+00	9.54E+07	9.07E+07	7.87E+07	7.06E+07	6.21E+07	5.79E+07	6.21E+07	6.48E+07	6.20E+07	5.73E+07	5.25E+07
	2.00E+00	1.50E+06	9.67E+05	9.39E+05	9.62E+05	1.01E+06	1.11E+06	1.38E+06	1.62E+06	1.68E+06	1.67E+06	1.64E+06
	2.40E+00	4.03E+07	4.03E+07	3.43E+07	2.99E+07	2.49E+07	2.10E+07	1.80E+07	1.49E+07	1.23E+07	1.03E+07	8.53E+06
	2.80E+00	7.43E+07	7.54E+07	7.85E+07	8.39E+07	9.77E+07	1.31E+08	2.24E+08	3.05E+08	3.24E+08	3.19E+08	3.07E+08
	3.25E+00	1.44E+07	1.44E+07	1.23E+07	1.07E+07	8.91E+06	7.51E+06	6.44E+06	5.33E+06	4.42E+06	3.67E+06	3.05E+06
	3.75E+00	8.36E+06	8.36E+06	7.11E+06	6.21E+06	5.16E+06	4.35E+06	3.73E+06	3.09E+06	2.56E+06	2.13E+06	1.77E+06
	4.25E+00	4.85E+06	4.85E+06	4.12E+06	3.60E+06	2.99E+06	2.52E+06	2.16E+06	1.79E+06	1.49E+06	1.23E+06	1.03E+06
	4.75E+00	2.81E+06	2.81E+06	2.39E+06	2.09E+06	1.73E+06	1.46E+06	1.25E+06	1.04E+06	8.62E+05	7.15E+05	5.95E+05
	5.50E+00	2.54E+06	2.54E+06	2.16E+06	1.89E+06	1.57E+06	1.32E+06	1.13E+06	9.40E+05	7.79E+05	6.47E+05	5.38E+05
0	total	2.79E+17	1.37E+17	7.63E+13	5.62E+13	3.51E+13	2.15E+13	2.00E+13	2.30E+13	2.52E+13	2.68E+13	2.80E+13
0	mev/sec	2.37E+16	1.30E+16	9.77E+11	7.15E+11	5.17E+11	4.10E+11	4.77E+11	6.19E+11	7.28E+11	8.10E+11	8.73E+11

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

	emean	time after discharge										
	(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	1.00E-02	2.91E+08	1.52E+08	1.70E+05	1.25E+05	7.54E+04	4.26E+04	3.45E+04	3.53E+04	3.58E+04	3.59E+04	3.59E+04
	3.00E-02	5.49E+07	9.33E+06	5.74E+02	5.36E+02	6.77E+02	9.48E+02	1.69E+03	2.69E+03	3.47E+03	4.07E+03	4.53E+03
	5.50E-02	1.46E+08	4.65E+07	1.71E+04	1.63E+04	2.03E+04	2.86E+04	5.19E+04	8.37E+04	1.08E+05	1.27E+05	1.42E+05
	8.50E-02	9.81E+08	1.41E+08	7.44E+03	3.95E+03	3.94E+03	3.93E+03	3.91E+03	3.87E+03	3.82E+03	3.78E+03	3.75E+03
	1.20E-01	1.41E+09	1.03E+09	1.11E+04	7.70E+03	7.58E+03	7.46E+03	7.23E+03	6.89E+03	6.60E+03	6.33E+03	6.10E+03
	1.70E-01	6.57E+07	1.06E+07	6.94E+02	2.35E+02	1.67E+02	1.22E+02	1.08E+02	1.06E+02	1.04E+02	1.02E+02	9.98E+01
	3.00E-01	1.87E+09	1.35E+09	1.73E+04	1.04E+04	1.04E+04	1.02E+04	9.84E+03	9.25E+03	8.72E+03	8.26E+03	7.86E+03
	6.50E-01	2.19E+08	6.66E+06	2.44E+02	1.96E+02	1.44E+02	1.16E+02	1.33E+02	1.58E+02	1.66E+02	1.67E+02	1.65E+02
	1.13E+00	4.06E+08	2.54E+08	1.57E+02	1.48E+02	1.37E+02	1.30E+02	1.26E+02	1.21E+02	1.16E+02	1.12E+02	1.08E+02
	1.58E+00	3.45E+01	3.29E+01	2.85E+01	2.56E+01	2.25E+01	2.10E+01	2.25E+01	2.35E+01	2.24E+01	2.07E+01	1.90E+01
	2.00E+00	6.88E-01	4.45E-01	4.32E-01	4.42E-01	4.64E-01	5.11E-01	6.35E-01	7.44E-01	7.71E-01	7.67E-01	7.52E-01
	2.40E+00	2.22E+01	2.22E+01	1.89E+01	1.65E+01	1.37E+01	1.16E+01	9.91E+00	8.21E+00	6.81E+00	5.66E+00	4.71E+00
	2.80E+00	4.78E+01	4.86E+01	5.06E+01	5.40E+01	6.29E+01	8.42E+01	1.44E+02	1.96E+02	2.09E+02	2.06E+02	1.98E+02
	3.25E+00	1.08E+01	1.08E+01	9.17E+00	8.00E+00	6.65E+00	5.61E+00	4.81E+00	3.98E+00	3.30E+00	2.74E+00	2.28E+00
	3.75E+00	7.21E+00	7.21E+00	6.13E+00	5.35E+00	4.45E+00	3.75E+00	3.22E+00	2.66E+00	2.21E+00	1.84E+00	1.53E+00
	4.25E+00	4.74E+00	4.74E+00	4.03E+00	3.52E+00	2.92E+00	2.47E+00	2.11E+00	1.75E+00	1.45E+00	1.21E+00	1.00E+00
	4.75E+00	3.07E+00	3.07E+00	2.61E+00	2.28E+00	1.89E+00	1.60E+00	1.37E+00	1.13E+00	9.41E-01	7.81E-01	6.50E-01
	5.50E+00	3.21E+00	3.21E+00	2.73E+00	2.39E+00	1.98E+00	1.67E+00	1.43E+00	1.19E+00	9.86E-01	8.18E-01	6.80E-01
0	total	5.44E+09	3.00E+09	2.25E+05	1.64E+05	1.19E+05	9.42E+04	1.10E+05	1.42E+05	1.67E+05	1.86E+05	2.01E+05
0	gamma watts	3.79E+03	2.09E+03	1.57E-01	1.15E-01	8.29E-02	6.57E-02	7.64E-02	9.92E-02	1.17E-01	1.30E-01	1.40E-01

1

1 * gamma sources determined *
0case applies the following photon data base
master photon library

in binary mode
the sources include photons of nuclides for...

light elements

gamma source spectrum for decay step for BWR source term - plen ds2 - discharge
1.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	5.6216E+12	1.6865E+11
5.0000E-02	to	1.0000E-01	1.0757E+12	8.0674E+10
1.0000E-01	to	2.0000E-01	2.5528E+12	3.8293E+11
2.0000E-01	to	3.0000E-01	3.6252E+11	9.0630E+10
3.0000E-01	to	4.0000E-01	3.4415E+11	1.2045E+11
4.0000E-01	to	6.0000E-01	7.6084E+11	3.8042E+11
6.0000E-01	to	8.0000E-01	3.4016E+13	2.3811E+13
8.0000E-01	to	1.0000E+00	2.2898E+11	2.0608E+11
1.0000E+00	to	1.3300E+00	1.0742E+12	1.2514E+12
1.3300E+00	to	1.6600E+00	2.9473E+11	4.4062E+11
1.6600E+00	to	2.0000E+00	1.0329E+11	1.8901E+11
2.0000E+00	to	2.5000E+00	6.0229E+08	1.3552E+09
2.5000E+00	to	3.0000E+00	1.1231E+07	3.0886E+07
3.0000E+00	to	4.0000E+00	9.5136E+05	3.3297E+06
4.0000E+00	to	5.0000E+00	2.1180E-20	9.5308E-20
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			4.6435E+13	2.7123E+13

total energy from nuclides with spectrum data = 2.7022E+13
total energy from nuclides with no spectrum data = 1.0182E+11

gamma source spectrum for decay step for BWR source term - plen ds2 - 0.25 year
90.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.1326E+12	3.3977E+10
5.0000E-02	to	1.0000E-01	4.6088E+10	3.4566E+09
1.0000E-01	to	2.0000E-01	6.1183E+10	9.1774E+09
2.0000E-01	to	3.0000E-01	2.0042E+10	5.0104E+09
3.0000E-01	to	4.0000E-01	1.0715E+10	3.7503E+09
4.0000E-01	to	6.0000E-01	1.4414E+11	7.2069E+10
6.0000E-01	to	8.0000E-01	1.1426E+13	7.9984E+12
8.0000E-01	to	1.0000E+00	6.4847E+10	5.8363E+10
1.0000E+00	to	1.3300E+00	7.2401E+11	8.4347E+11
1.3300E+00	to	1.6600E+00	2.0448E+11	3.0570E+11
1.6600E+00	to	2.0000E+00	1.3934E+09	2.5500E+09
2.0000E+00	to	2.5000E+00	1.3995E+08	3.1489E+08
2.5000E+00	to	3.0000E+00	1.0622E+05	2.9210E+05
3.0000E+00	to	4.0000E+00	8.6622E-13	3.0318E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			1.3836E+13	9.3363E+12

total energy from nuclides with spectrum data = 9.2767E+12
total energy from nuclides with no spectrum data = 5.9621E+10

gamma source spectrum for decay step for BWR source term - plen ds2 - 0.50 year
182.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	8.0691E+11	2.4207E+10
5.0000E-02	to	1.0000E-01	2.0368E+10	1.5276E+09
1.0000E-01	to	2.0000E-01	2.9384E+10	4.4076E+09
2.0000E-01	to	3.0000E-01	9.3046E+09	2.3261E+09
3.0000E-01	to	4.0000E-01	6.0535E+09	2.1187E+09
4.0000E-01	to	6.0000E-01	1.2381E+11	6.1907E+10
6.0000E-01	to	8.0000E-01	4.7244E+12	3.3071E+12
8.0000E-01	to	1.0000E+00	3.0595E+10	2.7536E+10
1.0000E+00	to	1.3300E+00	7.0086E+11	8.1651E+11
1.3300E+00	to	1.6600E+00	1.9791E+11	2.9588E+11
1.6600E+00	to	2.0000E+00	4.9786E+08	9.1109E+08
2.0000E+00	to	2.5000E+00	5.1235E+07	1.1528E+08
2.5000E+00	to	3.0000E+00	4.1341E+04	1.1369E+05
3.0000E+00	to	4.0000E+00	8.6258E-13	3.0190E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			6.6502E+12	4.5445E+12

total energy from nuclides with spectrum data = 4.5103E+12
total energy from nuclides with no spectrum data = 3.4203E+10
gamma source spectrum for decay step for BWR source term - plen ds2 - 1 year
365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	5.0451E+11	1.5135E+10
5.0000E-02	to	1.0000E-01	6.4335E+09	4.8252E+08
1.0000E-01	to	2.0000E-01	2.1041E+10	3.1562E+09
2.0000E-01	to	3.0000E-01	2.9096E+09	7.2740E+08
3.0000E-01	to	4.0000E-01	4.7035E+09	1.6462E+09
4.0000E-01	to	6.0000E-01	1.0297E+11	5.1486E+10
6.0000E-01	to	8.0000E-01	7.3883E+11	5.1718E+11
8.0000E-01	to	1.0000E+00	9.4100E+09	8.4690E+09
1.0000E+00	to	1.3300E+00	6.5571E+11	7.6391E+11
1.3300E+00	to	1.6600E+00	1.8516E+11	2.7682E+11
1.6600E+00	to	2.0000E+00	6.5921E+07	1.2064E+08
2.0000E+00	to	2.5000E+00	1.0065E+07	2.2647E+07
2.5000E+00	to	3.0000E+00	1.0964E+04	3.0151E+04
3.0000E+00	to	4.0000E+00	8.5305E-13	2.9857E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			2.2318E+12	1.6391E+12

total energy from nuclides with spectrum data = 1.6277E+12
total energy from nuclides with no spectrum data = 1.1445E+10
gamma source spectrum for decay step for BWR source term - plen ds2 - 2 year
730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.6510E+11	7.9530E+09
5.0000E-02	to	1.0000E-01	3.1779E+09	2.3834E+08
1.0000E-01	to	2.0000E-01	1.5443E+10	2.3164E+09
2.0000E-01	to	3.0000E-01	1.0477E+09	2.6193E+08
3.0000E-01	to	4.0000E-01	3.5614E+09	1.2465E+09
4.0000E-01	to	6.0000E-01	7.8408E+10	3.9204E+10
6.0000E-01	to	8.0000E-01	5.4137E+10	3.7896E+10
8.0000E-01	to	1.0000E+00	2.6481E+09	2.3833E+09

1.0000E+00 to	1.3300E+00	5.7160E+11	6.6591E+11
1.3300E+00 to	1.6600E+00	1.6142E+11	2.4132E+11
1.6600E+00 to	2.0000E+00	1.2312E+06	2.2531E+06
2.0000E+00 to	2.5000E+00	3.9147E+06	8.8082E+06
2.5000E+00 to	3.0000E+00	6.0014E+03	1.6504E+04
3.0000E+00 to	4.0000E+00	8.3052E-13	2.9068E-12
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		1.1565E+12	9.9874E+11

total energy from nuclides with spectrum data = 9.9740E+11
total energy from nuclides with no spectrum data = 1.3399E+09
gamma source spectrum for decay step for BWR source term - plen ds2 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	7.8523E+10	2.3557E+09
5.0000E-02 to	1.0000E-01	1.7649E+09	1.3236E+08
1.0000E-01 to	2.0000E-01	7.2580E+09	1.0887E+09
2.0000E-01 to	3.0000E-01	4.3076E+08	1.0769E+08
3.0000E-01 to	4.0000E-01	1.6618E+09	5.8163E+08
4.0000E-01 to	6.0000E-01	3.6540E+10	1.8270E+10
6.0000E-01 to	8.0000E-01	1.8927E+10	1.3249E+10
8.0000E-01 to	1.0000E+00	2.4585E+08	2.2126E+08
1.0000E+00 to	1.3300E+00	3.8473E+11	4.4821E+11
1.3300E+00 to	1.6600E+00	1.0865E+11	1.6243E+11
1.6600E+00 to	2.0000E+00	7.1276E+01	1.3043E+02
2.0000E+00 to	2.5000E+00	2.5784E+06	5.8013E+06
2.5000E+00 to	3.0000E+00	3.9980E+03	1.0995E+04
3.0000E+00 to	4.0000E+00	7.7863E-13	2.7252E-12
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		6.3873E+11	6.4665E+11

total energy from nuclides with spectrum data = 6.4661E+11
total energy from nuclides with no spectrum data = 4.1470E+07
gamma source spectrum for decay step for BWR source term - plen ds2 - 10 year
3652.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	2.1318E+10	6.3955E+08
5.0000E-02 to	1.0000E-01	8.0499E+08	6.0374E+07
1.0000E-01 to	2.0000E-01	2.1146E+09	3.1719E+08
2.0000E-01 to	3.0000E-01	1.2473E+08	3.1183E+07
3.0000E-01 to	4.0000E-01	4.7181E+08	1.6513E+08
4.0000E-01 to	6.0000E-01	1.0266E+10	5.1331E+09
6.0000E-01 to	8.0000E-01	5.3243E+09	3.7270E+09
8.0000E-01 to	1.0000E+00	2.1394E+07	1.9254E+07
1.0000E+00 to	1.3300E+00	1.9931E+11	2.3219E+11
1.3300E+00 to	1.6600E+00	5.6284E+10	8.4145E+10
1.6600E+00 to	2.0000E+00	5.0362E+01	9.2163E+01
2.0000E+00 to	2.5000E+00	1.3357E+06	3.0053E+06
2.5000E+00 to	3.0000E+00	2.0711E+03	5.6957E+03
3.0000E+00 to	4.0000E+00	7.0074E-13	2.4526E-12
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00

	energy interval in mev		photons / second	mev / second
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		2.9604E+11	3.2643E+11

0
0 total energy from nuclides with spectrum data = 3.2642E+11
0 total energy from nuclides with no spectrum data = 1.2263E+07
1 gamma source spectrum for decay step for BWR source term - plen ds2 - 15 year
0 5478.75 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	6.7892E+09	2.0368E+08
	5.0000E-02 to	1.0000E-01	3.8811E+08	2.9108E+07
	1.0000E-01 to	2.0000E-01	6.3323E+08	9.4984E+07
	2.0000E-01 to	3.0000E-01	3.7003E+07	9.2508E+06
	3.0000E-01 to	4.0000E-01	1.3511E+08	4.7290E+07
	4.0000E-01 to	6.0000E-01	2.8846E+09	1.4423E+09
	6.0000E-01 to	8.0000E-01	1.5024E+09	1.0517E+09
	8.0000E-01 to	1.0000E+00	1.3366E+07	1.2029E+07
	1.0000E+00 to	1.3300E+00	1.0325E+11	1.2029E+11
	1.3300E+00 to	1.6600E+00	2.9158E+10	4.3591E+10
	1.6600E+00 to	2.0000E+00	4.4527E+01	8.1485E+01
	2.0000E+00 to	2.5000E+00	6.9196E+05	1.5569E+06
	2.5000E+00 to	3.0000E+00	1.0730E+03	2.9506E+03
	3.0000E+00 to	4.0000E+00	6.3065E-13	2.2073E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.4479E+11	1.6677E+11

0
0 total energy from nuclides with spectrum data = 1.6677E+11
0 total energy from nuclides with no spectrum data = 4.4833E+06
1 gamma source spectrum for decay step for BWR source term - plen ds2 - 20 year
0 7305.00 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	2.3449E+09	7.0347E+07
	5.0000E-02 to	1.0000E-01	1.9303E+08	1.4477E+07
	1.0000E-01 to	2.0000E-01	1.9821E+08	2.9732E+07
	2.0000E-01 to	3.0000E-01	1.1418E+07	2.8546E+06
	3.0000E-01 to	4.0000E-01	3.9290E+07	1.3752E+07
	4.0000E-01 to	6.0000E-01	8.1054E+08	4.0527E+08
	6.0000E-01 to	8.0000E-01	4.2864E+08	3.0005E+08
	8.0000E-01 to	1.0000E+00	1.1082E+07	9.9742E+06
	1.0000E+00 to	1.3300E+00	5.3490E+10	6.2316E+10
	1.3300E+00 to	1.6600E+00	1.5105E+10	2.2583E+10
	1.6600E+00 to	2.0000E+00	3.9369E+01	7.2045E+01
	2.0000E+00 to	2.5000E+00	3.5848E+05	8.0657E+05
	2.5000E+00 to	3.0000E+00	5.5585E+02	1.5286E+03
	3.0000E+00 to	4.0000E+00	5.6758E-13	1.9865E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		7.2633E+10	8.5746E+10

0
0 total energy from nuclides with spectrum data = 8.5743E+10
0 total energy from nuclides with no spectrum data = 2.2458E+06
1 gamma source spectrum for decay step for BWR source term - plen ds2 - 25 year
0 9131.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	8.9266E+08	2.6780E+07
	5.0000E-02 to	1.0000E-01	9.7807E+07	7.3355E+06
	1.0000E-01 to	2.0000E-01	6.6234E+07	9.9352E+06
	2.0000E-01 to	3.0000E-01	3.7446E+06	9.3614E+05
	3.0000E-01 to	4.0000E-01	1.1731E+07	4.1060E+06
	4.0000E-01 to	6.0000E-01	2.2778E+08	1.1389E+08
	6.0000E-01 to	8.0000E-01	1.2693E+08	8.8854E+07
	8.0000E-01 to	1.0000E+00	9.9312E+06	8.9381E+06
	1.0000E+00 to	1.3300E+00	2.7711E+10	3.2283E+10
	1.3300E+00 to	1.6600E+00	7.8256E+09	1.1699E+10
	1.6600E+00 to	2.0000E+00	3.4809E+01	6.3700E+01
	2.0000E+00 to	2.5000E+00	1.8571E+05	4.1786E+05
	2.5000E+00 to	3.0000E+00	2.8797E+02	7.9191E+02
	3.0000E+00 to	4.0000E+00	5.1082E-13	1.7879E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
	totals		3.6974E+10	4.4244E+10

total energy from nuclides with spectrum data = 4.4242E+10
total energy from nuclides with no spectrum data = 1.5687E+06

* normal termination of execution *

table of contents for material tables
case or subcase printed page

1 1

```
Ondset          33
          33          4          1         27          6          0          0          0          0          0
           0          0          0          0          0          2         -1       1698        690        130
         880       7935          0          5         99          7          9         93         18         18
          18          0          0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     14 entries read
0   74* array     14 entries read
0   75$ array     14 entries read
0    6t
     l140  71971
     used   107088 in size   150000
Ojopt           12
           0          0          0          0          0          0          0          0          0          0
           0          0
Otherm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
Onon             5
```

```
          7935          20           6          18        1697
0mmn            19
            10          10           0           0           1           3           0           0           0           0
            21         100          14           4           3           0           2           1           0
0tconst         5
  8.640000E+04 .000000E+00 .000000E+00 .000000E+00 1.000000E-05
0mzero          4
             0         689         129         879
0pow            3
   .000000E+00 .000000E+00 .000000E+00
0 linp          9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              3.4634E+00  1.9421E+02  1.9768E+02
 start of interval flux =          1.59016E+13
 n-gamma, fission and total mev/fission =              3.8366E+00  1.9431E+02  1.9815E+02
 start of interval flux =          1.59426E+13
 n-gamma, fission and total mev/fission =              3.9266E+00  1.9441E+02  1.9834E+02
 start of interval flux =          1.59937E+13
 n-gamma, fission and total mev/fission =              4.0155E+00  1.9451E+02  1.9852E+02
 start of interval flux =          1.60555E+13
 n-gamma, fission and total mev/fission =              4.1071E+00  1.9460E+02  1.9871E+02
 start of interval flux =          1.61265E+13
 n-gamma, fission and total mev/fission =              4.2012E+00  1.9469E+02  1.9889E+02
 start of interval flux =          1.62057E+13
 n-gamma, fission and total mev/fission =              4.2975E+00  1.9477E+02  1.9907E+02
 start of interval flux =          1.62923E+13
 n-gamma, fission and total mev/fission =              4.3955E+00  1.9486E+02  1.9925E+02
 start of interval flux =          1.63856E+13
 n-gamma, fission and total mev/fission =              4.4950E+00  1.9494E+02  1.9943E+02
 start of interval flux =          1.64852E+13
 n-gamma, fission and total mev/fission =              4.5958E+00  1.9502E+02  1.9961E+02
 start of interval flux =          1.65903E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
0ndset             33
            33           4           2          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt          12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm          4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
```

```
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 1.799989E+03 1.624719E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              4.6634E+00   1.9507E+02   1.9974E+02
 start of interval flux =          1.65420E+13
 n-gamma, fission and total mev/fission =              4.7547E+00   1.9515E+02   1.9990E+02
 start of interval flux =          1.66661E+13
 n-gamma, fission and total mev/fission =              4.8528E+00   1.9522E+02   2.0007E+02
 start of interval flux =          1.67942E+13
 n-gamma, fission and total mev/fission =              4.9526E+00   1.9529E+02   2.0025E+02
 start of interval flux =          1.69266E+13
 n-gamma, fission and total mev/fission =              5.0535E+00   1.9536E+02   2.0042E+02
 start of interval flux =          1.70633E+13
 n-gamma, fission and total mev/fission =              5.1554E+00   1.9544E+02   2.0059E+02
 start of interval flux =          1.72039E+13
 n-gamma, fission and total mev/fission =              5.2582E+00   1.9551E+02   2.0077E+02
 start of interval flux =          1.73483E+13
 n-gamma, fission and total mev/fission =              5.3619E+00   1.9558E+02   2.0094E+02
 start of interval flux =          1.74963E+13
 n-gamma, fission and total mev/fission =              5.4664E+00   1.9565E+02   2.0111E+02
 start of interval flux =          1.76478E+13
 n-gamma, fission and total mev/fission =              5.5717E+00   1.9572E+02   2.0129E+02
 start of interval flux =          1.78027E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
0ndset          33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
```

```
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 3.599977E+03 1.723304E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              5.4841E+00   1.9575E+02   2.0124E+02
 start of interval flux =          1.78777E+13
 n-gamma, fission and total mev/fission =              5.5780E+00   1.9582E+02   2.0139E+02
 start of interval flux =          1.80675E+13
 n-gamma, fission and total mev/fission =              5.6853E+00   1.9588E+02   2.0156E+02
 start of interval flux =          1.82599E+13
 n-gamma, fission and total mev/fission =              5.7941E+00   1.9594E+02   2.0174E+02
 start of interval flux =          1.84550E+13
 n-gamma, fission and total mev/fission =              5.9038E+00   1.9601E+02   2.0191E+02
 start of interval flux =          1.86527E+13
 n-gamma, fission and total mev/fission =              6.0146E+00   1.9607E+02   2.0209E+02
 start of interval flux =          1.88529E+13
 n-gamma, fission and total mev/fission =              6.1262E+00   1.9614E+02   2.0226E+02
 start of interval flux =          1.90557E+13
 n-gamma, fission and total mev/fission =              6.2387E+00   1.9620E+02   2.0244E+02
 start of interval flux =          1.92610E+13
 n-gamma, fission and total mev/fission =              6.3520E+00   1.9627E+02   2.0262E+02
 start of interval flux =          1.94687E+13
 n-gamma, fission and total mev/fission =              6.4662E+00   1.9633E+02   2.0280E+02
 start of interval flux =          1.96787E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
0ndset          33
           33            4            4           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0            0            0            0            0            0            0            0            0            0
            0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
```

```
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 5.399966E+03 1.888091E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              6.4027E+00   1.9638E+02   2.0278E+02
 start of interval flux =          1.98457E+13
 n-gamma, fission and total mev/fission =              6.5157E+00   1.9644E+02   2.0296E+02
 start of interval flux =          2.00911E+13
 n-gamma, fission and total mev/fission =              6.6367E+00   1.9650E+02   2.0314E+02
 start of interval flux =          2.03381E+13
 n-gamma, fission and total mev/fission =              6.7589E+00   1.9656E+02   2.0332E+02
 start of interval flux =          2.05866E+13
 n-gamma, fission and total mev/fission =              6.8818E+00   1.9663E+02   2.0351E+02
 start of interval flux =          2.08365E+13
 n-gamma, fission and total mev/fission =              7.0055E+00   1.9669E+02   2.0370E+02
 start of interval flux =          2.10878E+13
 n-gamma, fission and total mev/fission =              7.1300E+00   1.9676E+02   2.0389E+02
 start of interval flux =          2.13403E+13
 n-gamma, fission and total mev/fission =              7.2552E+00   1.9682E+02   2.0408E+02
 start of interval flux =          2.15940E+13
 n-gamma, fission and total mev/fission =              7.3810E+00   1.9689E+02   2.0427E+02
 start of interval flux =          2.18489E+13
 n-gamma, fission and total mev/fission =              7.5075E+00   1.9695E+02   2.0446E+02
 start of interval flux =          2.21048E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
0ndset          33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
```

```
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst         5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero          4
            21          689          129          879
0pow            3
  4.349999E+00 7.199954E+03 2.111540E+13
0 linp          9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              7.4484E+00   1.9701E+02   2.0446E+02
 start of interval flux =          2.23562E+13
 n-gamma, fission and total mev/fission =              7.5771E+00   1.9707E+02   2.0465E+02
 start of interval flux =          2.26543E+13
 n-gamma, fission and total mev/fission =              7.7133E+00   1.9713E+02   2.0484E+02
 start of interval flux =          2.29524E+13
 n-gamma, fission and total mev/fission =              7.8500E+00   1.9719E+02   2.0504E+02
 start of interval flux =          2.32498E+13
 n-gamma, fission and total mev/fission =              7.9870E+00   1.9726E+02   2.0524E+02
 start of interval flux =          2.35464E+13
 n-gamma, fission and total mev/fission =              8.1243E+00   1.9732E+02   2.0545E+02
 start of interval flux =          2.38421E+13
 n-gamma, fission and total mev/fission =              8.2617E+00   1.9739E+02   2.0565E+02
 start of interval flux =          2.41369E+13
 n-gamma, fission and total mev/fission =              8.3993E+00   1.9745E+02   2.0585E+02
 start of interval flux =          2.44307E+13
 n-gamma, fission and total mev/fission =              8.5368E+00   1.9752E+02   2.0606E+02
 start of interval flux =          2.47234E+13
 n-gamma, fission and total mev/fission =              8.6744E+00   1.9759E+02   2.0626E+02
 start of interval flux =          2.50148E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
0ndset             33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt          12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm          4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
```

```
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst         5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero          4
            21          689          129          879
0pow            3
  4.349999E+00 8.999942E+03 2.386569E+13
0 linp          9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              8.8247E+00   1.9766E+02   2.0648E+02
 start of interval flux =          2.53316E+13
 n-gamma, fission and total mev/fission =              8.9002E+00   1.9770E+02   2.0660E+02
 start of interval flux =          2.54917E+13
 n-gamma, fission and total mev/fission =              8.9767E+00   1.9773E+02   2.0671E+02
 start of interval flux =          2.56514E+13
 n-gamma, fission and total mev/fission =              9.0530E+00   1.9777E+02   2.0682E+02
 start of interval flux =          2.58105E+13
 n-gamma, fission and total mev/fission =              9.1293E+00   1.9781E+02   2.0694E+02
 start of interval flux =          2.59692E+13
 n-gamma, fission and total mev/fission =              9.2055E+00   1.9785E+02   2.0705E+02
 start of interval flux =          2.61274E+13
 n-gamma, fission and total mev/fission =              9.2817E+00   1.9788E+02   2.0717E+02
 start of interval flux =          2.62851E+13
 n-gamma, fission and total mev/fission =              9.3577E+00   1.9792E+02   2.0728E+02
 start of interval flux =          2.64422E+13
 n-gamma, fission and total mev/fission =              9.4336E+00   1.9796E+02   2.0739E+02
 start of interval flux =          2.65987E+13
 n-gamma, fission and total mev/fission =              9.5094E+00   1.9800E+02   2.0751E+02
 start of interval flux =          2.67547E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 50000 MWd/MTU
0ndset          33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt          12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm          4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
```

```
0non                5
          7935              20               6              18            1697
0mmn               19
             0              10               0               0               1               1               0               0               0              10
            21             100               0               4               3               0               2               0               0
0tconst             5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero              4
            21             689             129             879
0pow                3
  4.349999E+00 9.999936E+03 2.013603E+13
0 linp              9
             6               2               0              26               1           14808            1000            1697               5
0 case or subcase    1  BWR SNF Assembly - Plenum - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1         primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     80000    130000     140000
       220000    240000    250000     260000
       270000    280000    290000     400000
       410000    500000
74**     89.4    10100.0      46.5  189764.1
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
```

```
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 50000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1000000 e
   5t
BWR SNF Assembly - Top - deplete to 50000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Top - decay
per ONE BWR Fuel Assembly - Top Region - ds2t
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - top ds2 - discharge
  decay step for BWR source term - top ds2 - 0.25 year
  decay step for BWR source term - top ds2 - 0.50 year
  decay step for BWR source term - top ds2 - 1 year
  decay step for BWR source term - top ds2 - 2 year
  decay step for BWR source term - top ds2 - 5 year
  decay step for BWR source term - top ds2 - 10 year
  decay step for BWR source term - top ds2 - 15 year
  decay step for BWR source term - top ds2 - 20 year
  decay step for BWR source term - top ds2 - 25 year
```

```
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooo   rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nnn         nn  ssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggg    eeeeeeeee       nn    nn    nn  ssssssssssss
    oo         oo   rrrrrrrrrrrr         ii         gg    gggggg    eeeeeeeee       nn     nn   nn   ssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooo   rr          rr  iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nn         nnn  ssssssssssss
     ooooooooooo   rr          rr  iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooo   tttttttttttt    zzzzzzzzzzzz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    ll             oo         oo        tt           zz
    llllllllllllll oooooooooooo        tt          zzzzzzzzzzzz
    llllllllllllll  ooooooooooo        tt         zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666              //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666             //   9999999999999  6666666666666
       1111       22         22              //    00       00   66                       //   99         99  66
         11                  22             //    00         00  66                      //    99         99  66
         11                  22            //     00         00  66                     //     99         99  66
         11                22             //      00         00  666666666666          //      9999999999999  666666666666
         11               22             //       00         00  6666666666666        //        999999999999  6666666666666
         11             22              //        00         00  66         66       //                   99  66         66
         11           22               //         00         00  66         66      //                    99  66         66
         11         22                //           00       00  66         66     //                     99  66         66
      11111111    2222222222222     //             000000000    6666666666666    //           9999999999999  6666666666666
      11111111    2222222222222    //               0000000      66666666666    //            999999999999    66666666666
0

         11        33333333333                    5555555555555           44                        11       5555555555555
        111       3333333333333                   5555555555555          444                       111       5555555555555
       1111       33         33        :::        55                    4444          :::          1111       55
         11                  33        :::        55                   44 44          :::            11       55
         11                  33        :::        55                  44  44          :::            11       55
         11                333                    555555555555       44   44                        11       555555555555
         11                333                    5555555555555     44    44                        11       5555555555555
         11                  33        :::                  55   444444444444        :::            11                  55
         11                  33        :::                  55  4444444444444        :::            11                  55
         11       33         33        :::        55        55           44          :::            11       55         55
      11111111    3333333333333                   5555555555555           44                    11111111    5555555555555
      11111111     33333333333                     55555555555            44                    11111111     55555555555
1
0                                  sssssssssss    cccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                  ssssssssssss   cccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
```

```
ss         ss   cc         cc   aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
            ss   cc              aa         aa   ll              ee
            ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccccc  aa         aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  13:54:15                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    500000
74**     89.4   10100.0      46.5  189764.1
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1800000 e
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds2t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1800000 e
    5t
 BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds2t
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 50000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1000000 e
    5t
 BWR SNF Assembly - Top - deplete to 50000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds2t
 58** 10r4.35
 60** 23.0 46.0 69.0 92.0 115.0 138.0 161.0 184.0 207.0 229.8850575
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Top - decay
 per ONE BWR Fuel Assembly - Top Region - ds2t
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - top ds2 - discharge
   decay step for BWR source term - top ds2 - 0.25 year
   decay step for BWR source term - top ds2 - 0.50 year
   decay step for BWR source term - top ds2 - 1 year
   decay step for BWR source term - top ds2 - 2 year
   decay step for BWR source term - top ds2 - 5 year
   decay step for BWR source term - top ds2 - 10 year
   decay step for BWR source term - top ds2 - 15 year
   decay step for BWR source term - top ds2 - 20 year
   decay step for BWR source term - top ds2 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
0                      7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                    1697     total number of nuclides in library
                      689     number of light-element nuclides
                      129     number of actinide nuclides
                      879     number of fission product nuclides
0                    7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *           prelim lwr origen-s binary working library--id = 1143              *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  5 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *            prelim lwr origen-s binary working library--id = 1143           *
         *         made from modified card-image origen-s libraries of scale 4.2      *
         *      data from the light element, actinide, and fission product libraries  *
         *        decay data, including gamma and total energy, are from endf/b-vi    *
         *                                                                            *
         *      neutron flux spectrum factors and cross sections were produced from   *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                            *
         *                  fission product yields are from endf/b-v                  *
         *                                                                            *
         *              photon libraries use an 18-energy-group structure             *
         *             the photon data are from the master photon data base,          *
         *              produced to include bremsstrahlung from uo2 matrix            *
         *                                                                            *
         *        see information above this box (if present) for later updates       *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
1
    BWR SNF Assembly - Top - decay                                                    light elements        page    1
0                                        nuclide concentrations, grams
                                         basis =per ONE BWR Fuel Assembly - Top Region -
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03
h 2	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06	1.39E-06
h 3	5.71E-10	5.71E-10	5.63E-10	5.55E-10	5.40E-10	5.10E-10	4.31E-10	3.25E-10	2.46E-10	1.85E-10	1.40E-10
he 3	1.67E-11	1.68E-11	2.46E-11	3.25E-11	4.79E-11	7.74E-11	1.57E-10	2.62E-10	3.42E-10	4.02E-10	4.48E-10
he 4	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04	5.17E-04
li 6	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11
li 7	7.07E-14	7.07E-14	7.07E-14	7.07E-14	7.07E-14	7.07E-14	7.07E-14	7.07E-14	7.07E-14	7.07E-14	7.07E-14
be 9	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
be 10	2.84E-08	2.84E-08	2.84E-08	2.84E-08	2.84E-08	2.84E-08	2.84E-08	2.84E-08	2.84E-08	2.84E-08	2.84E-08
b 10	4.29E-15	4.32E-15	7.32E-15	1.04E-14	1.66E-14	2.89E-14	6.58E-14	1.27E-13	1.89E-13	2.50E-13	3.12E-13
b 11	3.44E-14	3.44E-14	3.44E-14	3.44E-14	3.44E-14	3.44E-14	3.44E-14	3.44E-14	3.44E-14	3.44E-14	3.44E-14
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03
c 14	4.51E-08	4.51E-08	4.51E-08	4.51E-08	4.51E-08	4.51E-08	4.51E-08	4.51E-08	4.50E-08	4.50E-08	4.50E-08
n 14	1.54E-11	1.54E-11	1.67E-11	1.81E-11	2.09E-11	2.63E-11	4.27E-11	7.00E-11	9.72E-11	1.24E-10	1.52E-10
n 15	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08	1.85E-08
o 16	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
o 17	8.07E-05	8.07E-05	8.07E-05	8.07E-05	8.07E-05	8.07E-05	8.07E-05	8.07E-05	8.07E-05	8.07E-05	8.07E-05
o 18	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04
f 19	7.54E-10	7.54E-10	7.54E-10	7.54E-10	7.54E-10	7.54E-10	7.54E-10	7.54E-10	7.54E-10	7.54E-10	7.54E-10
ne 20	1.57E-14	1.57E-14	1.57E-14	1.57E-14	1.57E-14	1.57E-14	1.57E-14	1.57E-14	1.57E-14	1.57E-14	1.57E-14
ne 21	2.67E-11	2.67E-11	2.67E-11	2.67E-11	2.67E-11	2.67E-11	2.67E-11	2.67E-11	2.67E-11	2.67E-11	2.67E-11
ne 22	2.75E-09	2.75E-09	2.75E-09	2.75E-09	2.75E-09	2.75E-09	2.75E-09	2.75E-09	2.75E-09	2.75E-09	2.75E-09
na 23	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10	2.24E-10
na 24	1.71E-09	5.51E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	3.48E-06	3.48E-06	3.48E-06	3.48E-06	3.48E-06	3.48E-06	3.48E-06	3.48E-06	3.48E-06	3.48E-06	3.48E-06
mg 25	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05	3.13E-05
mg 26	1.44E-05	1.44E-05	1.44E-05	1.44E-05	1.44E-05	1.44E-05	1.44E-05	1.44E-05	1.44E-05	1.44E-05	1.44E-05
al 27	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
si 28	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00
si 29	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01
si 30	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
si 31	5.04E-09	8.85E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	3.61E-12	3.61E-12	3.61E-12	3.61E-12	3.60E-12	3.58E-12	3.54E-12	3.47E-12	3.40E-12	3.33E-12	3.27E-12
p 31	5.51E-05	5.51E-05	5.51E-05	5.51E-05	5.51E-05	5.51E-05	5.51E-05	5.51E-05	5.51E-05	5.51E-05	5.51E-05
p 32	4.91E-10	4.68E-10	6.18E-12	6.97E-14	8.26E-16	8.13E-16	8.04E-16	7.88E-16	7.72E-16	7.57E-16	7.41E-16
p 33	8.54E-14	8.31E-14	7.28E-15	5.80E-16	3.91E-18	1.79E-22	1.71E-35	.00E+00	.00E+00	.00E+00	.00E+00
s 32	2.02E-08	2.03E-08	2.07E-08	2.07E-08	2.07E-08	2.07E-08	2.07E-08	2.07E-08	2.07E-08	2.07E-08	2.07E-08
s 33	5.86E-12	5.86E-12	5.94E-12	5.95E-12	5.95E-12	5.95E-12	5.95E-12	5.95E-12	5.95E-12	5.95E-12	5.95E-12
ar 40	3.14E-11	3.14E-11	3.14E-11	3.14E-11	3.14E-11	3.14E-11	3.14E-11	3.14E-11	3.14E-11	3.14E-11	3.14E-11
k 41	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12	1.03E-12
k 43	2.04E-14	9.67E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	1.99E-14	1.99E-14	1.99E-14	1.99E-14	1.99E-14	1.99E-14	1.99E-14	1.99E-14	1.99E-14	1.99E-14	1.99E-14
ca 43	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07	6.82E-07
ca 44	5.29E-06	5.29E-06	5.29E-06	5.29E-06	5.29E-06	5.29E-06	5.29E-06	5.29E-06	5.29E-06	5.29E-06	5.29E-06
ca 45	1.49E-08	1.48E-08	1.02E-08	6.89E-09	3.18E-09	6.77E-10	6.56E-12	2.88E-15	1.27E-18	5.57E-22	2.45E-25
ca 46	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07	6.67E-07
ca 47	5.82E-12	4.99E-12	6.19E-18	4.50E-24	3.34E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	9.63E-08	9.63E-08	1.01E-07	1.04E-07	1.08E-07	1.10E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07	1.11E-07
sc 46	9.38E-07	9.31E-07	4.46E-07	2.07E-07	4.58E-08	2.23E-09	2.59E-13	7.13E-20	1.96E-26	5.41E-33	1.49E-39
sc 47	6.09E-08	4.95E-08	5.01E-16	1.49E-23	9.41E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	3.18E-09	2.17E-09	4.18E-24	2.12E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

BWR SNF Assembly - Top - decay light elements page 2

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	9.49E-02	9.49E-02	9.49E-02	9.49E-02	9.49E-02	9.49E-02	9.49E-02	9.49E-02	9.49E-02	9.49E-02	9.49E-02
ti 47	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02

ti 48	8.68E-01	8.68E-01	8.68E-01	8.68E-01	8.68E-01	8.68E-01	8.68E-01	8.68E-01	8.68E-01	8.68E-01	8.68E-01
ti 49	8.41E-02	8.41E-02	8.41E-02	8.41E-02	8.41E-02	8.41E-02	8.41E-02	8.41E-02	8.41E-02	8.41E-02	8.41E-02
ti 50	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02
v 50	5.81E-04	5.81E-04	5.81E-04	5.81E-04	5.81E-04	5.81E-04	5.81E-04	5.81E-04	5.81E-04	5.81E-04	5.81E-04
v 51	9.11E-02	9.12E-02	9.31E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02
cr 50	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00	2.15E+00
cr 51	2.15E-03	2.09E-03	2.26E-04	2.23E-05	2.31E-07	2.48E-11	3.09E-23	4.29E-43	.00E+00	.00E+00	.00E+00
cr 52	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01
cr 53	5.06E+00	5.06E+00	5.06E+00	5.06E+00	5.06E+00	5.06E+00	5.06E+00	5.06E+00	5.06E+00	5.06E+00	5.06E+00
cr 54	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00
mn 54	1.60E-03	1.59E-03	1.31E-03	1.06E-03	7.09E-04	3.15E-04	2.77E-05	4.79E-07	8.31E-09	1.44E-10	2.50E-12
mn 55	3.26E+00	3.26E+00	3.26E+00	3.26E+00	3.27E+00	3.27E+00	3.28E+00	3.29E+00	3.29E+00	3.29E+00	3.29E+00
mn 56	1.54E-05	2.44E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	9.13E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00	9.13E+00
fe 55	3.08E-02	3.07E-02	2.89E-02	2.71E-02	2.39E-02	1.85E-02	8.65E-03	2.43E-03	6.82E-04	1.92E-04	5.39E-05
fe 56	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02
fe 57	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00	4.65E+00
fe 58	5.52E-01	5.52E-01	5.53E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01	5.54E-01
fe 59	8.30E-05	8.17E-05	2.04E-05	4.84E-06	2.81E-07	9.50E-10	3.68E-17	1.63E-29	7.19E-42	.00E+00	.00E+00
co 58m	1.86E-10	3.01E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.76E-03	1.74E-03	7.31E-04	2.96E-04	4.96E-05	1.40E-06	3.11E-11	5.51E-19	9.74E-27	1.72E-34	3.01E-42
co 59	4.43E-01	4.43E-01	4.43E-01	4.43E-01	4.43E-01	4.43E-01	4.43E-01	4.43E-01	4.43E-01	4.43E-01	4.43E-01
co 60	5.74E-02	5.74E-02	5.56E-02	5.38E-02	5.04E-02	4.41E-02	2.98E-02	1.54E-02	7.99E-03	4.14E-03	2.14E-03
co 61	3.55E-08	1.49E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01
ni 59	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01	4.38E-01
ni 60	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01
ni 61	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01	8.88E-01
ni 62	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00	2.37E+00
ni 63	8.78E-02	8.78E-02	8.77E-02	8.75E-02	8.72E-02	8.66E-02	8.48E-02	8.19E-02	7.91E-02	7.65E-02	7.39E-02
ni 64	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01
ni 65	2.61E-07	3.54E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	3.19E-11	2.35E-11	3.96E-23	2.29E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.38E-01	1.40E-01	1.42E-01	1.45E-01	1.48E-01	1.51E-01
cu 64	9.87E-07	2.66E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	6.54E-02	6.54E-02	6.54E-02	6.54E-02	6.54E-02	6.54E-02	6.54E-02	6.54E-02	6.54E-02	6.54E-02	6.54E-02
cu 66	1.53E-09	3.67E-14	6.17E-26	3.57E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	8.86E-13	6.77E-13	2.70E-23	4.20E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	8.26E-04	8.27E-04	8.27E-04	8.27E-04	8.27E-04	8.27E-04	8.27E-04	8.27E-04	8.27E-04	8.27E-04	8.27E-04
zn 65	4.68E-07	4.67E-07	3.62E-07	2.79E-07	1.66E-07	5.87E-08	2.61E-09	1.45E-11	8.07E-14	4.50E-16	2.50E-18
zn 66	5.08E-04	5.08E-04	5.08E-04	5.08E-04	5.08E-04	5.08E-04	5.08E-04	5.08E-04	5.08E-04	5.08E-04	5.08E-04
zn 67	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07	7.20E-07
zn 68	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08
ga 69	1.88E-11	1.88E-11	1.88E-11	1.88E-11	1.88E-11	1.88E-11	1.88E-11	1.88E-11	1.88E-11	1.88E-11	1.88E-11
ge 70	1.02E-13	1.02E-13	1.02E-13	1.02E-13	1.02E-13	1.02E-13	1.02E-13	1.02E-13	1.02E-13	1.02E-13	1.02E-13
sr 87	3.44E-06	3.44E-06	3.44E-06	3.44E-06	3.44E-06	3.44E-06	3.44E-06	3.44E-06	3.44E-06	3.44E-06	3.44E-06
sr 88	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04	3.34E-04
sr 89	1.03E-06	1.01E-06	2.99E-07	8.42E-08	6.87E-09	4.59E-11	1.37E-17	1.83E-28	2.45E-39	.00E+00	.00E+00
sr 90	1.53E-08	1.53E-08	1.52E-08	1.51E-08	1.49E-08	1.45E-08	1.35E-08	1.19E-08	1.06E-08	9.33E-09	8.25E-09
sr 91	1.60E-09	2.80E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 89	2.46E-05	2.46E-05	2.53E-05	2.55E-05	2.56E-05	2.56E-05	2.56E-05	2.56E-05	2.56E-05	2.56E-05	2.56E-05
y 90	2.04E-06	1.57E-06	3.95E-12	3.92E-12	3.87E-12	3.78E-12	3.51E-12	3.10E-12	2.74E-12	2.43E-12	2.14E-12
y 91	3.07E-06	3.03E-06	1.06E-06	3.53E-07	4.06E-08	5.35E-10	1.23E-15	4.95E-25	1.99E-34	1.28E-43	.00E+00
y 92	6.81E-09	6.19E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	3.91E-12	7.62E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

zr 90	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01
zr 91	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01
zr 92	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01
zr 93	5.21E-02	5.21E-02	5.21E-02	5.21E-02	5.21E-02	5.21E-02	5.21E-02	5.21E-02	5.21E-02	5.21E-02	5.21E-02
zr 94	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01
zr 95	1.07E-03	1.06E-03	4.04E-04	1.48E-04	2.05E-05	3.93E-07	2.76E-12	7.14E-21	1.84E-29	4.76E-38	.00E+00
zr 96	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00	5.16E+00
zr 97	1.86E-05	6.94E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	4.59E-09	4.59E-09	4.59E-09	4.59E-09	4.58E-09	4.58E-09	4.56E-09	4.54E-09	4.52E-09	4.50E-09	4.47E-09
nb 92	8.84E-06	8.84E-06	8.84E-06	8.84E-06	8.84E-06	8.84E-06	8.84E-06	8.84E-06	8.84E-06	8.84E-06	8.84E-06
nb 93	4.93E-01	4.93E-01	4.93E-01	4.93E-01	4.93E-01	4.93E-01	4.93E-01	4.93E-01	4.93E-01	4.93E-01	4.93E-01
nb 93m	2.01E-04	2.01E-04	1.99E-04	1.96E-04	1.92E-04	1.84E-04	1.62E-04	1.31E-04	1.06E-04	8.53E-05	6.89E-05
nb 94	6.48E-03	6.48E-03	6.48E-03	6.48E-03	6.48E-03	6.48E-03	6.48E-03	6.48E-03	6.48E-03	6.48E-03	6.48E-03
nb 95	6.01E-04	6.00E-04	3.70E-04	1.60E-04	2.42E-05	4.87E-07	3.33E-12	8.59E-21	2.22E-29	6.37E-40	.00E+00
nb 95m	6.69E-07	6.68E-07	2.68E-07	9.83E-08	1.36E-08	2.60E-10	1.83E-15	4.74E-24	1.22E-32	.00E+00	.00E+00
nb 96	1.43E-08	6.99E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.32E-06	4.96E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.74E-08	6.49E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	6.59E-07	6.59E-07	7.13E-07	7.69E-07	8.80E-07	1.10E-06	1.77E-06	2.87E-06	3.98E-06	5.09E-06	6.19E-06
mo 95	1.86E-02	1.86E-02	1.95E-02	1.99E-02	2.02E-02	2.02E-02	2.02E-02	2.02E-02	2.02E-02	2.02E-02	2.02E-02
mo 96	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03	1.26E-03
mo 97	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02	3.26E-02
mo 98	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04
mo 99	7.06E-09	5.49E-09	9.74E-19	7.15E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	7.35E-11	7.35E-11	7.35E-11	7.35E-11	7.35E-11	7.35E-11	7.35E-11	7.35E-11	7.35E-11	7.35E-11	7.35E-11
tc 98	6.72E-13	6.72E-13	6.72E-13	6.72E-13	6.72E-13	6.72E-13	6.72E-13	6.72E-13	6.72E-13	6.72E-13	6.72E-13
tc 99	1.19E-07	1.19E-07	1.19E-07	1.19E-07	1.19E-07	1.19E-07	1.19E-07	1.19E-07	1.19E-07	1.19E-07	1.19E-07
ru 99	5.22E-13	5.23E-13	6.19E-13	7.18E-13	9.15E-13	1.31E-12	2.48E-12	4.45E-12	6.41E-12	8.37E-12	1.03E-11
ru100	9.14E-09	9.14E-09	9.14E-09	9.14E-09	9.14E-09	9.14E-09	9.14E-09	9.14E-09	9.14E-09	9.14E-09	9.14E-09
ru101	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11
ru102	7.47E-13	7.47E-13	7.47E-13	7.47E-13	7.47E-13	7.47E-13	7.47E-13	7.47E-13	7.47E-13	7.47E-13	7.47E-13
cd111	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09	3.34E-09
cd112	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08	2.87E-08
cd113	8.54E-11	8.54E-11	8.54E-11	8.54E-11	8.54E-11	8.55E-11	8.55E-11	8.55E-11	8.55E-11	8.55E-11	8.55E-11
cd113m	8.99E-11	8.99E-11	8.88E-11	8.77E-11	8.56E-11	8.14E-11	7.03E-11	5.50E-11	4.30E-11	3.36E-11	2.63E-11
cd114	3.32E-06	3.32E-06	3.50E-06	3.55E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06	3.57E-06
cd115	1.33E-10	9.76E-11	9.22E-23	2.93E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	2.86E-10	2.81E-10	7.06E-11	1.68E-11	9.78E-13	3.35E-15	1.34E-22	6.32E-35	.00E+00	.00E+00	.00E+00
cd116	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08	2.15E-08
cd117	1.57E-12	1.97E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	8.33E-04	8.34E-04	8.69E-04	8.91E-04	9.10E-04	9.19E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04	9.20E-04
in113m	5.22E-08	5.19E-08	3.04E-08	1.74E-08	5.79E-09	6.41E-10	8.73E-13	1.46E-17	2.44E-22	4.08E-27	6.83E-32
in114	1.32E-10	8.31E-11	2.39E-11	6.55E-12	5.07E-13	3.05E-15	6.64E-22	5.24E-33	.00E+00	.00E+00	.00E+00
in114m	5.24E-06	5.16E-06	1.49E-06	4.07E-07	3.15E-08	1.90E-10	4.13E-17	3.26E-28	2.57E-39	.00E+00	.00E+00
in115	9.06E-09	9.07E-09	9.28E-09	9.33E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09	9.35E-09
in117	5.19E-12	1.27E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.12E-12	6.57E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sn112	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02	2.26E-02
sn113	8.69E-05	8.64E-05	5.05E-05	2.90E-05	9.63E-06	1.07E-06	1.45E-09	2.43E-14	4.06E-19	6.80E-24	1.14E-28
sn114	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02	1.61E-02
sn115	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03	8.21E-03
sn116	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01	3.55E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
sn117m	5.45E-05	5.18E-05	5.55E-07	4.97E-09	4.48E-13	3.68E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01

sn119	2.17E-01	2.17E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01
sn119m	1.05E-03	1.05E-03	8.48E-04	6.81E-04	4.42E-04	1.86E-04	1.40E-05	1.86E-07	2.47E-09	3.29E-11	4.38E-13
sn120	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01	8.18E-01
sn121	1.57E-06	8.52E-07	5.16E-10	5.15E-10	5.12E-10	5.05E-10	4.86E-10	4.57E-10	4.29E-10	4.03E-10	3.78E-10
sn121m	1.19E-05	1.19E-05	1.19E-05	1.18E-05	1.17E-05	1.16E-05	1.12E-05	1.05E-05	9.85E-06	9.25E-06	8.68E-06
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.69E-05	1.68E-05	1.04E-05	6.33E-06	2.37E-06	3.34E-07	9.34E-10	5.18E-14	2.87E-18	1.59E-22	8.82E-27
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	2.61E-07	2.43E-07	4.04E-10	5.23E-13	1.03E-18	4.03E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03	1.57E-03
sb122	6.73E-07	5.21E-07	6.23E-17	3.04E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.42E-04	1.42E-04	1.49E-04	1.53E-04	1.57E-04	1.59E-04	1.59E-04	1.59E-04	1.59E-04	1.59E-04	1.59E-04
sb124	8.62E-07	8.52E-07	3.06E-07	1.05E-07	1.28E-08	1.92E-10	6.35E-16	4.68E-25	3.45E-34	1.74E-43	.00E+00
sb125	5.94E-04	5.94E-04	5.59E-04	5.24E-04	4.61E-04	3.58E-04	1.67E-04	4.69E-05	1.32E-05	3.71E-06	1.04E-06
sb126	8.19E-08	7.75E-08	5.34E-10	3.03E-12	1.11E-16	1.49E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.51E-04	1.51E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04	1.52E-04
te123	1.33E-06	1.33E-06	1.48E-06	1.58E-06	1.67E-06	1.71E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06
te123m	3.90E-07	3.87E-07	2.31E-07	1.35E-07	4.70E-08	5.66E-09	9.93E-12	2.53E-16	6.45E-21	1.64E-25	4.19E-30
te124	1.08E-05	1.08E-05	1.14E-05	1.16E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05	1.17E-05
te125	5.18E-04	5.18E-04	5.54E-04	5.89E-04	6.53E-04	7.57E-04	9.51E-04	1.07E-03	1.11E-03	1.12E-03	1.12E-03
te125m	7.72E-06	7.72E-06	7.69E-06	7.36E-06	6.54E-06	5.08E-06	2.37E-06	6.67E-07	1.87E-07	5.26E-08	1.48E-08
te126	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05	1.49E-05
te127	6.59E-11	1.69E-11	3.97E-12	2.20E-12	6.89E-13	6.75E-14	6.36E-17	5.75E-22	5.21E-27	4.71E-32	4.25E-37
te127m	2.01E-09	1.99E-09	1.13E-09	6.29E-10	1.97E-10	1.93E-11	1.82E-14	1.64E-19	1.49E-24	1.35E-29	1.22E-34
te128	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10	2.34E-10
te129m	1.58E-15	1.54E-15	2.46E-16	3.65E-17	8.42E-19	4.50E-22	6.85E-32	.00E+00	.00E+00	.00E+00	.00E+00
i127	6.59E-08	6.60E-08	6.68E-08	6.73E-08	6.78E-08	6.79E-08	6.80E-08	6.80E-08	6.80E-08	6.80E-08	6.80E-08
i129	1.83E-13	1.83E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13	1.85E-13
xe127	1.24E-15	1.21E-15	2.23E-16	3.83E-17	1.18E-18	1.12E-21	9.76E-31	.00E+00	.00E+00	.00E+00	.00E+00
xe128	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09	2.65E-09
xe129	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11	1.05E-11
xe129m	2.58E-14	2.39E-14	2.31E-17	1.71E-20	1.11E-26	4.74E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13	4.45E-13
xe131	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15	1.01E-15
total	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02

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BWR SNF Assembly - Top - decay light elements page 5

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	5.52E-06	5.52E-06	5.45E-06	5.37E-06	5.22E-06	4.93E-06	4.17E-06	3.15E-06	2.38E-06	1.79E-06	1.35E-06
be 10	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10	6.35E-10
c 14	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07	2.01E-07
na 24	1.53E-02	4.91E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	3.06E-11	1.38E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	1.90E+00	1.38E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	1.94E-01	3.41E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	2.35E-10	2.35E-10	2.34E-10	2.34E-10	2.34E-10	2.33E-10	2.30E-10	2.25E-10	2.21E-10	2.17E-10	2.12E-10
p 32	1.41E-04	1.34E-04	1.77E-06	2.00E-08	2.37E-10	2.33E-10	2.30E-10	2.25E-10	2.21E-10	2.17E-10	2.12E-10
p 33	1.33E-08	1.30E-08	1.14E-09	9.06E-11	6.10E-13	2.79E-17	2.67E-30	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	5.35E-09	5.95E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	1.12E-10	2.92E-11	1.36E-17	1.35E-17	1.34E-17	1.31E-17	1.23E-17	1.11E-17	9.95E-18	8.95E-18	8.06E-18
k 43	6.66E-08	3.16E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	2.64E-04	2.63E-04	1.81E-04	1.22E-04	5.63E-05	1.20E-05	1.16E-07	5.11E-11	2.25E-14	9.88E-18	4.34E-21
ca 47	3.57E-06	3.06E-06	3.79E-12	2.76E-18	2.05E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	3.18E-02	3.15E-02	1.51E-02	7.03E-03	1.55E-03	7.56E-05	8.76E-09	2.41E-15	6.65E-22	1.83E-28	.00E+00
sc 47	5.06E-02	4.11E-02	4.16E-10	1.24E-17	7.83E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	4.75E-03	3.25E-03	6.25E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	4.88E-03	1.29E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	1.98E+02	1.93E+02	2.09E+01	2.06E+00	2.13E-02	2.30E-06	2.86E-18	.00E+00	.00E+00	.00E+00	.00E+00

mn 54	1.24E+01	1.23E+01	1.01E+01	8.25E+00	5.50E+00	2.44E+00	2.14E-01	3.72E-03	6.44E-05	1.12E-06	1.93E-08
mn 56	3.35E+02	5.29E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	7.33E+01	7.32E+01	6.88E+01	6.46E+01	5.69E+01	4.41E+01	2.06E+01	5.79E+00	1.63E+00	4.57E-01	1.28E-01
fe 59	4.13E+00	4.07E+00	1.02E+00	2.41E-01	1.40E-02	4.73E-05	1.83E-12	8.11E-25	.00E+00	.00E+00	.00E+00
co 58m	1.10E-03	1.78E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	5.59E+01	5.54E+01	2.32E+01	9.40E+00	1.57E+00	4.43E-02	9.89E-07	1.75E-14	3.09E-22	5.48E-30	.00E+00
co 60	6.50E+01	6.49E+01	6.29E+01	6.08E+01	5.70E+01	4.99E+01	3.37E+01	1.74E+01	9.03E+00	4.68E+00	2.42E+00
co 61	1.11E+00	4.63E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02	3.54E-02
ni 63	4.98E+00	4.98E+00	4.97E+00	4.96E+00	4.95E+00	4.91E+00	4.81E+00	4.65E+00	4.49E+00	4.34E+00	4.19E+00
ni 65	4.99E+00	6.78E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.78E-05	2.05E-05	3.45E-17	1.99E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	3.81E+00	1.03E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	8.58E-01	2.05E-05	3.45E-17	2.00E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	6.70E-07	5.12E-07	2.04E-17	3.18E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	3.86E-03	3.85E-03	2.99E-03	2.30E-03	1.37E-03	4.84E-04	2.15E-05	1.20E-07	6.65E-10	3.70E-12	2.06E-14
zn 69	1.18E-07	2.55E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	7.96E-09	2.38E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	1.45E-14	4.45E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	1.55E-12	1.46E-12	6.64E-15	2.44E-17	3.77E-22	9.13E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	2.98E-02	2.94E-02	8.68E-03	2.44E-03	1.99E-04	1.33E-06	3.98E-13	5.32E-24	.00E+00	.00E+00	.00E+00
sr 90	2.16E-06	2.16E-06	2.14E-06	2.13E-06	2.10E-06	2.05E-06	1.91E-06	1.69E-06	1.49E-06	1.32E-06	1.16E-06
sr 91	5.81E-03	1.01E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	2.77E-06	2.74E-06	8.08E-07	2.27E-07	1.85E-08	1.24E-10	3.71E-17	4.95E-28	.00E+00	.00E+00	.00E+00
y 90	1.11E+00	8.53E-01	2.14E-06	2.13E-06	2.10E-06	2.05E-06	1.91E-06	1.69E-06	1.49E-06	1.32E-06	1.17E-06
y 90m	8.58E-08	4.66E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	7.53E-02	7.45E-02	2.59E-02	8.67E-03	9.95E-04	1.31E-05	3.02E-11	1.21E-20	4.88E-30	.00E+00	.00E+00
y 92	6.56E-02	5.96E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.30E-05	2.54E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04	1.31E-04
zr 95	2.30E+01	2.27E+01	8.67E+00	3.18E+00	4.40E-01	8.44E-03	5.93E-08	1.53E-16	3.96E-25	.00E+00	.00E+00
zr 97	3.55E+01	1.33E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 6

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 91	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.65E-08	2.64E-08	2.62E-08	2.61E-08	2.60E-08	2.58E-08
nb 92	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10	9.82E-10
nb 93m	4.78E-02	4.78E-02	4.73E-02	4.68E-02	4.58E-02	4.39E-02	3.86E-02	3.12E-02	2.52E-02	2.03E-02	1.64E-02
nb 94	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03
nb 95	2.36E+01	2.36E+01	1.46E+01	6.29E+00	9.50E-01	1.92E-02	1.31E-07	3.38E-16	8.73E-25	.00E+00	.00E+00
nb 95m	2.55E-01	2.54E-01	1.02E-01	3.75E-02	5.18E-03	9.92E-05	6.98E-10	1.80E-18	4.66E-27	.00E+00	.00E+00
nb 96	1.99E-02	9.78E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	3.55E+01	1.33E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.37E+01	1.26E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	3.39E-03	2.63E-03	4.68E-13	3.43E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	2.03E-09	2.03E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09
ru103	5.35E-12	5.26E-12	1.09E-12	2.13E-13	8.47E-15	1.34E-17	5.31E-26	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	2.02E-08	2.02E-08	1.99E-08	1.97E-08	1.92E-08	1.83E-08	1.58E-08	1.23E-08	9.65E-09	7.55E-09	5.90E-09
cd115	6.79E-05	4.98E-05	4.70E-17	1.49E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	7.28E-06	7.17E-06	1.80E-06	4.27E-07	2.49E-08	8.53E-11	3.42E-18	1.62E-30	.00E+00	.00E+00	.00E+00
cd117	1.69E-05	2.12E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.56E-08	1.82E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	8.73E-01	8.68E-01	5.08E-01	2.91E-01	9.68E-02	1.07E-02	1.46E-05	2.44E-10	4.09E-15	6.83E-20	1.14E-24
in114	1.82E-01	1.14E-01	3.29E-02	9.01E-03	6.98E-04	4.20E-06	9.15E-13	7.21E-24	.00E+00	.00E+00	.00E+00
in114m	1.21E-01	1.20E-01	3.44E-02	9.42E-03	7.29E-04	4.39E-06	9.56E-13	7.54E-24	.00E+00	.00E+00	.00E+00
in116m	2.40E-05	2.37E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	1.90E-04	4.64E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.54E-05	9.06E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

sn113	8.73E-01	8.68E-01	5.08E-01	2.91E-01	9.67E-02	1.07E-02	1.46E-05	2.44E-10	4.08E-15	6.83E-20	1.14E-24
sn117m	4.47E+00	4.25E+00	4.55E-02	4.08E-04	3.68E-08	3.02E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	3.93E+00	3.92E+00	3.18E+00	2.55E+00	1.66E+00	6.98E-01	5.23E-02	6.96E-04	9.26E-06	1.23E-07	1.64E-09
sn121	1.51E+00	8.16E-01	4.95E-04	4.93E-04	4.90E-04	4.84E-04	4.66E-04	4.37E-04	4.11E-04	3.86E-04	3.62E-04
sn121m	6.39E-04	6.39E-04	6.37E-04	6.35E-04	6.31E-04	6.23E-04	6.00E-04	5.64E-04	5.29E-04	4.97E-04	4.66E-04
sn123	1.39E-01	1.38E-01	8.55E-02	5.20E-02	1.95E-02	2.75E-03	7.68E-06	4.26E-10	2.36E-14	1.31E-18	7.25E-23
sn123m	8.02E-04	1.23E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	2.83E-02	2.64E-02	4.38E-05	5.67E-08	1.11E-13	4.37E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	2.67E-01	2.06E-01	2.47E-11	1.20E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	1.51E-02	1.49E-02	5.35E-03	1.84E-03	2.25E-04	3.35E-06	1.11E-11	8.19E-21	6.02E-30	.00E+00	.00E+00
sb125	6.23E-01	6.23E-01	5.85E-01	5.49E-01	4.84E-01	3.75E-01	1.75E-01	4.92E-02	1.38E-02	3.88E-03	1.09E-03
sb126	6.85E-03	6.48E-03	4.47E-05	2.53E-07	9.24E-12	1.25E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	3.46E-03	3.44E-03	2.05E-03	1.20E-03	4.17E-04	5.03E-05	8.81E-08	2.24E-12	5.72E-17	1.46E-21	3.72E-26
te125m	1.39E-01	1.39E-01	1.38E-01	1.33E-01	1.18E-01	9.16E-02	4.28E-02	1.20E-02	3.38E-03	9.48E-04	2.66E-04
te127	1.74E-04	4.47E-05	1.05E-05	5.81E-06	1.82E-06	1.78E-07	1.68E-10	1.52E-15	1.37E-20	1.24E-25	1.12E-30
te127m	1.89E-05	1.88E-05	1.07E-05	5.94E-06	1.86E-06	1.82E-07	1.71E-10	1.55E-15	1.40E-20	1.27E-25	1.14E-30
te129	7.38E-10	2.98E-11	4.76E-12	7.06E-13	1.63E-14	8.69E-18	1.32E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	4.75E-11	4.66E-11	7.42E-12	1.10E-12	2.54E-14	1.36E-17	2.06E-27	.00E+00	.00E+00	.00E+00	.00E+00
i130	1.26E-11	3.32E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.11E-15	1.02E-15	4.76E-19	1.64E-22	2.36E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	3.50E-11	3.43E-11	6.30E-12	1.08E-12	3.33E-14	3.18E-17	2.76E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	2.94E-09	2.72E-09	2.63E-12	1.94E-15	1.26E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	3.89E-13	3.67E-13	2.06E-15	9.40E-18	2.24E-22	1.37E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	1.01E+03	5.09E+02	2.21E+02	1.64E+02	1.30E+02	1.03E+02	5.96E+01	2.80E+01	1.52E+01	9.53E+00	6.80E+00

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Top - decay

0 spectrum of photon release rates, photons/sec

basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	9.33E+12	1.93E+12	4.96E+11	2.65E+11	1.57E+11	1.11E+11	6.67E+10	3.44E+10	1.82E+10	9.90E+09	5.56E+09
3.00E-02	2.57E+12	3.80E+11	1.25E+11	9.48E+10	6.70E+10	4.42E+10	2.17E+10	9.75E+09	4.74E+09	2.39E+09	1.24E+09
5.50E-02	1.74E+12	1.26E+11	2.92E+10	2.02E+10	1.46E+10	1.20E+10	8.06E+09	4.17E+09	2.16E+09	1.12E+09	5.81E+08
8.50E-02	9.35E+11	6.59E+10	1.29E+10	8.38E+09	5.65E+09	4.55E+09	3.05E+09	1.58E+09	8.16E+08	4.22E+08	2.19E+08
1.20E-01	6.54E+11	4.29E+10	7.07E+09	4.25E+09	2.58E+09	2.00E+09	1.32E+09	6.78E+08	3.49E+08	1.80E+08	9.33E+07
1.70E-01	8.09E+11	1.73E+11	8.40E+09	4.23E+09	2.52E+09	1.82E+09	1.00E+09	4.06E+08	1.78E+08	8.32E+07	4.06E+07
3.00E-01	1.62E+12	8.12E+11	8.66E+10	1.09E+10	1.28E+09	6.92E+08	3.74E+08	1.50E+08	6.56E+07	3.06E+07	1.49E+07
6.50E-01	2.48E+13	6.74E+12	2.77E+12	1.33E+12	4.19E+11	1.28E+11	1.44E+10	1.46E+09	4.57E+08	2.14E+08	1.43E+08
1.13E+00	5.55E+12	5.38E+12	5.18E+12	5.01E+12	4.69E+12	4.11E+12	2.77E+12	1.44E+12	7.44E+11	3.85E+11	2.00E+11
1.58E+00	2.24E+12	2.59E+10	4.83E+09	1.95E+09	3.25E+08	9.09E+06	9.99E+02	4.23E+02	2.28E+02	1.26E+02	7.26E+01
2.00E+00	3.41E+12	7.06E+09	3.99E+07	3.09E+07	2.55E+07	2.19E+07	1.48E+07	7.66E+06	3.97E+06	2.06E+06	1.06E+06
2.40E+00	1.31E+11	2.08E+08	1.69E+05	1.11E+05	8.24E+04	6.95E+04	4.68E+04	2.42E+04	1.26E+04	6.50E+03	3.37E+03
2.80E+00	1.19E+11	3.65E+08	7.82E+03	2.69E+03	3.29E+02	4.90E+00	1.62E-05	4.29E-11	3.86E-11	3.47E-11	3.12E-11
3.25E+00	2.16E+10	3.41E+07	5.55E-12	5.52E-12	5.47E-12	5.35E-12	5.02E-12	4.52E-12	4.07E-12	3.66E-12	3.30E-12
3.75E+00	7.31E+05	1.16E+05	6.72E-15	6.68E-15	6.61E-15	6.47E-15	6.08E-15	5.47E-15	4.92E-15	4.43E-15	3.99E-15
4.25E+00	5.55E+05	1.52E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	4.35E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	3.96E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	5.40E+13	1.57E+13	8.72E+12	6.75E+12	5.36E+12	4.42E+12	2.89E+12	1.49E+12	7.71E+11	4.00E+11	2.08E+11
0 mev/sec	3.45E+13	1.08E+13	7.68E+12	6.51E+12	5.56E+12	4.71E+12	3.13E+12	1.62E+12	8.38E+11	4.34E+11	2.25E+11

0 spectrum of energy release rates, mev/watt-sec

basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.15E+04	4.43E+03	1.14E+03	6.10E+02	3.60E+02	2.55E+02	1.53E+02	7.90E+01	4.19E+01	2.27E+01	1.28E+01
3.00E-02	1.77E+04	2.62E+03	8.63E+02	6.54E+02	4.62E+02	3.05E+02	1.50E+02	6.72E+01	3.27E+01	1.65E+01	8.55E+00

5.50E-02	2.20E+04	1.59E+03	3.70E+02	2.56E+02	1.85E+02	1.52E+02	1.02E+02	5.27E+01	2.73E+01	1.41E+01	7.34E+00
8.50E-02	1.83E+04	1.29E+03	2.52E+02	1.64E+02	1.10E+02	8.89E+01	5.96E+01	3.08E+01	1.59E+01	8.25E+00	4.28E+00
1.20E-01	1.80E+04	1.18E+03	1.95E+02	1.17E+02	7.12E+01	5.51E+01	3.65E+01	1.87E+01	9.63E+00	4.98E+00	2.57E+00
1.70E-01	3.16E+04	6.76E+03	3.28E+02	1.65E+02	9.83E+01	7.11E+01	3.93E+01	1.59E+01	6.96E+00	3.25E+00	1.59E+00
3.00E-01	1.12E+05	5.60E+04	5.98E+03	7.54E+02	8.82E+01	4.77E+01	2.58E+01	1.04E+01	4.53E+00	2.11E+00	1.03E+00
6.50E-01	3.71E+06	1.01E+06	4.14E+05	1.99E+05	6.26E+04	1.92E+04	2.14E+03	2.18E+02	6.82E+01	3.20E+01	2.13E+01
1.13E+00	1.44E+06	1.39E+06	1.34E+06	1.30E+06	1.21E+06	1.06E+06	7.17E+05	3.71E+05	1.92E+05	9.96E+04	5.16E+04
1.58E+00	8.13E+05	9.38E+03	1.75E+03	7.06E+02	1.18E+02	3.29E+00	3.62E-04	1.53E-04	8.27E-05	4.58E-05	2.63E-05
2.00E+00	1.57E+06	3.25E+03	1.83E+01	1.42E+01	1.17E+01	1.01E+01	6.80E+00	3.52E+00	1.82E+00	9.45E-01	4.90E-01
2.40E+00	7.20E+04	1.15E+02	9.31E-02	6.15E-02	4.55E-02	3.83E-02	2.58E-02	1.34E-02	6.93E-03	3.59E-03	1.86E-03
2.80E+00	7.63E+04	2.35E+02	5.03E-03	1.73E-03	2.11E-04	3.15E-06	1.05E-11	2.76E-17	2.48E-17	2.23E-17	2.01E-17
3.25E+00	1.61E+04	2.55E+01	4.15E-18	4.13E-18	4.08E-18	4.00E-18	3.75E-18	3.38E-18	3.04E-18	2.74E-18	2.46E-18
3.75E+00	6.30E-01	1.00E-01	5.79E-21	5.76E-21	5.70E-21	5.58E-21	5.24E-21	4.71E-21	4.24E-21	3.82E-21	3.44E-21
4.25E+00	5.42E-01	1.49E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	4.75E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	5.01E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	7.93E+06	2.49E+06	1.76E+06	1.50E+06	1.28E+06	1.08E+06	7.19E+05	3.72E+05	1.93E+05	9.98E+04	5.17E+04
0 gamma watts	5.53E+00	1.73E+00	1.23E+00	1.04E+00	8.91E-01	7.56E-01	5.02E-01	2.59E-01	1.34E-01	6.96E-02	3.60E-02

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photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Top - decay

0 spectrum of photon release rates, photons/sec

basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.52E+17	3.24E+16	8.33E+15	6.09E+15	4.06E+15	2.21E+15	8.09E+14	5.64E+14	4.88E+14	4.28E+14	3.77E+14
3.00E-02	1.11E+17	2.53E+16	3.59E+15	2.57E+15	1.72E+15	9.41E+14	3.52E+14	2.48E+14	2.14E+14	1.88E+14	1.66E+14
5.50E-02	5.96E+16	8.73E+15	1.89E+15	1.42E+15	9.65E+14	5.28E+14	1.92E+14	1.30E+14	1.09E+14	9.32E+13	8.07E+13
8.50E-02	4.07E+16	7.48E+15	1.16E+15	8.81E+14	5.97E+14	3.18E+14	1.06E+14	6.90E+13	5.75E+13	4.95E+13	4.31E+13
1.20E-01	3.34E+16	7.03E+15	1.36E+15	1.07E+15	7.27E+14	3.73E+14	1.14E+14	6.95E+13	5.42E+13	4.37E+13	3.60E+13
1.70E-01	5.34E+16	8.43E+15	1.17E+15	6.26E+14	3.84E+14	2.01E+14	6.29E+13	4.16E+13	3.59E+13	3.16E+13	2.78E+13
3.00E-01	1.14E+17	1.75E+16	8.86E+14	6.63E+14	4.47E+14	2.33E+14	7.05E+13	4.56E+13	3.89E+13	3.38E+13	2.95E+13
6.50E-01	2.35E+17	6.46E+16	1.53E+16	8.84E+15	4.91E+15	3.27E+15	1.69E+15	9.76E+14	7.71E+14	6.65E+14	5.86E+14
1.13E+00	7.45E+16	5.03E+15	2.94E+14	2.32E+14	1.85E+14	1.32E+14	7.18E+13	4.20E+13	2.77E+13	1.88E+13	1.29E+13
1.58E+00	3.85E+16	9.01E+15	1.55E+14	7.75E+13	5.81E+13	3.54E+13	1.12E+13	3.15E+12	1.44E+12	8.86E+11	6.14E+11
2.00E+00	1.14E+16	5.65E+14	5.30E+13	3.87E+13	2.51E+13	1.06E+13	8.48E+11	3.10E+10	1.51E+10	1.30E+10	1.14E+10
2.40E+00	9.10E+15	4.32E+14	6.65E+12	2.74E+12	1.91E+12	9.45E+11	1.17E+11	3.77E+09	1.32E+08	1.15E+07	6.68E+06
2.80E+00	3.79E+15	6.86E+12	5.55E+11	4.30E+11	3.03E+11	1.52E+11	1.93E+10	6.29E+08	2.07E+07	6.87E+05	2.28E+04
3.25E+00	1.89E+15	2.54E+12	1.02E+11	6.95E+10	4.93E+10	2.49E+10	3.23E+09	1.07E+08	3.56E+06	1.18E+05	3.91E+03
3.75E+00	8.81E+14	1.34E+10	3.63E+07	3.06E+07	2.17E+07	1.10E+07	1.43E+06	4.73E+04	1.57E+03	5.20E+01	1.72E+00
4.25E+00	8.47E+14	1.83E+09	1.04E-05	1.04E-05	1.05E-05	1.07E-05	1.10E-05	1.12E-05	1.12E-05	1.13E-05	1.13E-05
4.75E+00	2.50E+14	1.36E+10	5.21E-06	5.24E-06	5.29E-06	5.37E-06	5.52E-06	5.62E-06	5.64E-06	5.65E-06	5.65E-06
5.50E+00	1.93E+14	8.70E+07	3.86E-06	3.88E-06	3.92E-06	3.98E-06	4.10E-06	4.17E-06	4.19E-06	4.19E-06	4.19E-06
0 total	1.04E+18	1.87E+17	3.42E+16	2.25E+16	1.41E+16	8.26E+15	3.48E+15	2.19E+15	1.80E+15	1.55E+15	1.36E+15
0 mev/sec	4.28E+17	7.38E+16	1.16E+16	6.94E+15	4.03E+15	2.61E+15	1.28E+15	7.42E+14	5.81E+14	4.95E+14	4.31E+14

0 spectrum of energy release rates, mev/watt-sec

basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.79E+08	7.44E+07	1.91E+07	1.40E+07	9.34E+06	5.09E+06	1.86E+06	1.30E+06	1.12E+06	9.84E+05	8.66E+05
3.00E-02	7.68E+08	1.75E+08	2.47E+07	1.77E+07	1.19E+07	6.49E+06	2.43E+06	1.71E+06	1.48E+06	1.30E+06	1.15E+06
5.50E-02	7.53E+08	1.10E+08	2.39E+07	1.80E+07	1.22E+07	6.67E+06	2.43E+06	1.64E+06	1.37E+06	1.18E+06	1.02E+06
8.50E-02	7.95E+08	1.46E+08	2.26E+07	1.72E+07	1.17E+07	6.22E+06	2.08E+06	1.35E+06	1.12E+06	9.66E+05	8.41E+05
1.20E-01	9.21E+08	1.94E+08	3.76E+07	2.96E+07	2.01E+07	1.03E+07	3.14E+06	1.92E+06	1.50E+06	1.21E+06	9.93E+05
1.70E-01	2.09E+09	3.30E+08	4.57E+07	2.45E+07	1.50E+07	7.86E+06	2.46E+06	1.62E+06	1.40E+06	1.23E+06	1.09E+06
3.00E-01	7.85E+09	1.21E+09	6.11E+07	4.57E+07	3.08E+07	1.61E+07	4.86E+06	3.14E+06	2.69E+06	2.33E+06	2.04E+06
6.50E-01	3.51E+10	9.65E+09	2.28E+09	1.32E+09	7.34E+08	4.89E+08	2.52E+08	1.46E+08	1.15E+08	9.93E+07	8.76E+07

	1.13E+00	1.93E+10	1.30E+09	7.61E+07	6.00E+07	4.78E+07	3.41E+07	1.86E+07	1.09E+07	7.17E+06	4.86E+06	3.33E+06
	1.58E+00	1.40E+10	3.26E+09	5.63E+07	2.81E+07	2.11E+07	1.28E+07	4.07E+06	1.14E+06	5.23E+05	3.21E+05	2.22E+05
	2.00E+00	5.22E+09	2.60E+08	2.43E+07	1.78E+07	1.15E+07	4.88E+06	3.90E+05	1.42E+04	6.97E+03	5.99E+03	5.26E+03
	2.40E+00	5.02E+09	2.39E+08	3.67E+06	1.51E+06	1.05E+06	5.22E+05	6.47E+04	2.08E+03	7.27E+01	6.33E+00	3.69E+00
	2.80E+00	2.44E+09	4.41E+06	3.57E+05	2.77E+05	1.95E+05	9.78E+04	1.24E+04	4.05E+02	1.34E+01	4.42E-01	1.47E-02
	3.25E+00	1.42E+09	1.89E+06	7.62E+04	5.19E+04	3.68E+04	1.86E+04	2.41E+03	8.01E+01	2.66E+00	8.81E-02	2.92E-03
	3.75E+00	7.59E+08	1.16E+04	3.13E+01	2.64E+01	1.87E+01	9.48E+00	1.23E+00	4.07E-02	1.35E-03	4.48E-05	1.49E-06
	4.25E+00	8.27E+08	1.79E+03	1.01E-11	1.02E-11	1.03E-11	1.05E-11	1.08E-11	1.09E-11	1.10E-11	1.10E-11	1.10E-11
	4.75E+00	2.73E+08	1.48E+04	5.69E-12	5.72E-12	5.77E-12	5.86E-12	6.03E-12	6.13E-12	6.16E-12	6.17E-12	6.17E-12
	5.50E+00	2.44E+08	1.10E+02	4.88E-12	4.91E-12	4.96E-12	5.04E-12	5.18E-12	5.27E-12	5.29E-12	5.30E-12	5.30E-12
0	total	9.83E+10	1.70E+10	2.68E+09	1.60E+09	9.27E+08	6.00E+08	2.95E+08	1.71E+08	1.34E+08	1.14E+08	9.91E+07
0	gamma watts	6.85E+04	1.18E+04	1.87E+03	1.11E+03	6.46E+02	4.18E+02	2.05E+02	1.19E+02	9.31E+01	7.93E+01	6.91E+01

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0 principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
y 91	1.75E+15	1.74E+15	6.08E+14	2.03E+14	2.33E+13	3.08E+11	7.08E+05	2.84E-04	1.14E-13	4.58E-23	.00E+00
mo 99	2.27E+15	1.76E+15	3.13E+05	2.30E-05	2.19E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.69E+15	2.59E+15	2.19E+15	1.85E+15	1.31E+15	6.65E+14	8.61E+13	2.86E+12	9.47E+10	3.14E+09	1.04E+08
ba140	1.94E+15	1.83E+15	1.45E+13	9.54E+10	4.64E+06	1.11E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.63E+15	2.54E+15	2.10E+13	1.37E+11	6.68E+06	1.60E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.21E+15	4.18E+15	3.37E+15	2.69E+15	1.72E+15	7.09E+14	4.93E+13	5.80E+11	6.83E+09	8.04E+07	9.46E+05

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
te132	4.24E+15	3.43E+15	2.05E+07	5.83E-02	7.59E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.29E+15	4.15E+15	3.62E+10	1.77E+05	5.69E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.61E+15	1.53E+15	1.21E+13	7.96E+10	3.87E+06	9.27E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.47E+15	1.45E+15	2.17E+14	3.02E+13	6.13E+11	2.54E+08	1.80E-02	2.18E-19	.00E+00	.00E+00	.00E+00
ce143	4.88E+15	2.97E+15	9.71E-05	5.44E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.39E+15	1.38E+15	1.11E+15	8.90E+14	5.70E+14	2.35E+14	1.63E+13	1.92E+11	2.26E+09	2.66E+07	3.13E+05
nd147	1.45E+15	1.36E+15	4.93E+12	1.44E+10	1.40E+05	1.36E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.73E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rh106	6.37E+14	6.13E+14	5.19E+14	4.37E+14	3.11E+14	1.57E+14	2.04E+13	6.76E+11	2.24E+10	7.43E+08	2.47E+07
te132	8.17E+14	6.60E+14	3.95E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.54E+14	5.35E+14	4.42E+12	2.90E+10	1.41E+06	3.38E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.39E+15	8.45E+14	2.77E-05	1.55E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.78E+14	9.71E+14	7.82E+14	6.25E+14	4.00E+14	1.65E+14	1.15E+13	1.35E+11	1.59E+09	1.87E+07	2.20E+05
sm153	1.33E+15	9.31E+14	1.19E+01	4.30E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.48E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
xe133	3.03E+15	2.93E+15	2.56E+10	1.25E+05	4.02E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.75E+14	5.72E+14	4.60E+14	3.68E+14	2.36E+14	9.69E+13	6.74E+12	7.94E+10	9.34E+08	1.10E+07	1.29E+05
nd147	8.98E+14	8.44E+14	3.06E+12	8.92E+09	8.71E+04	8.44E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.03E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
tc 99m	3.69E+15	3.13E+15	5.60E+05	4.12E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.36E+14	7.34E+14	5.91E+14	4.72E+14	3.03E+14	1.24E+14	8.66E+12	1.02E+11	1.20E+09	1.41E+07	1.66E+05
pr144	4.12E+14	4.09E+14	3.29E+14	2.63E+14	1.69E+14	6.94E+13	4.82E+12	5.68E+10	6.68E+08	7.86E+06	9.25E+04
sm153	6.34E+14	4.43E+14	5.65E+00	2.05E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.43E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.99E+14	6.21E+14	1.10E+05	8.09E-06	7.70E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.61E+15	2.21E+15	3.96E+05	2.91E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.82E+14	4.56E+14	3.62E+12	2.38E+10	1.15E+06	2.77E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.92E+15	2.87E+15	4.30E+14	5.98E+13	1.21E+12	5.02E+08	3.56E-02	4.32E-19	.00E+00	.00E+00	.00E+00
pr144	4.35E+14	4.32E+14	3.48E+14	2.78E+14	1.78E+14	7.33E+13	5.10E+12	6.00E+10	7.07E+08	8.32E+06	9.79E+04

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.24E+15	8.92E+14	5.87E-04	7.41E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.50E+15	4.20E+15	2.00E+12	6.88E+08	9.90E+01	2.09E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.13E+15	3.34E+15	2.00E+07	5.68E-02	7.40E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.50E+15	1.77E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.96E+15	1.89E+15	1.56E+13	1.03E+11	4.98E+06	1.19E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.21E+15	1.96E+15	6.40E-05	3.58E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.46E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	8.04E+15	7.95E+15	3.03E+15	1.11E+15	1.54E+14	2.95E+12	2.08E+07	5.37E-02	1.39E-10	3.58E-19	9.62E-28
nb 95	8.37E+15	8.37E+15	5.25E+15	2.28E+15	3.45E+14	6.95E+12	4.74E+07	1.23E-01	3.17E-10	8.18E-19	.00E+00
ru103	5.28E+15	5.18E+15	1.08E+15	2.10E+14	8.35E+12	1.32E+10	5.24E+01	5.20E-13	5.18E-27	.00E+00	.00E+00
i132	1.66E+16	1.35E+16	8.09E+07	2.30E-01	3.00E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.42E+15	3.42E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	3.64E+15	3.64E+15	3.35E+15	3.08E+15	2.60E+15	1.86E+15	6.78E+14	1.26E+14	2.35E+13	4.38E+12	8.16E+11
la140	6.29E+15	6.07E+15	5.01E+13	3.29E+11	1.60E+07	3.83E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec
mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.03E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.75E+15	3.05E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.81E+06	2.50E-02	3.26E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.06E+15	4.82E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.35E+14	4.12E+14	3.80E+12	2.91E+10	1.92E+06	8.47E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.85E+14	6.61E+14	5.46E+12	3.58E+10	1.74E+06	4.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	5.93E+14	5.68E+14	9.77E+12	1.43E+11	3.41E+07	1.96E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec
mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (9.01E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.81E+14	5.57E+14	3.33E+06	9.45E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	8.13E+15	7.84E+15	6.48E+13	4.25E+11	2.07E+07	4.95E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec
mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (5.65E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.75E+14	1.43E+14	8.55E+05	2.43E-03	3.16E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.51E+14	3.58E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.37E+13	5.33E+13	4.30E+13	3.43E+13	2.20E+13	9.05E+12	6.29E+11	7.41E+09	8.72E+07	1.03E+06	1.21E+04
eu156	2.90E+14	2.78E+14	4.78E+12	7.00E+10	1.67E+07	9.59E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec
mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.32E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.85E+14	3.71E+14	3.07E+12	2.01E+10	9.79E+05	2.35E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 13, photons/sec
mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.86E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	5.88E+11	5.66E+11	4.79E+11	4.03E+11	2.87E+11	1.45E+11	1.88E+10	6.23E+08	2.07E+07	6.86E+05	2.28E+04
ag112	1.13E+12	5.98E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.40E+12	5.21E+12	4.30E+10	2.82E+08	1.37E+04	3.29E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 14, photons/sec
mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.54E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.46E+12	2.38E+12	1.96E+10	1.29E+08	6.26E+03	1.50E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 15, photons/sec
mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.34E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	3.18E+12	9.87E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.76E+14	3.46E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.83E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.90E+11	1.83E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.36E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	4.38E+12	1.36E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.70E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.80E+10	8.70E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

photon spectrum as a function of time for heavy metals and their daughters

BWR SNF Assembly - Top - decay
actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.27E+17	6.61E+16	7.38E+13	5.42E+13	3.28E+13	1.85E+13	1.50E+13	1.54E+13	1.56E+13	1.56E+13	1.56E+13
3.00E-02	7.96E+15	1.35E+15	8.32E+10	7.77E+10	9.81E+10	1.38E+11	2.44E+11	3.90E+11	5.03E+11	5.90E+11	6.57E+11
5.50E-02	1.15E+16	3.68E+15	1.36E+12	1.29E+12	1.61E+12	2.26E+12	4.10E+12	6.62E+12	8.56E+12	1.01E+13	1.12E+13
8.50E-02	5.02E+16	7.23E+15	3.81E+11	2.02E+11	2.02E+11	2.01E+11	2.00E+11	1.98E+11	1.96E+11	1.94E+11	1.92E+11
1.20E-01	5.10E+16	3.73E+16	4.01E+11	2.79E+11	2.75E+11	2.70E+11	2.62E+11	2.50E+11	2.39E+11	2.30E+11	2.21E+11
1.70E-01	1.68E+15	2.71E+14	1.78E+10	6.01E+09	4.28E+09	3.12E+09	2.77E+09	2.71E+09	2.65E+09	2.60E+09	2.55E+09
3.00E-01	2.71E+16	1.96E+16	2.51E+11	1.51E+11	1.50E+11	1.48E+11	1.43E+11	1.34E+11	1.27E+11	1.20E+11	1.14E+11
6.50E-01	1.46E+15	4.46E+13	1.63E+09	1.31E+09	9.62E+08	7.75E+08	8.89E+08	1.06E+09	1.11E+09	1.12E+09	1.11E+09
1.13E+00	1.57E+15	9.82E+14	6.05E+08	5.71E+08	5.31E+08	5.02E+08	4.86E+08	4.68E+08	4.50E+08	4.32E+08	4.16E+08
1.58E+00	9.54E+07	9.07E+07	7.87E+07	7.06E+07	6.21E+07	5.79E+07	6.21E+07	6.48E+07	6.20E+07	5.73E+07	5.25E+07
2.00E+00	1.50E+06	9.67E+05	9.39E+05	9.62E+05	1.01E+06	1.11E+06	1.38E+06	1.62E+06	1.68E+06	1.67E+06	1.64E+06
2.40E+00	4.03E+07	4.03E+07	3.43E+07	2.99E+07	2.49E+07	2.10E+07	1.80E+07	1.49E+07	1.23E+07	1.03E+07	8.53E+06
2.80E+00	7.43E+07	7.54E+07	7.85E+07	8.39E+07	9.77E+07	1.31E+08	2.24E+08	3.05E+08	3.24E+08	3.19E+08	3.07E+08
3.25E+00	1.44E+07	1.44E+07	1.23E+07	1.07E+07	8.91E+06	7.51E+06	6.44E+06	5.33E+06	4.42E+06	3.67E+06	3.06E+06
3.75E+00	8.36E+06	8.36E+06	7.11E+06	6.21E+06	5.16E+06	4.35E+06	3.73E+06	3.09E+06	2.56E+06	2.13E+06	1.77E+06
4.25E+00	4.85E+06	4.85E+06	4.12E+06	3.60E+06	2.99E+06	2.52E+06	2.16E+06	1.79E+06	1.49E+06	1.23E+06	1.03E+06
4.75E+00	2.81E+06	2.81E+06	2.39E+06	2.09E+06	1.73E+06	1.46E+06	1.25E+06	1.04E+06	8.62E+05	7.15E+05	5.95E+05

	5.50E+00	2.54E+06	2.54E+06	2.16E+06	1.89E+06	1.57E+06	1.32E+06	1.13E+06	9.40E+05	7.80E+05	6.47E+05	5.38E+05
0	total	2.79E+17	1.37E+17	7.63E+13	5.62E+13	3.51E+13	2.15E+13	2.00E+13	2.30E+13	2.52E+13	2.68E+13	2.80E+13
0	mev/sec	2.37E+16	1.30E+16	9.77E+11	7.15E+11	5.17E+11	4.10E+11	4.77E+11	6.19E+11	7.28E+11	8.10E+11	8.73E+11

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.91E+08	1.52E+08	1.70E+05	1.25E+05	7.54E+04	4.26E+04	3.45E+04	3.53E+04	3.58E+04	3.59E+04	3.59E+04
3.00E-02	5.49E+07	9.33E+06	5.74E+02	5.36E+02	6.77E+02	9.48E+02	1.69E+03	2.69E+03	3.47E+03	4.07E+03	4.53E+03
5.50E-02	1.46E+08	4.65E+07	1.71E+04	1.63E+04	2.03E+04	2.86E+04	5.19E+04	8.37E+04	1.08E+05	1.27E+05	1.42E+05
8.50E-02	9.81E+08	1.41E+08	7.44E+03	3.95E+03	3.94E+03	3.93E+03	3.91E+03	3.87E+03	3.82E+03	3.78E+03	3.75E+03
1.20E-01	1.41E+09	1.03E+09	1.11E+04	7.70E+03	7.58E+03	7.46E+03	7.23E+03	6.89E+03	6.60E+03	6.33E+03	6.10E+03
1.70E-01	6.57E+07	1.06E+07	6.94E+02	2.35E+02	1.67E+02	1.22E+02	1.08E+02	1.06E+02	1.04E+02	1.02E+02	9.98E+01
3.00E-01	1.87E+09	1.35E+09	1.73E+04	1.04E+04	1.04E+04	1.02E+04	9.84E+03	9.25E+03	8.72E+03	8.26E+03	7.86E+03
6.50E-01	2.19E+08	6.66E+06	2.44E+02	1.96E+02	1.44E+02	1.16E+02	1.33E+02	1.58E+02	1.66E+02	1.67E+02	1.65E+02
1.13E+00	4.06E+08	2.54E+08	1.57E+02	1.48E+02	1.37E+02	1.30E+02	1.26E+02	1.21E+02	1.16E+02	1.12E+02	1.08E+02
1.58E+00	3.45E+01	3.29E+01	2.85E+01	2.56E+01	2.25E+01	2.10E+01	2.25E+01	2.35E+01	2.24E+01	2.07E+01	1.90E+01
2.00E+00	6.88E-01	4.45E-01	4.32E-01	4.42E-01	4.64E-01	5.11E-01	6.35E-01	7.44E-01	7.71E-01	7.67E-01	7.52E-01
2.40E+00	2.22E+01	2.22E+01	1.89E+01	1.65E+01	1.37E+01	1.16E+01	9.91E+00	8.21E+00	6.81E+00	5.66E+00	4.71E+00
2.80E+00	4.78E+01	4.86E+01	5.06E+01	5.40E+01	6.29E+01	8.42E+01	1.44E+02	1.96E+02	2.09E+02	2.06E+02	1.98E+02
3.25E+00	1.08E+01	1.08E+01	9.17E+00	8.00E+00	6.65E+00	5.61E+00	4.81E+00	3.98E+00	3.30E+00	2.74E+00	2.28E+00
3.75E+00	7.21E+00	7.21E+00	6.13E+00	5.35E+00	4.45E+00	3.75E+00	3.22E+00	2.66E+00	2.21E+00	1.84E+00	1.53E+00
4.25E+00	4.74E+00	4.74E+00	4.03E+00	3.52E+00	2.92E+00	2.47E+00	2.11E+00	1.75E+00	1.45E+00	1.21E+00	1.00E+00
4.75E+00	3.07E+00	3.07E+00	2.61E+00	2.28E+00	1.89E+00	1.60E+00	1.37E+00	1.13E+00	9.41E-01	7.81E-01	6.50E-01
5.50E+00	3.21E+00	3.21E+00	2.73E+00	2.39E+00	1.98E+00	1.67E+00	1.43E+00	1.19E+00	9.86E-01	8.18E-01	6.80E-01
0 total	5.44E+09	3.00E+09	2.25E+05	1.64E+05	1.19E+05	9.42E+04	1.10E+05	1.42E+05	1.67E+05	1.86E+05	2.01E+05
0 gamma watts	3.79E+03	2.09E+03	1.57E-01	1.15E-01	8.29E-02	6.57E-02	7.64E-02	9.92E-02	1.17E-01	1.30E-01	1.40E-01

1 page 14

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - top ds2 - discharge

0 1.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.0683E+11	1.8205E+10
5.0000E-02	to	1.0000E-01	1.2945E+11	9.7091E+09
1.0000E-01	to	2.0000E-01	2.3058E+11	3.4588E+10
2.0000E-01	to	3.0000E-01	3.5690E+10	8.9225E+09
3.0000E-01	to	4.0000E-01	6.7117E+11	2.3491E+11
4.0000E-01	to	6.0000E-01	7.0351E+11	3.5176E+11
6.0000E-01	to	8.0000E-01	2.8085E+12	1.9660E+12
8.0000E-01	to	1.0000E+00	2.3018E+12	2.0716E+12
1.0000E+00	to	1.3300E+00	3.8231E+12	4.4539E+12
1.3300E+00	to	1.6600E+00	1.0789E+12	1.6130E+12
1.6600E+00	to	2.0000E+00	2.3322E+10	4.2679E+10
2.0000E+00	to	2.5000E+00	2.7061E+09	6.0887E+09
2.5000E+00	to	3.0000E+00	5.5110E+08	1.5155E+09
3.0000E+00	to	4.0000E+00	3.1824E+07	1.1138E+08
4.0000E+00	to	5.0000E+00	1.4378E+03	6.4699E+03
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			1.2416E+13	1.0813E+13

0

0 total energy from nuclides with spectrum data = 1.0800E+13
0 total energy from nuclides with no spectrum data = 1.2774E+10
1 gamma source spectrum for decay step for BWR source term - top ds2 - 0.25 year
0 90.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.8563E+11	5.5689E+09
5.0000E-02	to	1.0000E-01	2.6926E+10	2.0194E+09
1.0000E-01	to	2.0000E-01	1.5153E+10	2.2730E+09
2.0000E-01	to	3.0000E-01	4.0065E+09	1.0016E+09
3.0000E-01	to	4.0000E-01	7.1489E+10	2.5021E+10
4.0000E-01	to	6.0000E-01	2.7453E+11	1.3727E+11
6.0000E-01	to	8.0000E-01	9.3462E+11	6.5423E+11
8.0000E-01	to	1.0000E+00	1.1242E+12	1.0118E+12
1.0000E+00	to	1.3300E+00	3.6757E+12	4.2822E+12
1.3300E+00	to	1.6600E+00	1.0378E+12	1.5516E+12
1.6600E+00	to	2.0000E+00	4.1567E+09	7.6067E+09
2.0000E+00	to	2.5000E+00	3.5538E+07	7.9961E+07
2.5000E+00	to	3.0000E+00	4.6160E+04	1.2694E+05
3.0000E+00	to	4.0000E+00	5.1700E-12	1.8095E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			7.3543E+12	7.6806E+12

0
0 total energy from nuclides with spectrum data = 7.6715E+12
0 total energy from nuclides with no spectrum data = 9.0779E+09
1 gamma source spectrum for decay step for BWR source term - top ds2 - 0.50 year
0 182.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.3808E+11	4.1425E+09
5.0000E-02	to	1.0000E-01	1.7949E+10	1.3462E+09
1.0000E-01	to	2.0000E-01	8.1671E+09	1.2251E+09
2.0000E-01	to	3.0000E-01	1.7983E+09	4.4958E+08
3.0000E-01	to	4.0000E-01	8.0911E+09	2.8319E+09
4.0000E-01	to	6.0000E-01	1.1642E+11	5.8210E+10
6.0000E-01	to	8.0000E-01	3.8427E+11	2.6899E+11
8.0000E-01	to	1.0000E+00	5.9768E+11	5.3791E+11
1.0000E+00	to	1.3300E+00	3.5544E+12	4.1409E+12
1.3300E+00	to	1.6600E+00	1.0037E+12	1.5005E+12
1.6600E+00	to	2.0000E+00	1.6774E+09	3.0696E+09
2.0000E+00	to	2.5000E+00	2.7572E+07	6.2037E+07
2.5000E+00	to	3.0000E+00	3.9680E+04	1.0912E+05
3.0000E+00	to	4.0000E+00	5.1417E-12	1.7996E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			5.8323E+12	6.5197E+12

0
0 total energy from nuclides with spectrum data = 6.5129E+12
0 total energy from nuclides with no spectrum data = 6.7510E+09
1 gamma source spectrum for decay step for BWR source term - top ds2 - 1 year
0 365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	9.9330E+10	2.9799E+09
5.0000E-02	to	1.0000E-01	1.2450E+10	9.3374E+08

1.0000E-01 to	2.0000E-01	4.8872E+09	7.3309E+08
2.0000E-01 to	3.0000E-01	5.2022E+08	1.3005E+08
3.0000E-01 to	4.0000E-01	7.2640E+08	2.5424E+08
4.0000E-01 to	6.0000E-01	2.6149E+10	1.3074E+10
6.0000E-01 to	8.0000E-01	5.9999E+10	4.1999E+10
8.0000E-01 to	1.0000E+00	2.4157E+11	2.1741E+11
1.0000E+00 to	1.3300E+00	3.3270E+12	3.8760E+12
1.3300E+00 to	1.6600E+00	9.3953E+11	1.4046E+12
1.6600E+00 to	2.0000E+00	2.7962E+08	5.1170E+08
2.0000E+00 to	2.5000E+00	2.2754E+07	5.1196E+07
2.5000E+00 to	3.0000E+00	3.4908E+04	9.5997E+04
3.0000E+00 to	4.0000E+00	5.0866E-12	1.7803E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		4.7125E+12	5.5587E+12

total energy from nuclides with spectrum data = 5.5543E+12
total energy from nuclides with no spectrum data = 4.4300E+09
gamma source spectrum for decay step for BWR source term - top ds2 - 2 year
730.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	7.1167E+10	2.1350E+09
5.0000E-02 to	1.0000E-01	1.0108E+10	7.5807E+08
1.0000E-01 to	2.0000E-01	3.6377E+09	5.4566E+08
2.0000E-01 to	3.0000E-01	2.0700E+08	5.1750E+07
3.0000E-01 to	4.0000E-01	4.4619E+08	1.5617E+08
4.0000E-01 to	6.0000E-01	6.8717E+09	3.4359E+09
6.0000E-01 to	8.0000E-01	4.4454E+09	3.1118E+09
8.0000E-01 to	1.0000E+00	8.5505E+10	7.6955E+10
1.0000E+00 to	1.3300E+00	2.9163E+12	3.3975E+12
1.3300E+00 to	1.6600E+00	8.2357E+11	1.2312E+12
1.6600E+00 to	2.0000E+00	7.8205E+06	1.4312E+07
2.0000E+00 to	2.5000E+00	1.9551E+07	4.3991E+07
2.5000E+00 to	3.0000E+00	3.0311E+04	8.3355E+04
3.0000E+00 to	4.0000E+00	4.9795E-12	1.7428E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		3.9223E+12	4.7160E+12

total energy from nuclides with spectrum data = 4.7132E+12
total energy from nuclides with no spectrum data = 2.8256E+09
gamma source spectrum for decay step for BWR source term - top ds2 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	3.9886E+10	1.1966E+09
5.0000E-02 to	1.0000E-01	6.7670E+09	5.0753E+08
1.0000E-01 to	2.0000E-01	2.1874E+09	3.2811E+08
2.0000E-01 to	3.0000E-01	1.1434E+08	2.8585E+07
3.0000E-01 to	4.0000E-01	2.3904E+08	8.3662E+07
4.0000E-01 to	6.0000E-01	2.9735E+09	1.4868E+09
6.0000E-01 to	8.0000E-01	1.5835E+09	1.1085E+09
8.0000E-01 to	1.0000E+00	7.4881E+09	6.7393E+09
1.0000E+00 to	1.3300E+00	1.9651E+12	2.2893E+12
1.3300E+00 to	1.6600E+00	5.5494E+11	8.2963E+11

	1.6600E+00 to	2.0000E+00	1.7805E+02	3.2582E+02
	2.0000E+00 to	2.5000E+00	1.3169E+07	2.9631E+07
	2.5000E+00 to	3.0000E+00	2.0421E+04	5.6157E+04
	3.0000E+00 to	4.0000E+00	4.6736E-12	1.6357E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		2.5813E+12	3.1305E+12

0
0 total energy from nuclides with spectrum data = 3.1292E+12
0 total energy from nuclides with no spectrum data = 1.2738E+09
1 gamma source spectrum for decay step for BWR source term - top ds2 - 10 year
0 3652.50 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	1.9205E+10	5.7614E+08
5.0000E-02 to	1.0000E-01	3.4965E+09	2.6224E+08
1.0000E-01 to	2.0000E-01	9.9949E+08	1.4992E+08
2.0000E-01 to	3.0000E-01	5.1246E+07	1.2811E+07
3.0000E-01 to	4.0000E-01	9.2226E+07	3.2279E+07
4.0000E-01 to	6.0000E-01	8.3687E+08	4.1843E+08
6.0000E-01 to	8.0000E-01	4.7782E+08	3.3447E+08
8.0000E-01 to	1.0000E+00	2.1633E+08	1.9470E+08
1.0000E+00 to	1.3300E+00	1.0178E+12	1.1858E+12
1.3300E+00 to	1.6600E+00	2.8744E+11	4.2972E+11
1.6600E+00 to	2.0000E+00	4.1114E+00	7.5239E+00
2.0000E+00 to	2.5000E+00	6.8213E+06	1.5348E+07
2.5000E+00 to	3.0000E+00	1.0577E+04	2.9087E+04
3.0000E+00 to	4.0000E+00	4.2054E-12	1.4719E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		1.3307E+12	1.6175E+12

0
0 total energy from nuclides with spectrum data = 1.6171E+12
0 total energy from nuclides with no spectrum data = 3.6070E+08
1 gamma source spectrum for decay step for BWR source term - top ds2 - 15 year
0 5478.75 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	9.7115E+09	2.9135E+08
5.0000E-02 to	1.0000E-01	1.8092E+09	1.3569E+08
1.0000E-01 to	2.0000E-01	4.8031E+08	7.2047E+07
2.0000E-01 to	3.0000E-01	2.4316E+07	6.0789E+06
3.0000E-01 to	4.0000E-01	3.8902E+07	1.3616E+07
4.0000E-01 to	6.0000E-01	2.3593E+08	1.1796E+08
6.0000E-01 to	8.0000E-01	1.6695E+08	1.1686E+08
8.0000E-01 to	1.0000E+00	6.9192E+07	6.2272E+07
1.0000E+00 to	1.3300E+00	5.2724E+11	6.1424E+11
1.3300E+00 to	1.6600E+00	1.4889E+11	2.2260E+11
1.6600E+00 to	2.0000E+00	3.6348E+00	6.6516E+00
2.0000E+00 to	2.5000E+00	3.5335E+06	7.9503E+06
2.5000E+00 to	3.0000E+00	5.4790E+03	1.5067E+04
3.0000E+00 to	4.0000E+00	3.7844E-12	1.3246E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00

0	totals		6.8868E+11	8.3766E+11

0
0 total energy from nuclides with spectrum data = 8.3755E+11
0 total energy from nuclides with no spectrum data = 1.0419E+08
1 gamma source spectrum for decay step for BWR source term - top ds2 - 20 year
0 7305.00 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
0	1.0000E-02 to	5.0000E-02	5.0377E+09	1.5113E+08
	5.0000E-02 to	1.0000E-01	9.3693E+08	7.0270E+07
	1.0000E-01 to	2.0000E-01	2.3837E+08	3.5755E+07
	2.0000E-01 to	3.0000E-01	1.1979E+07	2.9947E+06
	3.0000E-01 to	4.0000E-01	1.7662E+07	6.1816E+06
	4.0000E-01 to	6.0000E-01	6.6708E+07	3.3354E+07
	6.0000E-01 to	8.0000E-01	7.9475E+07	5.5632E+07
	8.0000E-01 to	1.0000E+00	5.5690E+07	5.0121E+07
	1.0000E+00 to	1.3300E+00	2.7313E+11	3.1819E+11
	1.3300E+00 to	1.6600E+00	7.7131E+10	1.1531E+11
	1.6600E+00 to	2.0000E+00	3.2135E+00	5.8808E+00
	2.0000E+00 to	2.5000E+00	1.8304E+06	4.1185E+06
	2.5000E+00 to	3.0000E+00	2.8383E+03	7.8053E+03
	3.0000E+00 to	4.0000E+00	3.4058E-12	1.1920E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.5671E+11	4.3392E+11

0
0 total energy from nuclides with spectrum data = 4.3388E+11
0 total energy from nuclides with no spectrum data = 3.2116E+07
1 gamma source spectrum for decay step for BWR source term - top ds2 - 25 year
0 9131.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
0	1.0000E-02 to	5.0000E-02	2.6797E+09	8.0390E+07
	5.0000E-02 to	1.0000E-01	4.8554E+08	3.6416E+07
	1.0000E-01 to	2.0000E-01	1.2062E+08	1.8093E+07
	2.0000E-01 to	3.0000E-01	6.0411E+06	1.5103E+06
	3.0000E-01 to	4.0000E-01	8.4513E+06	2.9580E+06
	4.0000E-01 to	6.0000E-01	1.8963E+07	9.4814E+06
	6.0000E-01 to	8.0000E-01	5.4822E+07	3.8376E+07
	8.0000E-01 to	1.0000E+00	4.9780E+07	4.4802E+07
	1.0000E+00 to	1.3300E+00	1.4149E+11	1.6484E+11
	1.3300E+00 to	1.6600E+00	3.9957E+10	5.9736E+10
	1.6600E+00 to	2.0000E+00	2.8412E+00	5.1994E+00
	2.0000E+00 to	2.5000E+00	9.4825E+05	2.1336E+06
	2.5000E+00 to	3.0000E+00	1.4704E+03	4.0435E+03
	3.0000E+00 to	4.0000E+00	3.0651E-12	1.0728E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.8488E+11	2.2481E+11

0
0 total energy from nuclides with spectrum data = 2.2480E+11
0 total energy from nuclides with no spectrum data = 1.1862E+07
1
1 * normal termination of execution *
0 table of contents for material tables
0 case or subcase printed page

```
                                                  1                  1
Ondset          33
          33          4          1         27          6          0          0          0          0          0
           0          0          0          0          0          2         -1       1698        690        130
         880       7935          0          5         99          7          9         93         18         18
          18          0          0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     18 entries read
0   74* array     18 entries read
0   75$ array     18 entries read
0    6t
     l140  71971
     used   107088 in size   150000
Ojopt           12
           0          0          0          0          0          0          0          0          0          0
           0          0
Otherm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
Onon             5
        7935         20          6         18       1697
Ommn            19
          10         10          0          0          1          3          0          0          0          0
          21        100         18          4          3          0          2          1          0
Otconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
Omzero           4
           0        689        129        879
Opow             3
   .000000E+00  .000000E+00  .000000E+00
O linp           9
           6          0         51         26          2       3000       1000       1697          5
 n-gamma, fission and total mev/fission =          3.4627E+00     1.9421E+02     1.9768E+02
 start of interval flux =        1.59016E+13
 n-gamma, fission and total mev/fission =          3.8360E+00     1.9431E+02     1.9815E+02
 start of interval flux =        1.59426E+13
 n-gamma, fission and total mev/fission =          3.9259E+00     1.9441E+02     1.9834E+02
 start of interval flux =        1.59938E+13
 n-gamma, fission and total mev/fission =          4.0149E+00     1.9451E+02     1.9852E+02
 start of interval flux =        1.60555E+13
 n-gamma, fission and total mev/fission =          4.1065E+00     1.9460E+02     1.9870E+02
 start of interval flux =        1.61265E+13
 n-gamma, fission and total mev/fission =          4.2006E+00     1.9469E+02     1.9889E+02
 start of interval flux =        1.62057E+13
 n-gamma, fission and total mev/fission =          4.2968E+00     1.9477E+02     1.9907E+02
 start of interval flux =        1.62923E+13
 n-gamma, fission and total mev/fission =          4.3948E+00     1.9486E+02     1.9925E+02
 start of interval flux =        1.63857E+13
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 n-gamma, fission and total mev/fission =              4.4943E+00       1.9494E+02       1.9943E+02
 start of interval flux =         1.64852E+13
 n-gamma, fission and total mev/fission =              4.5951E+00       1.9502E+02       1.9961E+02
 start of interval flux =         1.65904E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
0ndset           33
            33            4            2           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 1.799989E+03 1.624725E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              4.6628E+00       1.9507E+02       1.9973E+02
 start of interval flux =         1.65420E+13
 n-gamma, fission and total mev/fission =              4.7541E+00       1.9515E+02       1.9990E+02
 start of interval flux =         1.66661E+13
 n-gamma, fission and total mev/fission =              4.8521E+00       1.9522E+02       2.0007E+02
 start of interval flux =         1.67942E+13
 n-gamma, fission and total mev/fission =              4.9519E+00       1.9529E+02       2.0024E+02
 start of interval flux =         1.69267E+13
 n-gamma, fission and total mev/fission =              5.0528E+00       1.9536E+02       2.0042E+02
 start of interval flux =         1.70633E+13
 n-gamma, fission and total mev/fission =              5.1547E+00       1.9544E+02       2.0059E+02
 start of interval flux =         1.72040E+13
 n-gamma, fission and total mev/fission =              5.2576E+00       1.9551E+02       2.0076E+02
 start of interval flux =         1.73484E+13
 n-gamma, fission and total mev/fission =              5.3612E+00       1.9558E+02       2.0094E+02
 start of interval flux =         1.74964E+13
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```
 n-gamma, fission and total mev/fission =              5.4657E+00       1.9565E+02       2.0111E+02
 start of interval flux =         1.76479E+13
 n-gamma, fission and total mev/fission =              5.5710E+00       1.9572E+02       2.0129E+02
 start of interval flux =         1.78028E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
0ndset           33
            33             4             3            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935            20             6            18          1697
0mmn             19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21           689           129           879
0pow              3
  4.349999E+00 3.599977E+03 1.723310E+13
0 linp            9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              5.4836E+00       1.9575E+02       2.0124E+02
 start of interval flux =         1.78777E+13
 n-gamma, fission and total mev/fission =              5.5775E+00       1.9582E+02       2.0139E+02
 start of interval flux =         1.80675E+13
 n-gamma, fission and total mev/fission =              5.6848E+00       1.9588E+02       2.0156E+02
 start of interval flux =         1.82599E+13
 n-gamma, fission and total mev/fission =              5.7936E+00       1.9594E+02       2.0174E+02
 start of interval flux =         1.84550E+13
 n-gamma, fission and total mev/fission =              5.9034E+00       1.9601E+02       2.0191E+02
 start of interval flux =         1.86527E+13
 n-gamma, fission and total mev/fission =              6.0141E+00       1.9607E+02       2.0208E+02
 start of interval flux =         1.88530E+13
 n-gamma, fission and total mev/fission =              6.1257E+00       1.9614E+02       2.0226E+02
 start of interval flux =         1.90558E+13
 n-gamma, fission and total mev/fission =              6.2382E+00       1.9620E+02       2.0244E+02
 start of interval flux =         1.92610E+13
```

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 n-gamma, fission and total mev/fission =              6.3515E+00       1.9627E+02       2.0262E+02
 start of interval flux =         1.94687E+13
 n-gamma, fission and total mev/fission =              6.4657E+00       1.9633E+02       2.0280E+02
 start of interval flux =         1.96787E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
0ndset          33
           33           4           4          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 5.399966E+03 1.888097E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              6.4023E+00       1.9638E+02       2.0278E+02
 start of interval flux =         1.98457E+13
 n-gamma, fission and total mev/fission =              6.5154E+00       1.9644E+02       2.0296E+02
 start of interval flux =         2.00911E+13
 n-gamma, fission and total mev/fission =              6.6364E+00       1.9650E+02       2.0314E+02
 start of interval flux =         2.03382E+13
 n-gamma, fission and total mev/fission =              6.7585E+00       1.9656E+02       2.0332E+02
 start of interval flux =         2.05867E+13
 n-gamma, fission and total mev/fission =              6.8815E+00       1.9663E+02       2.0351E+02
 start of interval flux =         2.08366E+13
 n-gamma, fission and total mev/fission =              7.0052E+00       1.9669E+02       2.0370E+02
 start of interval flux =         2.10878E+13
 n-gamma, fission and total mev/fission =              7.1297E+00       1.9676E+02       2.0389E+02
 start of interval flux =         2.13404E+13
 n-gamma, fission and total mev/fission =              7.2549E+00       1.9682E+02       2.0408E+02
 start of interval flux =         2.15941E+13
```

```
 n-gamma, fission and total mev/fission =              7.3807E+00       1.9689E+02       2.0427E+02
 start of interval flux =         2.18490E+13
 n-gamma, fission and total mev/fission =              7.5071E+00       1.9695E+02       2.0446E+02
 start of interval flux =         2.21049E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
0ndset           33
            33             4             5            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935            20             6            18          1697
0mmn            19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21           689           129           879
0pow             3
  4.349999E+00 7.199954E+03 2.111546E+13
0 linp           9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              7.4483E+00       1.9701E+02       2.0446E+02
 start of interval flux =         2.23562E+13
 n-gamma, fission and total mev/fission =              7.5770E+00       1.9707E+02       2.0465E+02
 start of interval flux =         2.26544E+13
 n-gamma, fission and total mev/fission =              7.7132E+00       1.9713E+02       2.0484E+02
 start of interval flux =         2.29525E+13
 n-gamma, fission and total mev/fission =              7.8499E+00       1.9719E+02       2.0504E+02
 start of interval flux =         2.32498E+13
 n-gamma, fission and total mev/fission =              7.9869E+00       1.9726E+02       2.0524E+02
 start of interval flux =         2.35464E+13
 n-gamma, fission and total mev/fission =              8.1242E+00       1.9732E+02       2.0545E+02
 start of interval flux =         2.38422E+13
 n-gamma, fission and total mev/fission =              8.2616E+00       1.9739E+02       2.0565E+02
 start of interval flux =         2.41370E+13
 n-gamma, fission and total mev/fission =              8.3992E+00       1.9745E+02       2.0585E+02
 start of interval flux =         2.44308E+13
```

```
 n-gamma, fission and total mev/fission =              8.5367E+00       1.9752E+02       2.0606E+02
 start of interval flux =         2.47234E+13
 n-gamma, fission and total mev/fission =              8.6743E+00       1.9759E+02       2.0626E+02
 start of interval flux =         2.50148E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
0ndset          33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
         7935          20           6          18        1697
0mmn           19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 8.999942E+03 2.386573E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              8.8246E+00       1.9766E+02       2.0648E+02
 start of interval flux =         2.53317E+13
 n-gamma, fission and total mev/fission =              8.9001E+00       1.9770E+02       2.0660E+02
 start of interval flux =         2.54917E+13
 n-gamma, fission and total mev/fission =              8.9766E+00       1.9773E+02       2.0671E+02
 start of interval flux =         2.56514E+13
 n-gamma, fission and total mev/fission =              9.0529E+00       1.9777E+02       2.0682E+02
 start of interval flux =         2.58106E+13
 n-gamma, fission and total mev/fission =              9.1292E+00       1.9781E+02       2.0694E+02
 start of interval flux =         2.59692E+13
 n-gamma, fission and total mev/fission =              9.2055E+00       1.9785E+02       2.0705E+02
 start of interval flux =         2.61274E+13
 n-gamma, fission and total mev/fission =              9.2816E+00       1.9788E+02       2.0717E+02
 start of interval flux =         2.62851E+13
 n-gamma, fission and total mev/fission =              9.3576E+00       1.9792E+02       2.0728E+02
 start of interval flux =         2.64422E+13
```

```
 n-gamma, fission and total mev/fission =              9.4335E+00       1.9796E+02       2.0739E+02
 start of interval flux =         2.65988E+13
 n-gamma, fission and total mev/fission =              9.5093E+00       1.9800E+02       2.0751E+02
 start of interval flux =         2.67547E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 50000 MWd/MTU
0ndset           33
           33            4            5           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
            0            0            0            0            0            0            0            0            0            0
            0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
         7935           20            6           18         1697
0mmn             19
            0           10            0            0            1            1            0            0            0           10
           21          100            0            4            3            0            2            0            0
0tconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero            4
           21          689          129          879
0pow              3
  4.349999E+00 9.999936E+03 2.013608E+13
0 linp            9
            6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Top - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1         primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     80000    130000     140000
       220000    240000    250000     260000
       270000    280000    290000     400000
       410000    420000    500000
74**     89.4    10100.0      46.5  189764.1
          0.1    27013.3       1.5       0.6
          2.0      140.0       0.6     225.4
          2.5      133.1       0.5   91535.0
         12.3        7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
```

```
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 55000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.181818 e
   5t
BWR SNF Assembly - Fuel - deplete to 55000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Fuel - decay
per ONE BWR Fuel Assembly - Fuel Region - ds3f
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
81$$ 2 0 26 1 e
82$$ f2
   6t
  decay step for BWR source term - fuel ds3 - discharge
  decay step for BWR source term - fuel ds3 - 0.25 year
  decay step for BWR source term - fuel ds3 - 0.50 year
  decay step for BWR source term - fuel ds3 - 1 year
  decay step for BWR source term - fuel ds3 - 2 year
  decay step for BWR source term - fuel ds3 - 5 year
  decay step for BWR source term - fuel ds3 - 10 year
  decay step for BWR source term - fuel ds3 - 15 year
  decay step for BWR source term - fuel ds3 - 20 year
  decay step for BWR source term - fuel ds3 - 25 year
```

```
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooo   rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nnn         nn  sssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn    nn    nn  sssssssssssss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn     nn   nn   sssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooo   rr          rr  iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
     ooooooooooo   rr          rr  iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooooo  tttttttttttt    zzzzzzzzzzzz
    ll             oo         oo        tt                   zz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    llllllllllll   oooooooooooooo        tt          zzzzzzzzzzzz
    llllllllllll    ooooooooooo          tt         zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666                //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666               //   9999999999999  6666666666666
       1111       22         22              //    00       00   66                         //   99         99  66
         11                  22             //    00         00  66                        //    99         99  66
         11                  22            //     00         00  66                       //     99         99  66
         11                22             //      00         00  666666666666            //      9999999999999  666666666666
         11               22             //       00         00  6666666666666          //        999999999999  6666666666666
         11             22              //        00         00  66         66         //                   99  66         66
         11           22               //         00         00  66         66        //                    99  66         66
         11         22                //           00       00  66         66       //                     99  66         66
      11111111    2222222222222     //             000000000    6666666666666     //            9999999999999  6666666666666
      11111111    2222222222222    //               0000000      66666666666     //             999999999999    66666666666
0

         11          0000000                        0000000      5555555555555                    22222222222   7777777777777
        111         000000000                      000000000    5555555555555                   2222222222222  777777777777
       1111        00       00         :::        00       00   55                   :::        22         22  77         77
         11       00         00        :::       00         00  55                   :::                   22            77
         11       00         00        :::       00         00  55                   :::                   22           77
         11       00         00                  00         00  555555555555                              22           77
         11       00         00                  00         00  5555555555555                           22            77
         11       00         00        :::       00         00              55       :::            22              77
         11       00         00        :::       00         00              55       :::          22                77
         11        00       00         :::        00       00   55         55       :::         22                 77
      11111111      000000000                      000000000    5555555555555                   2222222222222        77
      11111111       0000000                        0000000      55555555555                    2222222222222        77
1
0                                 sssssssssss    cccccccccc      aaaaaaaaa     ll              eeeeeeeeeeeee
                                 sssssssssssss  cccccccccccc    aaaaaaaaaaa    ll              eeeeeeeeeeeee
```

```
ss         ss   cc         cc   aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
            ss   cc              aa         aa   ll              ee
            ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     cccccccccc     aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  10:05:27                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     80000    130000     140000
       220000    240000    250000     260000
       270000    280000    290000     400000
       410000    420000    500000
74**     89.4   10100.0      46.5  189764.1
          0.1   27013.3       1.5       0.6
          2.0     140.0       0.6     225.4
          2.5     133.1       0.5   91535.0
         12.3       7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds3f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1636364 e
    5t
 BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds3f
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 55000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.181818 e
    5t
 BWR SNF Assembly - Fuel - deplete to 55000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds3f
 58** 10r4.35
 60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Fuel - decay
 per ONE BWR Fuel Assembly - Fuel Region - ds3f
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
 81$$ 2 0 26 1 e
 82$$ f2
    6t
   decay step for BWR source term - fuel ds3 - discharge
   decay step for BWR source term - fuel ds3 - 0.25 year
   decay step for BWR source term - fuel ds3 - 0.50 year
   decay step for BWR source term - fuel ds3 - 1 year
   decay step for BWR source term - fuel ds3 - 2 year
   decay step for BWR source term - fuel ds3 - 5 year
   decay step for BWR source term - fuel ds3 - 10 year
   decay step for BWR source term - fuel ds3 - 15 year
   decay step for BWR source term - fuel ds3 - 20 year
   decay step for BWR source term - fuel ds3 - 25 year
 56$$ f0
    5t
Owhen job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                     1697     total number of nuclides in library
                       689     number of light-element nuclides
                       129     number of actinide nuclides
                       879     number of fission product nuclides
0                     7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                   fission product yields are from endf/b-v                   *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *      data from the light element, actinide, and fission product libraries  *
          *        decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
    BWR SNF Assembly - Fuel - decay                                                    light elements        page    1
0                                        nuclide concentrations, grams
                                         basis =per ONE BWR Fuel Assembly - Fuel Region
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02
h 2	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04
h 3	2.52E-09	2.51E-09	2.48E-09	2.45E-09	2.38E-09	2.25E-09	1.90E-09	1.43E-09	1.08E-09	8.17E-10	6.17E-10
he 3	4.43E-11	4.47E-11	7.89E-11	1.14E-10	1.82E-10	3.12E-10	6.61E-10	1.13E-09	1.48E-09	1.74E-09	1.94E-09
he 4	7.38E-01	7.38E-01	7.38E-01	7.38E-01	7.38E-01	7.38E-01	7.38E-01	7.38E-01	7.38E-01	7.38E-01	7.38E-01
li 6	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10
li 7	1.58E-11	1.58E-11	1.58E-11	1.58E-11	1.58E-11	1.58E-11	1.58E-11	1.58E-11	1.58E-11	1.58E-11	1.58E-11
be 9	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
be 10	3.09E-05	3.09E-05	3.09E-05	3.09E-05	3.09E-05	3.09E-05	3.09E-05	3.09E-05	3.09E-05	3.09E-05	3.09E-05
b 10	4.16E-12	4.20E-12	7.46E-12	1.08E-11	1.75E-11	3.09E-11	7.10E-11	1.38E-10	2.05E-10	2.72E-10	3.39E-10
b 11	6.96E-10	6.96E-10	6.96E-10	6.96E-10	6.96E-10	6.96E-10	6.96E-10	6.96E-10	6.96E-10	6.96E-10	6.96E-10
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00
c 14	6.19E-03	6.19E-03	6.19E-03	6.19E-03	6.19E-03	6.19E-03	6.19E-03	6.18E-03	6.18E-03	6.18E-03	6.17E-03
n 14	2.29E-06	2.29E-06	2.48E-06	2.67E-06	3.04E-06	3.79E-06	6.04E-06	9.78E-06	1.35E-05	1.73E-05	2.10E-05
n 15	2.82E-03	2.82E-03	2.82E-03	2.82E-03	2.82E-03	2.82E-03	2.82E-03	2.82E-03	2.82E-03	2.82E-03	2.82E-03
o 16	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04
o 17	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01
o 18	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01
f 19	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04	1.15E-04
ne 20	2.61E-09	2.61E-09	2.61E-09	2.61E-09	2.61E-09	2.61E-09	2.61E-09	2.61E-09	2.61E-09	2.61E-09	2.61E-09
ne 21	1.28E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10	1.28E-10
ne 22	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10	4.79E-10
na 23	4.45E-11	4.45E-11	4.45E-11	4.45E-11	4.45E-11	4.45E-11	4.45E-11	4.45E-11	4.45E-11	4.45E-11	4.45E-11
na 24	6.75E-09	2.17E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05	1.47E-05
mg 25	4.83E-06	4.83E-06	4.83E-06	4.83E-06	4.83E-06	4.83E-06	4.83E-06	4.83E-06	4.83E-06	4.83E-06	4.83E-06
mg 26	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06	2.53E-06
al 27	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
si 28	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01
si 29	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02
si 30	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02
si 31	7.22E-10	1.27E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	5.83E-13	5.83E-13	5.82E-13	5.82E-13	5.80E-13	5.78E-13	5.71E-13	5.60E-13	5.49E-13	5.38E-13	5.27E-13
p 31	8.52E-06	8.52E-06	8.52E-06	8.52E-06	8.52E-06	8.52E-06	8.52E-06	8.52E-06	8.52E-06	8.52E-06	8.52E-06
p 32	8.00E-11	7.62E-11	1.01E-12	1.14E-14	1.33E-16	1.31E-16	1.30E-16	1.27E-16	1.25E-16	1.22E-16	1.20E-16
p 33	1.77E-14	1.73E-14	1.51E-15	1.20E-16	8.11E-19	3.71E-23	3.55E-36	.00E+00	.00E+00	.00E+00	.00E+00
s 32	3.57E-09	3.57E-09	3.64E-09	3.65E-09	3.65E-09	3.65E-09	3.65E-09	3.65E-09	3.65E-09	3.65E-09	3.65E-09
s 33	1.15E-12	1.15E-12	1.17E-12	1.17E-12	1.17E-12	1.17E-12	1.17E-12	1.17E-12	1.17E-12	1.17E-12	1.17E-12
ar 40	6.66E-11	6.66E-11	6.66E-11	6.66E-11	6.66E-11	6.66E-11	6.66E-11	6.66E-11	6.66E-11	6.66E-11	6.66E-11
k 41	2.20E-12	2.20E-12	2.20E-12	2.20E-12	2.20E-12	2.20E-12	2.20E-12	2.20E-12	2.20E-12	2.20E-12	2.20E-12
k 43	4.03E-14	1.91E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	4.35E-14	4.35E-14	4.36E-14	4.36E-14	4.36E-14	4.36E-14	4.36E-14	4.36E-14	4.36E-14	4.36E-14	4.36E-14
ca 43	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
ca 44	9.95E-06	9.95E-06	9.95E-06	9.95E-06	9.95E-06	9.95E-06	9.95E-06	9.95E-06	9.95E-06	9.95E-06	9.95E-06
ca 45	2.66E-08	2.65E-08	1.82E-08	1.23E-08	5.68E-09	1.21E-09	1.17E-11	5.15E-15	2.26E-18	9.96E-22	4.38E-25
ca 46	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06	1.28E-06
ca 47	1.14E-11	9.81E-12	1.22E-17	8.83E-24	6.57E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.83E-07	1.84E-07	1.92E-07	1.98E-07	2.04E-07	2.09E-07	2.10E-07	2.10E-07	2.10E-07	2.10E-07	2.10E-07
sc 46	1.65E-06	1.64E-06	7.84E-07	3.65E-07	8.05E-08	3.93E-09	4.55E-13	1.25E-19	3.46E-26	9.52E-33	2.62E-39
sc 47	1.07E-07	8.66E-08	8.81E-16	2.88E-23	1.84E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.61E-09	3.83E-09	7.37E-24	3.74E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 2

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01
ti 47	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01

ti 48	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00
ti 49	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
ti 50	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
v 50	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03	1.68E-03
v 51	2.69E-01	2.69E-01	2.74E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01
cr 50	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00	5.58E+00
cr 51	5.85E-03	5.71E-03	6.16E-04	6.09E-05	6.30E-07	6.78E-11	8.44E-23	1.21E-42	.00E+00	.00E+00	.00E+00
cr 52	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
cr 53	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01
cr 54	4.17E+00	4.17E+00	4.17E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00	4.18E+00
mn 54	2.32E-03	2.31E-03	1.90E-03	1.55E-03	1.03E-03	4.58E-04	4.02E-05	6.96E-07	1.21E-08	2.09E-10	3.62E-12
mn 55	6.13E-01	6.13E-01	6.16E-01	6.18E-01	6.23E-01	6.31E-01	6.46E-01	6.55E-01	6.58E-01	6.59E-01	6.59E-01
mn 56	3.22E-06	5.07E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01
fe 55	4.61E-02	4.61E-02	4.33E-02	4.06E-02	3.58E-02	2.77E-02	1.30E-02	3.64E-03	1.02E-03	2.87E-04	8.07E-05
fe 56	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02	2.06E+02
fe 57	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00
fe 58	7.97E-01	7.97E-01	7.99E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01	8.00E-01
fe 59	1.28E-04	1.26E-04	3.15E-05	7.45E-06	4.33E-07	1.46E-09	5.67E-17	2.51E-29	1.12E-41	.00E+00	.00E+00
co 58m	9.26E-10	1.50E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.72E-03	3.68E-03	1.54E-03	6.24E-04	1.05E-04	2.95E-06	6.57E-11	1.16E-18	2.06E-26	3.64E-34	6.42E-42
co 59	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00	2.11E+00
co 60	3.07E-01	3.07E-01	2.97E-01	2.87E-01	2.69E-01	2.36E-01	1.59E-01	8.24E-02	4.27E-02	2.21E-02	1.15E-02
co 61	1.96E-07	8.20E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01	8.83E+01
ni 59	9.97E-01	9.97E-01	9.97E-01	9.97E-01	9.97E-01	9.97E-01	9.96E-01	9.96E-01	9.96E-01	9.96E-01	9.96E-01
ni 60	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.57E+01	3.58E+01	3.58E+01	3.58E+01	3.58E+01
ni 61	1.86E+00	1.86E+00	1.86E+00	1.86E+00	1.86E+00	1.86E+00	1.86E+00	1.86E+00	1.86E+00	1.86E+00	1.86E+00
ni 62	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00	4.85E+00
ni 63	2.04E-01	2.04E-01	2.03E-01	2.03E-01	2.02E-01	2.01E-01	1.97E-01	1.90E-01	1.83E-01	1.77E-01	1.71E-01
ni 64	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00
ni 65	5.63E-07	7.65E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	7.30E-11	5.38E-11	9.05E-23	5.24E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	3.41E-01	3.41E-01	3.41E-01	3.42E-01	3.42E-01	3.44E-01	3.48E-01	3.54E-01	3.61E-01	3.67E-01	3.73E-01
cu 64	2.59E-06	6.98E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01
cu 66	4.01E-09	8.39E-14	1.41E-25	8.17E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.44E-12	1.86E-12	7.43E-23	1.16E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03	2.34E-03
zn 65	1.42E-06	1.42E-06	1.10E-06	8.47E-07	5.04E-07	1.78E-07	7.92E-09	4.41E-11	2.45E-13	1.37E-15	7.61E-18
zn 66	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03	1.44E-03
zn 67	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06	2.31E-06
zn 68	3.84E-08	3.84E-08	3.84E-08	3.84E-08	3.84E-08	3.84E-08	3.84E-08	3.84E-08	3.84E-08	3.84E-08	3.84E-08
zn 69m	9.21E-15	2.75E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 70	1.95E-15	1.95E-15	1.95E-15	1.95E-15	1.95E-15	1.95E-15	1.95E-15	1.95E-15	1.95E-15	1.95E-15	1.95E-15
ga 69	7.73E-11	7.73E-11	7.73E-11	7.73E-11	7.73E-11	7.73E-11	7.73E-11	7.73E-11	7.73E-11	7.73E-11	7.73E-11
ge 70	4.73E-13	4.73E-13	4.73E-13	4.73E-13	4.73E-13	4.73E-13	4.73E-13	4.73E-13	4.73E-13	4.73E-13	4.73E-13
sr 87	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03	2.00E-03
sr 88	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01	1.96E-01
sr 89	5.63E-04	5.55E-04	1.64E-04	4.61E-05	3.76E-06	2.52E-08	7.52E-15	1.00E-25	1.34E-36	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 90	1.00E-05	1.00E-05	9.96E-06	9.90E-06	9.78E-06	9.54E-06	8.86E-06	7.83E-06	6.93E-06	6.12E-06	5.42E-06
sr 91	8.75E-07	1.52E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	1.44E-02	1.44E-02	1.48E-02	1.49E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02	1.50E-02
y 89m	2.52E-13	2.38E-13	5.60E-14	1.58E-14	1.29E-15	8.60E-18	2.57E-24	3.43E-35	.00E+00	.00E+00	.00E+00
y 90	1.11E-03	8.57E-04	2.59E-09	2.57E-09	2.54E-09	2.48E-09	2.30E-09	2.04E-09	1.80E-09	1.59E-09	1.41E-09

y 90m	4.84E-12	2.62E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.68E-03	1.66E-03	5.79E-04	1.93E-04	2.22E-05	2.93E-07	6.75E-13	2.71E-22	1.09E-31	4.36E-41	.00E+00
y 92	3.72E-06	3.38E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	2.13E-09	4.15E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	1.04E-09	8.42E-10	5.35E-18	1.62E-26	2.49E-43	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04
zr 91	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04	1.02E+04
zr 92	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04	1.58E+04
zr 93	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01
zr 94	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04
zr 95	5.86E-01	5.80E-01	2.21E-01	8.12E-02	1.12E-02	2.15E-04	1.51E-09	3.91E-18	1.01E-26	2.61E-35	1.33E-43
zr 96	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03	2.68E+03
zr 97	1.01E-02	3.78E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.27E-07	1.27E-07	1.27E-07	1.27E-07	1.27E-07	1.27E-07	1.27E-07	1.26E-07	1.25E-07	1.25E-07	1.24E-07
nb 92	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04	3.33E-04
nb 93	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
nb 93m	5.55E-03	5.55E-03	5.50E-03	5.44E-03	5.33E-03	5.12E-03	4.54E-03	3.73E-03	3.07E-03	2.54E-03	2.11E-03
nb 94	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.79E-01	1.78E-01	1.78E-01	1.78E-01	1.78E-01
nb 95	3.17E-01	3.17E-01	2.01E-01	8.73E-02	1.32E-02	2.67E-04	1.82E-09	4.71E-18	1.22E-26	3.10E-35	.00E+00
nb 95m	3.80E-04	3.77E-04	1.47E-04	5.39E-05	7.45E-06	1.43E-07	1.00E-12	2.59E-21	6.70E-30	.00E+00	.00E+00
nb 96	7.84E-06	3.85E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	7.19E-04	2.70E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	9.46E-06	3.54E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 92	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
mo 93	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.08E-03	1.07E-03
mo 94	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01
mo 95	1.16E+01	1.17E+01	1.21E+01	1.24E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01
mo 96	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00
mo 97	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01	1.98E+01
mo 98	2.10E+00	2.10E+00	2.10E+00	2.10E+00	2.10E+00	2.10E+00	2.10E+00	2.10E+00	2.10E+00	2.10E+00	2.10E+00
mo 99	4.12E-05	3.20E-05	5.69E-15	4.18E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01
tc 98	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08	2.43E-08
tc 99	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03	1.88E-03
ru 98	8.06E-15	8.08E-15	9.05E-15	1.01E-14	1.21E-14	1.61E-14	2.81E-14	4.81E-14	6.82E-14	8.82E-14	1.08E-13
ru 99	1.90E-08	1.90E-08	2.06E-08	2.21E-08	2.52E-08	3.14E-08	5.00E-08	8.09E-08	1.12E-07	1.43E-07	1.74E-07
ru100	3.32E-04	3.32E-04	3.32E-04	3.32E-04	3.32E-04	3.32E-04	3.32E-04	3.32E-04	3.32E-04	3.32E-04	3.32E-04
ru101	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03	4.12E-03
ru102	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04	2.43E-04
ru103	6.37E-08	6.26E-08	1.30E-08	2.54E-09	1.01E-10	1.60E-13	6.32E-22	6.28E-36	.00E+00	.00E+00	.00E+00
ru104	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09	1.90E-09
rh102	2.62E-15	2.62E-15	2.47E-15	2.33E-15	2.07E-15	1.63E-15	7.94E-16	2.40E-16	7.28E-17	2.20E-17	6.67E-18
rh103	1.42E-09	1.42E-09	1.55E-09	1.58E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09	1.59E-09
rh105	2.07E-14	1.48E-14	9.75E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd104	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10	4.91E-10
pd105	6.70E-12	6.71E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12	6.72E-12
pd106	3.18E-13	3.18E-13	3.18E-13	3.18E-13	3.18E-13	3.18E-13	3.18E-13	3.18E-13	3.18E-13	3.18E-13	3.18E-13

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BWR SNF Assembly - Fuel - decay light elements page 4

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cd111	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06	1.96E-06
cd112	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.68E-05	1.68E-05
cd113	4.48E-08	4.48E-08	4.48E-08	4.48E-08	4.48E-08	4.48E-08	4.48E-08	4.48E-08	4.48E-08	4.48E-08	4.49E-08
cd113m	5.92E-08	5.92E-08	5.85E-08	5.78E-08	5.64E-08	5.37E-08	4.63E-08	3.62E-08	2.83E-08	2.22E-08	1.73E-08
cd114	2.21E-03	2.21E-03	2.32E-03	2.35E-03	2.36E-03	2.36E-03	2.36E-03	2.36E-03	2.36E-03	2.36E-03	2.36E-03
cd115	9.28E-08	6.80E-08	6.42E-20	2.04E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	2.02E-07	1.99E-07	4.98E-08	1.18E-08	6.91E-10	2.36E-12	9.48E-20	4.46E-32	.00E+00	.00E+00	.00E+00
cd116	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05	1.27E-05

cd117	8.62E-10	1.08E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.00E-12	1.41E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	4.85E-01	4.85E-01	5.05E-01	5.17E-01	5.28E-01	5.32E-01	5.33E-01	5.33E-01	5.33E-01	5.33E-01	5.33E-01	5.33E-01
in113m	2.86E-05	2.85E-05	1.67E-05	9.54E-06	3.17E-06	3.52E-07	4.79E-10	8.01E-15	1.34E-19	2.24E-24	3.75E-29	
in114	8.14E-08	5.12E-08	1.47E-08	4.03E-09	3.12E-10	1.88E-12	4.09E-19	3.23E-30	3.31E-41	.00E+00	.00E+00	
in114m	3.23E-03	3.18E-03	9.15E-04	2.51E-04	1.94E-05	1.17E-07	2.54E-14	2.01E-25	1.58E-36	.00E+00	.00E+00	
in115	4.95E-06	4.95E-06	5.10E-06	5.14E-06	5.15E-06	5.15E-06	5.15E-06	5.15E-06	5.15E-06	5.15E-06	5.15E-06	
in117	2.84E-09	6.95E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
in117m	6.12E-10	3.60E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
sn112	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	
sn113	4.77E-02	4.74E-02	2.77E-02	1.59E-02	5.29E-03	5.86E-04	7.97E-07	1.33E-11	2.23E-16	3.73E-21	6.24E-26	
sn114	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	
sn115	4.22E+00	4.22E+00	4.22E+00	4.22E+00	4.22E+00	4.22E+00	4.22E+00	4.22E+00	4.22E+00	4.22E+00	4.22E+00	
sn116	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	
sn117	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	
sn117m	2.99E-02	2.84E-02	3.04E-04	2.73E-06	2.46E-10	2.02E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
sn118	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	
sn119	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	
sn119m	5.79E-01	5.78E-01	4.68E-01	3.76E-01	2.44E-01	1.03E-01	7.71E-03	1.03E-04	1.36E-06	1.82E-08	2.42E-10	
sn120	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	
sn121	8.64E-04	4.67E-04	3.04E-07	3.03E-07	3.01E-07	2.97E-07	2.86E-07	2.69E-07	2.52E-07	2.37E-07	2.22E-07	
sn121m	7.00E-03	7.00E-03	6.98E-03	6.95E-03	6.91E-03	6.82E-03	6.57E-03	6.17E-03	5.79E-03	5.44E-03	5.11E-03	
sn122	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	
sn123	9.30E-03	9.25E-03	5.74E-03	3.49E-03	1.31E-03	1.84E-04	5.16E-07	2.86E-11	1.58E-15	8.78E-20	4.87E-24	
sn124	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	
sn125	1.43E-04	1.33E-04	2.22E-07	2.87E-10	5.63E-16	2.21E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
sb121	9.13E-01	9.13E-01	9.13E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.14E-01	9.15E-01	9.15E-01	9.15E-01	
sb122	4.13E-04	3.20E-04	3.82E-14	1.86E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
sb123	8.40E-02	8.40E-02	8.75E-02	8.98E-02	9.20E-02	9.31E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02	9.33E-02	
sb124	5.38E-04	5.32E-04	1.91E-04	6.58E-05	8.03E-06	1.20E-07	3.97E-13	2.92E-22	2.15E-31	1.59E-40	.00E+00	
sb125	3.35E-01	3.34E-01	3.15E-01	2.95E-01	2.60E-01	2.01E-01	9.41E-02	2.64E-02	7.43E-03	2.09E-03	5.86E-04	
sb126	4.85E-05	4.59E-05	3.17E-07	1.80E-09	6.55E-14	8.83E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	
te122	9.96E-02	9.97E-02	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	1.00E-01	
te123	9.09E-04	9.11E-04	1.02E-03	1.09E-03	1.15E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	
te123m	2.75E-04	2.73E-04	1.63E-04	9.55E-05	3.31E-05	4.00E-06	7.00E-09	1.78E-13	4.55E-18	1.16E-22	2.95E-27	
te124	7.61E-03	7.61E-03	7.95E-03	8.08E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	8.14E-03	
te125	3.20E-01	3.20E-01	3.40E-01	3.60E-01	3.96E-01	4.55E-01	5.64E-01	6.32E-01	6.52E-01	6.57E-01	6.58E-01	
te125m	4.36E-03	4.36E-03	4.33E-03	4.14E-03	3.68E-03	2.86E-03	1.34E-03	3.75E-04	1.05E-04	2.96E-05	8.33E-06	
te126	9.94E-03	9.94E-03	9.99E-03	9.99E-03	9.99E-03	9.99E-03	9.99E-03	9.99E-03	9.99E-03	9.99E-03	9.99E-03	
te127	4.64E-08	1.20E-08	2.83E-09	1.57E-09	4.92E-10	4.82E-11	4.54E-14	4.11E-19	3.72E-24	3.36E-29	3.04E-34	
te127m	1.43E-06	1.42E-06	8.09E-07	4.49E-07	1.41E-07	1.38E-08	1.30E-11	1.17E-16	1.06E-21	9.61E-27	8.70E-32	
te128	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	1.98E-07	
te129	3.13E-14	1.28E-15	2.04E-16	3.02E-17	6.97E-19	3.72E-22	5.67E-32	.00E+00	.00E+00	.00E+00	.00E+00	
te129m	1.42E-12	1.39E-12	2.21E-13	3.28E-14	7.56E-16	4.04E-19	6.15E-29	.00E+00	.00E+00	.00E+00	.00E+00	

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BWR SNF Assembly - Fuel - decay light elements page 5

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te130	2.80E-15	2.80E-15	2.80E-15	2.80E-15	2.80E-15	2.80E-15	2.80E-15	2.80E-15	2.80E-15	2.80E-15	2.80E-15
i127	4.97E-05	4.97E-05	5.04E-05	5.07E-05	5.10E-05	5.11E-05	5.12E-05	5.12E-05	5.12E-05	5.12E-05	5.12E-05
i129	1.75E-10	1.75E-10	1.76E-10	1.76E-10	1.76E-10	1.76E-10	1.76E-10	1.76E-10	1.76E-10	1.76E-10	1.76E-10
i130	6.50E-15	1.70E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe126	8.19E-15	8.19E-15	8.19E-15	8.19E-15	8.19E-15	8.19E-15	8.19E-15	8.19E-15	8.19E-15	8.19E-15	8.19E-15
xe127	1.12E-12	1.10E-12	2.02E-13	3.47E-14	1.07E-15	1.02E-18	8.84E-28	7.12E-43	.00E+00	.00E+00	.00E+00
xe128	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06
xe129	1.00E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08	1.01E-08
xe129m	2.32E-11	2.15E-11	2.08E-14	1.53E-17	9.94E-24	4.26E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	4.85E-10	4.85E-10	4.85E-10	4.85E-10	4.85E-10	4.85E-10	4.85E-10	4.85E-10	4.85E-10	4.85E-10	4.85E-10
xe131	1.23E-12	1.23E-12	1.24E-12	1.24E-12	1.24E-12	1.24E-12	1.24E-12	1.24E-12	1.24E-12	1.24E-12	1.24E-12

xe131m	5.35E-15	5.04E-15	2.82E-17	1.29E-19	3.07E-24	1.76E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	1.45E-13	1.45E-13	1.45E-13	1.45E-13	1.45E-13	1.45E-13	1.45E-13	1.45E-13	1.45E-13	1.45E-13	1.45E-13
total	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05

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BWR SNF Assembly - Fuel - decay light elements page 6

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	2.43E-05	2.43E-05	2.40E-05	2.36E-05	2.30E-05	2.17E-05	1.84E-05	1.39E-05	1.05E-05	7.90E-06	5.96E-06
be 10	6.90E-07	6.90E-07	6.90E-07	6.90E-07	6.90E-07	6.90E-07	6.90E-07	6.90E-07	6.90E-07	6.90E-07	6.90E-07
c 14	2.76E-02	2.76E-02	2.76E-02	2.76E-02	2.76E-02	2.76E-02	2.76E-02	2.76E-02	2.76E-02	2.75E-02	2.75E-02
na 24	6.01E-02	1.93E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.26E-10	5.67E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	4.79E+00	5.68E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	2.79E-02	4.89E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	3.79E-11	3.79E-11	3.78E-11	3.78E-11	3.77E-11	3.76E-11	3.71E-11	3.64E-11	3.56E-11	3.49E-11	3.42E-11
p 32	2.29E-05	2.18E-05	2.88E-07	3.25E-09	3.82E-11	3.76E-11	3.71E-11	3.64E-11	3.56E-11	3.49E-11	3.42E-11
p 33	2.77E-09	2.70E-09	2.36E-10	1.88E-11	1.27E-13	5.80E-18	5.48E-31	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	1.06E-08	1.18E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	2.28E-10	5.92E-11	3.04E-17	3.02E-17	2.99E-17	2.93E-17	2.75E-17	2.47E-17	2.23E-17	2.00E-17	1.80E-17
k 43	1.32E-07	6.24E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	4.72E-04	4.70E-04	3.23E-04	2.18E-04	1.01E-04	2.14E-05	2.08E-07	9.13E-11	4.01E-14	1.77E-17	7.76E-21
ca 47	7.00E-06	6.01E-06	7.45E-12	5.41E-18	4.02E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	5.59E-02	5.55E-02	2.66E-02	1.24E-02	2.73E-03	1.33E-04	1.54E-08	4.25E-15	1.17E-21	3.23E-28	.00E+00
sc 47	8.85E-02	7.20E-02	7.32E-10	2.39E-17	1.53E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	8.38E-03	5.73E-03	1.10E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	8.80E-03	2.32E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	5.41E+02	5.28E+02	5.69E+01	5.63E+00	5.82E-02	6.26E-06	7.80E-18	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	1.80E+01	1.79E+01	1.47E+01	1.20E+01	7.98E+00	3.55E+00	3.11E-01	5.40E-03	9.35E-05	1.62E-06	2.81E-08
mn 56	6.98E+01	1.10E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	1.10E+02	1.10E+02	1.03E+02	9.67E+01	8.52E+01	6.61E+01	3.09E+01	8.67E+00	2.44E+00	6.84E-01	1.92E-01
fe 59	6.36E+00	6.26E+00	1.57E+00	3.71E-01	2.15E-02	7.28E-05	2.82E-12	1.25E-24	.00E+00	.00E+00	.00E+00
co 58m	5.48E-03	8.87E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.18E+02	1.17E+02	4.90E+01	1.98E+01	3.32E+00	9.36E-02	2.09E-06	3.69E-14	6.53E-22	1.15E-29	.00E+00
co 60	3.47E+02	3.47E+02	3.36E+02	3.25E+02	3.04E+02	2.67E+02	1.80E+02	9.32E+01	4.83E+01	2.50E+01	1.30E+01
co 61	6.11E+00	2.55E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02	8.05E-02
ni 63	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.14E+01	1.12E+01	1.08E+01	1.04E+01	1.01E+01	9.71E+00
ni 65	1.08E+01	1.46E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	6.35E-05	4.68E-05	7.87E-17	4.56E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	9.98E+00	2.69E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	2.24E+00	4.69E-05	7.89E-17	4.57E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	1.84E-06	1.41E-06	5.62E-17	8.75E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	1.17E-02	1.17E-02	9.08E-03	6.98E-03	4.15E-03	1.47E-03	6.53E-05	3.63E-07	2.02E-09	1.13E-11	6.27E-14
zn 69	4.53E-07	9.74E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	3.04E-08	9.08E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	8.03E-14	2.47E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	7.63E-12	7.18E-12	3.26E-14	1.20E-16	1.85E-21	4.56E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	1.63E+01	1.61E+01	4.76E+00	1.34E+00	1.09E-01	7.31E-04	2.18E-10	2.92E-21	4.56E-32	.00E+00	.00E+00
sr 90	1.41E-03	1.41E-03	1.41E-03	1.40E-03	1.38E-03	1.35E-03	1.25E-03	1.11E-03	9.78E-04	8.65E-04	7.64E-04
sr 91	3.17E+00	5.52E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	1.99E-03	1.88E-03	4.43E-04	1.25E-04	1.02E-05	6.79E-08	2.03E-14	2.71E-25	.00E+00	.00E+00	.00E+00
y 90	6.03E+02	4.65E+02	1.41E-03	1.40E-03	1.38E-03	1.35E-03	1.25E-03	1.11E-03	9.78E-04	8.65E-04	7.65E-04
y 90m	5.28E-05	2.87E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	4.12E+01	4.08E+01	1.42E+01	4.75E+00	5.45E-01	7.19E-03	1.66E-08	6.65E-18	2.67E-27	.00E+00	.00E+00
y 92	3.58E+01	3.25E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	7.11E-03	1.39E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	4.67E-04	3.78E-04	2.40E-12	7.27E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	7.68E-02	7.68E-02	7.68E-02	7.68E-02	7.68E-02	7.68E-02	7.68E-02	7.68E-02	7.68E-02	7.68E-02	7.68E-02
zr 95	1.26E+04	1.25E+04	4.75E+03	1.74E+03	2.41E+02	4.62E+00	3.25E-05	8.40E-14	2.17E-22	5.70E-31	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 7

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 97	1.94E+04	7.23E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	7.36E-07	7.36E-07	7.36E-07	7.36E-07	7.35E-07	7.35E-07	7.32E-07	7.29E-07	7.25E-07	7.21E-07	7.18E-07
nb 92	3.70E-08	3.70E-08	3.70E-08	3.70E-08	3.70E-08	3.70E-08	3.70E-08	3.70E-08	3.70E-08	3.70E-08	3.70E-08
nb 93m	1.32E+00	1.32E+00	1.31E+00	1.30E+00	1.27E+00	1.22E+00	1.08E+00	8.88E-01	7.32E-01	6.05E-01	5.03E-01
nb 94	3.35E-02	3.35E-02	3.35E-02	3.35E-02	3.35E-02	3.35E-02	3.35E-02	3.35E-02	3.35E-02	3.34E-02	3.34E-02
nb 95	1.24E+04	1.24E+04	7.90E+03	3.43E+03	5.20E+02	1.05E+01	7.16E-05	1.85E-13	4.78E-22	1.21E-30	.00E+00
nb 95m	1.45E+02	1.44E+02	5.59E+01	2.05E+01	2.84E+00	5.44E-02	3.82E-07	9.88E-16	2.55E-24	.00E+00	.00E+00
nb 96	1.10E+01	5.38E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.94E+04	7.27E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.83E+04	6.86E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 93	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03
mo 99	1.98E+01	1.54E+01	2.73E-09	2.01E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11	2.11E-11
tc 99	3.22E-05	3.22E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05	3.23E-05
ru103	2.06E-03	2.02E-03	4.20E-04	8.21E-05	3.26E-06	5.15E-09	2.04E-17	2.05E-31	.00E+00	.00E+00	.00E+00
ru105	1.82E-08	4.28E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	1.27E-14	1.27E-14	1.07E-14	9.03E-15	6.42E-15	3.25E-15	4.21E-16	1.40E-17	4.63E-19	1.54E-20	5.09E-22
rh102	3.17E-12	3.17E-12	2.99E-12	2.82E-12	2.50E-12	1.97E-12	9.60E-13	2.91E-13	8.80E-14	2.66E-14	8.06E-15
rh105	1.75E-08	1.25E-08	8.23E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	5.16E-09	1.22E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	4.64E-10	1.27E-14	1.07E-14	9.03E-15	6.42E-15	3.25E-15	4.21E-16	1.40E-17	4.63E-19	1.54E-20	5.09E-22
rh106m	1.93E-10	8.94E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	2.93E-15	2.69E-15	6.81E-19	1.25E-22	5.13E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	1.33E-05	1.33E-05	1.31E-05	1.30E-05	1.27E-05	1.20E-05	1.04E-05	8.13E-06	6.36E-06	4.97E-06	3.89E-06
cd115	4.73E-02	3.47E-02	3.27E-14	1.04E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	5.14E-03	5.06E-03	1.27E-03	3.01E-04	1.76E-05	6.02E-08	2.42E-15	1.14E-27	.00E+00	.00E+00	.00E+00
cd117	9.28E-03	1.16E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	1.59E-05	1.13E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	4.79E+02	4.76E+02	2.79E+02	1.60E+02	5.31E+01	5.89E+00	8.02E-03	1.34E-07	2.24E-12	3.75E-17	6.27E-22
in114	1.12E+02	7.05E+01	2.03E+01	5.55E+00	4.30E-01	2.59E-03	5.64E-10	4.44E-21	4.56E-32	.00E+00	.00E+00
in114m	7.47E+01	7.36E+01	2.12E+01	5.80E+00	4.49E-01	2.70E-03	5.89E-10	4.64E-21	4.56E-32	.00E+00	.00E+00
in116m	1.38E-02	1.36E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	1.04E-01	2.55E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	8.45E-03	4.97E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	4.79E+02	4.76E+02	2.79E+02	1.60E+02	5.31E+01	5.88E+00	8.01E-03	1.34E-07	2.24E-12	3.75E-17	6.27E-22
sn117m	2.45E+03	2.33E+03	2.50E+01	2.24E-01	2.02E-05	1.66E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	2.17E+03	2.16E+03	1.75E+03	1.41E+03	9.15E+02	3.85E+02	2.89E+01	3.84E-01	5.11E-03	6.80E-05	9.05E-07
sn121	8.27E+02	4.48E+02	2.91E-01	2.90E-01	2.88E-01	2.85E-01	2.74E-01	2.57E-01	2.42E-01	2.27E-01	2.13E-01
sn121m	3.76E-01	3.76E-01	3.75E-01	3.74E-01	3.71E-01	3.67E-01	3.53E-01	3.31E-01	3.11E-01	2.92E-01	2.74E-01
sn123	7.65E+01	7.60E+01	4.72E+01	2.87E+01	1.08E+01	1.52E+00	4.24E-03	2.35E-07	1.30E-11	7.22E-16	4.00E-20
sn123m	4.40E-01	6.74E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	1.55E+01	1.45E+01	2.40E-02	3.11E-05	6.11E-11	2.40E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	1.64E+02	1.27E+02	1.52E-08	7.39E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	9.42E+00	9.32E+00	3.34E+00	1.15E+00	1.41E-01	2.09E-03	6.94E-09	5.12E-18	3.77E-27	.00E+00	.00E+00
sb125	3.51E+02	3.51E+02	3.30E+02	3.09E+02	2.72E+02	2.11E+02	9.86E+01	2.77E+01	7.78E+00	2.19E+00	6.14E-01
sb126	4.06E+00	3.84E+00	2.65E-02	1.50E-04	5.48E-09	7.39E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	2.13E-13	2.14E-13	2.39E-13	2.55E-13	2.70E-13	2.77E-13	2.78E-13	2.78E-13	2.78E-13	2.78E-13	2.78E-13
te123m	2.44E+00	2.42E+00	1.45E+00	8.47E-01	2.94E-01	3.55E-02	6.22E-05	1.58E-09	4.04E-14	1.03E-18	2.62E-23
te125m	7.85E+01	7.85E+01	7.80E+01	7.47E+01	6.64E+01	5.16E+01	2.41E+01	6.76E+00	1.90E+00	5.34E-01	1.50E-01
te127	1.23E-01	3.16E-02	7.48E-03	4.15E-03	1.30E-03	1.27E-04	1.20E-07	1.09E-12	9.82E-18	8.88E-23	8.04E-28
te127m	1.35E-02	1.34E-02	7.63E-03	4.24E-03	1.33E-03	1.30E-04	1.22E-07	1.11E-12	1.00E-17	9.07E-23	8.21E-28
te129	6.56E-07	2.68E-08	4.27E-09	6.33E-10	1.46E-11	7.80E-15	1.19E-24	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 8

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te129m	4.27E-08	4.18E-08	6.66E-09	9.88E-10	2.28E-11	1.22E-14	1.85E-24	.00E+00	.00E+00	.00E+00	.00E+00
i126	5.46E-13	5.18E-13	4.53E-15	3.30E-17	1.96E-21	7.05E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i129	3.09E-14	3.09E-14	3.11E-14	3.12E-14	3.12E-14	3.12E-14	3.12E-14	3.12E-14	3.12E-14	3.12E-14	3.12E-14
i130	1.27E-08	3.33E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.19E-12	1.09E-12	5.07E-16	1.75E-19	2.51E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	3.17E-08	3.11E-08	5.71E-09	9.80E-10	3.02E-11	2.88E-14	2.50E-23	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	2.64E-06	2.44E-06	2.37E-09	1.75E-12	1.13E-18	4.79E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	4.48E-10	4.23E-10	2.37E-12	1.08E-14	2.57E-19	1.48E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	3.91E-13	3.45E-13	2.79E-18	1.36E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	2.64E-14	1.92E-14	1.12E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	2.32E-15	2.32E-15	2.14E-15	1.96E-15	1.66E-15	1.19E-15	4.33E-16	8.06E-17	1.50E-17	2.79E-18	5.20E-19
total	9.27E+04	5.48E+04	1.61E+04	7.83E+03	2.55E+03	1.03E+03	3.76E+02	1.49E+02	7.23E+01	3.98E+01	2.48E+01

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BWR SNF Assembly - Fuel - decay actinides page 9

0 nuclide concentrations, grams

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
he 4	3.27E-01	3.27E-01	3.60E-01	3.85E-01	4.18E-01	4.57E-01	5.33E-01	6.52E-01	7.68E-01	8.82E-01	9.93E-01
tl207	1.11E-14	1.11E-14	1.20E-14	1.28E-14	1.47E-14	1.83E-14	2.76E-14	4.16E-14	5.39E-14	6.46E-14	7.40E-14
tl208	6.69E-12	6.83E-12	7.56E-12	8.52E-12	1.05E-11	1.48E-11	2.63E-11	3.64E-11	3.90E-11	3.85E-11	3.71E-11
pb206	3.08E-12	3.08E-12	3.64E-12	4.28E-12	5.66E-12	8.72E-12	2.02E-11	5.32E-11	1.18E-10	2.36E-10	4.36E-10
pb207	1.76E-09	1.77E-09	1.98E-09	2.22E-09	2.80E-09	4.05E-09	9.30E-09	2.26E-08	4.09E-08	6.36E-08	9.01E-08
pb208	3.59E-06	3.59E-06	4.17E-06	4.84E-06	6.41E-06	1.06E-05	3.14E-05	8.51E-05	1.48E-04	2.13E-04	2.76E-04
pb209	1.04E-13	9.92E-14	2.56E-14	2.23E-14	2.24E-14	2.25E-14	2.31E-14	2.43E-14	2.58E-14	2.75E-14	2.95E-14
pb210	9.05E-11	9.07E-11	9.55E-11	9.77E-11	1.02E-10	1.12E-10	1.58E-10	3.07E-10	5.84E-10	1.03E-09	1.69E-09
pb211	8.60E-14	8.61E-14	9.25E-14	9.92E-14	1.14E-13	1.41E-13	2.14E-13	3.22E-13	4.17E-13	5.00E-13	5.73E-13
pb212	3.97E-09	3.96E-09	4.48E-09	5.05E-09	6.25E-09	8.80E-09	1.56E-08	2.16E-08	2.31E-08	2.29E-08	2.20E-08
bi209	2.85E-10	2.86E-10	3.10E-10	3.21E-10	3.42E-10	3.84E-10	5.11E-10	7.32E-10	9.66E-10	1.21E-09	1.48E-09
bi210	5.52E-14	5.52E-14	5.88E-14	6.02E-14	6.28E-14	6.91E-14	9.72E-14	1.89E-13	3.60E-13	6.35E-13	1.04E-12
bi211	5.10E-15	5.10E-15	5.48E-15	5.88E-15	6.74E-15	8.37E-15	1.27E-14	1.91E-14	2.47E-14	2.96E-14	3.39E-14
bi212	3.76E-10	3.84E-10	4.25E-10	4.79E-10	5.93E-10	8.34E-10	1.48E-09	2.05E-09	2.19E-09	2.17E-09	2.09E-09
bi213	2.48E-14	2.48E-14	6.08E-15	5.31E-15	5.33E-15	5.36E-15	5.50E-15	5.78E-15	6.13E-15	6.54E-15	7.02E-15
po210	1.17E-12	1.17E-12	1.32E-12	1.43E-12	1.58E-12	1.78E-12	2.50E-12	5.21E-12	9.93E-12	1.75E-11	2.87E-11
po216	1.53E-14	1.53E-14	1.73E-14	1.95E-14	2.41E-14	3.39E-14	6.02E-14	8.33E-14	8.92E-14	8.82E-14	8.49E-14
rn220	5.98E-12	5.97E-12	6.75E-12	7.61E-12	9.42E-12	1.33E-11	2.35E-11	3.25E-11	3.48E-11	3.44E-11	3.32E-11
rn222	1.65E-13	1.65E-13	1.72E-13	1.80E-13	1.97E-13	2.36E-13	3.95E-13	8.12E-13	1.43E-12	2.26E-12	3.31E-12
fr221	2.77E-15	2.76E-15	6.79E-16	5.92E-16	5.94E-16	5.98E-16	6.14E-16	6.45E-16	6.84E-16	7.29E-16	7.82E-16
ra223	4.14E-11	4.15E-11	4.46E-11	4.78E-11	5.48E-11	6.81E-11	1.03E-10	1.55E-10	2.01E-10	2.41E-10	2.76E-10
ra224	3.46E-08	3.46E-08	3.91E-08	4.41E-08	5.46E-08	7.67E-08	1.36E-07	1.88E-07	2.02E-07	1.99E-07	1.92E-07
ra225	1.20E-11	1.16E-11	2.75E-12	2.62E-12	2.63E-12	2.65E-12	2.72E-12	2.86E-12	3.03E-12	3.23E-12	3.47E-12
ra226	2.57E-08	2.57E-08	2.68E-08	2.80E-08	3.06E-08	3.66E-08	6.14E-08	1.26E-07	2.22E-07	3.51E-07	5.15E-07
ra228	1.85E-14	1.85E-14	2.01E-14	2.18E-14	2.55E-14	3.36E-14	6.34E-14	1.26E-13	1.98E-13	2.76E-13	3.56E-13
ac225	8.28E-12	8.26E-12	2.03E-12	1.77E-12	1.78E-12	1.79E-12	1.84E-12	1.93E-12	2.05E-12	2.18E-12	2.34E-12
ac227	3.04E-08	3.04E-08	3.26E-08	3.49E-08	3.94E-08	4.81E-08	7.28E-08	1.10E-07	1.42E-07	1.70E-07	1.95E-07
th226	3.61E-15	3.49E-15	1.80E-16	8.24E-18	1.87E-20	9.65E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	6.90E-11	6.91E-11	7.42E-11	7.95E-11	8.99E-11	1.12E-10	1.69E-10	2.55E-10	3.30E-10	3.96E-10	4.54E-10
th228	6.69E-06	6.70E-06	7.56E-06	8.53E-06	1.06E-05	1.49E-05	2.64E-05	3.66E-05	3.91E-05	3.87E-05	3.73E-05
th229	5.17E-07	5.17E-07	5.18E-07	5.19E-07	5.20E-07	5.24E-07	5.38E-07	5.65E-07	5.99E-07	6.39E-07	6.86E-07
th230	4.86E-04	4.86E-04	5.15E-04	5.46E-04	6.06E-04	7.29E-04	1.11E-03	1.78E-03	2.49E-03	3.25E-03	4.05E-03
th231	7.04E-07	3.70E-07	6.52E-09	6.52E-09	6.52E-09	6.52E-09	6.52E-09	6.52E-09	6.52E-09	6.52E-09	6.52E-09
th232	1.78E-04	1.78E-04	1.88E-04	1.99E-04	2.20E-04	2.62E-04	3.87E-04	5.96E-04	8.05E-04	1.01E-03	1.22E-03
th234	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06
pa231	4.83E-04	4.84E-04	4.85E-04	4.85E-04	4.86E-04	4.87E-04	4.92E-04	5.00E-04	5.07E-04	5.15E-04	5.23E-04
pa232	6.17E-07	3.64E-07	1.29E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pa233	6.31E-06	6.31E-06	6.22E-06	6.21E-06	6.21E-06	6.21E-06	6.22E-06	6.26E-06	6.30E-06	6.36E-06	6.42E-06
pa234m	9.17E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11	8.96E-11
pa234	7.06E-10	9.56E-11	4.00E-11	4.00E-11	4.00E-11	4.00E-11	4.00E-11	4.00E-11	4.00E-11	4.00E-11	4.00E-11
u230	3.56E-12	3.44E-12	1.77E-13	8.12E-15	1.84E-17	9.51E-23	1.31E-38	.00E+00	.00E+00	.00E+00	.00E+00

u231	6.52E-11	5.53E-11	2.32E-17	5.47E-24	4.41E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	5.97E-04	5.98E-04	6.59E-04	7.18E-04	8.23E-04	9.97E-04	1.31E-03	1.47E-03	1.46E-03	1.41E-03	1.35E-03
u233	8.46E-04	8.46E-04	8.60E-04	8.75E-04	9.04E-04	9.69E-04	1.15E-03	1.44E-03	1.74E-03	2.03E-03	2.33E-03
u234	4.32E+01	4.32E+01	4.34E+01	4.35E+01	4.39E+01	4.46E+01	4.66E+01	4.99E+01	5.31E+01	5.61E+01	5.91E+01
u235	1.60E+03	1.60E+03	1.60E+03	1.60E+03	1.60E+03	1.60E+03	1.60E+03	1.60E+03	1.60E+03	1.60E+03	1.60E+03
u236	1.44E+03	1.44E+03	1.44E+03	1.44E+03	1.44E+03	1.44E+03	1.44E+03	1.44E+03	1.44E+03	1.44E+03	1.44E+03
u237	1.96E+00	1.77E+00	2.00E-04	9.94E-06	9.69E-06	9.24E-06	7.99E-06	6.28E-06	4.93E-06	3.87E-06	3.04E-06
u238	1.83E+05	1.83E+05	1.83E+05	1.83E+05	1.83E+05	1.83E+05	1.83E+05	1.83E+05	1.83E+05	1.83E+05	1.83E+05
np235	8.11E-06	8.10E-06	6.93E-06	5.90E-06	4.28E-06	2.26E-06	3.32E-07	1.36E-08	5.58E-10	2.28E-11	9.35E-13
np236m	5.56E-06	2.65E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03	1.30E-03

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BWR SNF Assembly - Fuel - decay actinides page 10

0 nuclide concentrations, grams

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
np237	1.81E+02	1.81E+02	1.83E+02	1.83E+02	1.83E+02	1.83E+02	1.83E+02	1.84E+02	1.85E+02	1.87E+02	1.89E+02
np238	3.50E-01	2.52E-01	9.36E-08	9.35E-08	9.32E-08	9.28E-08	9.14E-08	8.92E-08	8.70E-08	8.49E-08	8.29E-08
np239	1.06E+01	7.96E+00	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05	3.71E-05
np240	2.95E-04	2.93E-11	1.35E-24	1.74E-24	2.50E-24	4.01E-24	8.56E-24	1.62E-23	2.37E-23	3.13E-23	3.89E-23
pu236	1.11E-03	1.11E-03	1.05E-03	9.85E-04	8.74E-04	6.88E-04	3.36E-04	1.02E-04	3.08E-05	9.32E-06	2.82E-06
pu237	2.86E-05	2.82E-05	7.18E-06	1.74E-06	1.05E-07	3.87E-10	1.93E-17	1.31E-29	8.97E-42	.00E+00	.00E+00
pu238	8.46E+01	8.47E+01	8.64E+01	8.73E+01	8.83E+01	8.84E+01	8.66E+01	8.32E+01	8.00E+01	7.69E+01	7.40E+01
pu239	1.12E+03	1.12E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03
pu240	5.39E+02	5.39E+02	5.39E+02	5.39E+02	5.39E+02	5.40E+02	5.41E+02	5.43E+02	5.45E+02	5.46E+02	5.47E+02
pu241	3.36E+02	3.36E+02	3.32E+02	3.28E+02	3.20E+02	3.05E+02	2.64E+02	2.07E+02	1.63E+02	1.28E+02	1.00E+02
pu242	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02	1.54E+02
pu243	2.77E-02	9.66E-04	1.25E-13	1.25E-13	1.25E-13	1.25E-13	1.25E-13	1.25E-13	1.25E-13	1.25E-13	1.25E-13
pu244	5.65E-10	5.67E-10	7.80E-10	1.00E-09	1.44E-09	2.31E-09	4.94E-09	9.31E-09	1.37E-08	1.81E-08	2.24E-08
am239	4.38E-10	1.08E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	1.91E-07	1.38E-07	3.19E-20	2.35E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.79E+01	1.79E+01	2.19E+01	2.59E+01	3.37E+01	4.87E+01	8.95E+01	1.45E+02	1.88E+02	2.21E+02	2.47E+02
am242m	5.15E-01	5.15E-01	5.14E-01	5.14E-01	5.13E-01	5.10E-01	5.03E-01	4.90E-01	4.78E-01	4.67E-01	4.56E-01
am242	3.05E-02	1.08E-02	6.64E-06	6.63E-06	6.61E-06	6.58E-06	6.48E-06	6.33E-06	6.17E-06	6.02E-06	5.88E-06
am243	4.31E+01	4.32E+01	4.32E+01	4.32E+01	4.32E+01	4.32E+01	4.32E+01	4.31E+01	4.31E+01	4.31E+01	4.31E+01
am244	2.26E-02	4.35E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	3.14E-14	3.13E-14	2.58E-14	2.11E-14	1.42E-14	6.43E-15	5.99E-16	1.15E-17	2.20E-19	4.21E-21	8.06E-23
cm241	3.27E-09	3.21E-09	4.89E-10	6.92E-11	1.46E-12	6.47E-16	5.68E-26	1.01E-42	.00E+00	.00E+00	.00E+00
cm242	5.14E+00	5.14E+00	3.53E+00	2.38E+00	1.09E+00	2.33E-01	3.50E-03	1.28E-03	1.25E-03	1.22E-03	1.19E-03
cm243	2.13E-01	2.13E-01	2.12E-01	2.11E-01	2.08E-01	2.03E-01	1.89E-01	1.67E-01	1.48E-01	1.31E-01	1.16E-01
cm244	1.62E+01	1.62E+01	1.61E+01	1.59E+01	1.56E+01	1.50E+01	1.34E+01	1.11E+01	9.13E+00	7.54E+00	6.23E+00
cm245	7.84E-01	7.84E-01	7.84E-01	7.84E-01	7.84E-01	7.84E-01	7.84E-01	7.84E-01	7.83E-01	7.83E-01	7.83E-01
cm246	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01	1.55E-01
cm247	3.59E-03	3.59E-03	3.59E-03	3.59E-03	3.59E-03	3.59E-03	3.59E-03	3.59E-03	3.59E-03	3.59E-03	3.59E-03
cm248	4.75E-04	4.75E-04	4.75E-04	4.75E-04	4.75E-04	4.75E-04	4.76E-04	4.76E-04	4.76E-04	4.76E-04	4.76E-04
cm249	4.84E-09	8.91E-15	2.52E-16	6.90E-18	5.63E-21	3.78E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	3.49E-12	3.49E-12	3.49E-12	3.49E-12	3.49E-12	3.49E-12	3.49E-12	3.49E-12	3.49E-12	3.49E-12	3.49E-12
bk249	8.21E-06	8.20E-06	6.76E-06	5.54E-06	3.73E-06	1.69E-06	1.57E-07	3.01E-09	5.77E-11	1.10E-12	2.12E-14
bk250	4.54E-09	2.58E-11	2.00E-14	1.58E-14	1.00E-14	3.99E-15	2.54E-16	2.58E-18	3.64E-20	1.06E-20	1.03E-20
cf249	1.88E-06	1.89E-06	3.33E-06	4.56E-06	6.36E-06	8.38E-06	9.86E-06	9.91E-06	9.82E-06	9.72E-06	9.63E-06
cf250	1.42E-06	1.42E-06	1.41E-06	1.39E-06	1.35E-06	1.28E-06	1.09E-06	8.38E-07	6.43E-07	4.94E-07	3.79E-07
cf251	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.72E-07	9.72E-07	9.69E-07	9.66E-07	9.62E-07	9.58E-07	9.54E-07
cf252	7.87E-07	7.87E-07	7.38E-07	6.91E-07	6.06E-07	4.66E-07	2.12E-07	5.73E-08	1.55E-08	4.17E-09	1.12E-09
cf253	1.10E-09	1.05E-09	3.30E-11	9.02E-13	7.36E-16	4.94E-22	1.50E-40	.00E+00	.00E+00	.00E+00	.00E+00
cf254	8.86E-13	8.76E-13	3.16E-13	1.09E-13	1.35E-14	2.05E-16	7.25E-22	5.94E-31	4.86E-40	.00E+00	.00E+00
es253	1.07E-09	1.08E-09	1.97E-10	1.27E-11	3.47E-14	1.68E-19	1.31E-35	.00E+00	.00E+00	.00E+00	.00E+00
es254	5.23E-11	5.22E-11	4.17E-11	3.31E-11	2.09E-11	8.34E-12	5.30E-13	5.38E-15	5.45E-17	5.52E-19	5.60E-21
es255	5.81E-14	5.72E-14	1.18E-14	2.27E-15	8.82E-17	1.34E-19	4.66E-28	3.57E-42	.00E+00	.00E+00	.00E+00
total	1.89E+05	1.89E+05	1.89E+05	1.89E+05	1.89E+05	1.89E+05	1.89E+05	1.89E+05	1.89E+05	1.89E+05	1.89E+05

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BWR SNF Assembly - Fuel - decay actinides page 11

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tl206	9.04E-15	9.05E-15	9.63E-15	9.85E-15	1.03E-14	1.13E-14	1.59E-14	3.09E-14	5.89E-14	1.04E-13	1.70E-13
tl207	2.12E-06	2.12E-06	2.28E-06	2.44E-06	2.80E-06	3.48E-06	5.26E-06	7.93E-06	1.03E-05	1.23E-05	1.41E-05
tl208	1.98E-03	2.02E-03	2.24E-03	2.52E-03	3.12E-03	4.39E-03	7.80E-03	1.08E-02	1.15E-02	1.14E-02	1.10E-02
tl209	1.01E-08	1.01E-08	2.48E-09	2.16E-09	2.17E-09	2.18E-09	2.24E-09	2.35E-09	2.49E-09	2.66E-09	2.85E-09
pb209	4.81E-07	4.57E-07	1.18E-07	1.03E-07	1.03E-07	1.04E-07	1.07E-07	1.12E-07	1.19E-07	1.27E-07	1.36E-07
pb210	6.91E-09	6.92E-09	7.29E-09	7.46E-09	7.79E-09	8.57E-09	1.21E-08	2.34E-08	4.46E-08	7.88E-08	1.29E-07
pb211	2.12E-06	2.13E-06	2.28E-06	2.45E-06	2.81E-06	3.49E-06	5.28E-06	7.95E-06	1.03E-05	1.23E-05	1.41E-05
pb212	5.51E-03	5.51E-03	6.23E-03	7.02E-03	8.69E-03	1.22E-02	2.17E-02	3.00E-02	3.21E-02	3.18E-02	3.06E-02
pb214	2.54E-08	2.54E-08	2.65E-08	2.77E-08	3.03E-08	3.62E-08	6.08E-08	1.25E-07	2.20E-07	3.47E-07	5.09E-07
bi210	6.85E-09	6.86E-09	7.30E-09	7.47E-09	7.80E-09	8.57E-09	1.21E-08	2.34E-08	4.46E-08	7.88E-08	1.29E-07
bi211	2.12E-06	2.13E-06	2.28E-06	2.45E-06	2.81E-06	3.49E-06	5.28E-06	7.95E-06	1.03E-05	1.23E-05	1.41E-05
bi212	5.51E-03	5.63E-03	6.23E-03	7.02E-03	8.69E-03	1.22E-02	2.17E-02	3.00E-02	3.21E-02	3.18E-02	3.06E-02
bi213	4.81E-07	4.80E-07	1.18E-07	1.03E-07	1.03E-07	1.04E-07	1.07E-07	1.12E-07	1.19E-07	1.27E-07	1.36E-07
bi214	2.54E-08	2.54E-08	2.65E-08	2.77E-08	3.03E-08	3.62E-08	6.08E-08	1.25E-07	2.20E-07	3.47E-07	5.09E-07
po210	5.26E-09	5.27E-09	5.91E-09	6.42E-09	7.09E-09	8.01E-09	1.12E-08	2.34E-08	4.46E-08	7.88E-08	1.29E-07
po211	5.84E-09	5.84E-09	6.28E-09	6.74E-09	7.72E-09	9.59E-09	1.45E-08	2.19E-08	2.83E-08	3.39E-08	3.89E-08
po212	3.53E-03	3.61E-03	3.99E-03	4.50E-03	5.57E-03	7.83E-03	1.39E-02	1.92E-02	2.06E-02	2.03E-02	1.96E-02
po213	4.71E-07	4.70E-07	1.15E-07	1.01E-07	1.01E-07	1.02E-07	1.04E-07	1.10E-07	1.16E-07	1.24E-07	1.33E-07
po214	1.23E-07	1.19E-07	3.14E-08	2.79E-08	3.03E-08	3.62E-08	6.07E-08	1.25E-07	2.20E-07	3.47E-07	5.09E-07
po215	2.12E-06	2.13E-06	2.28E-06	2.45E-06	2.81E-06	3.49E-06	5.28E-06	7.95E-06	1.03E-05	1.23E-05	1.41E-05
po216	5.51E-03	5.51E-03	6.23E-03	7.02E-03	8.69E-03	1.22E-02	2.17E-02	3.00E-02	3.21E-02	3.18E-02	3.06E-02
po218	2.54E-08	2.54E-08	2.65E-08	2.77E-08	3.03E-08	3.62E-08	6.08E-08	1.25E-07	2.20E-07	3.47E-07	5.09E-07
at217	4.81E-07	4.80E-07	1.18E-07	1.03E-07	1.03E-07	1.04E-07	1.07E-07	1.12E-07	1.19E-07	1.27E-07	1.36E-07
rn218	9.72E-08	9.41E-08	4.84E-09	2.22E-10	5.03E-13	2.60E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	2.12E-06	2.13E-06	2.28E-06	2.45E-06	2.81E-06	3.49E-06	5.28E-06	7.95E-06	1.03E-05	1.23E-05	1.41E-05
rn220	5.51E-03	5.51E-03	6.23E-03	7.02E-03	8.69E-03	1.22E-02	2.17E-02	3.00E-02	3.21E-02	3.18E-02	3.06E-02
rn222	2.54E-08	2.54E-08	2.65E-08	2.77E-08	3.03E-08	3.62E-08	6.08E-08	1.25E-07	2.20E-07	3.47E-07	5.09E-07
fr221	4.81E-07	4.80E-07	1.18E-07	1.03E-07	1.03E-07	1.04E-07	1.07E-07	1.12E-07	1.19E-07	1.27E-07	1.36E-07
fr223	3.04E-08	3.04E-08	3.26E-08	3.49E-08	3.93E-08	4.80E-08	7.27E-08	1.10E-07	1.42E-07	1.70E-07	1.95E-07
ra222	9.72E-08	9.41E-08	4.84E-09	2.22E-10	5.03E-13	2.60E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	2.12E-06	2.13E-06	2.28E-06	2.45E-06	2.81E-06	3.49E-06	5.28E-06	7.95E-06	1.03E-05	1.23E-05	1.41E-05
ra224	5.51E-03	5.51E-03	6.23E-03	7.02E-03	8.69E-03	1.22E-02	2.17E-02	3.00E-02	3.21E-02	3.18E-02	3.06E-02
ra225	4.72E-07	4.56E-07	1.08E-07	1.03E-07	1.03E-07	1.04E-07	1.07E-07	1.12E-07	1.19E-07	1.27E-07	1.36E-07
ra226	2.54E-08	2.54E-08	2.65E-08	2.77E-08	3.03E-08	3.62E-08	6.08E-08	1.25E-07	2.20E-07	3.47E-07	5.09E-07
ra228	5.04E-12	5.05E-12	5.48E-12	5.96E-12	6.95E-12	9.17E-12	1.73E-11	3.44E-11	5.41E-11	7.53E-11	9.73E-11
ac225	4.81E-07	4.80E-07	1.18E-07	1.03E-07	1.03E-07	1.04E-07	1.07E-07	1.12E-07	1.19E-07	1.27E-07	1.36E-07
ac227	2.20E-06	2.20E-06	2.36E-06	2.53E-06	2.85E-06	3.48E-06	5.27E-06	7.94E-06	1.03E-05	1.23E-05	1.41E-05
ac228	5.04E-12	5.04E-12	5.48E-12	5.96E-12	6.96E-12	9.17E-12	1.73E-11	3.44E-11	5.41E-11	7.53E-11	9.73E-11
th226	9.72E-08	9.41E-08	4.84E-09	2.22E-10	5.03E-13	2.60E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	2.12E-06	2.12E-06	2.28E-06	2.44E-06	2.76E-06	3.44E-06	5.21E-06	7.84E-06	1.02E-05	1.22E-05	1.39E-05
th228	5.48E-03	5.49E-03	6.20E-03	6.99E-03	8.66E-03	1.22E-02	2.17E-02	3.00E-02	3.21E-02	3.17E-02	3.06E-02
th229	1.02E-07	1.02E-07	1.03E-07	1.03E-07	1.03E-07	1.04E-07	1.07E-07	1.12E-07	1.19E-07	1.27E-07	1.36E-07
th230	1.00E-05	1.00E-05	1.06E-05	1.13E-05	1.25E-05	1.50E-05	2.29E-05	3.67E-05	5.14E-05	6.70E-05	8.35E-05
th231	3.74E-01	1.97E-01	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03
th232	1.95E-11	1.96E-11	2.07E-11	2.18E-11	2.41E-11	2.87E-11	4.25E-11	6.54E-11	8.83E-11	1.11E-10	1.34E-10
th234	6.16E-02	6.16E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02
pa231	2.28E-05	2.29E-05	2.29E-05	2.29E-05	2.30E-05	2.30E-05	2.32E-05	2.36E-05	2.40E-05	2.43E-05	2.47E-05
pa232	2.65E-01	1.56E-01	5.56E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pa233	1.31E-01	1.31E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.30E-01	1.31E-01	1.32E-01	1.33E-01
pa234m	6.30E-02	6.16E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02
pa234	1.41E-03	1.91E-04	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05	8.00E-05
u230	9.71E-08	9.40E-08	4.84E-09	2.22E-10	5.02E-13	2.60E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay actinides page 12

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
u231	8.78E-06	7.44E-06	3.13E-12	7.37E-19	6.85E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.32E-02	1.32E-02	1.45E-02	1.58E-02	1.82E-02	2.20E-02	2.89E-02	3.24E-02	3.23E-02	3.12E-02	2.99E-02
u233	8.15E-06	8.16E-06	8.29E-06	8.44E-06	8.72E-06	9.34E-06	1.11E-05	1.39E-05	1.67E-05	1.96E-05	2.25E-05
u234	2.69E-01	2.69E-01	2.70E-01	2.71E-01	2.73E-01	2.77E-01	2.90E-01	3.10E-01	3.30E-01	3.49E-01	3.67E-01
u235	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03	3.47E-03
u236	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.29E-02	9.30E-02	9.30E-02
u237	1.60E+05	1.44E+05	1.63E+01	8.12E-01	7.91E-01	7.54E-01	6.52E-01	5.12E-01	4.02E-01	3.16E-01	2.48E-01
u238	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02	6.15E-02
u239	2.47E+06	8.31E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u240	1.03E-14	1.04E-14	1.43E-14	1.83E-14	2.63E-14	4.23E-14	9.04E-14	1.70E-13	2.51E-13	3.31E-13	4.11E-13
np235	1.14E-02	1.14E-02	9.73E-03	8.27E-03	6.01E-03	3.17E-03	4.66E-04	1.91E-05	7.82E-07	3.20E-08	1.31E-09
np236m	3.28E+00	1.57E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.72E-05	1.72E-05	1.72E-05	1.72E-05	1.72E-05	1.72E-05	1.72E-05	1.72E-05	1.72E-05	1.72E-05	1.72E-05
np237	1.28E-01	1.28E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.29E-01	1.30E-01	1.31E-01	1.32E-01	1.33E-01
np238	9.08E+04	6.54E+04	2.43E-02	2.42E-02	2.42E-02	2.41E-02	2.37E-02	2.31E-02	2.26E-02	2.20E-02	2.15E-02
np239	2.46E+06	1.85E+06	8.62E+00	8.62E+00	8.62E+00	8.62E+00	8.62E+00	8.61E+00	8.61E+00	8.60E+00	8.60E+00
np240m	1.03E-14	1.04E-14	1.43E-14	1.83E-14	2.63E-14	4.23E-14	9.04E-14	1.70E-13	2.51E-13	3.31E-13	4.11E-13
np240	3.73E+03	3.71E-04	1.71E-17	2.20E-17	3.16E-17	5.08E-17	1.08E-16	2.05E-16	3.01E-16	3.97E-16	4.93E-16
pu236	5.79E-01	5.79E-01	5.47E-01	5.15E-01	4.57E-01	3.60E-01	1.76E-01	5.32E-02	1.61E-02	4.87E-03	1.48E-03
pu237	3.49E-01	3.43E-01	8.77E-02	2.12E-02	1.28E-03	4.73E-06	2.36E-13	1.59E-25	.00E+00	.00E+00	.00E+00
pu238	1.45E+03	1.45E+03	1.48E+03	1.50E+03	1.51E+03	1.51E+03	1.48E+03	1.43E+03	1.37E+03	1.32E+03	1.27E+03
pu239	6.94E+01	6.96E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01
pu240	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.22E+02	1.23E+02	1.23E+02	1.23E+02	1.24E+02	1.24E+02	1.24E+02
pu241	3.47E+04	3.47E+04	3.43E+04	3.39E+04	3.31E+04	3.15E+04	2.73E+04	2.14E+04	1.68E+04	1.32E+04	1.04E+04
pu242	6.09E-01	6.09E-01	6.09E-01	6.09E-01	6.09E-01	6.09E-01	6.09E-01	6.09E-01	6.09E-01	6.09E-01	6.09E-01
pu243	7.22E+04	2.51E+03	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07
pu244	1.03E-14	1.04E-14	1.43E-14	1.83E-14	2.64E-14	4.24E-14	9.05E-14	1.71E-13	2.51E-13	3.31E-13	4.11E-13
pu245	8.31E-10	1.70E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	2.27E-13	2.18E-13	7.23E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14
am239	4.83E-04	1.19E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	4.91E-02	3.54E-02	8.19E-15	6.04E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	6.14E+01	6.15E+01	7.50E+01	8.88E+01	1.16E+02	1.67E+02	3.07E+02	4.98E+02	6.46E+02	7.60E+02	8.47E+02
am242m	5.40E+00	5.40E+00	5.39E+00	5.38E+00	5.37E+00	5.35E+00	5.27E+00	5.14E+00	5.01E+00	4.89E+00	4.77E+00
am242	2.47E+04	8.74E+03	5.37E+00	5.36E+00	5.35E+00	5.32E+00	5.24E+00	5.12E+00	4.99E+00	4.87E+00	4.75E+00
am243	8.62E+00	8.62E+00	8.62E+00	8.62E+00	8.62E+00	8.62E+00	8.62E+00	8.61E+00	8.61E+00	8.60E+00	8.60E+00
am244	2.88E+04	5.54E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	1.96E-07	1.95E-07	1.61E-07	1.32E-07	8.86E-08	4.02E-08	3.74E-09	7.17E-11	1.37E-12	2.63E-14	5.03E-16
am246	2.27E-13	2.18E-13	7.23E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14	7.18E-14
cm241	5.41E-05	5.30E-05	8.08E-06	1.14E-06	2.41E-08	1.07E-11	9.39E-22	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.70E+04	1.70E+04	1.17E+04	7.88E+03	3.63E+03	7.70E+02	1.16E+01	4.24E+00	4.13E+00	4.03E+00	3.93E+00
cm243	1.10E+01	1.10E+01	1.09E+01	1.09E+01	1.07E+01	1.05E+01	9.75E+00	8.63E+00	7.65E+00	6.77E+00	5.99E+00
cm244	1.31E+03	1.31E+03	1.30E+03	1.29E+03	1.26E+03	1.22E+03	1.08E+03	8.96E+02	7.40E+02	6.11E+02	5.04E+02
cm245	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.35E-01	1.34E-01	1.34E-01
cm246	4.77E-02	4.77E-02	4.77E-02	4.77E-02	4.77E-02	4.77E-02	4.77E-02	4.77E-02	4.76E-02	4.76E-02	4.76E-02
cm247	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07	3.25E-07
cm248	2.01E-06	2.01E-06	2.01E-06	2.02E-06	2.02E-06	2.02E-06	2.02E-06	2.02E-06	2.02E-06	2.02E-06	2.02E-06
cm249	5.70E-02	1.05E-07	2.97E-09	8.13E-11	6.63E-14	4.45E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	2.87E-13	2.87E-13	2.87E-13	2.87E-13	2.87E-13	2.87E-13	2.87E-13	2.87E-13	2.87E-13	2.87E-13	2.87E-13
bk249	1.35E-02	1.34E-02	1.11E-02	9.07E-03	6.11E-03	2.77E-03	2.58E-04	4.94E-06	9.46E-08	1.81E-09	3.47E-11
bk250	1.77E-02	1.01E-04	7.79E-08	6.17E-08	3.90E-08	1.56E-08	9.90E-10	1.01E-11	1.42E-13	4.12E-14	4.02E-14
bk251	1.43E-06	7.52E-10	1.55E-10	2.99E-11	1.16E-12	1.76E-15	6.13E-24	.00E+00	.00E+00	.00E+00	.00E+00
cf249	7.69E-06	7.76E-06	1.37E-05	1.87E-05	2.61E-05	3.44E-05	4.04E-05	4.06E-05	4.02E-05	3.99E-05	3.95E-05

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BWR SNF Assembly - Fuel - decay actinides page 13

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cf250	1.55E-04	1.56E-04	1.54E-04	1.52E-04	1.48E-04	1.40E-04	1.20E-04	9.17E-05	7.04E-05	5.40E-05	4.14E-05
cf251	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.54E-06	1.53E-06	1.53E-06	1.52E-06	1.51E-06

cf252	4.22E-04	4.22E-04	3.96E-04	3.71E-04	3.25E-04	2.50E-04	1.14E-04	3.07E-05	8.29E-06	2.24E-06	6.03E-07
cf253	3.18E-05	3.05E-05	9.57E-07	2.62E-08	2.13E-11	1.43E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	7.53E-09	7.44E-09	2.69E-09	9.31E-10	1.15E-10	1.75E-12	6.16E-18	5.05E-27	.00E+00	.00E+00	.00E+00
cf255	1.02E-09	1.56E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
es253	2.70E-05	2.72E-05	4.96E-06	3.21E-07	8.76E-10	4.25E-15	3.19E-31	.00E+00	.00E+00	.00E+00	.00E+00
es254	9.76E-08	9.73E-08	7.78E-08	6.17E-08	3.90E-08	1.56E-08	9.89E-10	1.00E-11	1.02E-13	1.03E-15	1.04E-17
es255	7.63E-10	7.51E-10	1.54E-10	2.98E-11	1.16E-12	1.76E-15	6.12E-24	.00E+00	.00E+00	.00E+00	.00E+00
total	5.36E+06	2.13E+06	4.91E+04	4.49E+04	3.98E+04	3.54E+04	3.04E+04	2.45E+04	1.98E+04	1.61E+04	1.32E+04

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BWR SNF Assembly - Fuel - decay fission products page 14

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.48E-02	1.48E-02	1.46E-02	1.44E-02	1.40E-02	1.32E-02	1.12E-02	8.42E-03	6.36E-03	4.80E-03	3.62E-03
li 6	4.57E-05	4.57E-05	4.57E-05	4.57E-05	4.57E-05	4.57E-05	4.57E-05	4.57E-05	4.57E-05	4.57E-05	4.57E-05
li 7	3.39E-06	3.39E-06	3.39E-06	3.39E-06	3.39E-06	3.39E-06	3.39E-06	3.39E-06	3.39E-06	3.39E-06	3.39E-06
be 9	6.52E-06	6.52E-06	6.52E-06	6.52E-06	6.52E-06	6.52E-06	6.52E-06	6.52E-06	6.52E-06	6.52E-06	6.52E-06
be 10	4.35E-05	4.35E-05	4.35E-05	4.35E-05	4.35E-05	4.35E-05	4.35E-05	4.35E-05	4.35E-05	4.35E-05	4.35E-05
c 14	8.80E-06	8.80E-06	8.80E-06	8.80E-06	8.80E-06	8.80E-06	8.79E-06	8.79E-06	8.78E-06	8.78E-06	8.77E-06
ni 66	3.66E-10	2.70E-10	4.54E-22	2.63E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	5.72E-13	4.20E-13	7.07E-25	4.09E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 66	2.14E-07	2.14E-07	2.15E-07	2.15E-07	2.15E-07	2.15E-07	2.15E-07	2.15E-07	2.15E-07	2.15E-07	2.15E-07
cu 67	4.82E-11	3.68E-11	1.47E-21	2.29E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 67	2.78E-08	2.78E-08	2.79E-08	2.79E-08	2.79E-08	2.79E-08	2.79E-08	2.79E-08	2.79E-08	2.79E-08	2.79E-08
zn 68	2.55E-09	2.55E-09	2.55E-09	2.55E-09	2.55E-09	2.55E-09	2.55E-09	2.55E-09	2.55E-09	2.55E-09	2.55E-09
zn 69	3.03E-12	7.87E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	3.60E-11	1.08E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 69	9.43E-08	9.43E-08	9.43E-08	9.43E-08	9.43E-08	9.43E-08	9.43E-08	9.43E-08	9.43E-08	9.43E-08	9.43E-08
zn 70	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06	2.52E-06
ge 70	3.48E-09	3.48E-09	3.48E-09	3.48E-09	3.48E-09	3.48E-09	3.48E-09	3.48E-09	3.48E-09	3.48E-09	3.48E-09
zn 71m	2.60E-09	3.90E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 71	2.46E-05	2.46E-05	2.46E-05	2.46E-05	2.46E-05	2.46E-05	2.46E-05	2.46E-05	2.46E-05	2.46E-05	2.46E-05
ge 71	5.32E-13	5.01E-13	2.27E-15	8.35E-18	1.29E-22	3.13E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 72	2.13E-06	1.49E-06	2.22E-20	9.42E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	6.49E-07	5.63E-07	9.65E-21	4.10E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 72	1.57E-03	1.57E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03	1.58E-03
ga 73	6.09E-07	1.99E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03	4.68E-03
ge 73m	1.71E-11	5.60E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 74	4.29E-03	4.29E-03	4.29E-03	4.29E-03	4.29E-03	4.29E-03	4.29E-03	4.29E-03	4.29E-03	4.29E-03	4.29E-03
ge 75	1.14E-06	6.80E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 75	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02	3.77E-02
ge 76	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
as 76	2.65E-06	1.41E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 76	1.69E-03	1.69E-03	1.69E-03	1.69E-03	1.69E-03	1.69E-03	1.69E-03	1.69E-03	1.69E-03	1.69E-03	1.69E-03
ge 77	2.05E-05	4.71E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.16E-04	1.53E-04	4.42E-21	2.73E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 77	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01	2.57E-01
se 77m	1.03E-10	6.11E-11	1.76E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	2.77E-05	3.28E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	2.89E-05	4.91E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 78	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01	8.60E-01
se 79	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00	1.62E+00
br 79	1.13E-04	1.13E-04	1.22E-04	1.30E-04	1.47E-04	1.82E-04	2.84E-04	4.54E-04	6.24E-04	7.95E-04	9.65E-04
kr 79	9.13E-14	5.68E-14	2.50E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 80	4.53E+00	4.53E+00	4.53E+00	4.53E+00	4.53E+00	4.53E+00	4.53E+00	4.53E+00	4.53E+00	4.53E+00	4.53E+00
br 80	3.99E-10	4.96E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80m	2.99E-09	6.94E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 80	2.41E-05	2.41E-05	2.41E-05	2.41E-05	2.41E-05	2.41E-05	2.41E-05	2.41E-05	2.41E-05	2.41E-05	2.41E-05
se 81	4.34E-05	1.26E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

se 81m	9.85E-06	2.65E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 81	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00	6.60E+00
kr 81	1.99E-06	1.99E-06	1.99E-06	1.99E-06	1.99E-06	1.99E-06	1.99E-06	1.99E-06	1.99E-06	1.99E-06	1.99E-06
se 82	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01	1.10E+01
br 82	5.64E-04	3.53E-04	2.16E-22	2.55E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 15

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
kr 82	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01	2.82E-01
br 83	8.04E-04	8.58E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83	1.24E+01	1.24E+01	1.24E+01	1.24E+01	1.24E+01	1.24E+01	1.24E+01	1.24E+01	1.24E+01	1.24E+01	1.24E+01
kr 83m	6.13E-04	2.82E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 84	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01	4.05E+01
kr 85	6.79E+00	6.79E+00	6.68E+00	6.57E+00	6.36E+00	5.96E+00	4.91E+00	3.56E+00	2.57E+00	1.86E+00	1.35E+00
kr 85m	3.11E-03	7.68E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 85	3.27E+01	3.27E+01	3.28E+01	3.30E+01	3.32E+01	3.36E+01	3.46E+01	3.60E+01	3.70E+01	3.77E+01	3.82E+01
kr 86	6.33E+01	6.33E+01	6.33E+01	6.33E+01	6.33E+01	6.33E+01	6.33E+01	6.33E+01	6.33E+01	6.33E+01	6.33E+01
rb 86	4.46E-03	4.29E-03	1.57E-04	5.02E-06	5.60E-09	7.05E-15	1.40E-32	.00E+00	.00E+00	.00E+00	.00E+00
sr 86	1.81E-01	1.81E-01	1.85E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01	1.86E-01
kr 87	1.80E-03	3.79E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	8.25E+01	8.25E+01	8.25E+01	8.25E+01	8.25E+01	8.25E+01	8.25E+01	8.25E+01	8.25E+01	8.25E+01	8.25E+01
sr 87	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03
sr 87m	2.22E-07	5.97E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	5.58E-03	1.59E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	5.99E-04	1.86E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 88	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02	1.18E+02
sr 89	3.31E+00	3.27E+00	9.64E-01	2.71E-01	2.21E-02	1.48E-04	4.42E-11	5.91E-22	7.89E-33	1.25E-43	.00E+00
y 89	1.55E+02	1.55E+02	1.57E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02	1.58E+02
y 89m	1.14E-09	1.12E-09	3.30E-10	9.27E-11	7.57E-12	5.06E-14	1.51E-20	2.02E-31	2.87E-42	.00E+00	.00E+00
sr 90	1.76E+02	1.76E+02	1.75E+02	1.74E+02	1.72E+02	1.68E+02	1.56E+02	1.38E+02	1.22E+02	1.08E+02	9.53E+01
y 90	4.72E-02	4.69E-02	4.55E-02	4.53E-02	4.47E-02	4.36E-02	4.05E-02	3.58E-02	3.17E-02	2.80E-02	2.48E-02
y 90m	6.67E-08	3.62E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	1.74E+01	1.75E+01	1.85E+01	1.96E+01	2.17E+01	2.59E+01	3.79E+01	5.59E+01	7.19E+01	8.60E+01	9.85E+01
sr 91	3.45E-02	6.02E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	5.21E+00	5.18E+00	1.81E+00	6.04E-01	6.93E-02	9.15E-04	2.11E-09	8.46E-19	3.39E-28	1.36E-37	.00E+00
y 91m	1.74E-03	3.33E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 91	1.99E+02	1.99E+02	2.02E+02	2.03E+02	2.04E+02	2.04E+02	2.04E+02	2.04E+02	2.04E+02	2.04E+02	2.04E+02
nb 91	3.26E-10	3.26E-10	3.26E-10	3.26E-10	3.26E-10	3.25E-10	3.24E-10	3.23E-10	3.21E-10	3.20E-10	3.18E-10
sr 92	1.08E-02	2.33E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.42E-02	4.48E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 92	2.18E+02	2.18E+02	2.18E+02	2.18E+02	2.18E+02	2.18E+02	2.18E+02	2.18E+02	2.18E+02	2.18E+02	2.18E+02
nb 92	4.02E-08	4.02E-08	4.02E-08	4.02E-08	4.02E-08	4.02E-08	4.02E-08	4.02E-08	4.02E-08	4.02E-08	4.02E-08
y 93	3.18E-02	6.20E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02	1.57E+02
nb 93	2.83E-05	2.84E-05	3.10E-05	3.38E-05	3.99E-05	5.40E-05	1.10E-04	2.45E-04	4.23E-04	6.35E-04	8.75E-04
nb 93m	2.40E-04	2.40E-04	2.55E-04	2.70E-04	2.99E-04	3.56E-04	5.14E-04	7.35E-04	9.13E-04	1.06E-03	1.17E-03
zr 94	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02
nb 94	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04
zr 95	8.67E+00	8.57E+00	3.27E+00	1.20E+00	1.66E-01	3.18E-03	2.24E-08	5.79E-17	1.49E-25	3.86E-34	9.32E-43
nb 95	4.76E+00	4.76E+00	2.98E+00	1.29E+00	1.96E-01	3.95E-03	2.70E-08	6.96E-17	1.80E-25	4.64E-34	.00E+00
nb 95m	5.63E-03	5.59E-03	2.17E-03	7.97E-04	1.10E-04	2.11E-06	1.49E-11	3.84E-20	9.91E-29	2.54E-37	.00E+00
mo 95	2.34E+02	2.34E+02	2.41E+02	2.45E+02	2.47E+02	2.48E+02	2.48E+02	2.48E+02	2.48E+02	2.48E+02	2.48E+02
zr 96	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02	2.69E+02
nb 96	2.11E-04	1.04E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 96	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01	2.07E+01
zr 97	9.58E-02	3.58E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	6.87E-03	2.56E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	8.97E-05	3.35E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

mo 97	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02	2.53E+02
nb 98m	4.40E-05	1.56E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 16

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 98	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02	2.76E+02
tc 98	3.60E-03	3.60E-03	3.60E-03	3.60E-03	3.60E-03	3.60E-03	3.60E-03	3.60E-03	3.60E-03	3.60E-03	3.60E-03
mo 99	4.49E-01	3.49E-01	6.19E-11	4.55E-21	4.33E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	2.45E+02	2.45E+02	2.46E+02	2.46E+02	2.46E+02	2.46E+02	2.46E+02	2.46E+02	2.46E+02	2.46E+02	2.46E+02
tc 99m	3.60E-02	3.06E-02	5.47E-12	4.01E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru 99	1.16E-02	1.16E-02	1.18E-02	1.20E-02	1.24E-02	1.32E-02	1.56E-02	1.97E-02	2.37E-02	2.78E-02	3.18E-02
mo100	3.10E+02	3.10E+02	3.10E+02	3.10E+02	3.10E+02	3.10E+02	3.10E+02	3.10E+02	3.10E+02	3.10E+02	3.10E+02
ru100	4.91E+01	4.91E+01	4.91E+01	4.91E+01	4.91E+01	4.91E+01	4.91E+01	4.91E+01	4.91E+01	4.91E+01	4.91E+01
ru101	2.50E+02	2.50E+02	2.50E+02	2.50E+02	2.50E+02	2.50E+02	2.50E+02	2.50E+02	2.50E+02	2.50E+02	2.50E+02
ru102	2.59E+02	2.59E+02	2.59E+02	2.59E+02	2.59E+02	2.59E+02	2.59E+02	2.59E+02	2.59E+02	2.59E+02	2.59E+02
rh102	4.23E-04	4.23E-04	3.99E-04	3.75E-04	3.33E-04	2.62E-04	1.28E-04	3.88E-05	1.17E-05	3.55E-06	1.08E-06
ru103	6.05E+00	5.94E+00	1.23E+00	2.41E-01	9.57E-03	1.51E-05	6.00E-14	5.96E-28	5.92E-42	.00E+00	.00E+00
rh103	1.20E+02	1.20E+02	1.25E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02
rh103m	5.99E-03	5.89E-03	1.22E-03	2.39E-04	9.48E-06	1.50E-08	5.95E-17	5.90E-31	.00E+00	.00E+00	.00E+00
ru104	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02	1.72E+02
pd104	9.74E+01	9.74E+01	9.74E+01	9.74E+01	9.74E+01	9.74E+01	9.74E+01	9.74E+01	9.74E+01	9.74E+01	9.74E+01
ru105	2.11E-02	5.12E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.62E-01	1.16E-01	7.63E-20	9.63E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	1.68E-05	4.10E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd105	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02	1.25E+02
ru106	2.87E+01	2.86E+01	2.42E+01	2.04E+01	1.45E+01	7.34E+00	9.51E-01	3.15E-02	1.05E-03	3.47E-05	1.15E-06
rh106	2.76E-05	2.66E-05	2.25E-05	1.89E-05	1.35E-05	6.81E-06	8.83E-07	2.93E-08	9.71E-10	3.22E-11	1.07E-12
rh106m	1.17E-04	5.40E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd106	8.17E+01	8.18E+01	8.61E+01	9.00E+01	9.59E+01	1.03E+02	1.09E+02	1.10E+02	1.10E+02	1.10E+02	1.10E+02
pd107	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01	6.87E+01
ag107	1.78E-05	1.78E-05	1.96E-05	2.15E-05	2.51E-05	3.25E-05	5.44E-05	9.11E-05	1.28E-04	1.64E-04	2.01E-04
pd108	4.46E+01	4.46E+01	4.46E+01	4.46E+01	4.46E+01	4.46E+01	4.46E+01	4.46E+01	4.46E+01	4.46E+01	4.46E+01
ag108	3.32E-10	3.67E-13	3.67E-13	3.66E-13	3.65E-13	3.63E-13	3.58E-13	3.48E-13	3.39E-13	3.29E-13	3.21E-13
ag108m	1.19E-04	1.19E-04	1.19E-04	1.19E-04	1.18E-04	1.18E-04	1.16E-04	1.13E-04	1.10E-04	1.07E-04	1.04E-04
cd108	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1.20E-04	1.21E-04	1.21E-04	1.21E-04	1.21E-04	1.21E-04	1.22E-04
pd109	2.59E-02	7.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01	2.41E+01
ag109m	2.08E-05	6.19E-06	1.18E-13	1.03E-13	7.82E-14	4.52E-14	8.76E-15	5.68E-16	3.68E-17	2.38E-18	1.54E-19
cd109	1.36E-07	1.36E-07	1.19E-07	1.04E-07	7.89E-08	4.56E-08	8.84E-09	5.73E-10	3.71E-11	2.41E-12	1.56E-13
pd110	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01
ag110	7.64E-06	3.14E-09	2.45E-09	1.90E-09	1.14E-09	4.15E-10	1.98E-11	1.25E-13	7.86E-16	4.94E-18	3.11E-20
ag110m	2.03E-01	2.03E-01	1.58E-01	1.22E-01	7.38E-02	2.68E-02	1.28E-03	8.05E-06	5.07E-08	3.19E-10	2.01E-12
cd110	1.64E+01	1.64E+01	1.65E+01	1.65E+01	1.66E+01	1.66E+01	1.66E+01	1.66E+01	1.66E+01	1.66E+01	1.66E+01
pd111	1.15E-04	1.80E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	6.65E-05	3.23E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	5.29E-02	4.84E-02	1.23E-05	2.24E-09	9.26E-17	1.62E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	5.31E-06	1.03E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111	7.14E+00	7.14E+00	7.19E+00	7.19E+00	7.19E+00	7.19E+00	7.19E+00	7.19E+00	7.19E+00	7.19E+00	7.19E+00
cd111m	1.02E-06	1.23E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd112	2.78E-03	1.26E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	4.16E-04	2.21E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd112	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00	3.75E+00
ag113	3.97E-04	1.80E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	2.11E-02	2.14E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02
cd113m	4.17E-02	4.17E-02	4.12E-02	4.07E-02	3.97E-02	3.78E-02	3.26E-02	2.55E-02	1.99E-02	1.56E-02	1.22E-02
in113	4.98E-03	4.98E-03	5.48E-03	5.99E-03	6.97E-03	8.87E-03	1.40E-02	2.11E-02	2.67E-02	3.10E-02	3.44E-02
cd114	3.83E+00	3.83E+00	3.83E+00	3.83E+00	3.83E+00	3.83E+00	3.83E+00	3.83E+00	3.83E+00	3.83E+00	3.83E+00

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BWR SNF Assembly - Fuel - decay fission products page 17

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
in114	8.09E-10	5.62E-10	1.62E-10	4.43E-11	3.43E-12	2.06E-14	4.50E-21	3.55E-32	.00E+00	.00E+00	.00E+00
in114m	3.55E-05	3.50E-05	1.01E-05	2.75E-06	2.13E-07	1.28E-09	2.80E-16	2.21E-27	1.74E-38	.00E+00	.00E+00
sn114	4.31E-04	4.32E-04	4.56E-04	4.63E-04	4.65E-04	4.65E-04	4.65E-04	4.65E-04	4.65E-04	4.65E-04	4.65E-04
cd115	2.11E-03	1.55E-03	1.46E-15	4.65E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	2.06E-03	2.03E-03	5.08E-04	1.21E-04	7.05E-06	2.41E-08	9.68E-16	4.55E-28	2.14E-40	.00E+00	.00E+00
in115	2.92E-01	2.93E-01	2.96E-01	2.96E-01	2.97E-01	2.97E-01	2.97E-01	2.97E-01	2.97E-01	2.97E-01	2.97E-01
in115m	1.77E-04	1.41E-04	2.35E-10	5.59E-11	3.26E-12	1.12E-14	4.48E-22	2.11E-34	.00E+00	.00E+00	.00E+00
sn115	5.57E-02	5.57E-02	5.58E-02	5.58E-02	5.58E-02	5.58E-02	5.58E-02	5.58E-02	5.58E-02	5.58E-02	5.58E-02
cd116	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00	1.57E+00
in116m	2.76E-05	2.73E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn116	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01	8.96E-01
cd117	9.52E-05	1.20E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.94E-05	2.09E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.08E-05	1.35E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	6.78E-05	4.04E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00
sn117m	1.72E-04	1.64E-04	1.76E-06	1.58E-08	1.42E-12	1.17E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	2.95E-05	7.12E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00	1.18E+00
sn119	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.24E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00
sn119m	2.80E-03	2.79E-03	2.26E-03	1.82E-03	1.18E-03	4.97E-04	3.72E-05	4.96E-07	6.59E-09	8.77E-11	1.17E-12
sn120	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00	1.22E+00
sn121	1.03E-03	5.60E-04	5.66E-07	5.64E-07	5.60E-07	5.53E-07	5.33E-07	5.00E-07	4.70E-07	4.41E-07	4.14E-07
sn121m	1.30E-02	1.30E-02	1.30E-02	1.29E-02	1.29E-02	1.27E-02	1.22E-02	1.15E-02	1.08E-02	1.01E-02	9.51E-03
sb121	1.16E+00	1.16E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00	1.17E+00
sn122	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00	1.58E+00
sb122	5.27E-04	4.08E-04	4.88E-14	2.38E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.27E-01	1.27E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01	1.28E-01
sn123	9.34E-03	9.29E-03	5.76E-03	3.51E-03	1.32E-03	1.85E-04	5.18E-07	2.87E-11	1.59E-15	8.83E-20	4.89E-24
sb123	1.40E+00	1.40E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00	1.41E+00
te123	1.17E-03	1.18E-03	1.30E-03	1.37E-03	1.44E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03	1.47E-03
te123m	2.98E-04	2.96E-04	1.77E-04	1.03E-04	3.59E-05	4.33E-06	7.58E-09	1.93E-13	4.93E-18	1.26E-22	3.20E-27
sn124	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00	2.64E+00
sb124	9.11E-03	9.00E-03	3.23E-03	1.11E-03	1.36E-04	2.02E-06	6.71E-12	4.94E-21	3.64E-30	2.68E-39	.00E+00
te124	1.03E-01	1.04E-01	1.09E-01	1.11E-01	1.12E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01	1.13E-01
sn125	5.68E-03	5.29E-03	8.80E-06	1.14E-08	2.23E-14	8.78E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb125	1.66E+00	1.66E+00	1.56E+00	1.47E+00	1.29E+00	1.00E+00	4.68E-01	1.31E-01	3.69E-02	1.04E-02	2.92E-03
te125	1.54E+00	1.55E+00	1.65E+00	1.74E+00	1.92E+00	2.21E+00	2.76E+00	3.10E+00	3.19E+00	3.22E+00	3.23E+00
te125m	2.17E-02	2.17E-02	2.16E-02	2.06E-02	1.83E-02	1.42E-02	6.65E-03	1.87E-03	5.25E-04	1.47E-04	4.14E-05
sn126	6.01E+00	6.01E+00	6.01E+00	6.01E+00	6.01E+00	6.01E+00	6.01E+00	6.01E+00	6.01E+00	6.01E+00	6.01E+00
sb126	6.17E-04	5.83E-04	4.31E-06	3.08E-07	2.86E-07	2.86E-07	2.86E-07	2.86E-07	2.86E-07	2.86E-07	2.86E-07
sb126m	7.77E-07	2.17E-09	2.17E-09	2.17E-09	2.17E-09	2.17E-09	2.17E-09	2.17E-09	2.17E-09	2.17E-09	2.17E-09
te126	1.25E-01	1.25E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.27E-01
xe126	7.23E-09	7.23E-09	7.23E-09	7.23E-09	7.23E-09	7.23E-09	7.23E-09	7.23E-09	7.23E-09	7.23E-09	7.23E-09
sn127	3.67E-04	1.33E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	4.01E-02	3.38E-02	3.71E-09	2.17E-16	1.11E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te127	4.03E-03	3.75E-03	3.96E-04	2.20E-04	6.87E-05	6.74E-06	6.35E-09	5.74E-14	5.19E-19	4.70E-24	4.25E-29
te127m	1.93E-01	1.93E-01	1.13E-01	6.28E-02	1.96E-02	1.92E-03	1.81E-06	1.64E-11	1.48E-16	1.34E-21	1.21E-26
i127	1.27E+01	1.28E+01	1.29E+01	1.29E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01
xe127	6.08E-07	5.96E-07	1.09E-07	1.88E-08	5.79E-10	5.53E-13	4.79E-22	3.78E-37	.00E+00	.00E+00	.00E+00
sn128	6.69E-04	3.10E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	6.65E-04	1.10E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 18

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sb128m	1.25E-04	6.61E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te128	2.91E+01	2.91E+01	2.91E+01	2.91E+01	2.91E+01	2.91E+01	2.91E+01	2.91E+01	2.91E+01	2.91E+01	2.91E+01
xe128	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00	1.16E+00
sb129	6.90E-03	1.59E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	1.73E-03	2.68E-04	3.53E-05	5.24E-06	1.21E-07	6.45E-11	9.83E-21	4.28E-37	.00E+00	.00E+00	.00E+00
te129m	2.44E-01	2.40E-01	3.83E-02	5.69E-03	1.31E-04	7.00E-08	1.07E-17	4.63E-34	.00E+00	.00E+00	.00E+00
i129	5.73E+01	5.73E+01	5.75E+01	5.76E+01	5.76E+01	5.76E+01	5.76E+01	5.76E+01	5.76E+01	5.76E+01	5.76E+01
xe129	8.32E-03	8.32E-03	8.41E-03	8.41E-03	8.41E-03	8.41E-03	8.42E-03	8.43E-03	8.44E-03	8.46E-03	8.47E-03
xe129m	9.04E-05	8.36E-05	8.10E-08	5.98E-11	3.87E-17	1.66E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	3.45E-04	3.67E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te130	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02
i130	2.24E-03	5.86E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	3.32E+00	3.32E+00	3.32E+00	3.32E+00	3.32E+00	3.32E+00	3.32E+00	3.32E+00	3.32E+00	3.32E+00	3.32E+00
te131	1.69E-03	5.39E-05	1.99E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	2.99E-02	1.73E-02	6.36E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	9.34E-01	8.72E-01	4.15E-04	1.43E-07	2.06E-14	4.35E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131	1.25E+02	1.25E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02
xe131m	1.58E-02	1.57E-02	2.41E-04	1.16E-06	2.77E-11	1.59E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	5.46E-01	4.42E-01	2.64E-09	7.51E-18	9.78E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.63E-02	1.33E-02	7.95E-11	2.26E-19	2.94E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	3.71E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02	3.72E+02
cs132	5.79E-05	5.20E-05	3.81E-09	1.92E-13	6.20E-22	6.64E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba132	1.29E-04	1.29E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04	1.30E-04
te133	1.12E-03	3.12E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	4.07E-03	6.13E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.08E-01	9.61E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	1.97E-06	1.70E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.23E+00	1.19E+00	1.04E-05	5.07E-11	1.63E-21	1.68E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	1.68E-02	1.51E-02	1.15E-14	2.21E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs133	3.57E+02	3.57E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02	3.58E+02
ba133	2.90E-08	2.90E-08	2.86E-08	2.81E-08	2.72E-08	2.55E-08	2.09E-08	1.50E-08	1.08E-08	7.78E-09	5.59E-09
te134	6.01E-03	2.56E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	9.72E-03	2.23E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe134	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02	5.03E+02
cs134	3.89E+01	3.88E+01	3.58E+01	3.29E+01	2.78E+01	1.98E+01	7.24E+00	1.35E+00	2.51E-01	4.68E-02	8.71E-03
cs134m	9.52E-04	3.14E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba134	3.35E+01	3.36E+01	3.66E+01	3.95E+01	4.46E+01	5.25E+01	6.52E+01	7.10E+01	7.21E+01	7.23E+01	7.24E+01
i135	6.40E-02	5.09E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	3.37E-02	2.43E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.55E-04	3.22E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02
cs135m	2.96E-04	1.96E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.70E-01	3.71E-01	3.71E-01	3.71E-01	3.71E-01
ba135m	1.73E-04	9.70E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe136	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02	6.81E+02
cs136	1.89E-01	1.80E-01	1.65E-03	1.27E-05	8.36E-10	3.69E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136	1.15E+01	1.15E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01	1.17E+01
ba136m	5.75E-09	5.46E-09	5.02E-11	3.85E-13	2.54E-17	1.12E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	3.94E+02	3.94E+02	3.92E+02	3.89E+02	3.85E+02	3.76E+02	3.51E+02	3.13E+02	2.79E+02	2.48E+02	2.21E+02
ba137	3.24E+01	3.24E+01	3.46E+01	3.69E+01	4.14E+01	5.02E+01	7.54E+01	1.14E+02	1.48E+02	1.78E+02	2.05E+02
ba137m	6.03E-05	6.02E-05	5.98E-05	5.95E-05	5.88E-05	5.74E-05	5.36E-05	4.77E-05	4.25E-05	3.79E-05	3.38E-05
ba138	4.30E+02	4.30E+02	4.30E+02	4.30E+02	4.30E+02	4.30E+02	4.30E+02	4.30E+02	4.30E+02	4.30E+02	4.30E+02

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BWR SNF Assembly - Fuel - decay fission products page 19

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la138	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03	2.60E-03
ba139	1.29E-02	1.09E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

la139	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02	4.03E+02
ce139	3.28E-06	3.27E-06	2.09E-06	1.31E-06	5.22E-07	8.29E-08	3.32E-10	3.36E-14	3.40E-18	3.44E-22	3.48E-26
pr139	3.50E-10	8.05E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	2.82E+00	2.67E+00	2.12E-02	1.39E-04	6.75E-09	1.62E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	3.93E-01	3.82E-01	3.21E-03	2.10E-05	1.02E-09	2.45E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce140	4.32E+02	4.32E+02	4.35E+02	4.35E+02	4.35E+02	4.35E+02	4.35E+02	4.35E+02	4.35E+02	4.35E+02	4.35E+02
la141	3.30E-02	5.13E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	6.61E+00	6.51E+00	9.75E-01	1.36E-01	2.75E-03	1.14E-06	8.07E-17	9.80E-34	.00E+00	.00E+00	.00E+00
pr141	3.64E+02	3.64E+02	3.70E+02	3.70E+02	3.71E+02	3.71E+02	3.71E+02	3.71E+02	3.71E+02	3.71E+02	3.71E+02
nd141	6.87E-10	8.59E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.25E-02	2.46E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	3.79E+02	3.79E+02	3.79E+02	3.79E+02	3.79E+02	3.79E+02	3.79E+02	3.79E+02	3.79E+02	3.79E+02	3.79E+02
pr142	1.10E-02	4.61E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd142	9.87E+00	9.88E+00	9.88E+00	9.88E+00	9.88E+00	9.88E+00	9.88E+00	9.88E+00	9.88E+00	9.88E+00	9.88E+00
ce143	2.59E-01	1.58E-01	5.16E-21	2.91E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	2.49E+00	2.46E+00	2.79E-02	2.47E-04	2.18E-08	1.71E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd143	2.38E+02	2.38E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02
ce144	5.04E+01	5.03E+01	4.05E+01	3.24E+01	2.07E+01	8.53E+00	5.94E-01	6.99E-03	8.22E-05	9.68E-07	1.14E-08
pr144	2.13E-03	2.12E-03	1.71E-03	1.36E-03	8.74E-04	3.59E-04	2.50E-05	2.94E-07	3.46E-09	4.08E-11	4.80E-13
pr144m	1.24E-05	1.24E-05	9.96E-06	7.95E-06	5.10E-06	2.10E-06	1.46E-07	1.72E-09	2.02E-11	2.38E-13	2.80E-15
nd144	4.21E+02	4.21E+02	4.31E+02	4.39E+02	4.51E+02	4.63E+02	4.71E+02	4.71E+02	4.71E+02	4.71E+02	4.71E+02
pr145	3.26E-02	2.04E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd145	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02
pm145	3.75E-04	3.75E-04	4.06E-04	4.33E-04	4.69E-04	5.03E-04	4.87E-04	4.04E-04	3.33E-04	2.73E-04	2.25E-04
sm145	2.12E-04	2.12E-04	1.76E-04	1.46E-04	1.01E-04	4.78E-05	5.12E-06	1.24E-07	2.99E-09	7.23E-11	1.75E-12
nd146	2.41E+02	2.41E+02	2.41E+02	2.41E+02	2.41E+02	2.41E+02	2.41E+02	2.41E+02	2.41E+02	2.41E+02	2.41E+02
pm146	2.83E-03	2.83E-03	2.75E-03	2.66E-03	2.50E-03	2.21E-03	1.51E-03	8.09E-04	4.32E-04	2.31E-04	1.23E-04
sm146	6.94E-03	6.95E-03	6.97E-03	7.00E-03	7.06E-03	7.16E-03	7.39E-03	7.63E-03	7.76E-03	7.83E-03	7.86E-03
nd147	9.56E-01	8.98E-01	3.26E-03	9.50E-06	9.28E-11	8.99E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	3.40E+01	3.41E+01	3.28E+01	3.07E+01	2.69E+01	2.06E+01	9.34E+00	2.49E+00	6.65E-01	1.77E-01	4.73E-02
sm147	3.52E+01	3.52E+01	3.74E+01	3.95E+01	4.33E+01	4.96E+01	6.08E+01	6.77E+01	6.95E+01	7.00E+01	7.01E+01
nd148	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02	1.20E+02
pm148	1.41E-01	1.24E-01	3.54E-04	7.46E-05	3.47E-06	7.55E-09	7.77E-17	3.78E-30	.00E+00	.00E+00	.00E+00
pm148m	2.32E-01	2.28E-01	5.12E-02	1.08E-02	5.05E-04	1.10E-06	1.13E-14	5.50E-28	2.68E-41	.00E+00	.00E+00
sm148	5.73E+01	5.73E+01	5.76E+01	5.76E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01	5.77E+01
nd149	3.80E-03	2.51E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	1.77E-01	1.32E-01	1.02E-13	2.63E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	5.08E-01	5.57E-01	6.89E-01	6.89E-01	6.89E-01	6.89E-01	6.89E-01	6.89E-01	6.89E-01	6.89E-01	6.89E-01
eu149	2.47E-11	2.45E-11	1.26E-11	6.33E-12	1.62E-12	1.07E-13	3.05E-17	3.77E-23	4.66E-29	5.76E-35	7.12E-41
nd150	5.78E+01	5.78E+01	5.78E+01	5.78E+01	5.78E+01	5.78E+01	5.78E+01	5.78E+01	5.78E+01	5.78E+01	5.78E+01
pm150	6.47E-05	1.30E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm150	9.47E+01	9.47E+01	9.47E+01	9.47E+01	9.47E+01	9.47E+01	9.47E+01	9.47E+01	9.47E+01	9.47E+01	9.47E+01
eu150	3.16E-07	3.16E-07	3.15E-07	3.13E-07	3.10E-07	3.04E-07	2.87E-07	2.61E-07	2.36E-07	2.15E-07	1.95E-07
pm151	3.39E-02	1.90E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	4.11E+00	4.13E+00	4.14E+00	4.13E+00	4.11E+00	4.08E+00	3.99E+00	3.84E+00	3.69E+00	3.55E+00	3.42E+00
eu151	6.93E-03	7.01E-03	1.48E-02	2.29E-02	3.87E-02	7.03E-02	1.64E-01	3.14E-01	4.59E-01	5.99E-01	7.33E-01
sm152	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01	3.73E+01
eu152	1.61E-02	1.61E-02	1.59E-02	1.57E-02	1.53E-02	1.45E-02	1.24E-02	9.55E-03	7.37E-03	5.68E-03	4.38E-03
eu152m	1.77E-05	2.97E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	3.52E-02	3.52E-02	3.52E-02	3.53E-02	3.54E-02	3.56E-02	3.62E-02	3.70E-02	3.76E-02	3.81E-02	3.84E-02

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BWR SNF Assembly - Fuel - decay fission products page 20

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sm153	1.71E-01	1.20E-01	1.53E-15	5.53E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu153	3.49E+01	3.50E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01	3.51E+01
gd153	2.08E-03	2.08E-03	1.61E-03	1.23E-03	7.30E-04	2.56E-04	1.10E-05	5.84E-08	3.09E-10	1.64E-12	8.68E-15
sm154	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01
eu154	1.49E+01	1.49E+01	1.46E+01	1.43E+01	1.37E+01	1.27E+01	9.95E+00	6.65E+00	4.44E+00	2.97E+00	1.98E+00

gd154	2.55E+00	2.55E+00	2.84E+00	3.14E+00	3.70E+00	4.77E+00	7.49E+00	1.08E+01	1.30E+01	1.45E+01	1.55E+01
eu155	5.55E+00	5.55E+00	5.35E+00	5.16E+00	4.79E+00	4.13E+00	2.65E+00	1.26E+00	6.02E-01	2.87E-01	1.37E-01
gd155	7.53E-02	7.76E-02	2.74E-01	4.71E-01	8.40E-01	1.50E+00	2.98E+00	4.37E+00	5.03E+00	5.34E+00	5.49E+00
sm156	1.46E-03	2.49E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.32E-01	7.00E-01	1.21E-02	1.77E-04	4.21E-08	2.42E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd156	2.90E+01	2.91E+01	2.97E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01
eu157	2.50E-03	8.40E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd157	2.94E-02	3.11E-02	3.20E-02	3.20E-02	3.20E-02	3.20E-02	3.20E-02	3.20E-02	3.20E-02	3.20E-02	3.20E-02
eu158	4.57E-05	1.85E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd158	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00	5.79E+00
gd159	7.72E-04	3.19E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb159	6.87E-01	6.88E-01	6.88E-01	6.88E-01	6.88E-01	6.88E-01	6.88E-01	6.88E-01	6.88E-01	6.88E-01	6.88E-01
gd160	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01	3.18E-01
tb160	1.75E-02	1.73E-02	7.37E-03	3.04E-03	5.27E-04	1.59E-05	4.35E-10	1.08E-17	2.70E-25	6.73E-33	1.68E-40
dy160	7.96E-02	7.98E-02	8.97E-02	9.41E-02	9.66E-02	9.71E-02	9.71E-02	9.71E-02	9.71E-02	9.71E-02	9.71E-02
tb161	1.32E-03	1.19E-03	1.56E-07	1.44E-11	1.53E-19	1.78E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy161	1.05E-01	1.05E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01
tb162m	1.00E-07	5.78E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy162	8.15E-02	8.15E-02	8.15E-02	8.15E-02	8.15E-02	8.15E-02	8.15E-02	8.15E-02	8.15E-02	8.15E-02	8.15E-02
dy163	7.35E-02	7.35E-02	7.35E-02	7.35E-02	7.35E-02	7.35E-02	7.35E-02	7.35E-02	7.35E-02	7.35E-02	7.35E-02
dy164	2.04E-02	2.04E-02	2.04E-02	2.04E-02	2.04E-02	2.04E-02	2.04E-02	2.04E-02	2.04E-02	2.04E-02	2.04E-02
dy165	8.99E-06	7.26E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho165	3.48E-02	3.49E-02	3.49E-02	3.49E-02	3.49E-02	3.49E-02	3.49E-02	3.49E-02	3.49E-02	3.49E-02	3.49E-02
dy166	2.01E-06	1.64E-06	2.17E-14	1.41E-22	9.32E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	2.78E-05	1.52E-05	1.06E-14	6.87E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.42E-04	1.42E-04	1.41E-04	1.41E-04
er166	8.96E-03	8.97E-03	8.99E-03	8.99E-03	8.99E-03	8.99E-03	8.99E-03	8.99E-03	8.99E-03	8.99E-03	8.99E-03
er167	1.87E-04	1.87E-04	1.87E-04	1.87E-04	1.87E-04	1.87E-04	1.87E-04	1.87E-04	1.87E-04	1.87E-04	1.87E-04
er168	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04	3.13E-04
er169	8.46E-09	7.86E-09	1.11E-11	1.21E-14	1.70E-20	3.42E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm169	9.46E-07	9.47E-07	9.55E-07	9.55E-07	9.55E-07	9.55E-07	9.55E-07	9.55E-07	9.55E-07	9.55E-07	9.55E-07
er170	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06
tm170	6.82E-10	6.78E-10	4.20E-10	2.55E-10	9.52E-11	1.33E-11	3.62E-14	1.92E-18	1.02E-22	5.40E-27	2.86E-31
yb170	5.21E-09	5.21E-09	5.47E-09	5.64E-09	5.80E-09	5.88E-09	5.89E-09	5.89E-09	5.89E-09	5.89E-09	5.89E-09
er171	4.01E-10	4.39E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	6.44E-07	6.44E-07	5.90E-07	5.38E-07	4.49E-07	3.13E-07	1.06E-07	1.74E-08	2.87E-09	4.72E-10	7.77E-11
yb171	7.25E-07	7.26E-07	7.80E-07	8.32E-07	9.21E-07	1.06E-06	1.26E-06	1.35E-06	1.37E-06	1.37E-06	1.37E-06
er172	1.74E-09	1.24E-09	1.13E-22	3.15E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm172	2.35E-09	2.24E-09	6.04E-19	1.89E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
yb172	8.98E-07	8.99E-07	9.02E-07	9.02E-07	9.02E-07	9.02E-07	9.02E-07	9.02E-07	9.02E-07	9.02E-07	9.02E-07
total	1.13E+04	1.13E+04	1.13E+04	1.13E+04	1.13E+04	1.13E+04	1.13E+04	1.13E+04	1.13E+04	1.13E+04	1.13E+04

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BWR SNF Assembly - Fuel - decay fission products page 21

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.43E+02	1.43E+02	1.41E+02	1.39E+02	1.35E+02	1.28E+02	1.08E+02	8.14E+01	6.15E+01	4.64E+01	3.50E+01
be 10	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.73E-07	9.73E-07
c 14	3.92E-05	3.92E-05	3.92E-05	3.92E-05	3.92E-05	3.92E-05	3.92E-05	3.92E-05	3.92E-05	3.91E-05	3.91E-05
ni 66	3.18E-04	2.35E-04	3.95E-16	2.28E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	3.20E-04	2.35E-04	3.95E-16	2.29E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	3.65E-05	2.79E-05	1.11E-15	1.73E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69	1.47E-04	3.81E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.19E-04	3.55E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 71m	2.90E-02	4.35E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	8.56E-08	8.06E-08	3.66E-10	1.34E-12	2.08E-17	5.04E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 72	2.00E+00	1.40E+00	2.08E-14	8.82E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	2.00E+00	1.74E+00	2.98E-14	1.27E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 73	5.38E+00	1.76E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73m	5.31E+00	1.74E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ge 75	3.46E+01	2.06E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 76	4.16E+00	2.21E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 77	7.40E+01	1.70E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.26E+02	1.60E+02	4.63E-15	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 77m	8.64E-01	5.13E-01	1.48E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	7.58E+02	9.00E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	7.69E+02	1.31E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 79	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.22E-01	2.22E-01	2.22E-01	2.22E-01
kr 79	1.03E-07	6.43E-08	2.83E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80	5.31E-02	6.59E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80m	2.65E-02	6.15E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81	5.47E+03	1.59E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81m	4.00E+02	1.08E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 81	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08	4.12E-08
br 82	6.11E+02	3.82E+02	2.34E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 83	1.27E+04	1.35E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83m	1.27E+04	5.83E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 84	2.33E+04	6.03E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 85	2.66E+03	2.66E+03	2.62E+03	2.58E+03	2.50E+03	2.34E+03	1.93E+03	1.40E+03	1.01E+03	7.31E+02	5.29E+02
kr 85m	2.56E+04	6.32E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 86	3.63E+02	3.50E+02	1.28E+01	4.09E-01	4.57E-04	5.74E-10	1.14E-27	.00E+00	.00E+00	.00E+00	.00E+00
kr 87	5.09E+04	1.07E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	7.07E-06	7.07E-06	7.07E-06	7.07E-06	7.07E-06	7.07E-06	7.07E-06	7.07E-06	7.07E-06	7.07E-06	7.07E-06
sr 87m	2.84E+00	7.66E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	7.01E+04	2.00E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	7.20E+04	2.23E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	9.61E+04	9.48E+04	2.80E+04	7.87E+03	6.43E+02	4.30E+00	1.28E-06	1.71E-17	2.29E-28	.00E+00	.00E+00
y 89m	8.99E+00	8.82E+00	2.60E+00	7.32E-01	5.98E-02	4.00E-04	1.19E-10	1.59E-21	2.28E-32	.00E+00	.00E+00
sr 90	2.49E+04	2.49E+04	2.47E+04	2.46E+04	2.43E+04	2.37E+04	2.20E+04	1.95E+04	1.72E+04	1.52E+04	1.34E+04
y 90	2.56E+04	2.55E+04	2.47E+04	2.46E+04	2.43E+04	2.37E+04	2.20E+04	1.95E+04	1.72E+04	1.52E+04	1.35E+04
y 90m	7.28E-01	3.95E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 91	1.25E+05	2.18E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.28E+05	1.27E+05	4.43E+04	1.48E+04	1.70E+03	2.25E+01	5.17E-05	2.07E-14	8.33E-24	.00E+00	.00E+00
y 91m	7.24E+04	1.38E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.89E-09	1.89E-09	1.88E-09	1.88E-09	1.88E-09	1.88E-09	1.88E-09	1.87E-09	1.86E-09	1.85E-09	1.84E-09
sr 92	1.35E+05	2.93E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.36E+05	4.31E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	4.47E-12	4.47E-12	4.47E-12	4.47E-12	4.47E-12	4.47E-12	4.47E-12	4.47E-12	4.47E-12	4.47E-12	4.47E-12

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 93	1.06E+05	2.07E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01	3.95E-01
nb 93m	5.71E-02	5.72E-02	6.07E-02	6.43E-02	7.14E-02	8.50E-02	1.22E-01	1.75E-01	2.18E-01	2.52E-01	2.80E-01
nb 94	2.72E-05	2.72E-05	2.72E-05	2.72E-05	2.72E-05	2.72E-05	2.72E-05	2.72E-05	2.72E-05	2.72E-05	2.72E-05
zr 95	1.86E+05	1.84E+05	7.03E+04	2.58E+04	3.57E+03	6.84E+01	4.81E-04	1.24E-12	3.21E-21	8.28E-30	.00E+00
nb 95	1.87E+05	1.87E+05	1.17E+05	5.09E+04	7.70E+03	1.55E+02	1.06E-03	2.74E-12	7.07E-21	1.83E-29	.00E+00
nb 95m	2.14E+03	2.13E+03	8.27E+02	3.04E+02	4.20E+01	8.04E-01	5.66E-06	1.46E-14	3.78E-23	9.13E-32	.00E+00
nb 96	2.96E+02	1.45E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 97	1.83E+05	6.85E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.85E+05	6.88E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.74E+05	6.50E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 98m	1.65E+03	5.84E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06	3.13E-06
mo 99	2.16E+05	1.68E+05	2.97E-05	2.18E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	4.20E+00	4.20E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00	4.21E+00
tc 99m	1.90E+05	1.61E+05	2.88E-05	2.11E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh102	5.12E-01	5.11E-01	4.82E-01	4.54E-01	4.03E-01	3.17E-01	1.55E-01	4.69E-02	1.42E-02	4.29E-03	1.30E-03

ru103	1.95E+05	1.92E+05	3.99E+04	7.79E+03	3.09E+02	4.89E-01	1.94E-09	1.92E-23	.00E+00	.00E+00	.00E+00
rh103m	1.95E+05	1.92E+05	3.98E+04	7.77E+03	3.09E+02	4.88E-01	1.94E-09	1.92E-23	.00E+00	.00E+00	.00E+00
ru105	1.42E+05	3.44E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.37E+05	9.79E+04	6.44E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	4.02E+04	9.80E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	9.51E+04	9.49E+04	8.04E+04	6.76E+04	4.81E+04	2.43E+04	3.15E+03	1.05E+02	3.47E+00	1.15E-01	3.82E-03
rh106	9.86E+04	9.49E+04	8.04E+04	6.76E+04	4.81E+04	2.43E+04	3.15E+03	1.05E+02	3.47E+00	1.15E-01	3.82E-03
rh106m	1.59E+03	7.37E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh107	8.65E+04	1.12E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd107	3.53E-02	3.53E-02	3.53E-02	3.53E-02	3.53E-02	3.53E-02	3.53E-02	3.53E-02	3.53E-02	3.53E-02	3.53E-02
ag108	2.44E-01	2.70E-04	2.70E-04	2.69E-04	2.69E-04	2.67E-04	2.63E-04	2.56E-04	2.49E-04	2.42E-04	2.36E-04
ag108m	3.10E-03	3.10E-03	3.10E-03	3.10E-03	3.09E-03	3.07E-03	3.02E-03	2.94E-03	2.86E-03	2.78E-03	2.71E-03
pd109	5.44E+04	1.62E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109m	5.44E+04	1.62E+04	3.09E-04	2.69E-04	2.04E-04	1.18E-04	2.29E-05	1.48E-06	9.62E-08	6.23E-09	4.04E-10
cd109	3.53E-04	3.53E-04	3.09E-04	2.69E-04	2.04E-04	1.18E-04	2.29E-05	1.48E-06	9.62E-08	6.23E-09	4.04E-10
ag110	3.19E+04	1.31E+01	1.02E+01	7.92E+00	4.77E+00	1.73E+00	8.27E-02	5.21E-04	3.28E-06	2.06E-08	1.30E-10
ag110m	9.66E+02	9.64E+02	7.53E+02	5.82E+02	3.51E+02	1.27E+02	6.08E+00	3.83E-02	2.41E-04	1.52E-06	9.54E-09
pd111	8.33E+03	1.30E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	3.42E+02	1.66E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	8.35E+03	7.64E+03	1.94E+00	3.54E-04	1.46E-11	2.55E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	8.34E+03	1.62E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111m	3.57E+01	4.30E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd112	3.70E+03	1.68E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	3.71E+03	1.97E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag113	2.05E+03	9.31E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	7.17E-15	7.30E-15	7.30E-15	7.30E-15	7.30E-15	7.30E-15	7.31E-15	7.31E-15	7.31E-15	7.31E-15	7.32E-15
cd113m	9.36E+00	9.36E+00	9.25E+00	9.13E+00	8.91E+00	8.48E+00	7.32E+00	5.72E+00	4.48E+00	3.50E+00	2.74E+00
in113m	1.97E-06	8.65E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in114	1.11E+00	7.74E-01	2.23E-01	6.10E-02	4.72E-03	2.84E-05	6.19E-12	4.88E-23	.00E+00	.00E+00	.00E+00
in114m	8.20E-01	8.09E-01	2.33E-01	6.38E-02	4.94E-03	2.97E-05	6.47E-12	5.10E-23	.00E+00	.00E+00	.00E+00
cd115	1.07E+03	7.90E+02	7.46E-10	2.37E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	5.24E+01	5.16E+01	1.29E+01	3.07E+00	1.80E-01	6.15E-04	2.47E-11	1.16E-23	.00E+00	.00E+00	.00E+00
in115	2.06E-12	2.06E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12	2.09E-12
in115m	1.07E+03	8.60E+02	1.43E-03	3.40E-04	1.98E-05	6.79E-08	2.72E-15	1.28E-27	.00E+00	.00E+00	.00E+00
in116m	8.27E+02	8.17E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 23

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cd117	1.02E+03	1.29E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.35E+02	1.67E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	7.65E+02	4.94E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	9.36E+02	5.57E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117m	1.42E+01	1.35E+01	1.44E-01	1.29E-03	1.17E-07	9.59E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	9.35E+02	2.26E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in118	9.36E+02	2.26E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	1.05E+01	1.05E+01	8.47E+00	6.81E+00	4.42E+00	1.86E+00	1.40E-01	1.86E-03	2.47E-05	3.29E-07	4.37E-09
sn121	9.89E+02	5.36E+02	5.42E-01	5.40E-01	5.37E-01	5.30E-01	5.10E-01	4.79E-01	4.50E-01	4.22E-01	3.97E-01
sn121m	7.00E-01	7.00E-01	6.98E-01	6.96E-01	6.91E-01	6.83E-01	6.57E-01	6.17E-01	5.80E-01	5.44E-01	5.11E-01
sb122	2.09E+02	1.62E+02	1.93E-08	9.43E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn123	7.68E+01	7.64E+01	4.74E+01	2.89E+01	1.08E+01	1.52E+00	4.26E-03	2.36E-07	1.31E-11	7.26E-16	4.02E-20
sn123m	1.04E+03	1.61E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	2.75E-13	2.76E-13	3.04E-13	3.21E-13	3.37E-13	3.44E-13	3.45E-13	3.45E-13	3.45E-13	3.45E-13	3.45E-13
te123m	2.64E+00	2.63E+00	1.57E+00	9.18E-01	3.18E-01	3.84E-02	6.73E-05	1.72E-09	4.37E-14	1.11E-18	2.84E-23
sb124	1.59E+02	1.58E+02	5.65E+01	1.95E+01	2.38E+00	3.54E-02	1.17E-07	8.65E-17	6.37E-26	.00E+00	.00E+00
sn125	6.16E+02	5.73E+02	9.53E-01	1.23E-03	2.42E-09	9.51E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb125	1.74E+03	1.74E+03	1.64E+03	1.54E+03	1.35E+03	1.05E+03	4.90E+02	1.38E+02	3.87E+01	1.09E+01	3.06E+00
te125m	3.92E+02	3.92E+02	3.88E+02	3.71E+02	3.30E+02	2.56E+02	1.20E+02	3.36E+01	9.45E+00	2.66E+00	7.46E-01
sn126	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01

sb126	5.16E+01	4.88E+01	3.60E-01	2.58E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02	2.39E-02
sb126m	6.11E+01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01	1.71E-01
sn127	4.32E+03	1.57E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	1.07E+04	9.04E+03	9.92E-04	5.79E-11	2.97E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te127	1.06E+04	9.89E+03	1.04E+03	5.80E+02	1.81E+02	1.78E+01	1.68E-02	1.52E-07	1.37E-12	1.24E-17	1.12E-22
te127m	1.82E+03	1.82E+03	1.07E+03	5.92E+02	1.85E+02	1.82E+01	1.71E-02	1.55E-07	1.40E-12	1.27E-17	1.15E-22
xe127	1.72E-02	1.68E-02	3.09E-03	5.32E-04	1.64E-05	1.56E-08	1.35E-17	.00E+00	.00E+00	.00E+00	.00E+00
sn128	1.66E+04	7.70E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	1.81E+03	2.99E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128m	1.77E+04	9.34E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i128	1.93E+03	8.58E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb129	3.81E+04	8.81E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	3.63E+04	5.62E+03	7.40E+02	1.10E+02	2.53E+00	1.35E-03	2.06E-13	8.97E-30	.00E+00	.00E+00	.00E+00
te129m	7.36E+03	7.24E+03	1.16E+03	1.71E+02	3.95E+00	2.11E-03	3.21E-13	1.40E-29	.00E+00	.00E+00	.00E+00
i129	1.01E-02	1.01E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02	1.02E-02
xe129m	1.03E+01	9.52E+00	9.23E-03	6.81E-06	4.41E-12	1.89E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	1.27E+04	1.34E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	4.36E+03	1.14E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb131	8.97E+04	1.29E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131	9.73E+04	3.10E+03	1.14E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	2.39E+04	1.38E+04	5.07E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.16E+05	1.08E+05	5.15E+01	1.77E-02	2.55E-09	5.40E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.32E+03	1.31E+03	2.02E+01	9.72E-02	2.32E-06	1.33E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	1.66E+05	1.34E+05	8.03E-04	2.28E-12	2.97E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.69E+05	1.38E+05	8.27E-04	2.35E-12	3.06E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs132	8.84E+00	7.94E+00	5.82E-04	2.93E-08	9.47E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133	1.27E+05	3.54E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	1.04E+05	1.56E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.36E+05	1.09E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	1.85E+04	1.60E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	2.31E+05	2.23E+05	1.94E+00	9.49E-06	3.05E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	7.55E+03	6.78E+03	5.15E-09	9.90E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ba133	7.43E-06	7.42E-06	7.31E-06	7.18E-06	6.95E-06	6.51E-06	5.34E-06	3.84E-06	2.76E-06	1.99E-06	1.43E-06
te134	2.02E+05	8.61E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	2.59E+05	5.95E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	5.03E+04	5.03E+04	4.63E+04	4.25E+04	3.60E+04	2.57E+04	9.37E+03	1.75E+03	3.25E+02	6.05E+01	1.13E+01
cs134m	7.65E+03	2.52E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	2.26E+05	1.80E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	8.55E+04	6.18E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.05E+04	2.94E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01	2.23E-01
cs135m	7.77E+03	5.15E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135m	1.40E+02	7.85E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	1.38E+04	1.31E+04	1.21E+02	9.24E-01	6.10E-05	2.69E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136m	1.55E+03	1.47E+03	1.35E+01	1.04E-01	6.83E-06	3.02E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	3.43E+04	3.43E+04	3.41E+04	3.39E+04	3.35E+04	3.27E+04	3.05E+04	2.72E+04	2.42E+04	2.16E+04	1.92E+04
ba137m	3.25E+04	3.24E+04	3.22E+04	3.20E+04	3.16E+04	3.09E+04	2.88E+04	2.57E+04	2.29E+04	2.04E+04	1.82E+04
cs138	2.16E+05	1.28E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la138	6.41E-11	6.41E-11	6.41E-11	6.41E-11	6.41E-11	6.41E-11	6.41E-11	6.41E-11	6.41E-11	6.41E-11	6.41E-11
ba139	2.05E+05	1.75E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce139	2.24E-02	2.23E-02	1.42E-02	8.94E-03	3.56E-03	5.66E-04	2.27E-06	2.30E-10	2.32E-14	2.35E-18	2.38E-22
pr139	1.79E-03	4.12E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	2.06E+05	1.95E+05	1.55E+03	1.02E+01	4.94E-04	1.18E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.19E+05	2.13E+05	1.78E+03	1.17E+01	5.69E-04	1.36E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la141	1.87E+05	2.91E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ce141	1.88E+05	1.85E+05	2.78E+04	3.87E+03	7.84E+01	3.25E-02	2.30E-12	2.80E-29	.00E+00	.00E+00	.00E+00
nd141	6.14E-03	7.68E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.82E+05	3.57E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	9.09E-06	9.09E-06	9.09E-06	9.09E-06	9.09E-06	9.09E-06	9.09E-06	9.09E-06	9.09E-06	9.09E-06	9.09E-06
pr142	1.27E+04	5.32E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.72E+05	1.05E+05	3.43E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	1.67E+05	1.66E+05	1.88E+03	1.67E+01	1.47E-03	1.15E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	1.61E+05	1.60E+05	1.29E+05	1.03E+05	6.60E+04	2.72E+04	1.89E+03	2.22E+01	2.62E-01	3.08E-03	3.62E-05
pr144	1.61E+05	1.60E+05	1.29E+05	1.03E+05	6.61E+04	2.72E+04	1.89E+03	2.22E+01	2.62E-01	3.08E-03	3.62E-05
pr144m	2.26E+03	2.24E+03	1.81E+03	1.44E+03	9.25E+02	3.80E+02	2.65E+01	3.11E-01	3.66E-03	4.31E-05	5.07E-07
nd144	5.00E-10	5.00E-10	5.12E-10	5.21E-10	5.35E-10	5.50E-10	5.59E-10	5.60E-10	5.60E-10	5.60E-10	5.60E-10
pr145	1.18E+05	7.37E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm145	5.22E-02	5.23E-02	5.66E-02	6.03E-02	6.54E-02	7.01E-02	6.78E-02	5.63E-02	4.63E-02	3.81E-02	3.13E-02
sm145	5.62E-01	5.60E-01	4.67E-01	3.87E-01	2.67E-01	1.27E-01	1.36E-02	3.28E-04	7.93E-06	1.92E-07	4.63E-09
pr146	9.56E+04	2.43E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm146	1.26E+00	1.25E+00	1.22E+00	1.18E+00	1.11E+00	9.77E-01	6.71E-01	3.58E-01	1.91E-01	1.02E-01	5.47E-02
sm146	1.65E-07	1.65E-07	1.66E-07	1.67E-07	1.68E-07	1.70E-07	1.76E-07	1.82E-07	1.85E-07	1.86E-07	1.87E-07
nd147	7.74E+04	7.27E+04	2.64E+02	7.69E-01	7.51E-06	7.28E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	3.16E+04	3.16E+04	3.04E+04	2.84E+04	2.49E+04	1.91E+04	8.66E+03	2.31E+03	6.17E+02	1.65E+02	4.39E+01
sm147	8.08E-07	8.09E-07	8.58E-07	9.07E-07	9.94E-07	1.14E-06	1.40E-06	1.55E-06	1.60E-06	1.61E-06	1.61E-06
pm148	2.32E+04	2.05E+04	5.81E+01	1.23E+01	5.71E-01	1.24E-03	1.28E-11	6.22E-25	.00E+00	.00E+00	.00E+00
pm148m	4.96E+03	4.88E+03	1.10E+03	2.32E+02	1.08E+01	2.35E-02	2.42E-10	1.18E-23	.00E+00	.00E+00	.00E+00
sm148	1.75E-11	1.75E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11	1.76E-11
nd149	4.63E+04	3.06E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	7.02E+04	5.25E+04	4.05E-08	1.04E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	1.22E-13	1.34E-13	1.66E-13	1.66E-13	1.66E-13	1.66E-13	1.66E-13	1.66E-13	1.66E-13	1.66E-13	1.66E-13
eu149	2.32E-07	2.31E-07	1.19E-07	5.96E-08	1.53E-08	1.01E-09	2.87E-13	3.55E-19	4.39E-25	5.48E-31	.00E+00
pm150	5.05E+02	1.02E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu150	2.11E-05	2.11E-05	2.10E-05	2.09E-05	2.06E-05	2.03E-05	1.91E-05	1.73E-05	1.57E-05	1.43E-05	1.30E-05

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pm151	2.48E+04	1.39E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	1.08E+02	1.09E+02	1.09E+02	1.09E+02	1.08E+02	1.07E+02	1.05E+02	1.01E+02	9.72E+01	9.36E+01	9.00E+01
eu152	2.84E+00	2.84E+00	2.80E+00	2.76E+00	2.69E+00	2.56E+00	2.19E+00	1.69E+00	1.30E+00	1.00E+00	7.73E-01
eu152m	3.92E+01	6.58E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	7.66E-13	7.66E-13	7.67E-13	7.69E-13	7.71E-13	7.76E-13	7.89E-13	8.06E-13	8.19E-13	8.29E-13	8.37E-13
sm153	7.59E+04	5.30E+04	6.76E-10	2.45E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd153	7.36E+00	7.34E+00	5.68E+00	4.36E+00	2.58E+00	9.05E-01	3.90E-02	2.07E-04	1.09E-06	5.79E-09	3.07E-11
eu154	4.03E+03	4.02E+03	3.95E+03	3.87E+03	3.71E+03	3.43E+03	2.69E+03	1.80E+03	1.20E+03	8.02E+02	5.36E+02
eu155	2.74E+03	2.74E+03	2.64E+03	2.54E+03	2.36E+03	2.04E+03	1.31E+03	6.23E+02	2.97E+02	1.42E+02	6.75E+01
sm156	3.13E+03	5.33E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	4.03E+04	3.86E+04	6.65E+02	9.75E+00	2.32E-03	1.33E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu157	3.29E+03	1.11E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu158	1.19E+03	4.79E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd159	8.20E+02	3.39E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb160	1.97E+02	1.95E+02	8.32E+01	3.43E+01	5.95E+00	1.79E-01	4.91E-06	1.22E-13	3.05E-21	7.60E-29	.00E+00
tb161	1.55E+02	1.40E+02	1.83E-02	1.69E-06	1.80E-14	2.10E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb162m	8.72E-01	5.02E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy165	7.32E+01	5.91E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy166	4.66E-01	3.80E-01	5.02E-09	3.25E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	1.96E+01	1.07E+01	7.48E-09	4.84E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.57E-04	2.56E-04	2.56E-04	2.55E-04	2.55E-04	2.54E-04	2.53E-04
er169	6.96E-04	6.46E-04	9.13E-07	9.96E-10	1.40E-15	2.82E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm170	4.08E-06	4.05E-06	2.51E-06	1.52E-06	5.69E-07	7.95E-08	2.16E-10	1.15E-14	6.08E-19	3.23E-23	1.71E-27
er171	9.78E-04	1.07E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	7.02E-04	7.01E-04	6.42E-04	5.86E-04	4.89E-04	3.41E-04	1.15E-04	1.90E-05	3.13E-06	5.14E-07	8.46E-08
er172	6.43E-04	4.59E-04	4.17E-17	1.16E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

tm172	6.72E-04	6.42E-04	1.73E-13	5.41E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.06E+07	4.46E+06	1.01E+06	6.62E+05	4.29E+05	2.69E+05	1.38E+05	1.00E+05	8.52E+04	7.45E+04	6.56E+04

photon spectrum as a function of time for light elements, cladding and structural materials

BWR SNF Assembly - Fuel - decay

spectrum of photon release rates, photons/sec

basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	5.84E+14	2.52E+14	2.49E+13	1.18E+13	4.05E+12	1.78E+12	6.83E+11	2.66E+11	1.21E+11	6.02E+10	3.20E+10
3.00E-02	2.73E+14	1.69E+14	4.46E+13	3.34E+13	2.18E+13	1.16E+13	3.31E+12	8.47E+11	2.47E+11	7.50E+10	2.40E+10
5.50E-02	1.13E+14	4.55E+13	2.36E+12	1.02E+12	2.90E+11	1.27E+11	6.58E+10	2.85E+10	1.33E+10	6.47E+09	3.25E+09
8.50E-02	6.23E+13	2.46E+13	9.03E+11	3.82E+11	1.06E+11	4.68E+10	2.56E+10	1.10E+10	5.10E+09	2.47E+09	1.23E+09
1.20E-01	4.24E+13	1.65E+13	4.85E+11	2.29E+11	9.15E+10	5.29E+10	2.61E+10	8.96E+09	3.37E+09	1.39E+09	6.21E+08
1.70E-01	1.18E+14	8.84E+13	2.11E+12	1.03E+12	7.87E+11	5.90E+11	2.75E+11	7.80E+10	2.22E+10	6.43E+09	1.90E+09
3.00E-01	9.82E+13	3.14E+13	1.31E+12	6.63E+11	3.56E+11	2.28E+11	1.04E+11	2.95E+10	8.42E+09	2.43E+09	7.19E+08
6.50E-01	2.65E+15	1.67E+15	5.55E+14	2.32E+14	3.95E+13	5.57E+12	2.23E+12	6.26E+11	1.78E+11	5.22E+10	1.68E+10
1.13E+00	7.74E+13	4.68E+13	2.77E+13	2.68E+13	2.51E+13	2.20E+13	1.48E+13	7.67E+12	3.97E+12	2.06E+12	1.07E+12
1.58E+00	1.77E+13	6.20E+12	8.12E+10	2.86E+10	3.67E+09	6.39E+07	2.37E+04	1.85E+04	1.56E+04	1.34E+04	1.16E+04
2.00E+00	3.15E+12	9.08E+11	7.82E+09	2.78E+09	4.55E+08	1.22E+08	7.90E+07	4.09E+07	2.12E+07	1.10E+07	5.69E+06
2.40E+00	5.51E+10	1.26E+09	5.10E+07	1.73E+07	2.47E+06	4.01E+05	2.50E+05	1.29E+05	6.71E+04	3.48E+04	1.80E+04
2.80E+00	6.06E+10	7.57E+08	4.88E+06	1.68E+06	2.05E+05	3.06E+03	1.01E-02	1.94E-10	8.93E-11	7.77E-11	6.99E-11
3.25E+00	1.43E+10	7.86E+06	1.20E-08	1.01E-08	7.18E-09	3.64E-09	4.81E-10	2.57E-11	9.62E-12	8.21E-12	7.37E-12
3.75E+00	1.08E+10	4.60E+05	5.30E-12	4.46E-12	3.18E-12	1.61E-12	2.21E-13	1.91E-14	1.12E-14	9.92E-15	8.92E-15
4.25E+00	3.84E+09	5.99E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.31E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	5.60E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	4.04E+15	2.35E+15	6.59E+14	3.07E+14	9.20E+13	4.19E+13	2.15E+13	9.57E+12	4.57E+12	2.27E+12	1.15E+12
mev/sec	1.92E+15	1.19E+15	3.95E+14	1.82E+14	5.48E+13	2.89E+13	1.83E+13	9.09E+12	4.60E+12	2.36E+12	1.21E+12

spectrum of energy release rates, mev/watt-sec

basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	1.34E+06	5.79E+05	5.73E+04	2.70E+04	9.31E+03	4.09E+03	1.57E+03	6.12E+02	2.79E+02	1.38E+02	7.36E+01
3.00E-02	1.88E+06	1.17E+06	3.07E+05	2.30E+05	1.50E+05	7.97E+04	2.29E+04	5.84E+03	1.71E+03	5.17E+02	1.66E+02
5.50E-02	1.43E+06	5.76E+05	2.98E+04	1.29E+04	3.66E+03	1.60E+03	8.32E+02	3.60E+02	1.68E+02	8.19E+01	4.11E+01
8.50E-02	1.22E+06	4.81E+05	1.77E+04	7.46E+03	2.08E+03	9.15E+02	5.00E+02	2.16E+02	9.96E+01	4.83E+01	2.41E+01
1.20E-01	1.17E+06	4.56E+05	1.34E+04	6.33E+03	2.53E+03	1.46E+03	7.19E+02	2.47E+02	9.29E+01	3.83E+01	1.71E+01
1.70E-01	4.60E+06	3.46E+06	8.23E+04	4.01E+04	3.07E+04	2.31E+04	1.08E+04	3.05E+03	8.69E+02	2.51E+02	7.43E+01
3.00E-01	6.77E+06	2.17E+06	9.02E+04	4.57E+04	2.45E+04	1.57E+04	7.19E+03	2.04E+03	5.81E+02	1.68E+02	4.96E+01
6.50E-01	3.96E+08	2.49E+08	8.29E+07	3.46E+07	5.90E+06	8.33E+05	3.34E+05	9.35E+04	2.66E+04	7.80E+03	2.52E+03
1.13E+00	2.00E+07	1.21E+07	7.16E+06	6.92E+06	6.48E+06	5.68E+06	3.83E+06	1.98E+06	1.03E+06	5.32E+05	2.76E+05
1.58E+00	6.39E+06	2.24E+06	2.94E+04	1.04E+04	1.33E+03	2.31E+01	8.58E-03	6.69E-03	5.64E-03	4.84E-03	4.20E-03
2.00E+00	1.45E+06	4.18E+05	3.59E+03	1.28E+03	2.09E+02	5.61E+01	3.63E+01	1.88E+01	9.75E+00	5.05E+00	2.62E+00
2.40E+00	3.04E+04	6.93E+02	2.81E+01	9.53E+00	1.36E+00	2.21E-01	1.38E-01	7.14E-02	3.70E-02	1.92E-02	9.93E-03
2.80E+00	3.90E+04	4.87E+02	3.14E+00	1.08E+00	1.32E-01	1.97E-03	6.53E-09	1.25E-16	5.75E-17	5.00E-17	4.50E-17
3.25E+00	1.07E+04	5.87E+00	8.96E-15	7.54E-15	5.37E-15	2.72E-15	3.60E-16	1.92E-17	7.19E-18	6.13E-18	5.51E-18
3.75E+00	9.30E+03	3.97E-01	4.57E-18	3.85E-18	2.74E-18	1.39E-18	1.90E-19	1.65E-20	9.69E-21	8.55E-21	7.69E-21
4.25E+00	3.75E+03	5.85E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.61E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	7.08E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	4.42E+08	2.73E+08	9.07E+07	4.19E+07	1.26E+07	6.64E+06	4.21E+06	2.09E+06	1.06E+06	5.41E+05	2.79E+05
gamma watts	3.08E+02	1.90E+02	6.32E+01	2.92E+01	8.79E+00	4.63E+00	2.93E+00	1.46E+00	7.38E-01	3.78E-01	1.94E-01

photon spectrum as a function of time for fission products

BWR SNF Assembly - Fuel - decay

spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	initial	time after discharge 1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.49E+17	3.23E+16	8.45E+15	6.24E+15	4.20E+15	2.31E+15	8.62E+14	6.03E+14	5.20E+14	4.56E+14	4.02E+14
3.00E-02	1.10E+17	2.53E+16	3.63E+15	2.62E+15	1.77E+15	9.80E+14	3.77E+14	2.66E+14	2.30E+14	2.02E+14	1.79E+14
5.50E-02	5.90E+16	8.83E+15	1.93E+15	1.46E+15	1.00E+15	5.55E+14	2.07E+14	1.40E+14	1.17E+14	9.99E+13	8.64E+13
8.50E-02	4.03E+16	7.53E+15	1.18E+15	9.03E+14	6.17E+14	3.34E+14	1.14E+14	7.42E+13	6.16E+13	5.28E+13	4.59E+13
1.20E-01	3.29E+16	7.03E+15	1.37E+15	1.09E+15	7.43E+14	3.88E+14	1.25E+14	7.69E+13	5.96E+13	4.77E+13	3.91E+13
1.70E-01	5.27E+16	8.37E+15	1.18E+15	6.40E+14	3.97E+14	2.10E+14	6.69E+13	4.42E+13	3.82E+13	3.36E+13	2.96E+13
3.00E-01	1.13E+17	1.75E+16	9.03E+14	6.81E+14	4.63E+14	2.44E+14	7.53E+13	4.88E+13	4.16E+13	3.61E+13	3.15E+13
6.50E-01	2.33E+17	6.49E+16	1.58E+16	9.45E+15	5.48E+15	3.70E+15	1.89E+15	1.07E+15	8.43E+14	7.25E+14	6.39E+14
1.13E+00	7.32E+16	5.20E+15	3.26E+14	2.59E+14	2.09E+14	1.51E+14	8.33E+13	4.89E+13	3.22E+13	2.18E+13	1.49E+13
1.58E+00	3.76E+16	8.80E+15	1.65E+14	8.63E+13	6.52E+13	4.00E+13	1.30E+13	3.64E+12	1.66E+12	1.01E+12	6.98E+11
2.00E+00	1.12E+16	6.26E+14	5.35E+13	3.83E+13	2.48E+13	1.05E+13	8.53E+11	3.25E+10	1.61E+10	1.38E+10	1.22E+10
2.40E+00	8.83E+15	4.26E+14	6.94E+12	2.95E+12	2.05E+12	1.02E+12	1.27E+11	4.10E+09	1.43E+08	1.23E+07	7.09E+06
2.80E+00	3.70E+15	6.78E+12	5.97E+11	4.65E+11	3.29E+11	1.65E+11	2.10E+10	6.85E+08	2.26E+07	7.48E+05	2.48E+04
3.25E+00	1.82E+15	2.47E+12	1.09E+11	7.57E+10	5.37E+10	2.72E+10	3.52E+09	1.17E+08	3.88E+06	1.29E+05	4.26E+03
3.75E+00	8.34E+14	1.27E+10	3.96E+07	3.33E+07	2.37E+07	1.20E+07	1.55E+06	5.15E+04	1.71E+03	5.67E+01	1.88E+00
4.25E+00	7.86E+14	1.71E+09	1.13E-05	1.14E-05	1.15E-05	1.16E-05	1.19E-05	1.21E-05	1.22E-05	1.22E-05	1.22E-05
4.75E+00	2.33E+14	1.27E+10	5.67E-06	5.70E-06	5.75E-06	5.83E-06	5.98E-06	6.07E-06	6.10E-06	6.10E-06	6.11E-06
5.50E+00	1.80E+14	8.11E+07	4.21E-06	4.23E-06	4.27E-06	4.33E-06	4.44E-06	4.50E-06	4.52E-06	4.53E-06	4.53E-06
total	1.03E+18	1.87E+17	3.50E+16	2.35E+16	1.50E+16	8.93E+15	3.82E+15	2.38E+15	1.94E+15	1.68E+15	1.47E+15
mev/sec	4.21E+17	7.39E+16	1.21E+16	7.39E+15	4.45E+15	2.93E+15	1.44E+15	8.19E+14	6.37E+14	5.41E+14	4.70E+14

spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean (mev)	initial	time after discharge 1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.72E+08	7.42E+07	1.94E+07	1.43E+07	9.66E+06	5.32E+06	1.98E+06	1.39E+06	1.20E+06	1.05E+06	9.24E+05
3.00E-02	7.60E+08	1.74E+08	2.50E+07	1.81E+07	1.22E+07	6.76E+06	2.60E+06	1.84E+06	1.59E+06	1.39E+06	1.23E+06
5.50E-02	7.45E+08	1.12E+08	2.44E+07	1.85E+07	1.27E+07	7.02E+06	2.62E+06	1.77E+06	1.48E+06	1.26E+06	1.09E+06
8.50E-02	7.87E+08	1.47E+08	2.30E+07	1.76E+07	1.21E+07	6.52E+06	2.24E+06	1.45E+06	1.20E+06	1.03E+06	8.97E+05
1.20E-01	9.09E+08	1.94E+08	3.79E+07	3.00E+07	2.05E+07	1.07E+07	3.44E+06	2.12E+06	1.64E+06	1.32E+06	1.08E+06
1.70E-01	2.06E+09	3.27E+08	4.60E+07	2.50E+07	1.55E+07	8.20E+06	2.61E+06	1.73E+06	1.49E+06	1.31E+06	1.16E+06
3.00E-01	7.79E+09	1.21E+09	6.23E+07	4.70E+07	3.19E+07	1.68E+07	5.19E+06	3.36E+06	2.87E+06	2.49E+06	2.17E+06
6.50E-01	3.48E+10	9.69E+09	2.36E+09	1.41E+09	8.19E+08	5.53E+08	2.83E+08	1.61E+08	1.26E+08	1.08E+08	9.55E+07
1.13E+00	1.89E+10	1.34E+09	8.44E+07	6.71E+07	5.40E+07	3.90E+07	2.16E+07	1.27E+07	8.34E+06	5.64E+06	3.86E+06
1.58E+00	1.36E+10	3.19E+09	5.96E+07	3.12E+07	2.36E+07	1.45E+07	4.70E+06	1.32E+06	6.02E+05	3.67E+05	2.53E+05
2.00E+00	5.13E+09	2.88E+08	2.46E+07	1.76E+07	1.14E+07	4.85E+06	3.92E+05	1.50E+04	7.41E+03	6.37E+03	5.59E+03
2.40E+00	4.87E+09	2.35E+08	3.83E+06	1.63E+06	1.13E+06	5.63E+05	7.02E+04	2.26E+03	7.90E+01	6.78E+00	3.91E+00
2.80E+00	2.38E+09	4.36E+06	3.84E+05	2.99E+05	2.12E+05	1.06E+05	1.35E+04	4.41E+02	1.45E+01	4.82E-01	1.60E-02
3.25E+00	1.36E+09	1.85E+06	8.16E+04	5.65E+04	4.01E+04	2.03E+04	2.63E+03	8.73E+01	2.90E+00	9.60E-02	3.19E-03
3.75E+00	7.19E+08	1.09E+04	3.41E+01	2.87E+01	2.04E+01	1.03E+01	1.34E+00	4.44E-02	1.47E-03	4.89E-05	1.62E-06
4.25E+00	7.68E+08	1.67E+03	1.10E-11	1.11E-11	1.12E-11	1.14E-11	1.16E-11	1.18E-11	1.19E-11	1.19E-11	1.19E-11
4.75E+00	2.54E+08	1.38E+04	6.19E-12	6.22E-12	6.28E-12	6.37E-12	6.53E-12	6.63E-12	6.66E-12	6.66E-12	6.67E-12
5.50E+00	2.28E+08	1.03E+02	5.32E-12	5.35E-12	5.39E-12	5.47E-12	5.61E-12	5.69E-12	5.72E-12	5.72E-12	5.73E-12
total	9.67E+10	1.70E+10	2.78E+09	1.70E+09	1.02E+09	6.73E+08	3.30E+08	1.88E+08	1.46E+08	1.24E+08	1.08E+08
gamma watts	6.75E+04	1.18E+04	1.94E+03	1.19E+03	7.14E+02	4.69E+02	2.30E+02	1.31E+02	1.02E+02	8.67E+01	7.54E+01

principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.23E+16) at 1.0 d

nuclide	initial	time after discharge 1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 91	1.65E+15	1.64E+15	5.73E+14	1.92E+14	2.20E+13	2.90E+11	6.68E+05	2.68E-04	1.08E-13	4.32E-23	.00E+00
mo 99	2.24E+15	1.74E+15	3.10E+05	2.27E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.93E+15	2.82E+15	2.39E+15	2.01E+15	1.43E+15	7.24E+14	9.38E+13	3.11E+12	1.03E+11	3.42E+09	1.14E+08
ba140	1.91E+15	1.81E+15	1.44E+13	9.41E+10	4.58E+06	1.10E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.54E+15	2.46E+15	2.07E+13	1.36E+11	6.60E+06	1.58E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

pr144	4.11E+15	4.09E+15	3.29E+15	2.63E+15	1.68E+15	6.93E+14	4.82E+13	5.67E+11	6.68E+09	7.86E+07	9.25E+05

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.22E+15	3.42E+15	2.04E+07	5.81E-02	7.56E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.33E+15	4.19E+15	3.64E+10	1.78E+05	5.72E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.59E+15	1.51E+15	1.20E+13	7.85E+10	3.82E+06	9.15E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.45E+15	1.43E+15	2.14E+14	2.98E+13	6.04E+11	2.50E+08	1.77E-02	2.15E-19	.00E+00	.00E+00	.00E+00
ce143	4.75E+15	2.89E+15	9.47E-05	5.33E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.36E+15	1.35E+15	1.09E+15	8.70E+14	5.57E+14	2.29E+14	1.60E+13	1.88E+11	2.21E+09	2.60E+07	3.06E+05
nd147	1.43E+15	1.35E+15	4.89E+12	1.42E+10	1.39E+05	1.35E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.83E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.94E+14	6.68E+14	5.66E+14	4.76E+14	3.39E+14	1.71E+14	2.22E+13	7.36E+11	2.44E+10	8.10E+08	2.69E+07
te132	8.14E+14	6.58E+14	3.94E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.35E+14	5.19E+14	4.36E+12	2.86E+10	1.39E+06	3.33E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.35E+15	8.23E+14	2.70E-05	1.52E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.56E+14	9.49E+14	7.64E+14	6.10E+14	3.91E+14	1.61E+14	1.12E+13	1.32E+11	1.55E+09	1.83E+07	2.15E+05
sm153	1.47E+15	1.03E+15	1.31E+01	4.76E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.53E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.12E+14	3.97E+14	3.36E+14	2.83E+14	2.01E+14	1.02E+14	1.32E+13	4.38E+11	1.45E+10	4.81E+08	1.60E+07
xe133	3.06E+15	2.96E+15	2.57E+10	1.26E+05	4.05E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.62E+14	5.59E+14	4.50E+14	3.59E+14	2.30E+14	9.47E+13	6.59E+12	7.76E+10	9.13E+08	1.07E+07	1.26E+05
nd147	8.91E+14	8.37E+14	3.04E+12	8.85E+09	8.64E+04	8.38E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.03E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.65E+15	3.10E+15	5.55E+05	4.07E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.19E+14	7.17E+14	5.78E+14	4.61E+14	2.96E+14	1.22E+14	8.46E+12	9.96E+10	1.17E+09	1.38E+07	1.62E+05
pr144	4.02E+14	4.00E+14	3.22E+14	2.57E+14	1.65E+14	6.78E+13	4.72E+12	5.55E+10	6.53E+08	7.69E+06	9.04E+04
sm153	7.01E+14	4.90E+14	6.25E+00	2.26E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.37E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.90E+14	6.14E+14	1.09E+05	8.01E-06	7.62E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.58E+15	2.19E+15	3.92E+05	2.88E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.76E+14	4.50E+14	3.57E+12	2.34E+10	1.14E+06	2.73E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.88E+15	2.83E+15	4.24E+14	5.90E+13	1.20E+12	4.95E+08	3.51E-02	4.26E-19	.00E+00	.00E+00	.00E+00
pr144	4.26E+14	4.23E+14	3.40E+14	2.72E+14	1.74E+14	7.17E+13	4.99E+12	5.87E+10	6.91E+08	8.13E+06	9.56E+04

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.31E+15	9.38E+14	6.17E-04	7.79E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.50E+15	4.20E+15	2.00E+12	6.89E+08	9.92E+01	2.10E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.12E+15	3.33E+15	1.99E+07	5.66E-02	7.37E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.41E+15	1.74E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.89E+15	1.84E+15	1.54E+13	1.01E+11	4.92E+06	1.18E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.13E+15	1.91E+15	6.24E-05	3.51E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.49E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
zr 95	7.83E+15	7.74E+15	2.95E+15	1.09E+15	1.50E+14	2.87E+12	2.02E+07	5.22E-02	1.35E-10	3.49E-19	8.42E-28
nb 95	8.15E+15	8.15E+15	5.11E+15	2.22E+15	3.35E+14	6.77E+12	4.62E+07	1.19E-01	3.08E-10	7.96E-19	.00E+00
ru103	5.43E+15	5.33E+15	1.11E+15	2.16E+14	8.59E+12	1.36E+10	5.39E+01	5.35E-13	5.31E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.07E+07	2.29E-01	2.98E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.34E+15	3.39E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.24E+15	4.24E+15	3.91E+15	3.59E+15	3.03E+15	2.17E+15	7.90E+14	1.47E+14	2.74E+13	5.10E+12	9.50E+11
la140	6.06E+15	5.89E+15	4.95E+13	3.24E+11	1.58E+07	3.78E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec
mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.20E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
sr 91	1.64E+15	2.86E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.78E+06	2.49E-02	3.25E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.01E+15	4.78E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.91E+14	4.66E+14	4.29E+12	3.28E+10	2.17E+06	9.57E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.61E+14	6.42E+14	5.39E+12	3.54E+10	1.72E+06	4.12E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.28E+14	6.97E+14	1.20E+13	1.76E+11	4.19E+07	2.41E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec
mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.80E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
i132	6.79E+14	5.55E+14	3.32E+06	9.42E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.84E+15	7.62E+15	6.39E+13	4.19E+11	2.04E+07	4.88E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec
mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.26E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
i132	1.74E+14	1.43E+14	8.52E+05	2.42E-03	3.15E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.47E+14	3.55E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.25E+13	5.21E+13	4.20E+13	3.35E+13	2.15E+13	8.84E+12	6.15E+11	7.24E+09	8.52E+07	1.00E+06	1.18E+04
eu156	3.56E+14	3.41E+14	5.86E+12	8.60E+10	2.05E+07	1.18E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec
mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.26E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
la140	3.71E+14	3.61E+14	3.03E+12	1.99E+10	9.66E+05	2.31E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.53E+13	2.42E+13	4.16E+11	6.10E+09	1.45E+06	8.35E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec
mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.78E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rh106	6.41E+11	6.16E+11	5.22E+11	4.39E+11	3.13E+11	1.58E+11	2.05E+10	6.79E+08	2.25E+07	7.48E+05	2.48E+04
ag112	1.20E+12	6.39E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.21E+12	5.06E+12	4.25E+10	2.78E+08	1.35E+04	3.24E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec
mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.47E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
la140	2.37E+12	2.31E+12	1.94E+10	1.27E+08	6.18E+03	1.48E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec
mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	2.97E+12	9.21E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.72E+14	3.38E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.71E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.51E+11	1.71E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	4.09E+12	1.27E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec

mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.11E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.61E+10	8.11E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Fuel - decay

0 actinide photon release rates, photons/sec

basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.33E+17	6.96E+16	8.95E+13	6.63E+13	4.08E+13	2.38E+13	1.94E+13	1.94E+13	1.93E+13	1.91E+13	1.89E+13
3.00E-02	8.37E+15	1.43E+15	9.18E+10	8.61E+10	1.08E+11	1.51E+11	2.68E+11	4.27E+11	5.51E+11	6.46E+11	7.19E+11
5.50E-02	1.22E+16	3.92E+15	1.50E+12	1.42E+12	1.77E+12	2.48E+12	4.49E+12	7.23E+12	9.36E+12	1.10E+13	1.23E+13
8.50E-02	5.27E+16	7.63E+15	4.62E+11	2.69E+11	2.69E+11	2.68E+11	2.67E+11	2.64E+11	2.61E+11	2.58E+11	2.56E+11
1.20E-01	5.35E+16	3.91E+16	4.95E+11	3.63E+11	3.58E+11	3.53E+11	3.42E+11	3.27E+11	3.13E+11	3.01E+11	2.90E+11
1.70E-01	1.77E+15	2.89E+14	2.00E+10	7.23E+09	5.18E+09	3.80E+09	3.40E+09	3.32E+09	3.26E+09	3.20E+09	3.15E+09
3.00E-01	2.84E+16	2.06E+16	3.05E+11	1.98E+11	1.96E+11	1.94E+11	1.87E+11	1.76E+11	1.66E+11	1.58E+11	1.51E+11
6.50E-01	1.54E+15	5.05E+13	2.03E+09	1.64E+09	1.23E+09	1.01E+09	1.14E+09	1.33E+09	1.38E+09	1.37E+09	1.35E+09
1.13E+00	1.83E+15	1.16E+15	7.19E+08	6.77E+08	6.30E+08	5.94E+08	5.72E+08	5.47E+08	5.22E+08	4.99E+08	4.77E+08
1.58E+00	1.31E+08	1.25E+08	1.11E+08	1.01E+08	9.05E+07	8.51E+07	8.89E+07	9.02E+07	8.49E+07	7.77E+07	7.07E+07
2.00E+00	1.65E+06	1.03E+06	9.91E+05	1.02E+06	1.08E+06	1.20E+06	1.54E+06	1.83E+06	1.91E+06	1.89E+06	1.85E+06
2.40E+00	5.61E+07	5.61E+07	4.88E+07	4.36E+07	3.74E+07	3.25E+07	2.81E+07	2.32E+07	1.92E+07	1.60E+07	1.33E+07
2.80E+00	1.02E+08	1.04E+08	1.07E+08	1.13E+08	1.30E+08	1.71E+08	2.86E+08	3.86E+08	4.10E+08	4.03E+08	3.87E+08
3.25E+00	2.01E+07	2.01E+07	1.75E+07	1.56E+07	1.34E+07	1.16E+07	1.01E+07	8.32E+06	6.90E+06	5.73E+06	4.76E+06
3.75E+00	1.16E+07	1.16E+07	1.01E+07	9.05E+06	7.77E+06	6.75E+06	5.83E+06	4.82E+06	4.00E+06	3.32E+06	2.76E+06
4.25E+00	6.74E+06	6.74E+06	5.87E+06	5.24E+06	4.51E+06	3.91E+06	3.38E+06	2.80E+06	2.32E+06	1.92E+06	1.60E+06
4.75E+00	3.91E+06	3.91E+06	3.40E+06	3.04E+06	2.61E+06	2.27E+06	1.96E+06	1.62E+06	1.34E+06	1.12E+06	9.27E+05
5.50E+00	3.54E+06	3.54E+06	3.08E+06	2.75E+06	2.36E+06	2.05E+06	1.77E+06	1.47E+06	1.22E+06	1.01E+06	8.39E+05
0 total	2.94E+17	1.44E+17	9.23E+13	6.86E+13	4.35E+13	2.72E+13	2.49E+13	2.78E+13	2.99E+13	3.15E+13	3.26E+13
0 mev/sec	2.50E+16	1.38E+16	1.18E+12	8.73E+11	6.37E+11	5.05E+11	5.71E+11	7.22E+11	8.37E+11	9.24E+11	9.89E+11

0 actinide energy release rates, mev/watt-sec

basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.06E+08	1.60E+08	2.06E+05	1.52E+05	9.38E+04	5.47E+04	4.45E+04	4.45E+04	4.43E+04	4.39E+04	4.34E+04
3.00E-02	5.77E+07	9.88E+06	6.33E+02	5.94E+02	7.48E+02	1.04E+03	1.85E+03	2.95E+03	3.80E+03	4.45E+03	4.96E+03
5.50E-02	1.54E+08	4.95E+07	1.89E+04	1.80E+04	2.24E+04	3.14E+04	5.67E+04	9.14E+04	1.18E+05	1.39E+05	1.55E+05
8.50E-02	1.03E+09	1.49E+08	9.02E+03	5.26E+03	5.25E+03	5.24E+03	5.21E+03	5.15E+03	5.10E+03	5.05E+03	5.00E+03
1.20E-01	1.48E+09	1.08E+09	1.36E+04	1.00E+04	9.88E+03	9.72E+03	9.43E+03	9.01E+03	8.64E+03	8.30E+03	8.00E+03
1.70E-01	6.91E+07	1.13E+07	7.83E+02	2.82E+02	2.03E+02	1.49E+02	1.33E+02	1.30E+02	1.27E+02	1.25E+02	1.23E+02
3.00E-01	1.96E+09	1.42E+09	2.10E+04	1.36E+04	1.35E+04	1.34E+04	1.29E+04	1.21E+04	1.15E+04	1.09E+04	1.04E+04
6.50E-01	2.31E+08	7.55E+06	3.03E+02	2.46E+02	1.84E+02	1.50E+02	1.70E+02	1.98E+02	2.06E+02	2.05E+02	2.02E+02
1.13E+00	4.72E+08	2.99E+08	1.86E+02	1.75E+02	1.63E+02	1.54E+02	1.48E+02	1.42E+02	1.35E+02	1.29E+02	1.23E+02
1.58E+00	4.73E+01	4.53E+01	4.00E+01	3.65E+01	3.28E+01	3.08E+01	3.22E+01	3.27E+01	3.07E+01	2.81E+01	2.56E+01
2.00E+00	7.59E-01	4.72E-01	4.56E-01	4.68E-01	4.96E-01	5.53E-01	7.07E-01	8.42E-01	8.77E-01	8.71E-01	8.52E-01
2.40E+00	3.09E+01	3.09E+01	2.69E+01	2.40E+01	2.06E+01	1.79E+01	1.55E+01	1.28E+01	1.06E+01	8.82E+00	7.33E+00

	2.80E+00	6.59E+01	6.68E+01	6.87E+01	7.30E+01	8.39E+01	1.10E+02	1.84E+02	2.48E+02	2.64E+02	2.60E+02	2.49E+02
	3.25E+00	1.50E+01	1.50E+01	1.31E+01	1.17E+01	1.00E+01	8.70E+00	7.52E+00	6.22E+00	5.15E+00	4.28E+00	3.56E+00
	3.75E+00	1.00E+01	1.00E+01	8.74E+00	7.80E+00	6.70E+00	5.82E+00	5.03E+00	4.16E+00	3.45E+00	2.86E+00	2.38E+00
	4.25E+00	6.59E+00	6.59E+00	5.74E+00	5.12E+00	4.40E+00	3.82E+00	3.30E+00	2.73E+00	2.27E+00	1.88E+00	1.56E+00
	4.75E+00	4.27E+00	4.27E+00	3.72E+00	3.32E+00	2.85E+00	2.48E+00	2.14E+00	1.77E+00	1.47E+00	1.22E+00	1.01E+00
	5.50E+00	4.47E+00	4.47E+00	3.89E+00	3.48E+00	2.99E+00	2.59E+00	2.24E+00	1.85E+00	1.54E+00	1.28E+00	1.06E+00
0	total	5.75E+09	3.18E+09	2.70E+05	2.01E+05	1.46E+05	1.16E+05	1.31E+05	1.66E+05	1.92E+05	2.12E+05	2.27E+05
0	gamma watts	4.01E+03	2.22E+03	1.89E-01	1.40E-01	1.02E-01	8.09E-02	9.16E-02	1.16E-01	1.34E-01	1.48E-01	1.59E-01

1

neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pb210	1.67E-14	1.68E-14	1.77E-14	1.81E-14	1.89E-14	2.07E-14	2.92E-14	5.67E-14	1.08E-13	1.91E-13	3.12E-13
bi210	4.23E-12	4.23E-12	4.51E-12	4.61E-12	4.81E-12	5.29E-12	7.45E-12	1.45E-11	2.76E-11	4.87E-11	7.96E-11
bi211	3.37E-03	3.37E-03	3.62E-03	3.88E-03	4.45E-03	5.53E-03	8.37E-03	1.26E-02	1.63E-02	1.96E-02	2.24E-02
bi212	2.42E+00	2.47E+00	2.73E+00	3.08E+00	3.81E+00	5.36E+00	9.51E+00	1.32E+01	1.41E+01	1.39E+01	1.34E+01
bi213	1.11E-05	1.11E-05	2.73E-06	2.38E-06	2.39E-06	2.41E-06	2.47E-06	2.59E-06	2.75E-06	2.93E-06	3.15E-06
bi214	7.13E-09	7.13E-09	7.43E-09	7.77E-09	8.49E-09	1.02E-08	1.70E-08	3.50E-08	6.16E-08	9.73E-08	1.43E-07
po210	4.00E-06	4.01E-06	4.50E-06	4.88E-06	5.39E-06	6.09E-06	8.55E-06	1.78E-05	3.40E-05	5.99E-05	9.81E-05
po211	1.33E-05	1.33E-05	1.43E-05	1.54E-05	1.76E-05	2.19E-05	3.31E-05	4.99E-05	6.46E-05	7.75E-05	8.88E-05
po212	1.24E+01	1.26E+01	1.40E+01	1.58E+01	1.95E+01	2.74E+01	4.87E+01	6.74E+01	7.21E+01	7.13E+01	6.87E+01
po213	1.47E-03	1.47E-03	3.60E-04	3.14E-04	3.15E-04	3.17E-04	3.26E-04	3.42E-04	3.63E-04	3.87E-04	4.15E-04
po214	3.06E-04	2.98E-04	7.83E-05	6.98E-05	7.56E-05	9.05E-05	1.52E-04	3.12E-04	5.48E-04	8.67E-04	1.27E-03
po215	4.76E-03	4.76E-03	5.12E-03	5.49E-03	6.29E-03	7.82E-03	1.18E-02	1.78E-02	2.31E-02	2.77E-02	3.17E-02
po216	9.66E+00	9.65E+00	1.09E+01	1.23E+01	1.52E+01	2.14E+01	3.80E+01	5.26E+01	5.63E+01	5.56E+01	5.36E+01
po218	3.02E-05	3.02E-05	3.15E-05	3.29E-05	3.60E-05	4.30E-05	7.22E-05	1.48E-04	2.61E-04	4.12E-04	6.04E-04
at217	9.52E-04	9.50E-04	2.33E-04	2.04E-04	2.04E-04	2.06E-04	2.11E-04	2.22E-04	2.35E-04	2.51E-04	2.69E-04
rn218	1.97E-04	1.91E-04	9.82E-06	4.50E-07	1.02E-09	5.27E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	3.78E-03	3.79E-03	4.07E-03	4.37E-03	5.00E-03	6.21E-03	9.41E-03	1.42E-02	1.83E-02	2.20E-02	2.52E-02
rn220	7.65E+00	7.64E+00	8.64E+00	9.74E+00	1.21E+01	1.70E+01	3.01E+01	4.16E+01	4.46E+01	4.41E+01	4.25E+01
rn222	2.21E-05	2.21E-05	2.30E-05	2.40E-05	2.63E-05	3.14E-05	5.27E-05	1.08E-04	1.91E-04	3.01E-04	4.41E-04
fr221	6.94E-04	6.93E-04	1.70E-04	1.49E-04	1.49E-04	1.50E-04	1.54E-04	1.62E-04	1.72E-04	1.83E-04	1.96E-04
fr223	1.49E-09	1.49E-09	1.60E-09	1.71E-09	1.92E-09	2.35E-09	3.56E-09	5.37E-09	6.94E-09	8.32E-09	9.54E-09
ra222	1.52E-04	1.48E-04	7.60E-06	3.48E-07	7.88E-10	4.08E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	2.19E-03	2.19E-03	2.36E-03	2.53E-03	2.90E-03	3.60E-03	5.45E-03	8.21E-03	1.06E-02	1.27E-02	1.46E-02
ra224	5.41E+00	5.40E+00	6.11E+00	6.89E+00	8.53E+00	1.20E+01	2.13E+01	2.94E+01	3.15E+01	3.12E+01	3.00E+01
ra226	1.29E-05	1.29E-05	1.35E-05	1.41E-05	1.54E-05	1.84E-05	3.08E-05	6.33E-05	1.11E-04	1.76E-04	2.58E-04
ac225	4.99E-04	4.98E-04	1.22E-04	1.07E-04	1.07E-04	1.08E-04	1.11E-04	1.16E-04	1.23E-04	1.32E-04	1.41E-04
ac227	1.67E-05	1.67E-05	1.80E-05	1.92E-05	2.17E-05	2.65E-05	4.01E-05	6.04E-05	7.81E-05	9.37E-05	1.07E-04
ac228	8.80E-17	8.81E-17	9.57E-17	1.04E-16	1.21E-16	1.60E-16	3.02E-16	6.01E-16	9.45E-16	1.32E-15	1.70E-15
th226	1.38E-04	1.33E-04	6.86E-06	3.14E-07	7.12E-10	3.68E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	2.45E-03	2.45E-03	2.63E-03	2.82E-03	3.19E-03	3.97E-03	6.01E-03	9.05E-03	1.17E-02	1.40E-02	1.61E-02
th228	4.54E+00	4.54E+00	5.13E+00	5.78E+00	7.17E+00	1.01E+01	1.79E+01	2.48E+01	2.66E+01	2.63E+01	2.53E+01
th229	6.21E-05	6.21E-05	6.22E-05	6.23E-05	6.26E-05	6.30E-05	6.47E-05	6.80E-05	7.20E-05	7.69E-05	8.25E-05
th230	4.68E-03	4.69E-03	4.97E-03	5.26E-03	5.85E-03	7.03E-03	1.07E-02	1.71E-02	2.40E-02	3.13E-02	3.90E-02
th232	4.35E-09	4.35E-09	4.60E-09	4.86E-09	5.37E-09	6.39E-09	9.45E-09	1.45E-08	1.97E-08	2.48E-08	2.99E-08
pa231	1.39E-02	1.39E-02	1.39E-02	1.39E-02	1.39E-02	1.40E-02	1.41E-02	1.43E-02	1.45E-02	1.48E-02	1.50E-02
u230	1.08E-04	1.05E-04	5.40E-06	2.47E-07	5.60E-10	2.90E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u231	4.08E-07	3.46E-07	1.45E-13	3.42E-20	3.18E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.02E+01	1.02E+01	1.12E+01	1.22E+01	1.40E+01	1.70E+01	2.23E+01	2.50E+01	2.50E+01	2.41E+01	2.30E+01
u233	4.31E-03	4.31E-03	4.39E-03	4.46E-03	4.61E-03	4.94E-03	5.86E-03	7.35E-03	8.85E-03	1.04E-02	1.19E-02
u234	1.35E+02	1.35E+02	1.36E+02	1.36E+02	1.37E+02	1.39E+02	1.46E+02	1.56E+02	1.66E+02	1.76E+02	1.85E+02
u235	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00
u236	3.64E+01	3.64E+01	3.64E+01	3.64E+01	3.64E+01	3.64E+01	3.64E+01	3.64E+01	3.64E+01	3.64E+01	3.64E+01
u238	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01	1.76E+01

np235	9.67E-05	9.65E-05	8.26E-05	7.03E-05	5.10E-05	2.69E-05	3.96E-06	1.62E-07	6.64E-09	2.72E-10	1.11E-11
np237	6.07E+01	6.08E+01	6.14E+01	6.14E+01	6.14E+01	6.14E+01	6.15E+01	6.18E+01	6.23E+01	6.28E+01	6.34E+01
pu236	5.97E+02	5.98E+02	5.64E+02	5.31E+02	4.71E+02	3.71E+02	1.81E+02	5.49E+01	1.66E+01	5.03E+00	1.52E+00
pu237	1.18E-02	1.16E-02	2.96E-03	7.17E-04	4.34E-05	1.60E-07	7.97E-15	5.39E-27	.00E+00	.00E+00	.00E+00
pu238	1.26E+06	1.26E+06	1.28E+06	1.30E+06	1.31E+06	1.31E+06	1.29E+06	1.24E+06	1.19E+06	1.14E+06	1.10E+06

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pu239	4.73E+04	4.74E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04
pu240	8.39E+04	8.39E+04	8.39E+04	8.39E+04	8.40E+04	8.40E+04	8.43E+04	8.46E+04	8.48E+04	8.50E+04	8.52E+04
pu241	4.61E+02	4.61E+02	4.55E+02	4.50E+02	4.39E+02	4.18E+02	3.62E+02	2.84E+02	2.23E+02	1.75E+02	1.38E+02
pu242	3.41E+02	3.41E+02	3.41E+02	3.41E+02	3.41E+02	3.41E+02	3.41E+02	3.41E+02	3.41E+02	3.41E+02	3.41E+02
pu244	4.42E-12	4.43E-12	6.10E-12	7.83E-12	1.13E-11	1.81E-11	3.86E-11	7.28E-11	1.07E-10	1.41E-10	1.75E-10
am239	4.98E-05	1.23E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	7.45E-05	5.37E-05	1.24E-17	9.17E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.29E+04	5.30E+04	6.46E+04	7.65E+04	9.95E+04	1.44E+05	2.64E+05	4.29E+05	5.56E+05	6.54E+05	7.30E+05
am242m	1.74E+01	1.74E+01	1.74E+01	1.74E+01	1.73E+01	1.72E+01	1.70E+01	1.66E+01	1.62E+01	1.58E+01	1.54E+01
am243	6.46E+03	6.46E+03	6.46E+03	6.46E+03	6.46E+03	6.46E+03	6.46E+03	6.46E+03	6.46E+03	6.45E+03	6.45E+03
cm241	6.07E-04	5.94E-04	9.06E-05	1.28E-05	2.70E-07	1.20E-10	1.05E-20	.00E+00	.00E+00	.00E+00	.00E+00
cm242	2.07E+07	2.07E+07	1.42E+07	9.57E+06	4.40E+06	9.35E+05	1.41E+04	5.14E+03	5.01E+03	4.89E+03	4.77E+03
cm243	1.20E+04	1.20E+04	1.19E+04	1.18E+04	1.17E+04	1.14E+04	1.06E+04	9.38E+03	8.31E+03	7.36E+03	6.52E+03
cm244	1.39E+06	1.39E+06	1.38E+06	1.36E+06	1.34E+06	1.29E+06	1.15E+06	9.47E+05	7.82E+05	6.46E+05	5.33E+05
cm245	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02	1.12E+02
cm246	3.84E+01	3.84E+01	3.84E+01	3.84E+01	3.84E+01	3.84E+01	3.84E+01	3.84E+01	3.83E+01	3.83E+01	3.83E+01
cm247	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04	1.91E-04
cm248	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.18E-03	1.19E-03	1.19E-03	1.19E-03	1.19E-03
cm250	5.03E-11	5.03E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.03E-11	5.03E-11
bk249	1.55E-04	1.55E-04	1.28E-04	1.04E-04	7.03E-05	3.19E-05	2.97E-06	5.68E-08	1.09E-09	2.08E-11	3.99E-13
cf249	8.48E-03	8.56E-03	1.50E-02	2.06E-02	2.87E-02	3.79E-02	4.45E-02	4.48E-02	4.44E-02	4.39E-02	4.35E-02
cf250	1.86E-01	1.87E-01	1.84E-01	1.82E-01	1.77E-01	1.68E-01	1.43E-01	1.10E-01	8.44E-02	6.48E-02	4.97E-02
cf251	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.65E-03	1.64E-03	1.63E-03	1.63E-03	1.62E-03
cf252	5.19E-01	5.19E-01	4.87E-01	4.55E-01	4.00E-01	3.07E-01	1.40E-01	3.78E-02	1.02E-02	2.75E-03	7.41E-04
cf253	1.19E-04	1.14E-04	3.58E-06	9.79E-08	7.98E-11	5.36E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	2.51E-08	2.48E-08	8.96E-09	3.10E-09	3.83E-10	5.83E-12	2.06E-17	1.68E-26	.00E+00	.00E+00	.00E+00
es253	4.42E-02	4.44E-02	8.12E-03	5.25E-04	1.43E-06	6.95E-12	5.22E-28	.00E+00	.00E+00	.00E+00	.00E+00
es254	1.37E-04	1.37E-04	1.10E-04	8.69E-05	5.49E-05	2.19E-05	1.39E-06	1.41E-08	1.43E-10	1.45E-12	1.47E-14
es255	1.62E-06	1.60E-06	3.28E-07	6.34E-08	2.46E-09	3.73E-12	1.30E-20	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.35E+07	2.35E+07	1.71E+07	1.25E+07	7.30E+06	3.83E+06	2.86E+06	2.77E+06	2.68E+06	2.60E+06	2.51E+06

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
spontaneous fission neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
th230	1.20E-07	1.20E-07	1.28E-07	1.35E-07	1.50E-07	1.80E-07	2.74E-07	4.40E-07	6.17E-07	8.04E-07	1.00E-06
pa231	1.74E-06	1.74E-06	1.74E-06	1.74E-06	1.75E-06	1.75E-06	1.77E-06	1.80E-06	1.82E-06	1.85E-06	1.88E-06
u232	6.25E-04	6.26E-04	6.90E-04	7.51E-04	8.61E-04	1.04E-03	1.37E-03	1.54E-03	1.53E-03	1.48E-03	1.42E-03
u234	2.91E-01	2.91E-01	2.92E-01	2.93E-01	2.95E-01	3.00E-01	3.14E-01	3.36E-01	3.57E-01	3.78E-01	3.97E-01
u235	1.57E-02	1.57E-02	1.57E-02	1.57E-02	1.57E-02	1.57E-02	1.57E-02	1.57E-02	1.57E-02	1.57E-02	1.57E-02
u236	5.46E+00	5.46E+00	5.46E+00	5.46E+00	5.46E+00	5.46E+00	5.46E+00	5.47E+00	5.47E+00	5.47E+00	5.47E+00
u237	3.25E-06	2.93E-06	3.32E-10	1.65E-11	1.61E-11	1.53E-11	1.33E-11	1.04E-11	8.18E-12	6.42E-12	5.04E-12

u238	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03	2.48E+03
u239	9.36E-07	3.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	2.07E-07	2.07E-07	2.07E-07	2.07E-07	2.07E-07	2.07E-07	2.07E-07	2.07E-07	2.07E-07	2.07E-07	2.07E-07
np238	1.91E-05	1.38E-05	5.11E-12	5.10E-12	5.09E-12	5.06E-12	4.99E-12	4.87E-12	4.75E-12	4.63E-12	4.52E-12
np239	1.91E-02	1.44E-02	6.70E-08	6.70E-08	6.70E-08	6.70E-08	6.70E-08	6.69E-08	6.69E-08	6.69E-08	6.68E-08
pu236	4.04E+01	4.04E+01	3.82E+01	3.60E+01	3.19E+01	2.51E+01	1.23E+01	3.71E+00	1.12E+00	3.40E-01	1.03E-01
pu238	2.32E+05	2.32E+05	2.37E+05	2.40E+05	2.42E+05	2.43E+05	2.37E+05	2.28E+05	2.19E+05	2.11E+05	2.03E+05
pu239	2.53E+01	2.54E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01	2.55E+01
pu240	5.58E+05	5.58E+05	5.58E+05	5.58E+05	5.58E+05	5.58E+05	5.59E+05	5.60E+05	5.62E+05	5.64E+05	5.66E+05
pu241	1.66E+01	1.66E+01	1.64E+01	1.62E+01	1.58E+01	1.51E+01	1.30E+01	1.02E+01	8.03E+00	6.31E+00	4.96E+00
pu242	2.66E+05	2.66E+05	2.66E+05	2.66E+05	2.66E+05	2.66E+05	2.66E+05	2.66E+05	2.66E+05	2.66E+05	2.66E+05
pu243	1.83E-03	6.39E-05	8.25E-15	8.25E-15	8.25E-15	8.25E-15	8.25E-15	8.25E-15	8.25E-15	8.25E-15	8.25E-15
pu244	1.06E-06	1.06E-06	1.46E-06	1.87E-06	2.69E-06	4.33E-06	9.23E-06	1.74E-05	2.56E-05	3.38E-05	4.20E-05
am241	2.03E+01	2.04E+01	2.49E+01	2.94E+01	3.83E+01	5.54E+01	1.02E+02	1.65E+02	2.14E+02	2.52E+02	2.81E+02
am242m	8.28E+01	8.28E+01	8.27E+01	8.26E+01	8.24E+01	8.20E+01	8.08E+01	7.88E+01	7.69E+01	7.50E+01	7.32E+01
am242	4.13E+02	1.46E+02	8.98E-02	8.97E-02	8.94E-02	8.90E-02	8.77E-02	8.56E-02	8.35E-02	8.15E-02	7.95E-02
am243	2.97E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01	2.97E+01
am244	4.12E-02	7.94E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.03E+08	1.03E+08	7.08E+07	4.78E+07	2.20E+07	4.67E+06	7.03E+04	2.57E+04	2.50E+04	2.44E+04	2.38E+04
cm243	2.60E+02	2.60E+02	2.58E+02	2.57E+02	2.54E+02	2.48E+02	2.30E+02	2.04E+02	1.80E+02	1.60E+02	1.42E+02
cm244	1.81E+08	1.81E+08	1.79E+08	1.78E+08	1.74E+08	1.68E+08	1.50E+08	1.24E+08	1.02E+08	8.42E+07	6.96E+07
cm245	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.04E+01	3.03E+01
cm246	1.38E+06	1.38E+06	1.38E+06	1.38E+06	1.38E+06	1.38E+06	1.38E+06	1.38E+06	1.38E+06	1.38E+06	1.38E+06
cm248	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.94E+04	1.94E+04
cm250	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02	2.15E-02
bk249	8.54E-01	8.52E-01	7.03E-01	5.76E-01	3.87E-01	1.76E-01	1.64E-02	3.13E-04	6.00E-06	1.15E-07	2.20E-09
cf249	5.16E-03	5.20E-03	9.15E-03	1.25E-02	1.75E-02	2.30E-02	2.71E-02	2.72E-02	2.70E-02	2.67E-02	2.64E-02
cf250	1.56E+04	1.56E+04	1.54E+04	1.52E+04	1.48E+04	1.41E+04	1.20E+04	9.21E+03	7.07E+03	5.42E+03	4.16E+03
cf252	1.82E+06	1.82E+06	1.70E+06	1.59E+06	1.40E+06	1.08E+06	4.90E+05	1.32E+05	3.57E+04	9.62E+03	2.60E+03
cf254	1.08E+03	1.07E+03	3.85E+02	1.33E+02	1.64E+01	2.50E-01	8.83E-07	7.23E-16	5.91E-25	.00E+00	.00E+00
es253	3.29E-01	3.31E-01	6.04E-02	3.91E-03	1.07E-05	5.17E-11	4.01E-27	.00E+00	.00E+00	.00E+00	.00E+00
es255	4.67E-03	4.60E-03	9.45E-04	1.83E-04	7.10E-06	1.08E-08	3.75E-17	2.87E-31	.00E+00	.00E+00	.00E+00
0 total	2.89E+08	2.89E+08	2.54E+08	2.30E+08	2.00E+08	1.76E+08	1.53E+08	1.26E+08	1.05E+08	8.67E+07	7.20E+07
0 total	3.12E+08	3.12E+08	2.72E+08	2.42E+08	2.08E+08	1.80E+08	1.56E+08	1.29E+08	1.07E+08	8.93E+07	7.45E+07

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alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2	3.00E+00 - 6.43E+00	1.003E+07	1.002E+07	7.095E+06	5.012E+06	2.673E+06	1.086E+06	6.376E+05	6.081E+05	5.834E+05	5.595E+05	5.369E+05
3	1.85E+00 - 3.00E+00	1.120E+07	1.120E+07	8.171E+06	6.018E+06	3.605E+06	1.985E+06	1.535E+06	1.487E+06	1.443E+06	1.399E+06	1.357E+06
4	1.40E+00 - 1.85E+00	1.584E+06	1.583E+06	1.209E+06	9.435E+05	6.464E+05	4.510E+05	3.980E+05	3.873E+05	3.768E+05	3.663E+05	3.561E+05
5	9.00E-01 - 1.40E+00	5.858E+05	5.857E+05	4.686E+05	3.853E+05	2.928E+05	2.338E+05	2.185E+05	2.132E+05	2.078E+05	2.024E+05	1.971E+05
6	4.00E-01 - 9.00E-01	1.106E+05	1.106E+05	9.492E+04	8.376E+04	7.154E+04	6.441E+04	6.282E+04	6.136E+04	5.985E+04	5.834E+04	5.685E+04
7	1.00E-01 - 4.00E-01	2.012E+04	2.012E+04	1.696E+04	1.470E+04	1.222E+04	1.072E+04	1.035E+04	1.006E+04	9.771E+03	9.485E+03	9.207E+03
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		2.354E+07	2.352E+07	1.706E+07	1.246E+07	7.300E+06	3.830E+06	2.862E+06	2.767E+06	2.680E+06	2.596E+06	2.513E+06

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spontaneous fission neutron source spectrum as a function of time

0 BWR SNF Assembly - Fuel - decay
spontaneous fission neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

boundaries, mev		initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	5.460E+06	5.461E+06	4.810E+06	4.335E+06	3.775E+06	3.315E+06	2.873E+06	2.375E+06	1.967E+06	1.632E+06	1.356E+06
2	3.00E+00 - 6.43E+00	6.045E+07	6.046E+07	5.331E+07	4.811E+07	4.196E+07	3.690E+07	3.199E+07	2.644E+07	2.191E+07	1.817E+07	1.509E+07
3	1.85E+00 - 3.00E+00	6.554E+07	6.555E+07	5.777E+07	5.210E+07	4.540E+07	3.990E+07	3.459E+07	2.859E+07	2.368E+07	1.965E+07	1.632E+07
4	1.40E+00 - 1.85E+00	3.758E+07	3.759E+07	3.318E+07	2.996E+07	2.616E+07	2.302E+07	1.997E+07	1.650E+07	1.367E+07	1.134E+07	9.421E+06
5	9.00E-01 - 1.40E+00	5.151E+07	5.152E+07	4.547E+07	4.105E+07	3.583E+07	3.153E+07	2.735E+07	2.260E+07	1.873E+07	1.554E+07	1.290E+07
6	4.00E-01 - 9.00E-01	5.684E+07	5.685E+07	5.010E+07	4.519E+07	3.939E+07	3.461E+07	3.001E+07	2.480E+07	2.055E+07	1.705E+07	1.416E+07
7	1.00E-01 - 4.00E-01	1.116E+07	1.117E+07	9.834E+06	8.864E+06	7.719E+06	6.779E+06	5.875E+06	4.856E+06	4.023E+06	3.338E+06	2.772E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		2.885E+08	2.886E+08	2.545E+08	2.296E+08	2.002E+08	1.761E+08	1.526E+08	1.262E+08	1.045E+08	8.672E+07	7.202E+07

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total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

boundaries, mev		initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d

1	6.43E+00 - 2.00E+01	5.460E+06	5.461E+06	4.810E+06	4.335E+06	3.775E+06	3.315E+06	2.873E+06	2.375E+06	1.967E+06	1.632E+06	1.356E+06
2	3.00E+00 - 6.43E+00	7.048E+07	7.048E+07	6.041E+07	5.312E+07	4.463E+07	3.798E+07	3.263E+07	2.705E+07	2.249E+07	1.873E+07	1.563E+07
3	1.85E+00 - 3.00E+00	7.674E+07	7.675E+07	6.594E+07	5.812E+07	4.901E+07	4.188E+07	3.612E+07	3.007E+07	2.513E+07	2.105E+07	1.768E+07
4	1.40E+00 - 1.85E+00	3.917E+07	3.918E+07	3.439E+07	3.090E+07	2.681E+07	2.347E+07	2.037E+07	1.689E+07	1.405E+07	1.171E+07	9.777E+06
5	9.00E-01 - 1.40E+00	5.210E+07	5.211E+07	4.593E+07	4.144E+07	3.613E+07	3.177E+07	2.757E+07	2.282E+07	1.893E+07	1.574E+07	1.310E+07
6	4.00E-01 - 9.00E-01	5.695E+07	5.696E+07	5.020E+07	4.527E+07	3.946E+07	3.468E+07	3.007E+07	2.486E+07	2.061E+07	1.710E+07	1.421E+07
7	1.00E-01 - 4.00E-01	1.118E+07	1.119E+07	9.851E+06	8.879E+06	7.731E+06	6.789E+06	5.886E+06	4.866E+06	4.033E+06	3.347E+06	2.781E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		3.121E+08	3.121E+08	2.715E+08	2.421E+08	2.075E+08	1.799E+08	1.555E+08	1.289E+08	1.072E+08	8.931E+07	7.453E+07

1

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements
actinides
fission products

1 gamma source spectrum for decay step for BWR source term - fuel ds3 - discharge

0 1.00 day time of the requested nuclides

0

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.4162E+16	1.9249E+15
5.0000E-02	to	1.0000E-01	2.3152E+16	1.7364E+15
1.0000E-01	to	2.0000E-01	4.6838E+16	7.0257E+15
2.0000E-01	to	3.0000E-01	3.1805E+16	7.9513E+15
3.0000E-01	to	4.0000E-01	9.9032E+15	3.4661E+15
4.0000E-01	to	6.0000E-01	2.2217E+16	1.1108E+16
6.0000E-01	to	8.0000E-01	4.0177E+16	2.8124E+16
8.0000E-01	to	1.0000E+00	7.6288E+15	6.8659E+15
1.0000E+00	to	1.3300E+00	3.7960E+15	4.4224E+15
1.3300E+00	to	1.6600E+00	9.0799E+15	1.3575E+16
1.6600E+00	to	2.0000E+00	4.9873E+14	9.1268E+14
2.0000E+00	to	2.5000E+00	4.5102E+14	1.0148E+15
2.5000E+00	to	3.0000E+00	2.6582E+14	7.3100E+14
3.0000E+00	to	4.0000E+00	2.3112E+12	8.0893E+12
4.0000E+00	to	5.0000E+00	1.5025E+10	6.7612E+10
5.0000E+00	to	6.5000E+00	8.1917E+07	4.7102E+08
6.5000E+00	to	8.0000E+00	8.2630E+05	5.9906E+06
8.0000E+00	to	1.0000E+01	1.7537E+05	1.5783E+06

0	totals		2.5998E+17	8.8866E+16

total energy from nuclides with spectrum data = 8.8755E+16
total energy from nuclides with no spectrum data = 1.1038E+14

1 gamma source spectrum for decay step for BWR source term - fuel ds3 - 0.25 year
90.00 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.8364E+15	2.0509E+14
5.0000E-02	to	1.0000E-01	2.1373E+15	1.6030E+14
1.0000E-01	to	2.0000E-01	2.4355E+15	3.6533E+14
2.0000E-01	to	3.0000E-01	5.2061E+14	1.3015E+14
3.0000E-01	to	4.0000E-01	3.9975E+14	1.3991E+14
4.0000E-01	to	6.0000E-01	3.8963E+15	1.9482E+15
6.0000E-01	to	8.0000E-01	1.1368E+16	7.9575E+15
8.0000E-01	to	1.0000E+00	9.1011E+14	8.1910E+14
1.0000E+00	to	1.3300E+00	2.7314E+14	3.1821E+14
1.3300E+00	to	1.6600E+00	1.7232E+14	2.5762E+14
1.6600E+00	to	2.0000E+00	1.2943E+13	2.3686E+13
2.0000E+00	to	2.5000E+00	4.6314E+13	1.0421E+14
2.5000E+00	to	3.0000E+00	2.8736E+12	7.9023E+12
3.0000E+00	to	4.0000E+00	1.0040E+11	3.5140E+11
4.0000E+00	to	5.0000E+00	9.1445E+06	4.1150E+07
5.0000E+00	to	6.5000E+00	3.6681E+06	2.1091E+07
6.5000E+00	to	8.0000E+00	7.1920E+05	5.2142E+06
8.0000E+00	to	1.0000E+01	1.5265E+05	1.3739E+06
0 totals			2.9012E+16	1.2437E+16

total energy from nuclides with spectrum data = 1.2434E+16
total energy from nuclides with no spectrum data = 3.6584E+12

1 gamma source spectrum for decay step for BWR source term - fuel ds3 - 0.50 year
182.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	5.0156E+15	1.5047E+14
5.0000E-02	to	1.0000E-01	1.6326E+15	1.2245E+14
1.0000E-01	to	2.0000E-01	1.5978E+15	2.3967E+14
2.0000E-01	to	3.0000E-01	3.9684E+14	9.9211E+13
3.0000E-01	to	4.0000E-01	3.0017E+14	1.0506E+14
4.0000E-01	to	6.0000E-01	2.4445E+15	1.2223E+15
6.0000E-01	to	8.0000E-01	6.3003E+15	4.4102E+15
8.0000E-01	to	1.0000E+00	7.8948E+14	7.1053E+14
1.0000E+00	to	1.3300E+00	2.2550E+14	2.6271E+14
1.3300E+00	to	1.6600E+00	9.1287E+13	1.3647E+14
1.6600E+00	to	2.0000E+00	8.4308E+12	1.5428E+13
2.0000E+00	to	2.5000E+00	3.3613E+13	7.5630E+13
2.5000E+00	to	3.0000E+00	5.8613E+11	1.6119E+12
3.0000E+00	to	4.0000E+00	6.9464E+10	2.4312E+11
4.0000E+00	to	5.0000E+00	8.1634E+06	3.6735E+07
5.0000E+00	to	6.5000E+00	3.2749E+06	1.8831E+07
6.5000E+00	to	8.0000E+00	6.4219E+05	4.6559E+06
8.0000E+00	to	1.0000E+01	1.3632E+05	1.2268E+06
0 totals			1.8837E+16	7.5520E+15

total energy from nuclides with spectrum data = 7.5504E+15
total energy from nuclides with no spectrum data = 1.5678E+12

1 gamma source spectrum for decay step for BWR source term - fuel ds3 - 1 year
365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second

1.0000E-02 to	5.0000E-02	3.4026E+15	1.0208E+14
5.0000E-02 to	1.0000E-01	1.1128E+15	8.3460E+13
1.0000E-01 to	2.0000E-01	1.0460E+15	1.5690E+14
2.0000E-01 to	3.0000E-01	2.6959E+14	6.7397E+13
3.0000E-01 to	4.0000E-01	2.0444E+14	7.1554E+13
4.0000E-01 to	6.0000E-01	1.7403E+15	8.7016E+14
6.0000E-01 to	8.0000E-01	3.1000E+15	2.1700E+15
8.0000E-01 to	1.0000E+00	6.5355E+14	5.8820E+14
1.0000E+00 to	1.3300E+00	1.8576E+14	2.1641E+14
1.3300E+00 to	1.6600E+00	7.0428E+13	1.0529E+14
1.6600E+00 to	2.0000E+00	5.6344E+12	1.0311E+13
2.0000E+00 to	2.5000E+00	2.1784E+13	4.9014E+13
2.5000E+00 to	3.0000E+00	4.0479E+11	1.1132E+12
3.0000E+00 to	4.0000E+00	4.9316E+10	1.7261E+11
4.0000E+00 to	5.0000E+00	7.0129E+06	3.1558E+07
5.0000E+00 to	6.5000E+00	2.8139E+06	1.6180E+07
6.5000E+00 to	8.0000E+00	5.5187E+05	4.0011E+06
8.0000E+00 to	1.0000E+01	1.1716E+05	1.0544E+06
totals		1.1813E+16	4.4920E+15

total energy from nuclides with spectrum data = 4.4915E+15
total energy from nuclides with no spectrum data = 5.4261E+11
gamma source spectrum for decay step for BWR source term - fuel ds3 - 2 year
730.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.8932E+15	5.6796E+13
5.0000E-02 to	1.0000E-01	6.0276E+14	4.5207E+13
1.0000E-01 to	2.0000E-01	5.4932E+14	8.2398E+13
2.0000E-01 to	3.0000E-01	1.4438E+14	3.6096E+13
3.0000E-01 to	4.0000E-01	1.0603E+14	3.7111E+13
4.0000E-01 to	6.0000E-01	1.1302E+15	5.6512E+14
6.0000E-01 to	8.0000E-01	2.0812E+15	1.4569E+15
8.0000E-01 to	1.0000E+00	4.6043E+14	4.1439E+14
1.0000E+00 to	1.3300E+00	1.3763E+14	1.6034E+14
1.3300E+00 to	1.6600E+00	4.5029E+13	6.7318E+13
1.6600E+00 to	2.0000E+00	2.7299E+12	4.9957E+12
2.0000E+00 to	2.5000E+00	9.2423E+12	2.0795E+13
2.5000E+00 to	3.0000E+00	2.0333E+11	5.5916E+11
3.0000E+00 to	4.0000E+00	2.4959E+10	8.7357E+10
4.0000E+00 to	5.0000E+00	6.0885E+06	2.7398E+07
5.0000E+00 to	6.5000E+00	2.4433E+06	1.4049E+07
6.5000E+00 to	8.0000E+00	4.7926E+05	3.4746E+06
8.0000E+00 to	1.0000E+01	1.0175E+05	9.1576E+05
totals		7.1625E+15	2.9481E+15

total energy from nuclides with spectrum data = 2.9480E+15
total energy from nuclides with no spectrum data = 8.5582E+10
gamma source spectrum for decay step for BWR source term - fuel ds3 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	7.3171E+14	2.1951E+13
5.0000E-02 to	1.0000E-01	2.1083E+14	1.5812E+13
1.0000E-01 to	2.0000E-01	1.7622E+14	2.6433E+13
2.0000E-01 to	3.0000E-01	4.7853E+13	1.1963E+13
3.0000E-01 to	4.0000E-01	3.0605E+13	1.0712E+13
4.0000E-01 to	6.0000E-01	3.6650E+14	1.8325E+14
6.0000E-01 to	8.0000E-01	1.2929E+15	9.0501E+14
8.0000E-01 to	1.0000E+00	1.7851E+14	1.6066E+14

	1.0000E+00 to	1.3300E+00	7.7033E+13	8.9743E+13
	1.3300E+00 to	1.6600E+00	1.6407E+13	2.4528E+13
	1.6600E+00 to	2.0000E+00	3.6963E+11	6.7641E+11
	2.0000E+00 to	2.5000E+00	7.3662E+11	1.6574E+12
	2.5000E+00 to	3.0000E+00	2.6199E+10	7.2047E+10
	3.0000E+00 to	4.0000E+00	3.2467E+09	1.1363E+10
	4.0000E+00 to	5.0000E+00	5.2624E+06	2.3681E+07
	5.0000E+00 to	6.5000E+00	2.1119E+06	1.2143E+07
	6.5000E+00 to	8.0000E+00	4.1426E+05	3.0034E+06
	8.0000E+00 to	1.0000E+01	8.7952E+04	7.9156E+05
0	totals		3.1297E+15	1.4525E+15

0
0 total energy from nuclides with spectrum data = 1.4525E+15
0 total energy from nuclides with no spectrum data = 1.4545E+10
1 gamma source spectrum for decay step for BWR source term - fuel ds3 - 10 year
0 3652.50 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	5.0847E+14	1.5254E+13
	5.0000E-02 to	1.0000E-01	1.4309E+14	1.0732E+13
	1.0000E-01 to	2.0000E-01	1.1203E+14	1.6804E+13
	2.0000E-01 to	3.0000E-01	3.1539E+13	7.8847E+12
	3.0000E-01 to	4.0000E-01	1.9459E+13	6.8108E+12
	4.0000E-01 to	6.0000E-01	7.8284E+13	3.9142E+13
	6.0000E-01 to	8.0000E-01	8.9532E+14	6.2672E+14
	8.0000E-01 to	1.0000E+00	4.8764E+13	4.3888E+13
	1.0000E+00 to	1.3300E+00	4.3587E+13	5.0779E+13
	1.3300E+00 to	1.6600E+00	5.3294E+12	7.9674E+12
	1.6600E+00 to	2.0000E+00	5.9969E+10	1.0974E+11
	2.0000E+00 to	2.5000E+00	1.5331E+10	3.4495E+10
	2.5000E+00 to	3.0000E+00	1.2422E+09	3.4161E+09
	3.0000E+00 to	4.0000E+00	1.2007E+08	4.2024E+08
	4.0000E+00 to	5.0000E+00	4.3529E+06	1.9588E+07
	5.0000E+00 to	6.5000E+00	1.7468E+06	1.0044E+07
	6.5000E+00 to	8.0000E+00	3.4263E+05	2.4840E+06
	8.0000E+00 to	1.0000E+01	7.2742E+04	6.5468E+05
0	totals		1.8859E+15	8.2613E+14

0
0 total energy from nuclides with spectrum data = 8.2613E+14
0 total energy from nuclides with no spectrum data = 4.4638E+09
1 gamma source spectrum for decay step for BWR source term - fuel ds3 - 15 year
0 5478.75 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	4.3193E+14	1.2958E+13
	5.0000E-02 to	1.0000E-01	1.2316E+14	9.2373E+12
	1.0000E-01 to	2.0000E-01	9.1259E+13	1.3689E+13
	2.0000E-01 to	3.0000E-01	2.6555E+13	6.6388E+12
	3.0000E-01 to	4.0000E-01	1.6832E+13	5.8913E+12
	4.0000E-01 to	6.0000E-01	2.6082E+13	1.3041E+13
	6.0000E-01 to	8.0000E-01	7.4867E+14	5.2407E+14
	8.0000E-01 to	1.0000E+00	2.0098E+13	1.8088E+13
	1.0000E+00 to	1.3300E+00	2.7701E+13	3.2272E+13
	1.3300E+00 to	1.6600E+00	2.5104E+12	3.7531E+12
	1.6600E+00 to	2.0000E+00	4.4291E+10	8.1053E+10
	2.0000E+00 to	2.5000E+00	2.4765E+09	5.5721E+09
	2.5000E+00 to	3.0000E+00	4.4520E+08	1.2243E+09
	3.0000E+00 to	4.0000E+00	1.4246E+07	4.9860E+07
	4.0000E+00 to	5.0000E+00	3.6084E+06	1.6238E+07
	5.0000E+00 to	6.5000E+00	1.4479E+06	8.3255E+06

```
                    6.5000E+00 to      8.0000E+00       2.8399E+05       2.0589E+06
                    8.0000E+00 to      1.0000E+01       6.0290E+04       5.4261E+05
0                   totals                              1.5148E+15       6.3972E+14
0
0                   total energy from nuclides with spectrum data    =   6.3972E+14
0                   total energy from nuclides with no spectrum data =   1.4579E+09
1                   gamma source spectrum for   decay step for BWR source term - fuel ds3 - 20 year
0                                 7305.00  day time of the requested nuclides
0                        energy interval in mev       photons / second     mev / second
0
                    1.0000E-02 to      5.0000E-02       3.7541E+14       1.1262E+13
                    5.0000E-02 to      1.0000E-01       1.0879E+14       8.1591E+12
                    1.0000E-01 to      2.0000E-01       7.6484E+13       1.1473E+13
                    2.0000E-01 to      3.0000E-01       2.2782E+13       5.6954E+12
                    3.0000E-01 to      4.0000E-01       1.4794E+13       5.1778E+12
                    4.0000E-01 to      6.0000E-01       1.4411E+13       7.2057E+12
                    6.0000E-01 to      8.0000E-01       6.5583E+14       4.5908E+14
                    8.0000E-01 to      1.0000E+00       1.1468E+13       1.0321E+13
                    1.0000E+00 to      1.3300E+00       1.8193E+13       2.1195E+13
                    1.3300E+00 to      1.6600E+00       1.4481E+12       2.1649E+12
                    1.6600E+00 to      2.0000E+00       3.8469E+10       7.0399E+10
                    2.0000E+00 to      2.5000E+00       1.9326E+09       4.3484E+09
                    2.5000E+00 to      3.0000E+00       4.1150E+08       1.1316E+09
                    3.0000E+00 to      4.0000E+00       8.9918E+06       3.1471E+07
                    4.0000E+00 to      5.0000E+00       2.9948E+06       1.3477E+07
                    5.0000E+00 to      6.5000E+00       1.2016E+06       6.9094E+06
                    6.5000E+00 to      8.0000E+00       2.3567E+05       1.7086E+06
                    8.0000E+00 to      1.0000E+01       5.0030E+04       4.5027E+05
0                   totals                              1.2997E+15       5.4181E+14
0
0                   total energy from nuclides with spectrum data    =   5.4181E+14
0                   total energy from nuclides with no spectrum data =   5.4952E+08
1                   gamma source spectrum for   decay step for BWR source term - fuel ds3 - 25 year
0                                 9131.25  day time of the requested nuclides
0                        energy interval in mev       photons / second     mev / second
0
                    1.0000E-02 to      5.0000E-02       3.2898E+14       9.8695E+12
                    5.0000E-02 to      1.0000E-01       9.7060E+13       7.2795E+12
                    1.0000E-01 to      2.0000E-01       6.5026E+13       9.7540E+12
                    2.0000E-01 to      3.0000E-01       1.9694E+13       4.9234E+12
                    3.0000E-01 to      4.0000E-01       1.3035E+13       4.5624E+12
                    4.0000E-01 to      6.0000E-01       1.0698E+13       5.3491E+12
                    6.0000E-01 to      8.0000E-01       5.8084E+14       4.0659E+14
                    8.0000E-01 to      1.0000E+00       7.6141E+12       6.8527E+12
                    1.0000E+00 to      1.3300E+00       1.2143E+13       1.4146E+13
                    1.3300E+00 to      1.6600E+00       9.2108E+11       1.3770E+12
                    1.6600E+00 to      2.0000E+00       3.3716E+10       6.1700E+10
                    2.0000E+00 to      2.5000E+00       1.6974E+09       3.8191E+09
                    2.5000E+00 to      3.0000E+00       3.9432E+08       1.0844E+09
                    3.0000E+00 to      4.0000E+00       7.3782E+06       2.5824E+07
                    4.0000E+00 to      5.0000E+00       2.4885E+06       1.1198E+07
                    5.0000E+00 to      6.5000E+00       9.9840E+05       5.7408E+06
                    6.5000E+00 to      8.0000E+00       1.9580E+05       1.4195E+06
                    8.0000E+00 to      1.0000E+01       4.1564E+04       3.7407E+05
0                   totals                              1.1360E+15       4.7077E+14
0
0                   total energy from nuclides with spectrum data    =   4.7077E+14
0                   total energy from nuclides with no spectrum data =   2.7046E+08
1
1  * normal termination of execution *
```

```
0                                    table of contents for material tables
0                                      case or subcase printed      page

                                                  1                  1
0ndset          33
           33           4           1          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     19 entries read
0   74* array     19 entries read
0   75$ array     19 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0           0
           21         100          19           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero           4
            0         689         129         879
0pow             3
   .000000E+00  .000000E+00  .000000E+00
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              3.7581E+00      1.9421E+02      1.9797E+02
 start of interval flux =        1.58779E+13
 n-gamma, fission and total mev/fission =              4.1325E+00      1.9431E+02      1.9844E+02
 start of interval flux =        1.59187E+13
 n-gamma, fission and total mev/fission =              4.2236E+00      1.9441E+02      1.9863E+02
 start of interval flux =        1.59696E+13
 n-gamma, fission and total mev/fission =              4.3139E+00      1.9451E+02      1.9882E+02
 start of interval flux =        1.60310E+13
 n-gamma, fission and total mev/fission =              4.4070E+00      1.9460E+02      1.9900E+02
 start of interval flux =        1.61016E+13
 n-gamma, fission and total mev/fission =              4.5027E+00      1.9469E+02      1.9919E+02
 start of interval flux =        1.61804E+13
 n-gamma, fission and total mev/fission =              4.6007E+00      1.9477E+02      1.9937E+02
 start of interval flux =        1.62666E+13
```

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 n-gamma, fission and total mev/fission =              4.7006E+00       1.9485E+02       1.9956E+02
 start of interval flux =         1.63595E+13
 n-gamma, fission and total mev/fission =              4.8021E+00       1.9494E+02       1.9974E+02
 start of interval flux =         1.64584E+13
 n-gamma, fission and total mev/fission =              4.9050E+00       1.9502E+02       1.9992E+02
 start of interval flux =         1.65631E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
0ndset          33
            33            4            2           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 1.799989E+03 1.622187E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              4.9780E+00       1.9507E+02       2.0005E+02
 start of interval flux =         1.65139E+13
 n-gamma, fission and total mev/fission =              5.0718E+00       1.9514E+02       2.0022E+02
 start of interval flux =         1.66374E+13
 n-gamma, fission and total mev/fission =              5.1724E+00       1.9522E+02       2.0039E+02
 start of interval flux =         1.67648E+13
 n-gamma, fission and total mev/fission =              5.2749E+00       1.9529E+02       2.0057E+02
 start of interval flux =         1.68965E+13
 n-gamma, fission and total mev/fission =              5.3785E+00       1.9536E+02       2.0074E+02
 start of interval flux =         1.70324E+13
 n-gamma, fission and total mev/fission =              5.4833E+00       1.9543E+02       2.0092E+02
 start of interval flux =         1.71722E+13
 n-gamma, fission and total mev/fission =              5.5890E+00       1.9551E+02       2.0109E+02
 start of interval flux =         1.73158E+13
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 n-gamma, fission and total mev/fission =              5.6957E+00       1.9558E+02       2.0127E+02
 start of interval flux =         1.74630E+13
 n-gamma, fission and total mev/fission =              5.8033E+00       1.9565E+02       2.0145E+02
 start of interval flux =         1.76137E+13
 n-gamma, fission and total mev/fission =              5.9116E+00       1.9572E+02       2.0163E+02
 start of interval flux =         1.77677E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
0ndset          33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 3.599977E+03 1.720146E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              5.8180E+00       1.9575E+02       2.0157E+02
 start of interval flux =         1.78425E+13
 n-gamma, fission and total mev/fission =              5.9156E+00       1.9581E+02       2.0173E+02
 start of interval flux =         1.80312E+13
 n-gamma, fission and total mev/fission =              6.0266E+00       1.9588E+02       2.0190E+02
 start of interval flux =         1.82224E+13
 n-gamma, fission and total mev/fission =              6.1392E+00       1.9594E+02       2.0208E+02
 start of interval flux =         1.84164E+13
 n-gamma, fission and total mev/fission =              6.2528E+00       1.9600E+02       2.0226E+02
 start of interval flux =         1.86129E+13
 n-gamma, fission and total mev/fission =              6.3675E+00       1.9607E+02       2.0244E+02
 start of interval flux =         1.88120E+13
 n-gamma, fission and total mev/fission =              6.4830E+00       1.9613E+02       2.0262E+02
 start of interval flux =         1.90136E+13
```

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 n-gamma, fission and total mev/fission =              6.5995E+00       1.9620E+02       2.0280E+02
 start of interval flux =         1.92176E+13
 n-gamma, fission and total mev/fission =              6.7169E+00       1.9626E+02       2.0298E+02
 start of interval flux =         1.94240E+13
 n-gamma, fission and total mev/fission =              6.8352E+00       1.9633E+02       2.0316E+02
 start of interval flux =         1.96327E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
0ndset           33
            33             4             4            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935            20             6            18          1697
0mmn             19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21           689           129           879
0pow             3
  4.349999E+00 5.399966E+03 1.884016E+13
0 linp           9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              6.7684E+00       1.9638E+02       2.0315E+02
 start of interval flux =         1.97990E+13
 n-gamma, fission and total mev/fission =              6.8861E+00       1.9644E+02       2.0332E+02
 start of interval flux =         2.00429E+13
 n-gamma, fission and total mev/fission =              7.0118E+00       1.9650E+02       2.0351E+02
 start of interval flux =         2.02884E+13
 n-gamma, fission and total mev/fission =              7.1387E+00       1.9656E+02       2.0370E+02
 start of interval flux =         2.05353E+13
 n-gamma, fission and total mev/fission =              7.2664E+00       1.9662E+02       2.0389E+02
 start of interval flux =         2.07836E+13
 n-gamma, fission and total mev/fission =              7.3950E+00       1.9669E+02       2.0408E+02
 start of interval flux =         2.10332E+13
 n-gamma, fission and total mev/fission =              7.5243E+00       1.9675E+02       2.0428E+02
 start of interval flux =         2.12841E+13
```

```
 n-gamma, fission and total mev/fission =              7.6544E+00       1.9682E+02       2.0447E+02
 start of interval flux =         2.15362E+13
 n-gamma, fission and total mev/fission =              7.7851E+00       1.9688E+02       2.0467E+02
 start of interval flux =         2.17893E+13
 n-gamma, fission and total mev/fission =              7.9165E+00       1.9695E+02       2.0486E+02
 start of interval flux =         2.20436E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
0ndset          33
            33             4             5            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0             0             0             0             0             0             0             0             0             0
             0             0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935            20             6            18          1697
0mmn            19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21           689           129           879
0pow             3
  4.349999E+00 7.199954E+03 2.106112E+13
0 linp           9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              7.8538E+00       1.9700E+02       2.0486E+02
 start of interval flux =         2.22939E+13
 n-gamma, fission and total mev/fission =              7.9881E+00       1.9706E+02       2.0505E+02
 start of interval flux =         2.25901E+13
 n-gamma, fission and total mev/fission =              8.1299E+00       1.9713E+02       2.0526E+02
 start of interval flux =         2.28861E+13
 n-gamma, fission and total mev/fission =              8.2722E+00       1.9719E+02       2.0546E+02
 start of interval flux =         2.31814E+13
 n-gamma, fission and total mev/fission =              8.4149E+00       1.9725E+02       2.0567E+02
 start of interval flux =         2.34760E+13
 n-gamma, fission and total mev/fission =              8.5578E+00       1.9732E+02       2.0587E+02
 start of interval flux =         2.37697E+13
 n-gamma, fission and total mev/fission =              8.7009E+00       1.9738E+02       2.0608E+02
 start of interval flux =         2.40625E+13
```

```
 n-gamma, fission and total mev/fission =              8.8440E+00       1.9745E+02       2.0629E+02
 start of interval flux =         2.43542E+13
 n-gamma, fission and total mev/fission =              8.9872E+00       1.9751E+02       2.0650E+02
 start of interval flux =         2.46449E+13
 n-gamma, fission and total mev/fission =              9.1304E+00       1.9758E+02       2.0671E+02
 start of interval flux =         2.49343E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
0ndset          33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 8.999942E+03 2.379376E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              9.2868E+00       1.9765E+02       2.0694E+02
 start of interval flux =         2.52490E+13
 n-gamma, fission and total mev/fission =              9.4463E+00       1.9773E+02       2.0717E+02
 start of interval flux =         2.55705E+13
 n-gamma, fission and total mev/fission =              9.6064E+00       1.9780E+02       2.0741E+02
 start of interval flux =         2.58899E+13
 n-gamma, fission and total mev/fission =              9.7660E+00       1.9788E+02       2.0764E+02
 start of interval flux =         2.62071E+13
 n-gamma, fission and total mev/fission =              9.9252E+00       1.9795E+02       2.0788E+02
 start of interval flux =         2.65219E+13
 n-gamma, fission and total mev/fission =              1.0084E+01       1.9803E+02       2.0811E+02
 start of interval flux =         2.68342E+13
 n-gamma, fission and total mev/fission =              1.0242E+01       1.9810E+02       2.0834E+02
 start of interval flux =         2.71438E+13
```

```
 n-gamma, fission and total mev/fission =              1.0399E+01       1.9817E+02       2.0857E+02
 start of interval flux =         2.74503E+13
 n-gamma, fission and total mev/fission =              1.0555E+01       1.9825E+02       2.0880E+02
 start of interval flux =         2.77537E+13
 n-gamma, fission and total mev/fission =              1.0710E+01       1.9832E+02       2.0903E+02
 start of interval flux =         2.80537E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 55000 MWd/MTU
0ndset           33
           33            4            5           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  87495
     used   107477 in size   150000
0jopt            12
            0            0            0            0            0            0            0            0            0            0
            0            0
0therm            4
 4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
         7935           20            6           18          697
0mmn             19
            0           10            0            0            1            1            0            0            0           10
           21          100            0            4            3            0            2            0            0
0tconst           5
 8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero            4
           21          689          129          879
0pow              3
 4.349999E+00 1.099993E+04 2.077211E+13
0 linp            9
            6            2            0           26            1        18418         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Fuel - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
*                                                                               *
*                     scale4.2  bulletin  board                                 *
*                     --------  --------  -----                                 *
*                                                                               *
*      welcome to the configuration controlled version of scale4.2.             *
*      any problems should be reported to kay martin at 4-9213.                 *
*                                                                               *
*      updates that have been made from version 4.1 to 4.2 include:             *
*                                                                               *
*      nitawl:  parameter added to prevent exponent underflows for very         *
*      dilute resonance calculations on workstation.  (mrr 93-011)              *
*                                                                               *
*      nitawl:   corrected discrepancies in maximum fractional energy loss      *
*      of neutron in admixed moderator calculation and simpson rule             *
*      calculation of collision density as documented in "improved              *
*      calculation of flux shapes with the resonance shielding code             *
*      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
*      impact will vary, but is insignificant for hydrogen-moderated            *
*      systems. (mrr 93-030)                                                    *
*                                                                               *
*      sas4:  added option of axial source profile input for both radial        *
*      and axial dose calculations. also added option idr = 2 for               *
*      estimation to point detectors from collisions in both top and            *
*      bottom halves of geometry.  (mrr 92-016)                                 *
*                                                                               *
*      morse:  modifications made for compatibility with the new options in     *
*      sas4 (i.e., the axial source profile input option and                    *
*      the option idr = 2 for estimation to point detectors from collisions     *
*      in both top and bottom halves of geometry).  (mrr 92-016)                *
*                                                                               *
*      csas & keno-v.a:  error checking during input processing was added       *
*      so that these modules terminate with an error message if input           *
*      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
*                                                                               *
*      keno-v.a:  corrections made for applying differential albedo             *
*      boundary conditions to supergrouped problems where global unit           *
*      contains only an array specification.  effect on keff is very large      *
*      for this type of problem.  (mrr 93-033)                                  *
*                                                                               *
*      keno-v.a:  corrected an error introduced with modification on may 24,    *
*      1993 (mrr 93-033). this error affected problems with mirror or           *
*      periodic boundary conditions and could cause problem to loop, fail,      *
*      or run incorrectly.                                                      *
*                                                                               *
*      xsdrnpm:  corrected calculation of number of direct access data          *
*      blocks needed to weight the cross sections to prevent occasional         *
*      failure.  improved calculation of balance tables.  (mrr 93-021)          *
*                                                                               *
*      origen-s:  modified program to read combined binary libraries that       *
*      include multi-cycle cross sections.  add option to edit binary           *
*      library.  (mrr 93-026)                                                   *
*                                                                               *
*      sas2:  modified to produce combined binary libraries for origen-s.       *
*      (mrr 93-027)                                                             *
*                                                                               *
*      couple:  modified to allow combined binary libraries tc be made by       *
*      sas2.  (mrr 93-031)                                                      *
*                                                                               *
*      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
       0$$  a4 33 a8 26 e
       1$$  1
          1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     8000     140000
       240000    250000    260000
       280000    400000    500000
74**     89.4    10100.0      46.5  189764.1
          0.2       0.2      17.8
        193.8      12.7     672.9
        122.3     171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 55000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.181818 e
   5t
BWR SNF Assembly - Bottom - deplete to 55000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Bottom - decay
per ONE BWR Fuel Assembly - Bottom Region - ds3b
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - bot ds3 - discharge
  decay step for BWR source term - bot ds3 - 0.25 year
  decay step for BWR source term - bot ds3 - 0.50 year
  decay step for BWR source term - bot ds3 - 1 year
  decay step for BWR source term - bot ds3 - 2 year
  decay step for BWR source term - bot ds3 - 5 year
  decay step for BWR source term - bot ds3 - 10 year
  decay step for BWR source term - bot ds3 - 15 year
  decay step for BWR source term - bot ds3 - 20 year
  decay step for BWR source term - bot ds3 - 25 year
56$$ f0
   5t
```

```
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1   ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
   oooooooooooo   rrrrrrrrrrrrr   iiiiiiiiiiii    ggggggggggggg   eeeeeeeeeeeee   nnn         nn  sssssssssssss
   oo         oo   rr         rr        ii        gg         gg   ee              nnnn        nn  ss         ss
   oo         oo   rr         rr        ii        gg              ee              nn nn       nn  ss
   oo         oo   rr         rr        ii        gg              ee              nn   nn     nn  ss
   oo         oo   rrrrrrrrrrrrr        ii        gg    ggggggg   eeeeeeeee       nn    nn    nn  sssssssssssss
   oo         oo   rrrrrrrrrrrrr        ii        gg    ggggggg   eeeeeeeee       nn     nn   nn   sssssssssssss
   oo         oo   rr       rr          ii        gg         gg   ee              nn      nn  nn             ss
   oo         oo   rr        rr         ii        gg         gg   ee              nn       nn nn             ss
   oo         oo   rr         rr        ii        gg         gg   ee              nn        nnnn  ss         ss
   oooooooooooo   rr          rr  iiiiiiiiiiii    ggggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
    ooooooooooo   rr          rr  iiiiiiiiiiii     gggggggggggg   eeeeeeeeeeeee   nn          nn   sssssssssss
0

   ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
   ll             oooooooooooooo  tttttttttttt    zzzzzzzzzzzz
   ll             oo         oo        tt                   zz
   ll             oo         oo        tt                  zz
   ll             oo         oo        tt                 zz
   ll             oo         oo        tt                zz
   ll             oo         oo        tt               zz
   ll             oo         oo        tt              zz
   ll             oo         oo        tt             zz
   lllllllllllll  oooooooooooooo        tt          zzzzzzzzzzzzz
   lllllllllllll   ooooooooooo          tt         zzzzzzzzzzzzz
0

        11        22222222222                //     0000000      666666666666              //   99999999999    666666666666
       111       2222222222222               //    000000000    6666666666666             //   9999999999999  6666666666666
      1111       22         22              //    00       00   66                        //   99         99  66
        11                  22             //    00         00  66                       //    99         99  66
        11                  22            //     00         00  66                      //     99         99  66
        11                22              //      00         00  666666666666          //      9999999999999  666666666666
        11               22              //       00         00  6666666666666        //       999999999999  6666666666666
        11             22               //        00         00  66         66       //                  99  66         66
        11           22                //         00         00  66         66      //                   99  66         66
        11         22                 //          00       00   66         66     //                    99  66         66
     11111111    2222222222222      //            000000000    6666666666666    //           9999999999999  6666666666666
     11111111    2222222222222     //              0000000      66666666666    //            999999999999    66666666666
0

        11             11                          0000000      99999999999                    33333333333            44
       111            111                         000000000    9999999999999                  3333333333333          444
      1111           1111              :::       00       00   99         99        :::       33         33         4444
        11             11              :::      00         00  99         99        :::                 33        44 44
        11             11              :::      00         00  99         99        :::                 33       44  44
        11             11                       00         00  9999999999999                          333      44   44
        11             11                       00         00   999999999999                          333     44    44
        11             11              :::      00         00              99        :::                 33   444444444444
        11             11              :::      00         00              99        :::                 33  4444444444444
        11             11              :::       00       00              99        :::       33         33           44
     11111111       11111111                     000000000    9999999999999                  3333333333333           44
     11111111       11111111                      0000000     999999999999                    33333333333           44
1
0                                 sssssssssss    cccccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                 sssssssssssss  cccccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
                                 ss         ss  cc         cc   aa         aa  ll              ee
                                 ss             cc              aa         aa  ll              ee
```

```
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
           ss   cc              aa         aa   ll              ee
           ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     cccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  11:09:34                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1636364 e
```

```
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     8000    140000
       240000    250000    260000
       280000    400000    500000
74**     89.4    10100.0      46.5  189764.1
          0.2       0.2      17.8
        193.8      12.7     672.9
        122.3     171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds3b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
```

```
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1636364 e
    5t
 BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Bottom Region - ds3b
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 55000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.181818 e
    5t
 BWR SNF Assembly - Bottom - deplete to 55000 MWd/MTU
 per ONE BWR Fuel Assembly - Bottom Region - ds3b
 58** 10r4.35
 60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Bottom - decay
 per ONE BWR Fuel Assembly - Bottom Region - ds3b
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - bot ds3 - discharge
   decay step for BWR source term - bot ds3 - 0.25 year
   decay step for BWR source term - bot ds3 - 0.50 year
   decay step for BWR source term - bot ds3 - 1 year
   decay step for BWR source term - bot ds3 - 2 year
   decay step for BWR source term - bot ds3 - 5 year
   decay step for BWR source term - bot ds3 - 10 year
   decay step for BWR source term - bot ds3 - 15 year
   decay step for BWR source term - bot ds3 - 20 year
   decay step for BWR source term - bot ds3 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0     0$ array      12 entries read
0     1$ array       1 entries read
0     1t
0          dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0              short-lived split test fraction, qxn =    9.1188E-04
```

```
0            half-norm of matrix used, axn =    7.0000E+00
0            4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
```

```
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
```

```
          pass n applies mid time densities of nth library interval
         first library updated was...
         ********************************************************************************
         *                                                                              *
         *            prelim lwr origen-s binary working library--id = 1143             *
         *          made from modified card-image origen-s libraries of scale 4.2       *
         *       data from the light element, actinide, and fission product libraries   *
         *         decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                              *
         *       neutron flux spectrum factors and cross sections were produced from    *
         *      the "presas2" case updating all nuclides on the scale "burnup" library  *
         *                                                                              *
         *                   fission product yields are from endf/b-v                   *
         *                                                                              *
         *              photon libraries use an 18-energy-group structure               *
         *             the photon data are from the master photon data base,            *
         *              produced to include bremsstrahlung from uo2 matrix              *
         *                                                                              *
         *        see information above this box (if present) for later updates         *
         *                                                                              *
         ********************************************************************************
         *                                                                              *
0        ********************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0               7/ 9/1993     date library was produced
0                  1697     total number of nuclides in library
                    689     number of light-element nuclides
                    129     number of actinide nuclides
                    879     number of fission product nuclides
0                  7935     number of nonzero off-diagonal matrix elements
0        ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  4 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ********************************************************************************
         *                                                                              *
         *            prelim lwr origen-s binary working library--id = 1143             *
         *          made from modified card-image origen-s libraries of scale 4.2       *
         *       data from the light element, actinide, and fission product libraries   *
         *         decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                              *
         *       neutron flux spectrum factors and cross sections were produced from    *
```

```
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
```

```
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
0                      7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
```

```
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *      data from the light element, actinide, and fission product libraries  *
          *        decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
    BWR SNF Assembly - Bottom - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Bottom Regio
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     h  1   2.98E-03  2.98E-03  2.98E-03  2.98E-03  2.98E-03  2.98E-03  2.98E-03  2.98E-03  2.98E-03  2.98E-03  2.98E-03
     h  2   3.95E-06  3.95E-06  3.95E-06  3.95E-06  3.95E-06  3.95E-06  3.95E-06  3.95E-06  3.95E-06  3.95E-06  3.95E-06
     h  3   8.54E-10  8.53E-10  8.42E-10  8.30E-10  8.07E-10  7.63E-10  6.44E-10  4.87E-10  3.67E-10  2.77E-10  2.09E-10
```

he 3	3.83E-11	3.85E-11	5.01E-11	6.20E-11	8.50E-11	1.29E-10	2.48E-10	4.05E-10	5.25E-10	6.15E-10	6.83E-10
he 4	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03	1.42E-03
li 6	2.14E-10	2.14E-10	2.14E-10	2.14E-10	2.14E-10	2.14E-10	2.14E-10	2.14E-10	2.14E-10	2.14E-10	2.14E-10
li 7	1.80E-13	1.80E-13	1.80E-13	1.80E-13	1.80E-13	1.80E-13	1.80E-13	1.80E-13	1.80E-13	1.80E-13	1.80E-13
be 9	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06	2.90E-06
be 10	6.39E-08	6.39E-08	6.39E-08	6.39E-08	6.39E-08	6.39E-08	6.39E-08	6.39E-08	6.39E-08	6.39E-08	6.39E-08
b 10	9.18E-15	9.26E-15	1.60E-14	2.30E-14	3.69E-14	6.46E-14	1.48E-13	2.86E-13	4.25E-13	5.63E-13	7.02E-13
b 11	7.96E-14	7.96E-14	7.96E-14	7.96E-14	7.96E-14	7.96E-14	7.96E-14	7.96E-14	7.96E-14	7.96E-14	7.96E-14
c 12	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
c 13	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03
c 14	1.09E-08	1.09E-08	1.09E-08	1.09E-08	1.09E-08	1.09E-08	1.09E-08	1.09E-08	1.09E-08	1.09E-08	1.09E-08
n 14	4.09E-12	4.09E-12	4.42E-12	4.75E-12	5.41E-12	6.73E-12	1.07E-11	1.73E-11	2.39E-11	3.05E-11	3.71E-11
ne 20	3.56E-15	3.56E-15	3.56E-15	3.56E-15	3.56E-15	3.56E-15	3.56E-15	3.56E-15	3.56E-15	3.56E-15	3.56E-15
ne 22	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08	1.43E-08
na 23	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09
na 24	4.12E-15	1.33E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	4.14E-12	4.15E-12	4.15E-12	4.15E-12	4.15E-12	4.15E-12	4.15E-12	4.15E-12	4.15E-12	4.15E-12	4.15E-12
mg 25	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04	1.43E-04
mg 26	6.57E-05	6.57E-05	6.57E-05	6.57E-05	6.57E-05	6.57E-05	6.57E-05	6.57E-05	6.57E-05	6.57E-05	6.57E-05
al 27	7.09E-07	7.09E-07	7.09E-07	7.09E-07	7.09E-07	7.09E-07	7.09E-07	7.09E-07	7.09E-07	7.09E-07	7.09E-07
si 28	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01
si 29	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01
si 30	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01
si 31	2.15E-08	3.78E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	1.74E-11	1.74E-11	1.74E-11	1.73E-11	1.73E-11	1.72E-11	1.70E-11	1.67E-11	1.64E-11	1.60E-11	1.57E-11
p 31	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04	2.53E-04
p 32	2.39E-09	2.27E-09	3.01E-11	3.39E-13	3.98E-15	3.91E-15	3.87E-15	3.79E-15	3.71E-15	3.64E-15	3.57E-15
p 33	5.32E-13	5.17E-13	4.53E-14	3.61E-15	2.43E-17	1.11E-21	1.06E-34	.00E+00	.00E+00	.00E+00	.00E+00
s 32	1.06E-07	1.06E-07	1.09E-07	1.09E-07	1.09E-07	1.09E-07	1.09E-07	1.09E-07	1.09E-07	1.09E-07	1.09E-07
s 33	3.43E-11	3.44E-11	3.48E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11
ca 44	2.21E-09	2.21E-09	2.21E-09	2.21E-09	2.21E-09	2.21E-09	2.21E-09	2.21E-09	2.21E-09	2.21E-09	2.21E-09
ca 45	6.97E-13	6.94E-13	4.76E-13	3.22E-13	1.48E-13	3.16E-14	3.06E-16	1.35E-19	5.92E-23	2.60E-26	1.14E-29
ca 46	7.48E-10	7.48E-10	7.48E-10	7.48E-10	7.48E-10	7.48E-10	7.48E-10	7.48E-10	7.48E-10	7.48E-10	7.48E-10
ca 47	1.75E-14	1.50E-14	1.86E-20	1.35E-26	1.01E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.73E-12	1.74E-12	1.95E-12	2.11E-12	2.28E-12	2.40E-12	2.43E-12	2.43E-12	2.43E-12	2.43E-12	2.43E-12
sc 46	7.29E-15	7.23E-15	3.46E-15	1.61E-15	3.56E-16	1.73E-17	2.01E-21	5.54E-28	1.53E-34	4.21E-41	.00E+00
sc 47	4.84E-11	3.93E-11	4.36E-19	3.98E-26	1.45E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	1.65E-10	1.13E-10	2.17E-25	1.10E-40	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	2.62E-14	2.63E-14	3.00E-14	3.19E-14	3.31E-14	3.35E-14	3.35E-14	3.35E-14	3.35E-14	3.35E-14	3.35E-14
ti 47	6.40E-05	6.40E-05	6.40E-05	6.40E-05	6.40E-05	6.40E-05	6.40E-05	6.40E-05	6.40E-05	6.40E-05	6.40E-05
ti 48	2.85E-07	2.85E-07	2.85E-07	2.85E-07	2.85E-07	2.85E-07	2.85E-07	2.85E-07	2.85E-07	2.85E-07	2.85E-07
ti 49	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04
ti 50	6.95E-04	6.95E-04	6.95E-04	6.95E-04	6.95E-04	6.95E-04	6.95E-04	6.95E-04	6.95E-04	6.95E-04	6.95E-04
v 50	2.33E-03	2.33E-03	2.33E-03	2.33E-03	2.33E-03	2.33E-03	2.33E-03	2.33E-03	2.33E-03	2.33E-03	2.33E-03
v 51	3.74E-01	3.74E-01	3.81E-01	3.82E-01	3.82E-01	3.82E-01	3.82E-01	3.82E-01	3.82E-01	3.82E-01	3.82E-01
cr 50	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00	7.72E+00
cr 51	8.14E-03	7.94E-03	8.57E-04	8.47E-05	8.76E-07	9.43E-11	1.17E-22	1.72E-42	.00E+00	.00E+00	.00E+00
cr 52	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02
cr 53	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01	1.82E+01

1

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cr 54	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00
mn 54	6.95E-03	6.94E-03	5.69E-03	4.64E-03	3.09E-03	1.37E-03	1.20E-04	2.09E-06	3.62E-08	6.27E-10	1.09E-11
mn 55	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.22E+01	1.22E+01	1.22E+01	1.23E+01	1.23E+01	1.23E+01
mn 56	6.06E-05	9.56E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01	3.75E+01
fe 55	1.38E-01	1.38E-01	1.29E-01	1.21E-01	1.07E-01	8.28E-02	3.87E-02	1.09E-02	3.05E-03	8.57E-04	2.41E-04

fe 56	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02
fe 57	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01	1.97E+01
fe 58	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00	2.22E+00
fe 59	3.51E-04	3.46E-04	8.64E-05	2.05E-05	1.19E-06	4.02E-09	1.56E-16	6.89E-29	3.05E-41	.00E+00	.00E+00
co 58m	2.32E-11	3.75E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.42E-03	3.39E-03	1.42E-03	5.75E-04	9.63E-05	2.71E-06	6.05E-11	1.07E-18	1.89E-26	3.35E-34	5.93E-42
co 59	5.25E-02	5.25E-02	5.28E-02	5.29E-02	5.29E-02	5.29E-02	5.29E-02	5.30E-02	5.30E-02	5.31E-02	5.31E-02
co 60	4.57E-03	4.57E-03	4.43E-03	4.28E-03	4.01E-03	3.52E-03	2.37E-03	1.23E-03	6.36E-04	3.30E-04	1.71E-04
co 61	4.90E-09	2.05E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01	8.12E+01
ni 59	9.17E-01	9.17E-01	9.17E-01	9.17E-01	9.17E-01	9.17E-01	9.17E-01	9.17E-01	9.17E-01	9.17E-01	9.17E-01
ni 60	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01	3.25E+01
ni 61	1.71E+00	1.71E+00	1.71E+00	1.71E+00	1.71E+00	1.71E+00	1.71E+00	1.71E+00	1.71E+00	1.71E+00	1.71E+00
ni 62	4.45E+00	4.45E+00	4.45E+00	4.45E+00	4.45E+00	4.45E+00	4.45E+00	4.45E+00	4.45E+00	4.45E+00	4.45E+00
ni 63	1.87E-01	1.87E-01	1.87E-01	1.87E-01	1.86E-01	1.85E-01	1.81E-01	1.75E-01	1.69E-01	1.63E-01	1.58E-01
ni 64	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
ni 65	5.18E-07	7.03E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	6.73E-11	4.96E-11	8.35E-23	4.84E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	4.05E-03	4.05E-03	4.37E-03	4.70E-03	5.34E-03	6.63E-03	1.04E-02	1.66E-02	2.25E-02	2.83E-02	3.38E-02
cu 64	3.09E-08	8.33E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	6.29E-03	6.29E-03	6.29E-03	6.29E-03	6.29E-03	6.29E-03	6.29E-03	6.29E-03	6.29E-03	6.29E-03	6.29E-03
cu 66	1.56E-10	7.74E-14	1.30E-25	7.54E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	9.49E-14	7.25E-14	2.89E-24	4.50E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05	1.04E-05
zn 65	5.02E-09	5.01E-09	3.89E-09	2.99E-09	1.78E-09	6.29E-10	2.79E-11	1.56E-13	8.66E-16	4.82E-18	2.68E-20
zn 66	2.83E-05	2.83E-05	2.83E-05	2.83E-05	2.83E-05	2.83E-05	2.83E-05	2.83E-05	2.83E-05	2.83E-05	2.83E-05
zn 67	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08	3.07E-08
zn 68	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10
ga 69	6.18E-13	6.19E-13	6.19E-13	6.19E-13	6.19E-13	6.19E-13	6.19E-13	6.19E-13	6.19E-13	6.19E-13	6.19E-13
ge 70	3.15E-15	3.15E-15	3.15E-15	3.15E-15	3.15E-15	3.15E-15	3.15E-15	3.15E-15	3.15E-15	3.15E-15	3.15E-15
sr 87	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06	3.77E-06
sr 88	3.69E-04	3.69E-04	3.69E-04	3.69E-04	3.69E-04	3.69E-04	3.69E-04	3.69E-04	3.69E-04	3.69E-04	3.69E-04
sr 89	1.06E-06	1.05E-06	3.09E-07	8.69E-08	7.09E-09	4.74E-11	1.42E-17	1.89E-28	2.53E-39	.00E+00	.00E+00
sr 90	1.89E-08	1.89E-08	1.88E-08	1.87E-08	1.85E-08	1.80E-08	1.67E-08	1.48E-08	1.31E-08	1.16E-08	1.02E-08
sr 91	1.65E-09	2.87E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	2.71E-05	2.71E-05	2.79E-05	2.81E-05	2.82E-05	2.82E-05	2.82E-05	2.82E-05	2.82E-05	2.82E-05	2.82E-05
y 90	2.09E-06	1.61E-06	4.89E-12	4.86E-12	4.80E-12	4.68E-12	4.35E-12	3.84E-12	3.40E-12	3.00E-12	2.66E-12
y 91	3.17E-06	3.13E-06	1.09E-06	3.65E-07	4.18E-08	5.52E-10	1.27E-15	5.10E-25	2.05E-34	1.28E-43	.00E+00
y 92	7.01E-09	6.37E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	4.01E-12	7.83E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01
zr 91	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
zr 92	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01
zr 93	5.75E-02	5.75E-02	5.75E-02	5.75E-02	5.75E-02	5.75E-02	5.75E-02	5.75E-02	5.75E-02	5.75E-02	5.75E-02
zr 94	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01
zr 95	1.10E-03	1.09E-03	4.17E-04	1.53E-04	2.12E-05	4.05E-07	2.85E-12	7.37E-21	1.90E-29	4.92E-38	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 96	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00
zr 97	1.91E-05	7.13E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	4.24E-14	4.24E-14	4.24E-14	4.24E-14	4.24E-14	4.24E-14	4.24E-14	4.24E-14	4.24E-14	4.24E-14	4.24E-14
nb 93	7.24E-09	7.25E-09	8.07E-09	8.98E-09	1.09E-08	1.56E-08	3.48E-08	8.22E-08	1.46E-07	2.22E-07	3.09E-07
nb 93m	7.50E-08	7.50E-08	8.06E-08	8.62E-08	9.73E-08	1.19E-07	1.78E-07	2.61E-07	3.27E-07	3.81E-07	4.25E-07
nb 94	3.24E-11	3.24E-11	3.24E-11	3.24E-11	3.24E-11	3.24E-11	3.24E-11	3.23E-11	3.23E-11	3.23E-11	3.23E-11
nb 95	5.95E-04	5.95E-04	3.78E-04	1.64E-04	2.49E-05	5.03E-07	3.43E-12	8.87E-21	2.29E-29	6.57E-40	.00E+00
nb 95m	7.16E-07	7.11E-07	2.76E-07	1.02E-07	1.40E-08	2.69E-10	1.89E-15	4.89E-24	1.26E-32	.00E+00	.00E+00
nb 96	1.48E-08	7.25E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

nb 97	1.36E-06	5.09E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.78E-08	6.67E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	1.41E-15	1.41E-15	1.68E-15	1.96E-15	2.51E-15	3.62E-15	6.93E-15	1.25E-14	1.80E-14	2.35E-14	2.90E-14
mo 95	2.00E-02	2.00E-02	2.09E-02	2.14E-02	2.16E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02
mo 96	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03	1.56E-03
mo 97	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02	3.59E-02
mo 98	4.73E-04	4.73E-04	4.73E-04	4.73E-04	4.73E-04	4.73E-04	4.73E-04	4.73E-04	4.73E-04	4.73E-04	4.73E-04
mo 99	9.34E-09	7.25E-09	1.29E-18	9.46E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10	1.09E-10
tc 98	1.07E-12	1.07E-12	1.07E-12	1.07E-12	1.07E-12	1.07E-12	1.07E-12	1.07E-12	1.07E-12	1.07E-12	1.07E-12
tc 99	1.66E-07	1.67E-07	1.68E-07	1.68E-07	1.68E-07	1.68E-07	1.68E-07	1.68E-07	1.68E-07	1.68E-07	1.68E-07
ru 99	7.88E-13	7.89E-13	9.23E-13	1.06E-12	1.34E-12	1.89E-12	3.54E-12	6.29E-12	9.04E-12	1.18E-11	1.45E-11
ru100	1.45E-08	1.45E-08	1.45E-08	1.45E-08	1.45E-08	1.45E-08	1.45E-08	1.45E-08	1.45E-08	1.45E-08	1.45E-08
ru101	7.78E-11	7.78E-11	7.78E-11	7.78E-11	7.78E-11	7.78E-11	7.78E-11	7.78E-11	7.78E-11	7.78E-11	7.78E-11
ru102	1.52E-12	1.52E-12	1.52E-12	1.52E-12	1.52E-12	1.52E-12	1.52E-12	1.52E-12	1.52E-12	1.52E-12	1.52E-12
cd111	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09
cd112	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08
cd113	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.59E-11	8.59E-11	8.59E-11	8.59E-11
cd113m	1.14E-10	1.14E-10	1.13E-10	1.11E-10	1.08E-10	1.03E-10	8.91E-11	6.97E-11	5.45E-11	4.26E-11	3.33E-11
cd114	4.25E-06	4.26E-06	4.46E-06	4.53E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06
cd115	1.79E-10	1.31E-10	1.24E-22	3.94E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	3.89E-10	3.83E-10	9.61E-11	2.28E-11	1.33E-12	4.56E-15	1.83E-22	8.61E-35	.00E+00	.00E+00	.00E+00
cd116	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08
cd117	1.66E-12	2.08E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	9.31E-04	9.32E-04	9.69E-04	9.92E-04	1.01E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03
in113m	5.50E-08	5.47E-08	3.20E-08	1.83E-08	6.10E-09	6.76E-10	9.20E-13	1.54E-17	2.57E-22	4.31E-27	7.20E-32
in114	1.57E-10	9.85E-11	2.84E-11	7.77E-12	6.01E-13	3.62E-15	7.88E-22	6.22E-33	.00E+00	.00E+00	.00E+00
in114m	6.21E-06	6.13E-06	1.76E-06	4.83E-07	3.74E-08	2.25E-10	4.90E-17	3.86E-28	3.05E-39	.00E+00	.00E+00
in115	9.49E-09	9.49E-09	9.78E-09	9.85E-09	9.87E-09	9.88E-09	9.88E-09	9.88E-09	9.88E-09	9.88E-09	9.88E-09
in117	5.47E-12	1.34E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.18E-12	6.93E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02
sn113	9.16E-05	9.11E-05	5.33E-05	3.05E-05	1.02E-05	1.13E-06	1.53E-09	2.56E-14	4.29E-19	7.17E-24	1.20E-28
sn114	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02
sn115	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03
sn116	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
sn117m	5.74E-05	5.46E-05	5.85E-07	5.24E-09	4.72E-13	3.88E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
sn119	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
sn119m	1.11E-03	1.11E-03	9.00E-04	7.23E-04	4.69E-04	1.98E-04	1.48E-05	1.97E-07	2.62E-09	3.49E-11	4.64E-13
sn120	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01
sn121	1.66E-06	8.98E-07	5.83E-10	5.81E-10	5.78E-10	5.71E-10	5.49E-10	5.16E-10	4.84E-10	4.55E-10	4.27E-10

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BWR SNF Assembly - Bottom - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sn121m	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.33E-05	1.31E-05	1.26E-05	1.18E-05	1.11E-05	1.04E-05	9.81E-06
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.79E-05	1.78E-05	1.10E-05	6.71E-06	2.52E-06	3.55E-07	9.91E-10	5.49E-14	3.04E-18	1.69E-22	9.36E-27
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	2.76E-07	2.56E-07	4.26E-10	5.51E-13	1.08E-18	4.25E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03
sb122	7.96E-07	6.16E-07	7.37E-17	3.59E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.61E-04	1.61E-04	1.68E-04	1.72E-04	1.77E-04	1.79E-04	1.79E-04	1.79E-04	1.79E-04	1.79E-04	1.79E-04
sb124	1.04E-06	1.03E-06	3.68E-07	1.27E-07	1.55E-08	2.31E-10	7.64E-16	5.63E-25	4.15E-34	3.48E-43	.00E+00
sb125	6.43E-04	6.42E-04	6.04E-04	5.66E-04	4.99E-04	3.87E-04	1.81E-04	5.08E-05	1.43E-05	4.01E-06	1.13E-06
sb126	9.36E-08	8.85E-08	6.10E-10	3.46E-12	1.26E-16	1.70E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04	1.92E-04

te123	1.75E-06	1.75E-06	1.97E-06	2.10E-06	2.22E-06	2.27E-06	2.28E-06	2.28E-06	2.28E-06	2.28E-06	2.28E-06
te123m	5.31E-07	5.27E-07	3.15E-07	1.84E-07	6.40E-08	7.71E-09	1.35E-11	3.45E-16	8.78E-21	2.24E-25	5.70E-30
te124	1.46E-05	1.47E-05	1.53E-05	1.56E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05
te125	6.14E-04	6.14E-04	6.53E-04	6.91E-04	7.59E-04	8.73E-04	1.08E-03	1.21E-03	1.25E-03	1.26E-03	1.26E-03
te125m	8.36E-06	8.37E-06	8.32E-06	7.96E-06	7.08E-06	5.50E-06	2.57E-06	7.21E-07	2.03E-07	5.69E-08	1.60E-08
te126	1.91E-05	1.91E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05
te127	8.97E-11	2.31E-11	5.47E-12	3.04E-12	9.50E-13	9.31E-14	8.77E-17	7.94E-22	7.18E-27	6.50E-32	5.90E-37
te127m	2.77E-09	2.75E-09	1.56E-09	8.68E-10	2.71E-10	2.66E-11	2.51E-14	2.27E-19	2.05E-24	1.86E-29	1.68E-34
te128	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10
te129m	2.75E-15	2.69E-15	4.29E-16	6.36E-17	1.47E-18	7.83E-22	1.19E-31	.00E+00	.00E+00	.00E+00	.00E+00
i127	9.58E-08	9.59E-08	9.71E-08	9.78E-08	9.84E-08	9.87E-08	9.87E-08	9.87E-08	9.87E-08	9.87E-08	9.87E-08
i129	3.39E-13	3.39E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13
xe127	2.17E-15	2.13E-15	3.92E-16	6.73E-17	2.07E-18	1.98E-21	1.72E-30	.00E+00	.00E+00	.00E+00	.00E+00
xe128	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09
xe129	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11
xe129m	4.50E-14	4.16E-14	4.03E-17	2.98E-20	1.93E-26	8.27E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	9.42E-13	9.42E-13	9.42E-13	9.42E-13	9.42E-13	9.42E-13	9.42E-13	9.42E-13	9.42E-13	9.42E-13	9.42E-13
xe131	2.40E-15	2.40E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15
total	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03

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BWR SNF Assembly - Bottom - decay light elements page 5

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	8.25E-06	8.25E-06	8.14E-06	8.02E-06	7.80E-06	7.38E-06	6.23E-06	4.70E-06	3.55E-06	2.68E-06	2.02E-06
be 10	1.43E-09	1.43E-09	1.43E-09	1.43E-09	1.43E-09	1.43E-09	1.43E-09	1.43E-09	1.43E-09	1.43E-09	1.43E-09
c 14	4.87E-08	4.87E-08	4.87E-08	4.87E-08	4.87E-08	4.87E-08	4.86E-08	4.86E-08	4.86E-08	4.86E-08	4.85E-08
na 24	3.67E-08	1.18E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.18E-12	5.31E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	3.04E+00	5.32E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	8.29E-01	1.46E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.12E-09	1.12E-09	1.11E-09	1.08E-09	1.06E-09	1.04E-09	1.02E-09
p 32	6.84E-04	6.51E-04	8.61E-06	9.71E-08	1.14E-09	1.12E-09	1.11E-09	1.08E-09	1.06E-09	1.04E-09	1.02E-09
p 33	8.31E-08	8.08E-08	7.08E-09	5.64E-10	3.80E-12	1.74E-16	1.66E-29	.00E+00	.00E+00	.00E+00	.00E+00
k 42	6.32E-15	1.65E-15	4.72E-21	4.69E-21	4.64E-21	4.54E-21	4.27E-21	3.84E-21	3.46E-21	3.11E-21	2.80E-21
ca 45	1.23E-08	1.23E-08	8.44E-09	5.70E-09	2.63E-09	5.61E-10	5.43E-12	2.39E-15	1.05E-18	4.62E-22	2.03E-25
ca 47	1.07E-08	9.19E-09	1.14E-14	8.28E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	2.47E-10	2.45E-10	1.17E-10	5.46E-11	1.20E-11	5.88E-13	6.81E-17	1.88E-23	5.18E-30	.00E+00	.00E+00
sc 47	4.02E-05	3.27E-05	3.62E-13	3.30E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	2.47E-04	1.69E-04	3.24E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	9.07E-06	2.39E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	7.53E+02	7.34E+02	7.92E+01	7.83E+00	8.10E-02	8.71E-06	1.09E-17	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	5.39E+01	5.38E+01	4.41E+01	3.59E+01	2.39E+01	1.06E+01	9.34E-01	1.62E-02	2.80E-04	4.86E-06	8.42E-08
mn 56	1.32E+03	2.08E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	3.28E+02	3.28E+02	3.08E+02	2.89E+02	2.54E+02	1.97E+02	9.21E+01	2.59E+01	7.27E+00	2.04E+00	5.74E-01
fe 59	1.75E+01	1.72E+01	4.30E+00	1.02E+00	5.91E-02	2.00E-04	7.74E-12	3.43E-24	.00E+00	.00E+00	.00E+00
co 58m	1.37E-04	2.22E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.09E+02	1.08E+02	4.51E+01	1.83E+01	3.06E+00	8.61E-02	1.92E-06	3.40E-14	6.01E-22	1.06E-29	.00E+00
co 60	5.17E+00	5.17E+00	5.01E+00	4.85E+00	4.54E+00	3.98E+00	2.68E+00	1.39E+00	7.20E-01	3.73E-01	1.93E-01
co 61	1.52E-01	6.38E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	7.41E-02	7.41E-02	7.41E-02	7.41E-02	7.41E-02	7.41E-02	7.41E-02	7.41E-02	7.41E-02	7.41E-02	7.41E-02
ni 63	1.06E+01	1.06E+01	1.06E+01	1.06E+01	1.06E+01	1.05E+01	1.03E+01	9.92E+00	9.58E+00	9.26E+00	8.94E+00
ni 65	9.91E+00	1.35E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	5.86E-05	4.32E-05	7.26E-17	4.21E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	1.19E-01	3.21E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	8.71E-02	4.33E-05	7.27E-17	4.21E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	7.18E-08	5.49E-08	2.19E-18	3.41E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	4.14E-05	4.13E-05	3.20E-05	2.46E-05	1.46E-05	5.19E-06	2.30E-07	1.28E-09	7.14E-12	3.97E-14	2.21E-16
zn 69	4.53E-09	9.76E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	3.05E-10	9.10E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ge 71	5.06E-14	4.76E-14	2.16E-16	7.94E-19	1.23E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.08E-02	3.04E-02	8.97E-03	2.52E-03	2.06E-04	1.38E-06	4.11E-13	5.49E-24	.00E+00	.00E+00	.00E+00
sr 90	2.67E-06	2.67E-06	2.65E-06	2.64E-06	2.61E-06	2.54E-06	2.36E-06	2.09E-06	1.85E-06	1.63E-06	1.44E-06
sr 91	5.97E-03	1.04E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	2.86E-06	2.83E-06	8.34E-07	2.35E-07	1.92E-08	1.28E-10	3.83E-17	5.11E-28	.00E+00	.00E+00	.00E+00
y 90	1.14E+00	8.77E-01	2.65E-06	2.64E-06	2.61E-06	2.54E-06	2.36E-06	2.09E-06	1.85E-06	1.63E-06	1.44E-06
y 90m	9.98E-08	5.41E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	7.77E-02	7.68E-02	2.68E-02	8.95E-03	1.03E-03	1.36E-05	3.12E-11	1.25E-20	5.02E-30	.00E+00	.00E+00
y 92	6.75E-02	6.13E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.34E-05	2.61E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04	1.45E-04
zr 95	2.37E+01	2.35E+01	8.95E+00	3.29E+00	4.54E-01	8.71E-03	6.13E-08	1.58E-16	4.09E-25	.00E+00	.00E+00
zr 97	3.65E+01	1.36E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 93m	1.79E-05	1.79E-05	1.92E-05	2.06E-05	2.32E-05	2.83E-05	4.24E-05	6.21E-05	7.80E-05	9.09E-05	1.01E-04
nb 94	6.06E-12	6.06E-12	6.06E-12	6.06E-12	6.06E-12	6.06E-12	6.06E-12	6.06E-12	6.06E-12	6.06E-12	6.06E-12
nb 95	2.34E+01	2.34E+01	1.49E+01	6.47E+00	9.80E-01	1.98E-02	1.35E-07	3.49E-16	9.01E-25	.00E+00	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 6

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 95m	2.73E-01	2.71E-01	1.05E-01	3.87E-02	5.35E-03	1.02E-04	7.21E-10	1.86E-18	4.81E-27	.00E+00	.00E+00
nb 96	2.07E-02	1.01E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	3.65E+01	1.37E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.46E+01	1.29E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	4.48E-03	3.48E-03	6.19E-13	4.54E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	2.85E-09	2.85E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09	2.87E-09
ru103	1.17E-11	1.15E-11	2.38E-12	4.65E-13	1.85E-14	2.92E-17	1.16E-25	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	2.56E-08	2.56E-08	2.53E-08	2.50E-08	2.44E-08	2.32E-08	2.00E-08	1.56E-08	1.22E-08	9.57E-09	7.49E-09
cd115	9.14E-05	6.69E-05	6.32E-17	2.01E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	9.92E-06	9.77E-06	2.45E-06	5.82E-07	3.40E-08	1.16E-10	4.66E-18	2.19E-30	.00E+00	.00E+00	.00E+00
cd117	1.78E-05	2.24E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.06E-08	2.17E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	9.21E-01	9.15E-01	5.36E-01	3.07E-01	1.02E-01	1.13E-02	1.54E-05	2.58E-10	4.31E-15	7.20E-20	1.20E-24
in114	2.16E-01	1.36E-01	3.90E-02	1.07E-02	8.28E-04	4.98E-06	1.09E-12	8.56E-24	.00E+00	.00E+00	.00E+00
in114m	1.44E-01	1.42E-01	4.08E-02	1.12E-02	8.65E-04	5.21E-06	1.13E-12	8.94E-24	.00E+00	.00E+00	.00E+00
in116m	2.65E-05	2.62E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.01E-04	4.90E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.62E-05	9.56E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	9.20E-01	9.15E-01	5.35E-01	3.07E-01	1.02E-01	1.13E-02	1.54E-05	2.57E-10	4.31E-15	7.20E-20	1.20E-24
sn117m	4.72E+00	4.48E+00	4.80E-02	4.30E-04	3.88E-08	3.19E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	4.17E+00	4.16E+00	3.37E+00	2.71E+00	1.76E+00	7.41E-01	5.55E-02	7.38E-04	9.82E-06	1.31E-07	1.74E-09
sn121	1.59E+00	8.60E-01	5.59E-04	5.57E-04	5.53E-04	5.46E-04	5.26E-04	4.94E-04	4.64E-04	4.35E-04	4.09E-04
sn121m	7.22E-04	7.22E-04	7.20E-04	7.17E-04	7.13E-04	7.04E-04	6.78E-04	6.36E-04	5.98E-04	5.61E-04	5.27E-04
sn123	1.47E-01	1.46E-01	9.07E-02	5.52E-02	2.07E-02	2.92E-03	8.15E-06	4.52E-10	2.50E-14	1.39E-18	7.69E-23
sn123m	8.46E-04	1.30E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	2.99E-02	2.78E-02	4.62E-05	5.98E-08	1.17E-13	4.61E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.16E-01	2.44E-01	2.92E-11	1.42E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	1.82E-02	1.79E-02	6.44E-03	2.22E-03	2.71E-04	4.03E-06	1.34E-11	9.85E-21	7.26E-30	.00E+00	.00E+00
sb125	6.74E-01	6.73E-01	6.33E-01	5.94E-01	5.23E-01	4.06E-01	1.89E-01	5.32E-02	1.49E-02	4.20E-03	1.18E-03
sb126	7.83E-03	7.40E-03	5.10E-05	2.89E-07	1.06E-11	1.42E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	4.71E-03	4.68E-03	2.80E-03	1.64E-03	5.68E-04	6.84E-05	1.20E-07	3.06E-12	7.79E-17	1.99E-21	5.06E-26
te125m	1.51E-01	1.51E-01	1.50E-01	1.43E-01	1.28E-01	9.90E-02	4.62E-02	1.30E-02	3.65E-03	1.03E-03	2.88E-04
te127	2.37E-04	6.11E-05	1.44E-05	8.02E-06	2.51E-06	2.46E-07	2.32E-10	2.10E-15	1.90E-20	1.72E-25	1.55E-30
te127m	2.61E-05	2.60E-05	1.47E-05	8.19E-06	2.56E-06	2.51E-07	2.36E-10	2.14E-15	1.94E-20	1.75E-25	1.57E-30
te129	1.27E-09	5.20E-11	8.29E-12	1.23E-12	2.83E-14	1.51E-17	2.30E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	8.28E-11	8.11E-11	1.29E-11	1.92E-12	4.42E-14	2.36E-17	3.60E-27	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.06E-15	1.00E-15	8.78E-18	6.39E-20	3.80E-24	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	2.47E-11	6.47E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	2.32E-15	2.13E-15	9.90E-19	3.41E-22	4.90E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

xe127	6.14E-11	6.03E-11	1.11E-11	1.90E-12	5.86E-14	5.59E-17	4.85E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	5.13E-09	4.74E-09	4.59E-12	3.39E-15	2.20E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	8.74E-13	8.24E-13	4.62E-15	2.11E-17	5.02E-22	2.97E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.82E+03	1.36E+03	5.26E+02	3.81E+02	3.01E+02	2.24E+02	1.06E+02	3.73E+01	1.77E+01	1.18E+01	9.78E+00

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Bottom - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.93E+13	4.75E+12	9.91E+11	4.01E+11	1.65E+11	6.69E+10	1.25E+10	4.86E+09	3.33E+09	2.58E+09	2.16E+09
3.00E-02	8.36E+12	4.15E+11	1.19E+11	7.83E+10	4.58E+10	2.40E+10	7.62E+09	2.34E+09	9.08E+08	4.30E+08	2.53E+08
5.50E-02	5.64E+12	1.46E+11	2.59E+10	1.10E+10	2.81E+09	1.11E+09	6.88E+08	3.48E+08	1.80E+08	9.48E+07	5.12E+07
8.50E-02	3.25E+12	7.94E+10	1.34E+10	5.57E+09	1.29E+09	4.23E+08	2.60E+08	1.30E+08	6.63E+07	3.40E+07	1.75E+07
1.20E-01	2.28E+12	5.32E+10	8.65E+09	3.61E+09	8.24E+08	2.48E+08	1.40E+08	6.36E+07	3.05E+07	1.51E+07	7.64E+06
1.70E-01	2.50E+12	1.90E+11	1.14E+10	4.95E+09	2.06E+09	1.20E+09	5.64E+08	1.68E+08	5.24E+07	1.74E+07	6.25E+06
3.00E-01	5.67E+12	2.91E+12	3.15E+11	3.44E+10	1.49E+09	4.71E+08	2.13E+08	6.35E+07	1.97E+07	6.51E+06	2.33E+06
6.50E-01	7.73E+13	1.17E+13	5.61E+12	3.14E+12	1.38E+12	5.20E+11	4.86E+10	1.97E+09	3.52E+08	9.60E+07	2.72E+07
1.13E+00	8.50E+11	4.61E+11	4.13E+11	3.99E+11	3.74E+11	3.28E+11	2.21E+11	1.14E+11	5.92E+10	3.07E+10	1.59E+10
1.58E+00	8.47E+12	4.57E+10	9.31E+09	3.76E+09	6.28E+08	1.76E+07	4.88E+02	6.26E+01	4.37E+01	3.26E+01	2.57E+01
2.00E+00	1.34E+13	2.28E+10	1.70E+07	7.21E+06	2.61E+06	1.76E+06	1.18E+06	6.10E+05	3.16E+05	1.64E+05	8.48E+04
2.40E+00	5.12E+11	8.10E+08	1.04E+05	3.91E+04	1.03E+04	5.59E+03	3.73E+03	1.93E+03	1.00E+03	5.18E+02	2.68E+02
2.80E+00	4.63E+11	7.31E+08	9.41E+03	3.24E+03	3.95E+02	5.90E+00	1.95E-05	3.01E-14	1.36E-14	1.21E-14	1.09E-14
3.25E+00	8.48E+10	1.34E+08	1.95E-15	1.94E-15	1.91E-15	1.87E-15	1.75E-15	1.57E-15	1.41E-15	1.27E-15	1.15E-15
3.75E+00	8.90E+05	6.11E+00	2.34E-18	2.33E-18	2.30E-18	2.25E-18	2.11E-18	1.90E-18	1.71E-18	1.54E-18	1.39E-18
4.25E+00	9.98E+05	3.66E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	8.57E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	2.58E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	1.58E+14	2.08E+13	7.52E+12	4.08E+12	1.97E+12	9.42E+11	2.91E+11	1.24E+11	6.42E+10	3.40E+10	1.84E+10
0 mev/sec	9.76E+13	9.23E+12	4.24E+12	2.52E+12	1.32E+12	7.09E+11	2.81E+11	1.30E+11	6.70E+10	3.46E+10	1.79E+10

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	6.74E+04	1.09E+04	2.28E+03	9.21E+02	3.79E+02	1.54E+02	2.88E+01	1.12E+01	7.66E+00	5.92E+00	4.98E+00
3.00E-02	5.76E+04	2.86E+03	8.18E+02	5.40E+02	3.16E+02	1.66E+02	5.25E+01	1.61E+01	6.26E+00	2.96E+00	1.75E+00
5.50E-02	7.13E+04	1.85E+03	3.28E+02	1.39E+02	3.55E+01	1.40E+01	8.70E+00	4.40E+00	2.28E+00	1.20E+00	6.47E-01
8.50E-02	6.35E+04	1.55E+03	2.61E+02	1.09E+02	2.52E+01	8.26E+00	5.07E+00	2.54E+00	1.29E+00	6.64E-01	3.42E-01
1.20E-01	6.30E+04	1.47E+03	2.39E+02	9.96E+01	2.27E+01	6.85E+00	3.85E+00	1.75E+00	8.41E-01	4.17E-01	2.11E-01
1.70E-01	9.77E+04	7.44E+03	4.45E+02	1.93E+02	8.03E+01	4.69E+01	2.21E+01	6.58E+00	2.05E+00	6.79E-01	2.44E-01
3.00E-01	3.91E+05	2.01E+05	2.18E+04	2.37E+03	1.03E+02	3.25E+01	1.47E+01	4.38E+00	1.36E+00	4.49E-01	1.61E-01
6.50E-01	1.16E+07	1.75E+06	8.39E+05	4.70E+05	2.06E+05	7.78E+04	7.26E+03	2.94E+02	5.26E+01	1.43E+01	4.07E+00
1.13E+00	2.20E+05	1.19E+05	1.07E+05	1.03E+05	9.66E+04	8.47E+04	5.71E+04	2.96E+04	1.53E+04	7.94E+03	4.11E+03
1.58E+00	3.07E+06	1.65E+04	3.37E+03	1.36E+03	2.27E+02	6.37E+00	1.77E-04	2.27E-05	1.58E-05	1.18E-05	9.32E-06
2.00E+00	6.15E+06	1.05E+04	7.80E+00	3.31E+00	1.20E+00	8.07E-01	5.41E-01	2.80E-01	1.45E-01	7.53E-02	3.90E-02
2.40E+00	2.83E+05	4.47E+02	5.75E-02	2.16E-02	5.66E-03	3.08E-03	2.06E-03	1.07E-03	5.52E-04	2.86E-04	1.48E-04
2.80E+00	2.98E+05	4.71E+02	6.06E-03	2.09E-03	2.55E-04	3.79E-06	1.26E-11	1.94E-20	8.77E-21	7.80E-21	6.99E-21
3.25E+00	6.33E+04	1.00E+02	1.46E-21	1.45E-21	1.43E-21	1.39E-21	1.30E-21	1.17E-21	1.06E-21	9.51E-22	8.56E-22
3.75E+00	7.67E-01	5.27E-06	2.02E-24	2.01E-24	1.98E-24	1.94E-24	1.82E-24	1.64E-24	1.47E-24	1.33E-24	1.19E-24
4.25E+00	9.75E-01	3.58E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	9.36E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	3.26E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.24E+07	2.12E+06	9.75E+05	5.79E+05	3.04E+05	1.63E+05	6.45E+04	2.99E+04	1.54E+04	7.96E+03	4.12E+03
0 gamma watts	1.56E+01	1.48E+00	6.80E-01	4.03E-01	2.12E-01	1.14E-01	4.50E-02	2.09E-02	1.07E-02	5.55E-03	2.88E-03

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photon spectrum as a function of time for fission products

BWR SNF Assembly - Bottom - decay
spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.49E+17	3.24E+16	8.47E+15	6.25E+15	4.21E+15	2.32E+15	8.64E+14	6.04E+14	5.21E+14	4.57E+14	4.02E+14
3.00E-02	1.10E+17	2.53E+16	3.64E+15	2.63E+15	1.78E+15	9.82E+14	3.77E+14	2.67E+14	2.30E+14	2.02E+14	1.79E+14
5.50E-02	5.91E+16	8.85E+15	1.93E+15	1.47E+15	1.00E+15	5.56E+14	2.07E+14	1.40E+14	1.17E+14	1.00E+14	8.65E+13
8.50E-02	4.04E+16	7.55E+15	1.18E+15	9.05E+14	6.19E+14	3.34E+14	1.15E+14	7.43E+13	6.17E+13	5.29E+13	4.60E+13
1.20E-01	3.30E+16	7.05E+15	1.38E+15	1.09E+15	7.45E+14	3.89E+14	1.25E+14	7.71E+13	5.97E+13	4.78E+13	3.91E+13
1.70E-01	5.28E+16	8.39E+15	1.18E+15	6.41E+14	3.98E+14	2.10E+14	6.70E+13	4.43E+13	3.83E+13	3.36E+13	2.96E+13
3.00E-01	1.13E+17	1.75E+16	9.06E+14	6.83E+14	4.64E+14	2.44E+14	7.54E+13	4.89E+13	4.17E+13	3.61E+13	3.15E+13
6.50E-01	2.34E+17	6.50E+16	1.59E+16	9.47E+15	5.50E+15	3.71E+15	1.90E+15	1.08E+15	8.44E+14	7.27E+14	6.40E+14
1.13E+00	7.34E+16	5.22E+15	3.27E+14	2.60E+14	2.09E+14	1.51E+14	8.36E+13	4.91E+13	3.23E+13	2.19E+13	1.50E+13
1.58E+00	3.77E+16	8.82E+15	1.65E+14	8.66E+13	6.54E+13	4.02E+13	1.30E+13	3.66E+12	1.67E+12	1.02E+12	6.99E+11
2.00E+00	1.12E+16	6.29E+14	5.37E+13	3.84E+13	2.49E+13	1.06E+13	8.55E+11	3.26E+10	1.61E+10	1.39E+10	1.22E+10
2.40E+00	8.85E+15	4.27E+14	6.96E+12	2.96E+12	2.06E+12	1.02E+12	1.28E+11	4.12E+09	1.44E+08	1.23E+07	7.10E+06
2.80E+00	3.71E+15	6.80E+12	5.99E+11	4.67E+11	3.30E+11	1.65E+11	2.10E+10	6.87E+08	2.27E+07	7.51E+05	2.49E+04
3.25E+00	1.82E+15	2.48E+12	1.10E+11	7.59E+10	5.39E+10	2.73E+10	3.53E+09	1.17E+08	3.89E+06	1.29E+05	4.28E+03
3.75E+00	8.35E+14	1.27E+10	3.97E+07	3.34E+07	2.38E+07	1.20E+07	1.56E+06	5.17E+04	1.71E+03	5.69E+01	1.89E+00
4.25E+00	7.86E+14	1.71E+09	1.13E-05	1.14E-05	1.15E-05	1.16E-05	1.19E-05	1.21E-05	1.22E-05	1.22E-05	1.22E-05
4.75E+00	2.33E+14	1.27E+10	5.68E-06	5.71E-06	5.76E-06	5.84E-06	5.99E-06	6.08E-06	6.11E-06	6.11E-06	6.11E-06
5.50E+00	1.81E+14	8.12E+07	4.21E-06	4.23E-06	4.27E-06	4.33E-06	4.44E-06	4.51E-06	4.53E-06	4.53E-06	4.54E-06
total	1.03E+18	1.87E+17	3.51E+16	2.35E+16	1.50E+16	8.95E+15	3.83E+15	2.39E+15	1.95E+15	1.68E+15	1.47E+15
mev/sec	4.22E+17	7.41E+16	1.21E+16	7.42E+15	4.47E+15	2.94E+15	1.44E+15	8.21E+14	6.38E+14	5.42E+14	4.71E+14

spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.73E+08	7.44E+07	1.95E+07	1.44E+07	9.68E+06	5.33E+06	1.99E+06	1.39E+06	1.20E+06	1.05E+06	9.25E+05
3.00E-02	7.61E+08	1.75E+08	2.51E+07	1.81E+07	1.23E+07	6.78E+06	2.60E+06	1.84E+06	1.59E+06	1.40E+06	1.23E+06
5.50E-02	7.47E+08	1.12E+08	2.44E+07	1.85E+07	1.27E+07	7.03E+06	2.62E+06	1.77E+06	1.48E+06	1.27E+06	1.09E+06
8.50E-02	7.89E+08	1.48E+08	2.30E+07	1.77E+07	1.21E+07	6.53E+06	2.24E+06	1.45E+06	1.21E+06	1.03E+06	8.98E+05
1.20E-01	9.11E+08	1.94E+08	3.80E+07	3.01E+07	2.06E+07	1.07E+07	3.45E+06	2.13E+06	1.65E+06	1.32E+06	1.08E+06
1.70E-01	2.06E+09	3.28E+08	4.61E+07	2.51E+07	1.56E+07	8.22E+06	2.62E+06	1.73E+06	1.50E+06	1.31E+06	1.16E+06
3.00E-01	7.81E+09	1.21E+09	6.25E+07	4.71E+07	3.20E+07	1.68E+07	5.20E+06	3.37E+06	2.87E+06	2.49E+06	2.17E+06
6.50E-01	3.49E+10	9.72E+09	2.37E+09	1.42E+09	8.22E+08	5.55E+08	2.84E+08	1.61E+08	1.26E+08	1.09E+08	9.56E+07
1.13E+00	1.90E+10	1.35E+09	8.47E+07	6.73E+07	5.41E+07	3.91E+07	2.16E+07	1.27E+07	8.36E+06	5.65E+06	3.87E+06
1.58E+00	1.36E+10	3.19E+09	5.98E+07	3.13E+07	2.37E+07	1.46E+07	4.71E+06	1.32E+06	6.03E+05	3.68E+05	2.53E+05
2.00E+00	5.14E+09	2.89E+08	2.47E+07	1.77E+07	1.14E+07	4.86E+06	3.93E+05	1.50E+04	7.42E+03	6.38E+03	5.60E+03
2.40E+00	4.88E+09	2.36E+08	3.84E+06	1.63E+06	1.14E+06	5.65E+05	7.04E+04	2.27E+03	7.93E+01	6.80E+00	3.92E+00
2.80E+00	2.39E+09	4.38E+06	3.85E+05	3.00E+05	2.12E+05	1.06E+05	1.35E+04	4.42E+02	1.46E+01	4.83E-01	1.60E-02
3.25E+00	1.36E+09	1.85E+06	8.18E+04	5.67E+04	4.03E+04	2.04E+04	2.64E+03	8.76E+01	2.91E+00	9.64E-02	3.20E-03
3.75E+00	7.20E+08	1.09E+04	3.42E+01	2.88E+01	2.05E+01	1.04E+01	1.34E+00	4.46E-02	1.48E-03	4.90E-05	1.63E-06
4.25E+00	7.68E+08	1.67E+03	1.11E-11	1.11E-11	1.12E-11	1.14E-11	1.17E-11	1.18E-11	1.19E-11	1.19E-11	1.19E-11
4.75E+00	2.55E+08	1.39E+04	6.20E-12	6.23E-12	6.29E-12	6.38E-12	6.54E-12	6.64E-12	6.67E-12	6.67E-12	6.68E-12
5.50E+00	2.28E+08	1.03E+02	5.33E-12	5.35E-12	5.40E-12	5.48E-12	5.62E-12	5.70E-12	5.73E-12	5.73E-12	5.73E-12
total	9.69E+10	1.70E+10	2.78E+09	1.70E+09	1.03E+09	6.75E+08	3.31E+08	1.89E+08	1.47E+08	1.25E+08	1.08E+08
gamma watts	6.76E+04	1.19E+04	1.94E+03	1.19E+03	7.16E+02	4.71E+02	2.31E+02	1.32E+02	1.02E+02	8.68E+01	7.55E+01

principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 91	1.66E+15	1.65E+15	5.74E+14	1.92E+14	2.20E+13	2.91E+11	6.69E+05	2.69E-04	1.08E-13	4.33E-23	.00E+00
mo 99	2.25E+15	1.75E+15	3.10E+05	2.28E-05	2.17E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.94E+15	2.83E+15	2.40E+15	2.02E+15	1.44E+15	7.27E+14	9.42E+13	3.12E+12	1.04E+11	3.44E+09	1.14E+08

ba140	1.91E+15	1.81E+15	1.44E+13	9.43E+10	4.59E+06	1.10E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.54E+15	2.47E+15	2.07E+13	1.36E+11	6.61E+06	1.58E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.12E+15	4.09E+15	3.30E+15	2.63E+15	1.69E+15	6.94E+14	4.83E+13	5.68E+11	6.69E+09	7.87E+07	9.26E+05

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.23E+15	3.42E+15	2.05E+07	5.82E-02	7.58E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.34E+15	4.20E+15	3.65E+10	1.78E+05	5.74E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.60E+15	1.51E+15	1.20E+13	7.87E+10	3.83E+06	9.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.46E+15	1.43E+15	2.15E+14	2.98E+13	6.06E+11	2.51E+08	1.78E-02	2.16E-19	.00E+00	.00E+00	.00E+00
ce143	4.76E+15	2.90E+15	9.49E-05	5.33E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.36E+15	1.35E+15	1.09E+15	8.71E+14	5.58E+14	2.30E+14	1.60E+13	1.88E+11	2.21E+09	2.60E+07	3.06E+05
nd147	1.44E+15	1.35E+15	4.90E+12	1.43E+10	1.39E+05	1.35E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec
mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.85E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.97E+14	6.70E+14	5.68E+14	4.78E+14	3.40E+14	1.72E+14	2.23E+13	7.39E+11	2.45E+10	8.13E+08	2.70E+07
te132	8.16E+14	6.60E+14	3.95E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.36E+14	5.21E+14	4.37E+12	2.87E+10	1.39E+06	3.34E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.36E+15	8.25E+14	2.70E-05	1.52E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.58E+14	9.51E+14	7.66E+14	6.12E+14	3.92E+14	1.61E+14	1.12E+13	1.32E+11	1.55E+09	1.83E+07	2.15E+05
sm153	1.48E+15	1.03E+15	1.32E+01	4.78E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec
mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.55E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.14E+14	3.98E+14	3.37E+14	2.84E+14	2.02E+14	1.02E+14	1.32E+13	4.39E+11	1.46E+10	4.83E+08	1.60E+07
xe133	3.07E+15	2.97E+15	2.58E+10	1.26E+05	4.06E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.64E+14	5.60E+14	4.51E+14	3.60E+14	2.31E+14	9.49E+13	6.60E+12	7.77E+10	9.14E+08	1.08E+07	1.27E+05
nd147	8.93E+14	8.39E+14	3.05E+12	8.87E+09	8.66E+04	8.40E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec
mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.05E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.66E+15	3.11E+15	5.56E+05	4.08E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.20E+14	7.19E+14	5.79E+14	4.62E+14	2.96E+14	1.22E+14	8.48E+12	9.98E+10	1.17E+09	1.38E+07	1.63E+05
pr144	4.03E+14	4.00E+14	3.23E+14	2.58E+14	1.65E+14	6.79E+13	4.72E+12	5.56E+10	6.54E+08	7.70E+06	9.06E+04
sm153	7.05E+14	4.92E+14	6.27E+00	2.27E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.39E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.92E+14	6.16E+14	1.09E+05	8.03E-06	7.65E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.59E+15	2.20E+15	3.93E+05	2.88E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.77E+14	4.51E+14	3.58E+12	2.35E+10	1.14E+06	2.74E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.88E+15	2.84E+15	4.25E+14	5.91E+13	1.20E+12	4.96E+08	3.52E-02	4.27E-19	.00E+00	.00E+00	.00E+00
pr144	4.26E+14	4.23E+14	3.41E+14	2.72E+14	1.75E+14	7.18E+13	5.00E+12	5.88E+10	6.92E+08	8.14E+06	9.58E+04

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.31E+15	9.41E+14	6.19E-04	7.81E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.51E+15	4.21E+15	2.01E+12	6.91E+08	9.94E+01	2.10E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.13E+15	3.34E+15	2.00E+07	5.67E-02	7.39E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.41E+15	1.74E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.90E+15	1.84E+15	1.55E+13	1.01E+11	4.93E+06	1.18E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.14E+15	1.91E+15	6.25E-05	3.51E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.50E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.84E+15	7.76E+15	2.96E+15	1.09E+15	1.50E+14	2.88E+12	2.03E+07	5.23E-02	1.35E-10	3.49E-19	9.62E-28
nb 95	8.17E+15	8.17E+15	5.12E+15	2.22E+15	3.36E+14	6.78E+12	4.63E+07	1.20E-01	3.09E-10	7.98E-19	.00E+00
ru103	5.45E+15	5.35E+15	1.11E+15	2.17E+14	8.62E+12	1.36E+10	5.40E+01	5.36E-13	5.31E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.08E+07	2.30E-01	2.99E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.36E+15	3.39E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.26E+15	4.26E+15	3.92E+15	3.60E+15	3.04E+15	2.18E+15	7.93E+14	1.48E+14	2.75E+13	5.12E+12	9.54E+11
la140	6.08E+15	5.91E+15	4.96E+13	3.25E+11	1.58E+07	3.79E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec
mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.22E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.64E+15	2.87E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.80E+06	2.50E-02	3.26E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.02E+15	4.79E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.93E+14	4.68E+14	4.31E+12	3.30E+10	2.18E+06	9.60E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.63E+14	6.44E+14	5.40E+12	3.54E+10	1.72E+06	4.13E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.33E+14	7.01E+14	1.21E+13	1.77E+11	4.22E+07	2.42E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec
mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.82E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.80E+14	5.56E+14	3.32E+06	9.45E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.86E+15	7.63E+15	6.41E+13	4.20E+11	2.04E+07	4.90E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec
mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.29E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.75E+14	1.43E+14	8.54E+05	2.43E-03	3.16E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.48E+14	3.56E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.26E+13	5.22E+13	4.21E+13	3.36E+13	2.15E+13	8.86E+12	6.16E+11	7.25E+09	8.53E+07	1.00E+06	1.18E+04
eu156	3.58E+14	3.43E+14	5.90E+12	8.65E+10	2.06E+07	1.18E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec
mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.27E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.72E+14	3.62E+14	3.04E+12	1.99E+10	9.68E+05	2.32E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.54E+13	2.43E+13	4.19E+11	6.14E+09	1.46E+06	8.41E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec
mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.80E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.43E+11	6.19E+11	5.24E+11	4.41E+11	3.14E+11	1.59E+11	2.06E+10	6.82E+08	2.26E+07	7.50E+05	2.49E+04
ag112	1.21E+12	6.41E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.22E+12	5.07E+12	4.25E+10	2.79E+08	1.36E+04	3.25E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec
mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.48E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.38E+12	2.31E+12	1.94E+10	1.27E+08	6.19E+03	1.48E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec
mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.97E+12	9.22E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

la142	1.73E+14	3.39E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.71E+09) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	5.51E+11	1.71E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	4.09E+12	1.27E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.12E+07) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.62E+10	8.12E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Bottom - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.34E+17	6.98E+16	8.98E+13	6.65E+13	4.10E+13	2.39E+13	1.95E+13	1.95E+13	1.94E+13	1.92E+13	1.89E+13
3.00E-02	8.40E+15	1.44E+15	9.19E+10	8.61E+10	1.08E+11	1.52E+11	2.68E+11	4.28E+11	5.51E+11	6.47E+11	7.20E+11
5.50E-02	1.22E+16	3.93E+15	1.50E+12	1.42E+12	1.77E+12	2.48E+12	4.49E+12	7.24E+12	9.37E+12	1.10E+13	1.23E+13
8.50E-02	5.29E+16	7.66E+15	4.64E+11	2.71E+11	2.70E+11	2.70E+11	2.68E+11	2.65E+11	2.62E+11	2.60E+11	2.57E+11
1.20E-01	5.37E+16	3.92E+16	4.97E+11	3.65E+11	3.60E+11	3.54E+11	3.44E+11	3.28E+11	3.15E+11	3.02E+11	2.92E+11
1.70E-01	1.77E+15	2.90E+14	2.01E+10	7.25E+09	5.20E+09	3.82E+09	3.41E+09	3.34E+09	3.27E+09	3.21E+09	3.16E+09
3.00E-01	2.85E+16	2.06E+16	3.07E+11	1.99E+11	1.97E+11	1.95E+11	1.88E+11	1.77E+11	1.67E+11	1.59E+11	1.51E+11
6.50E-01	1.55E+15	5.08E+13	2.04E+09	1.65E+09	1.24E+09	1.01E+09	1.14E+09	1.33E+09	1.38E+09	1.38E+09	1.35E+09
1.13E+00	1.84E+15	1.16E+15	7.20E+08	6.79E+08	6.31E+08	5.96E+08	5.73E+08	5.48E+08	5.23E+08	4.99E+08	4.78E+08
1.58E+00	1.31E+08	1.26E+08	1.11E+08	1.02E+08	9.12E+07	8.58E+07	8.95E+07	9.08E+07	8.55E+07	7.82E+07	7.11E+07
2.00E+00	1.66E+06	1.03E+06	9.92E+05	1.02E+06	1.08E+06	1.20E+06	1.54E+06	1.84E+06	1.91E+06	1.90E+06	1.86E+06
2.40E+00	5.65E+07	5.65E+07	4.92E+07	4.39E+07	3.77E+07	3.28E+07	2.83E+07	2.34E+07	1.94E+07	1.61E+07	1.34E+07
2.80E+00	1.03E+08	1.04E+08	1.07E+08	1.14E+08	1.31E+08	1.72E+08	2.87E+08	3.88E+08	4.12E+08	4.05E+08	3.89E+08
3.25E+00	2.02E+07	2.02E+07	1.76E+07	1.57E+07	1.35E+07	1.17E+07	1.02E+07	8.40E+06	6.96E+06	5.78E+06	4.80E+06
3.75E+00	1.17E+07	1.17E+07	1.02E+07	9.12E+06	7.84E+06	6.81E+06	5.89E+06	4.87E+06	4.04E+06	3.35E+06	2.78E+06
4.25E+00	6.79E+06	6.79E+06	5.92E+06	5.29E+06	4.54E+06	3.95E+06	3.41E+06	2.82E+06	2.34E+06	1.94E+06	1.61E+06
4.75E+00	3.94E+06	3.94E+06	3.43E+06	3.06E+06	2.63E+06	2.29E+06	1.98E+06	1.64E+06	1.36E+06	1.13E+06	9.35E+05
5.50E+00	3.56E+06	3.56E+06	3.10E+06	2.77E+06	2.38E+06	2.07E+06	1.79E+06	1.48E+06	1.23E+06	1.02E+06	8.46E+05
total	2.95E+17	1.44E+17	9.27E+13	6.89E+13	4.37E+13	2.74E+13	2.50E+13	2.79E+13	3.00E+13	3.16E+13	3.26E+13
mev/sec	2.51E+16	1.39E+16	1.18E+12	8.76E+11	6.39E+11	5.07E+11	5.73E+11	7.24E+11	8.39E+11	9.26E+11	9.92E+11

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.07E+08	1.60E+08	2.06E+05	1.53E+05	9.42E+04	5.50E+04	4.47E+04	4.47E+04	4.45E+04	4.41E+04	4.35E+04
3.00E-02	5.79E+07	9.92E+06	6.34E+02	5.94E+02	7.48E+02	1.05E+03	1.85E+03	2.95E+03	3.80E+03	4.46E+03	4.96E+03
5.50E-02	1.54E+08	4.97E+07	1.89E+04	1.80E+04	2.24E+04	3.14E+04	5.68E+04	9.16E+04	1.18E+05	1.39E+05	1.55E+05
8.50E-02	1.03E+09	1.50E+08	9.06E+03	5.29E+03	5.29E+03	5.27E+03	5.24E+03	5.18E+03	5.13E+03	5.08E+03	5.03E+03
1.20E-01	1.48E+09	1.08E+09	1.37E+04	1.01E+04	9.93E+03	9.77E+03	9.48E+03	9.06E+03	8.68E+03	8.34E+03	8.04E+03
1.70E-01	6.94E+07	1.13E+07	7.85E+02	2.83E+02	2.03E+02	1.49E+02	1.33E+02	1.30E+02	1.28E+02	1.26E+02	1.24E+02
3.00E-01	1.96E+09	1.42E+09	2.11E+04	1.37E+04	1.36E+04	1.34E+04	1.29E+04	1.22E+04	1.15E+04	1.10E+04	1.04E+04
6.50E-01	2.32E+08	7.59E+06	3.04E+02	2.47E+02	1.85E+02	1.51E+02	1.71E+02	1.99E+02	2.07E+02	2.06E+02	2.02E+02
1.13E+00	4.75E+08	3.01E+08	1.86E+02	1.76E+02	1.63E+02	1.54E+02	1.48E+02	1.42E+02	1.35E+02	1.29E+02	1.24E+02
1.58E+00	4.76E+01	4.56E+01	4.03E+01	3.68E+01	3.30E+01	3.11E+01	3.24E+01	3.29E+01	3.09E+01	2.83E+01	2.57E+01

	2.00E+00	7.61E-01	4.72E-01	4.56E-01	4.69E-01	4.96E-01	5.54E-01	7.08E-01	8.44E-01	8.79E-01	8.73E-01	8.54E-01
	2.40E+00	3.12E+01	3.12E+01	2.71E+01	2.42E+01	2.08E+01	1.81E+01	1.56E+01	1.29E+01	1.07E+01	8.90E+00	7.40E+00
	2.80E+00	6.62E+01	6.71E+01	6.90E+01	7.33E+01	8.43E+01	1.11E+02	1.85E+02	2.50E+02	2.65E+02	2.61E+02	2.50E+02
	3.25E+00	1.51E+01	1.51E+01	1.32E+01	1.18E+01	1.01E+01	8.78E+00	7.59E+00	6.28E+00	5.20E+00	4.32E+00	3.59E+00
	3.75E+00	1.01E+01	1.01E+01	8.80E+00	7.86E+00	6.76E+00	5.87E+00	5.07E+00	4.20E+00	3.48E+00	2.89E+00	2.40E+00
	4.25E+00	6.63E+00	6.64E+00	5.78E+00	5.16E+00	4.44E+00	3.86E+00	3.33E+00	2.76E+00	2.29E+00	1.90E+00	1.58E+00
	4.75E+00	4.30E+00	4.30E+00	3.75E+00	3.35E+00	2.88E+00	2.50E+00	2.16E+00	1.79E+00	1.48E+00	1.23E+00	1.02E+00
	5.50E+00	4.50E+00	4.50E+00	3.92E+00	3.50E+00	3.01E+00	2.62E+00	2.26E+00	1.87E+00	1.55E+00	1.29E+00	1.07E+00
0	total	5.77E+09	3.19E+09	2.71E+05	2.01E+05	1.47E+05	1.17E+05	1.32E+05	1.66E+05	1.93E+05	2.13E+05	2.28E+05
0	gamma watts	4.03E+03	2.23E+03	1.89E-01	1.40E-01	1.02E-01	8.13E-02	9.19E-02	1.16E-01	1.35E-01	1.49E-01	1.59E-01

1 page 14

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - bot ds3 - discharge

0 1.00 day time of the requested nuclides

0

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	6.6947E+11	2.0084E+10
	5.0000E-02 to	1.0000E-01	1.5417E+11	1.1563E+10
	1.0000E-01 to	2.0000E-01	2.5914E+11	3.8871E+10
	2.0000E-01 to	3.0000E-01	4.3356E+10	1.0839E+10
	3.0000E-01 to	4.0000E-01	2.4753E+12	8.6635E+11
	4.0000E-01 to	6.0000E-01	1.2915E+12	6.4574E+11
	6.0000E-01 to	8.0000E-01	2.8624E+12	2.0037E+12
	8.0000E-01 to	1.0000E+00	5.5319E+12	4.9787E+12
	1.0000E+00 to	1.3300E+00	3.3091E+11	3.8551E+11
	1.3300E+00 to	1.6600E+00	9.2777E+10	1.3870E+11
	1.6600E+00 to	2.0000E+00	4.8265E+10	8.8325E+10
	2.0000E+00 to	2.5000E+00	1.0426E+10	2.3459E+10
	2.5000E+00 to	3.0000E+00	1.4522E+09	3.9935E+09
	3.0000E+00 to	4.0000E+00	1.2464E+08	4.3624E+08
	4.0000E+00 to	5.0000E+00	3.4679E-03	1.5605E-02
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.3771E+13	9.2163E+12

0
0 total energy from nuclides with spectrum data = 9.1874E+12
0 total energy from nuclides with no spectrum data = 2.8907E+10

1 gamma source spectrum for decay step for BWR source term - bot ds3 - 0.25 year

0 90.00 day time of the requested nuclides

0

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	1.6669E+11	5.0008E+09
	5.0000E-02 to	1.0000E-01	2.6520E+10	1.9890E+09
	1.0000E-01 to	2.0000E-01	1.9886E+10	2.9830E+09
	2.0000E-01 to	3.0000E-01	6.1142E+09	1.5286E+09
	3.0000E-01 to	4.0000E-01	2.6757E+11	9.3649E+10
	4.0000E-01 to	6.0000E-01	5.2693E+11	2.6347E+11
	6.0000E-01 to	8.0000E-01	9.6295E+11	6.7407E+11
	8.0000E-01 to	1.0000E+00	3.0353E+12	2.7318E+12
	1.0000E+00 to	1.3300E+00	2.9412E+11	3.4265E+11
	1.3300E+00 to	1.6600E+00	8.3057E+10	1.2417E+11
	1.6600E+00 to	2.0000E+00	8.0449E+09	1.4722E+10
	2.0000E+00 to	2.5000E+00	1.5155E+07	3.4099E+07

2.5000E+00 to	3.0000E+00	1.2690E+04	3.4897E+04
3.0000E+00 to	4.0000E+00	1.8234E-15	6.3819E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		5.3972E+12	4.2560E+12

total energy from nuclides with spectrum data = 4.2319E+12
total energy from nuclides with no spectrum data = 2.4084E+10

gamma source spectrum for decay step for BWR source term - bot ds3 - 0.50 year
182.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	9.9379E+10	2.9814E+09
5.0000E-02 to	1.0000E-01	1.1144E+10	8.3577E+08
1.0000E-01 to	2.0000E-01	8.5255E+09	1.2788E+09
2.0000E-01 to	3.0000E-01	2.5812E+09	6.4530E+08
3.0000E-01 to	4.0000E-01	2.7859E+10	9.7506E+09
4.0000E-01 to	6.0000E-01	2.1963E+11	1.0982E+11
6.0000E-01 to	8.0000E-01	3.9879E+11	2.7915E+11
8.0000E-01 to	1.0000E+00	1.8568E+12	1.6711E+12
1.0000E+00 to	1.3300E+00	2.8517E+11	3.3223E+11
1.3300E+00 to	1.6600E+00	8.0530E+10	1.2039E+11
1.6600E+00 to	2.0000E+00	3.2590E+09	5.9640E+09
2.0000E+00 to	2.5000E+00	6.4600E+06	1.4535E+07
2.5000E+00 to	3.0000E+00	6.2923E+03	1.7304E+04
3.0000E+00 to	4.0000E+00	1.8154E-15	6.3537E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		2.9936E+12	2.5341E+12

total energy from nuclides with spectrum data = 2.5134E+12
total energy from nuclides with no spectrum data = 2.0727E+10

gamma source spectrum for decay step for BWR source term - bot ds3 - 1 year
365.25 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	5.2153E+10	1.5646E+09
5.0000E-02 to	1.0000E-01	2.7006E+09	2.0254E+08
1.0000E-01 to	2.0000E-01	2.9901E+09	4.4852E+08
2.0000E-01 to	3.0000E-01	5.5863E+08	1.3966E+08
3.0000E-01 to	4.0000E-01	8.9544E+08	3.1340E+08
4.0000E-01 to	6.0000E-01	4.4224E+10	2.2112E+10
6.0000E-01 to	8.0000E-01	6.2820E+10	4.3974E+10
8.0000E-01 to	1.0000E+00	9.3499E+11	8.4149E+11
1.0000E+00 to	1.3300E+00	2.6815E+11	3.1239E+11
1.3300E+00 to	1.6600E+00	7.5723E+10	1.1321E+11
1.6600E+00 to	2.0000E+00	5.4680E+08	1.0007E+09
2.0000E+00 to	2.5000E+00	2.3541E+06	5.2966E+06
2.5000E+00 to	3.0000E+00	3.1941E+03	8.7839E+03
3.0000E+00 to	4.0000E+00	1.7996E-15	6.2985E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		1.4457E+12	1.3368E+12

total energy from nuclides with spectrum data = 1.3202E+12
total energy from nuclides with no spectrum data = 1.6657E+10
gamma source spectrum for decay step for BWR source term - bot ds3 - 2 year
730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.7183E+10	8.1548E+08
5.0000E-02	to	1.0000E-01	9.5745E+08	7.1809E+07
1.0000E-01	to	2.0000E-01	1.5573E+09	2.3360E+08
2.0000E-01	to	3.0000E-01	1.0912E+08	2.7280E+07
3.0000E-01	to	4.0000E-01	3.3314E+08	1.1660E+08
4.0000E-01	to	6.0000E-01	7.9860E+09	3.9930E+09
6.0000E-01	to	8.0000E-01	4.7795E+09	3.3457E+09
8.0000E-01	to	1.0000E+00	3.7420E+11	3.3678E+11
1.0000E+00	to	1.3300E+00	2.3619E+11	2.7516E+11
1.3300E+00	to	1.6600E+00	6.6700E+10	9.9716E+10
1.6600E+00	to	2.0000E+00	1.5405E+07	2.8191E+07
2.0000E+00	to	2.5000E+00	1.5912E+06	3.5802E+06
2.5000E+00	to	3.0000E+00	2.4605E+03	6.7664E+03
3.0000E+00	to	4.0000E+00	1.7648E-15	6.1766E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			7.2001E+11	7.2029E+11

total energy from nuclides with spectrum data = 7.0802E+11
total energy from nuclides with no spectrum data = 1.2278E+10
gamma source spectrum for decay step for BWR source term - bot ds3 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	9.6091E+09	2.8827E+08
5.0000E-02	to	1.0000E-01	5.8731E+08	4.4048E+07
1.0000E-01	to	2.0000E-01	7.5334E+08	1.1300E+08
2.0000E-01	to	3.0000E-01	4.3707E+07	1.0927E+07
3.0000E-01	to	4.0000E-01	1.5554E+08	5.4439E+07
4.0000E-01	to	6.0000E-01	3.2723E+09	1.6361E+09
6.0000E-01	to	8.0000E-01	1.6941E+09	1.1859E+09
8.0000E-01	to	1.0000E+00	3.2683E+10	2.9415E+10
1.0000E+00	to	1.3300E+00	1.5964E+11	1.8598E+11
1.3300E+00	to	1.6600E+00	4.5082E+10	6.7397E+10
1.6600E+00	to	2.0000E+00	3.4927E+02	6.3917E+02
2.0000E+00	to	2.5000E+00	1.0699E+06	2.4072E+06
2.5000E+00	to	3.0000E+00	1.6589E+03	4.5620E+03
3.0000E+00	to	4.0000E+00	1.6566E-15	5.7982E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			2.5352E+11	2.8613E+11

total energy from nuclides with spectrum data = 2.8044E+11
total energy from nuclides with no spectrum data = 5.6865E+09
gamma source spectrum for decay step for BWR source term - bot ds3 - 10 year
3652.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.4233E+09	1.0270E+08
5.0000E-02	to	1.0000E-01	2.9244E+08	2.1933E+07

	1.0000E-01 to	2.0000E-01	2.4104E+08	3.6156E+07
	2.0000E-01 to	3.0000E-01	1.3722E+07	3.4305E+06
	3.0000E-01 to	4.0000E-01	4.5382E+07	1.5884E+07
	4.0000E-01 to	6.0000E-01	9.1234E+08	4.5617E+08
	6.0000E-01 to	8.0000E-01	4.7232E+08	3.3062E+08
	8.0000E-01 to	1.0000E+00	5.6554E+08	5.0899E+08
	1.0000E+00 to	1.3300E+00	8.2057E+10	9.5596E+10
	1.3300E+00 to	1.6600E+00	2.3173E+10	3.4643E+10
	1.6600E+00 to	2.0000E+00	5.1534E+00	9.4306E+00
	2.0000E+00 to	2.5000E+00	5.4992E+05	1.2373E+06
	2.5000E+00 to	3.0000E+00	8.5272E+02	2.3450E+03
	3.0000E+00 to	4.0000E+00	1.4787E-15	5.1754E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.1120E+11	1.3172E+11

0
0 total energy from nuclides with spectrum data = 1.3011E+11
0 total energy from nuclides with no spectrum data = 1.6035E+09
1 gamma source spectrum for decay step for BWR source term - bot ds3 - 15 year
0 5478.75 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	1.5771E+09	4.7312E+07
5.0000E-02 to	1.0000E-01	1.4836E+08	1.1127E+07
1.0000E-01 to	2.0000E-01	8.3347E+07	1.2502E+07
2.0000E-01 to	3.0000E-01	4.6299E+06	1.1575E+06
3.0000E-01 to	4.0000E-01	1.3724E+07	4.8034E+06
4.0000E-01 to	6.0000E-01	2.5500E+08	1.2750E+08
6.0000E-01 to	8.0000E-01	1.3200E+08	9.2403E+07
8.0000E-01 to	1.0000E+00	1.1569E+07	1.0412E+07
1.0000E+00 to	1.3300E+00	4.2279E+10	4.9255E+10
1.3300E+00 to	1.6600E+00	1.1940E+10	1.7850E+10
1.6600E+00 to	2.0000E+00	4.5316E+00	8.2928E+00
2.0000E+00 to	2.5000E+00	2.8334E+05	6.3752E+05
2.5000E+00 to	3.0000E+00	4.3935E+02	1.2082E+03
3.0000E+00 to	4.0000E+00	1.3235E-15	4.6324E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		5.6444E+10	6.7412E+10

0
0 total energy from nuclides with spectrum data = 6.6956E+10
0 total energy from nuclides with no spectrum data = 4.5643E+08
1 gamma source spectrum for decay step for BWR source term - bot ds3 - 20 year
0 7305.00 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	8.9355E+08	2.6806E+07
5.0000E-02 to	1.0000E-01	7.6153E+07	5.7115E+06
1.0000E-01 to	2.0000E-01	3.1612E+07	4.7417E+06
2.0000E-01 to	3.0000E-01	1.7085E+06	4.2712E+05
3.0000E-01 to	4.0000E-01	4.3837E+06	1.5343E+06
4.0000E-01 to	6.0000E-01	7.1471E+07	3.5736E+07
6.0000E-01 to	8.0000E-01	3.6992E+07	2.5894E+07
8.0000E-01 to	1.0000E+00	1.1405E+06	1.0264E+06
1.0000E+00 to	1.3300E+00	2.1839E+10	2.5442E+10
1.3300E+00 to	1.6600E+00	6.1673E+09	9.2200E+09

	1.6600E+00 to	2.0000E+00	3.9949E+00	7.3107E+00
	2.0000E+00 to	2.5000E+00	1.4636E+05	3.2931E+05
	2.5000E+00 to	3.0000E+00	2.2694E+02	6.2409E+02
	3.0000E+00 to	4.0000E+00	1.1877E-15	4.1569E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		2.9123E+10	3.4764E+10

0
0 total energy from nuclides with spectrum data = 3.4630E+10
0 total energy from nuclides with no spectrum data = 1.3413E+08
1 gamma source spectrum for decay step for BWR source term - bot ds3 - 25 year
0 9131.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	6.0970E+08	1.8291E+07
	5.0000E-02 to	1.0000E-01	3.9423E+07	2.9567E+06
	1.0000E-01 to	2.0000E-01	1.3145E+07	1.9717E+06
	2.0000E-01 to	3.0000E-01	6.9272E+05	1.7318E+05
	3.0000E-01 to	4.0000E-01	1.5091E+06	5.2820E+05
	4.0000E-01 to	6.0000E-01	2.0070E+07	1.0035E+07
	6.0000E-01 to	8.0000E-01	1.0385E+07	7.2693E+06
	8.0000E-01 to	1.0000E+00	5.0638E+05	4.5574E+05
	1.0000E+00 to	1.3300E+00	1.1297E+10	1.3162E+10
	1.3300E+00 to	1.6600E+00	3.1904E+09	4.7696E+09
	1.6600E+00 to	2.0000E+00	3.5270E+00	6.4545E+00
	2.0000E+00 to	2.5000E+00	7.5713E+04	1.7035E+05
	2.5000E+00 to	3.0000E+00	1.1740E+02	3.2285E+02
	3.0000E+00 to	4.0000E+00	1.0674E-15	3.7358E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.5183E+10	1.7973E+10

0
0 total energy from nuclides with spectrum data = 1.7929E+10
0 total energy from nuclides with no spectrum data = 4.3569E+07
1
1 * normal termination of execution *
0 table of contents for material tables
0 case or subcase printed page

1 1

0ndset 33

33	4	1	27	6	0	0	0	0	0
0	0	0	0	0	2	-1	1698	690	130
880	7935	0	5	99	7	9	93	18	18
18	0	0							

0 35$ array 1 entries read
0 4t
0 56$ array 20 entries read
0 57* array 5 entries read
0 5t
l90 102464
l116 66229
l32 33663 nudata (library) storage size
l44 33734
l103 81119
0 58* array 10 entries read

```
0   60* array      10 entries read
0   66$ array      12 entries read
0   73$ array      13 entries read
0   74* array      13 entries read
0   75$ array      13 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
              0            0            0            0            0            0            0            0            0            0
              0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
           7935           20            6           18         1697
0mmn             19
             10           10            0            0            1            3            0            0            0            0
             21          100           13            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero            4
              0          689          129          879
0pow              3
   .000000E+00  .000000E+00  .000000E+00
0 linp            9
              6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              3.4750E+00   1.9421E+02   1.9769E+02
 start of interval flux =          1.59007E+13
 n-gamma, fission and total mev/fission =              3.8483E+00   1.9431E+02   1.9816E+02
 start of interval flux =          1.59416E+13
 n-gamma, fission and total mev/fission =              3.9383E+00   1.9441E+02   1.9835E+02
 start of interval flux =          1.59928E+13
 n-gamma, fission and total mev/fission =              4.0273E+00   1.9451E+02   1.9853E+02
 start of interval flux =          1.60545E+13
 n-gamma, fission and total mev/fission =              4.1190E+00   1.9460E+02   1.9872E+02
 start of interval flux =          1.61255E+13
 n-gamma, fission and total mev/fission =              4.2132E+00   1.9469E+02   1.9890E+02
 start of interval flux =          1.62047E+13
 n-gamma, fission and total mev/fission =              4.3095E+00   1.9477E+02   1.9908E+02
 start of interval flux =          1.62913E+13
 n-gamma, fission and total mev/fission =              4.4076E+00   1.9486E+02   1.9926E+02
 start of interval flux =          1.63846E+13
 n-gamma, fission and total mev/fission =              4.5072E+00   1.9494E+02   1.9944E+02
 start of interval flux =          1.64841E+13
 n-gamma, fission and total mev/fission =              4.6080E+00   1.9502E+02   1.9962E+02
 start of interval flux =          1.65893E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
0ndset           33
             33            4            2           27            6            0            0            0            0            0
              0            0            0            0            0            2           -1         1698          690          130
            880         7935            0            5           99            7            9           93           18           18
             18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
           0            0            0            0            0            0            0            0            0            0
           0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
        7935           20            6           18         1697
0mmn             19
          10           10            0            0            1            3            0            0            0           10
          21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
          21          689          129          879
0pow              3
  4.349999E+00 1.799989E+03 1.624619E+13
0 linp            9
           6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              4.6759E+00       1.9507E+02       1.9975E+02
 start of interval flux =         1.65408E+13
 n-gamma, fission and total mev/fission =              4.7673E+00       1.9515E+02       1.9991E+02
 start of interval flux =         1.66649E+13
 n-gamma, fission and total mev/fission =              4.8655E+00       1.9522E+02       2.0009E+02
 start of interval flux =         1.67930E+13
 n-gamma, fission and total mev/fission =              4.9653E+00       1.9529E+02       2.0026E+02
 start of interval flux =         1.69254E+13
 n-gamma, fission and total mev/fission =              5.0664E+00       1.9536E+02       2.0043E+02
 start of interval flux =         1.70620E+13
 n-gamma, fission and total mev/fission =              5.1684E+00       1.9544E+02       2.0060E+02
 start of interval flux =         1.72026E+13
 n-gamma, fission and total mev/fission =              5.2714E+00       1.9551E+02       2.0078E+02
 start of interval flux =         1.73470E+13
 n-gamma, fission and total mev/fission =              5.3752E+00       1.9558E+02       2.0095E+02
 start of interval flux =         1.74950E+13
 n-gamma, fission and total mev/fission =              5.4798E+00       1.9565E+02       2.0113E+02
 start of interval flux =         1.76465E+13
 n-gamma, fission and total mev/fission =              5.5852E+00       1.9572E+02       2.0130E+02
 start of interval flux =         1.78013E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
0ndset           33
          33            4            3           27            6            0            0            0            0            0
           0            0            0            0            0            2           -1         1698          690          130
         880         7935            0            5           99            7            9           93           18           18
          18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 3.599977E+03 1.723178E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              5.4980E+00   1.9575E+02   2.0125E+02
 start of interval flux =         1.78762E+13
 n-gamma, fission and total mev/fission =              5.5921E+00   1.9581E+02   2.0141E+02
 start of interval flux =         1.80660E+13
 n-gamma, fission and total mev/fission =              5.6995E+00   1.9588E+02   2.0158E+02
 start of interval flux =         1.82583E+13
 n-gamma, fission and total mev/fission =              5.8085E+00   1.9594E+02   2.0175E+02
 start of interval flux =         1.84533E+13
 n-gamma, fission and total mev/fission =              5.9184E+00   1.9601E+02   2.0192E+02
 start of interval flux =         1.86510E+13
 n-gamma, fission and total mev/fission =              6.0293E+00   1.9607E+02   2.0210E+02
 start of interval flux =         1.88512E+13
 n-gamma, fission and total mev/fission =              6.1411E+00   1.9614E+02   2.0228E+02
 start of interval flux =         1.90540E+13
 n-gamma, fission and total mev/fission =              6.2538E+00   1.9620E+02   2.0245E+02
 start of interval flux =         1.92592E+13
 n-gamma, fission and total mev/fission =              6.3673E+00   1.9627E+02   2.0263E+02
 start of interval flux =         1.94668E+13
 n-gamma, fission and total mev/fission =              6.4816E+00   1.9633E+02   2.0281E+02
 start of interval flux =         1.96767E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
0ndset          33
            33            4            4           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
      l44   33734
      l103  81119
0    58* array      10 entries read
0    60* array      10 entries read
0    66$ array      12 entries read
0     6t
      l140  71971
      used   107088 in size   150000
0jopt             12
                  0             0             0             0             0             0             0             0             0             0
                  0             0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
             7935            20             6            18          1697
0mmn              19
                 10            10             0             0             1             3             0             0             0            10
                 21           100             0             4             3             0             2             1             0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
                 21           689           129           879
0pow              3
  4.349999E+00 5.399966E+03 1.887921E+13
0 linp            9
                  6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =                6.4185E+00    1.9638E+02    2.0280E+02
 start of interval flux =          1.98437E+13
 n-gamma, fission and total mev/fission =                6.5318E+00    1.9644E+02    2.0297E+02
 start of interval flux =          2.00890E+13
 n-gamma, fission and total mev/fission =                6.6530E+00    1.9650E+02    2.0315E+02
 start of interval flux =          2.03360E+13
 n-gamma, fission and total mev/fission =                6.7754E+00    1.9656E+02    2.0334E+02
 start of interval flux =          2.05844E+13
 n-gamma, fission and total mev/fission =                6.8985E+00    1.9663E+02    2.0353E+02
 start of interval flux =          2.08343E+13
 n-gamma, fission and total mev/fission =                7.0225E+00    1.9669E+02    2.0371E+02
 start of interval flux =          2.10854E+13
 n-gamma, fission and total mev/fission =                7.1472E+00    1.9676E+02    2.0390E+02
 start of interval flux =          2.13379E+13
 n-gamma, fission and total mev/fission =                7.2725E+00    1.9682E+02    2.0409E+02
 start of interval flux =          2.15915E+13
 n-gamma, fission and total mev/fission =                7.3986E+00    1.9689E+02    2.0428E+02
 start of interval flux =          2.18463E+13
 n-gamma, fission and total mev/fission =                7.5252E+00    1.9695E+02    2.0448E+02
 start of interval flux =          2.21022E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
0ndset           33
                 33             4             5            27             6             0             0             0             0             0
                  0             0             0             0             0             2            -1          1698           690           130
                880          7935             0             5            99             7             9            93            18            18
                 18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
      l44   33734
      l103  81119
0    58* array      10 entries read
0    60* array      10 entries read
0    66$ array      12 entries read
0     6t
      l140  71971
      used   107088 in size   150000
0jopt             12
                   0             0             0             0             0             0             0             0             0             0
                   0             0
0therm             4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non               5
            7935            20             6            18          1697
0mmn              19
                  10            10             0             0             1             3             0             0             0            10
                  21           100             0             4             3             0             2             1             0
0tconst            5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero             4
                  21           689           129           879
0pow               3
  4.349999E+00 7.199954E+03 2.111307E+13
0 linp             9
                   6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =                7.4667E+00    1.9701E+02    2.0447E+02
 start of interval flux =          2.23534E+13
 n-gamma, fission and total mev/fission =                7.5956E+00    1.9707E+02    2.0466E+02
 start of interval flux =          2.26515E+13
 n-gamma, fission and total mev/fission =                7.7321E+00    1.9713E+02    2.0486E+02
 start of interval flux =          2.29495E+13
 n-gamma, fission and total mev/fission =                7.8691E+00    1.9719E+02    2.0506E+02
 start of interval flux =          2.32468E+13
 n-gamma, fission and total mev/fission =                8.0063E+00    1.9726E+02    2.0526E+02
 start of interval flux =          2.35433E+13
 n-gamma, fission and total mev/fission =                8.1439E+00    1.9732E+02    2.0547E+02
 start of interval flux =          2.38389E+13
 n-gamma, fission and total mev/fission =                8.2816E+00    1.9739E+02    2.0567E+02
 start of interval flux =          2.41336E+13
 n-gamma, fission and total mev/fission =                8.4193E+00    1.9745E+02    2.0587E+02
 start of interval flux =          2.44273E+13
 n-gamma, fission and total mev/fission =                8.5572E+00    1.9752E+02    2.0608E+02
 start of interval flux =          2.47199E+13
 n-gamma, fission and total mev/fission =                8.6950E+00    1.9759E+02    2.0628E+02
 start of interval flux =          2.50112E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
0ndset            33
                  33             4             5            27             6             0             0             0             0             0
                   0             0             0             0             0             2            -1          1698           690           130
                 880          7935             0             5            99             7             9            93            18            18
                  18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
```

```
     l44   33734
     l103  81119
0   58* array      10 entries read
0   60* array      10 entries read
0   66$ array      12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
           0            0            0            0            0            0            0            0            0            0
           0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
        7935           20            6           18         1697
0mmn            19
          10           10            0            0            1            3            0            0            0           10
          21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
          21          689          129          879
0pow             3
  4.349999E+00 8.999942E+03 2.386250E+13
0 linp           9
           6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              8.8456E+00   1.9766E+02   2.0650E+02
 start of interval flux =          2.53279E+13
 n-gamma, fission and total mev/fission =              8.9991E+00   1.9773E+02   2.0673E+02
 start of interval flux =          2.56515E+13
 n-gamma, fission and total mev/fission =              9.1531E+00   1.9781E+02   2.0696E+02
 start of interval flux =          2.59730E+13
 n-gamma, fission and total mev/fission =              9.3068E+00   1.9788E+02   2.0719E+02
 start of interval flux =          2.62923E+13
 n-gamma, fission and total mev/fission =              9.4600E+00   1.9796E+02   2.0742E+02
 start of interval flux =          2.66092E+13
 n-gamma, fission and total mev/fission =              9.6127E+00   1.9803E+02   2.0765E+02
 start of interval flux =          2.69235E+13
 n-gamma, fission and total mev/fission =              9.7646E+00   1.9811E+02   2.0787E+02
 start of interval flux =          2.72351E+13
 n-gamma, fission and total mev/fission =              9.9160E+00   1.9818E+02   2.0810E+02
 start of interval flux =          2.75436E+13
 n-gamma, fission and total mev/fission =              1.0066E+01   1.9825E+02   2.0832E+02
 start of interval flux =          2.78489E+13
 n-gamma, fission and total mev/fission =              1.0216E+01   1.9832E+02   2.0854E+02
 start of interval flux =          2.81508E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 55000 MWd/MTU
0ndset          33
          33            4            5           27            6            0            0            0            0            0
           0            0            0            0            0            2           -1         1698          690          130
         880         7935            0            5           99            7            9           93           18           18
          18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
```

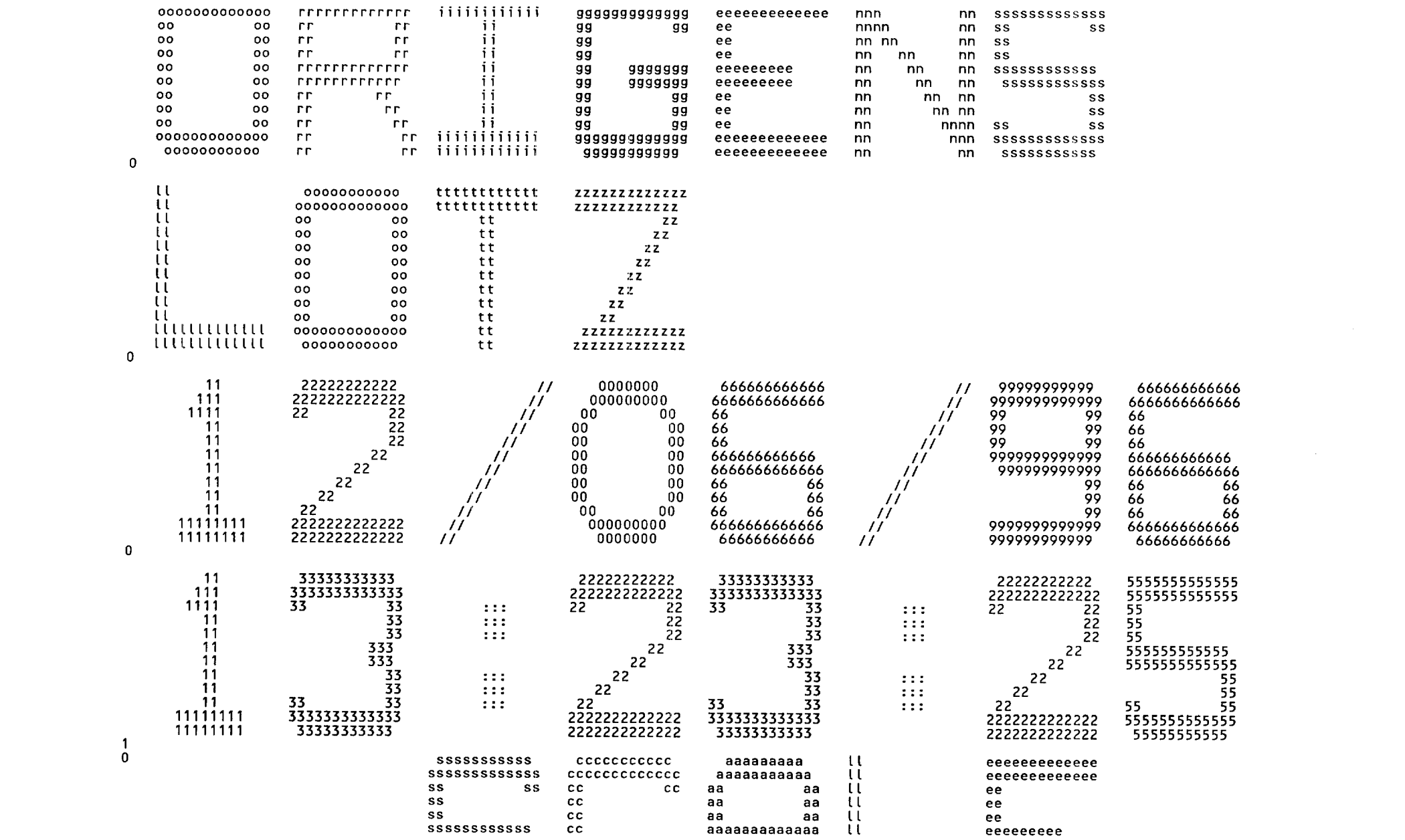
```
     l103  81117
0   60* array      10 entries read
0   61* array       7 entries read
0   65$ array      63 entries read
0   81$ array       6 entries read
0   82$ array      10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
             0           10            0            0            1            1            0            0            0           10
            21          100            0            4            3            0            2            0            0
0tconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 1.099993E+04 2.082328E+13
0 linp            9
             6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Bottom - decay
0   56$ array      20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*       and expanded decay data and fission product yield libraries.  (mrr     *
*       92-088, 92-025, 92-026)                                                *
*                                                                              *
*       origen-s libraries:  the six standard origen-s card image libraries    *
*       have been replaced by two new libraries, end6dec and xsectpho.         *
*       end6dec contains the updated and expanded decay data library based     *
*       on endf/b-vi data.  xsectpho contains the basic cross section and      *
*       photon spectra data and updated fission product yield data based on    *
*       endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*       002, 003, 006, 008, 009)                                               *
*                                                                              *
*       std. comp. library:  in drr 92-033, the following nuclides were        *
*       changed to turn on resonance processing flag but should not have       *
*       been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*       feinconel.  flags for these nuclides have now been returned to off.    *
*       (drr 93-014)                                                           *
*                                                                              *
*       heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                              *
*       htas1:  updated for compatibility with heating7 and to interact        *
*       effectively with ocular.  fin effectiveness technique was added.       *
*       (mrr 93-036)                                                           *
*                                                                              *
*       ocular:  made compatible with heating7 and htas1 on mainframe and      *
*       workstation.  (mrr 93-037)                                             *
*                                                                              *
*       sas2:  corrected so that 'parm=skipshipdata' would work on             *
*       workstation.  (mrr 93-051)                                             *
*                                                                              *
*       aim:  ft47ft001 is no longer require for aim to execute on             *
*       workstation.  (mrr 93-052)                                             *
*                                                                              *
*       27group, 27burnup, and 218group - these libraries have been            *
*       updated to correct an error found in the chlorine cross-sections.      *
*       (drr93-022)                                                            *
*                                                                              *
*       bonami:  corrected so that a case with a number density of zero        *
*       for a nuclide that has bondarenko data will run without failing.       *
*       (mrr 93-060)                                                           *
*                                                                              *
*       csas:  corrected calculation of dancoff correction factor for          *
*       cylindrical cells.  note that previous calculations of small           *
*       cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*       values.  also corrected dancoff factor for multiregion slab            *
*       cell with vacuum boundary conditions to be set to zero.                *
*       (mrr 93-065)                                                           *
*                                                                              *
*       csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*       resonance materials that are not part of the unit cell in lattice-     *
*       cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*       check your nitawl output in any previous scale-4.2 calculations        *
*       for dancoff factors =-1.                                               *
*       (mrr 93-070)                                                           *
*                                                                              *
********************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        80000    220000    240000    250000    260000
       270000    280000    400000    410000    500000
74**     89.4   10100.0      46.5  189764.1
          2.6       0.2       3.2       0.1       4.9
          0.1       4.5    2160.1       0.1      30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
```

```
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 45000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.1636364 e
         5t
      BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds3p
      58** 10r4.35
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 55000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.181818 e
         5t
      BWR SNF Assembly - Plenum - deplete to 55000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds3p
      58** 10r4.35
      60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
      66$$ 12r0 e
         6t
       BWR SNF Assembly Decay
      3$$  33 0 5 a33 -88 e
         2t
      35$$ 0
         4t
      56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
         5t
      BWR SNF Assembly - Plenum - decay
      per ONE BWR Fuel Assembly - Plenum Region - ds3p
      60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
      61** f1-15
      65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
      81$$ 2 0 26 1 e
      82$$ f4
         6t
        decay step for BWR source term - plen ds3 - discharge
        decay step for BWR source term - plen ds3 - 0.25 year
        decay step for BWR source term - plen ds3 - 0.50 year
        decay step for BWR source term - plen ds3 - 1 year
        decay step for BWR source term - plen ds3 - 2 year
        decay step for BWR source term - plen ds3 - 5 year
        decay step for BWR source term - plen ds3 - 10 year
        decay step for BWR source term - plen ds3 - 15 year
        decay step for BWR source term - plen ds3 - 20 year
        decay step for BWR source term - plen ds3 - 25 year
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1   ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiii    ggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
```



```
      sssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
               ss   cc              aa          aa   ll              ee
               ss   cc              aa          aa   ll              ee
ss             ss   cc          cc  aa          aa   ll              ee
sssssssssssss   ccccccccccccc  aa          aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     ccccccccccc   aa          aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                  program verification information                *****
*****                                                                     *****
*****                 code system:    scale  version:    4.2           *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  13:23:25                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0       note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0.............................columns 1-72.............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1636364 e
    5t
BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        80000    220000    240000    250000    260000
       270000    280000    400000    410000    500000
74**     89.4   10100.0      46.5  189764.1
          2.6       0.2       3.2       0.1       4.9
          0.1       4.5    2160.1       0.1      30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds3p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
```

```
 57** 0.0 0.0 1.0-5 0.1636364 e
    5t
 BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds3p
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 55000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.181818 e
    5t
 BWR SNF Assembly - Plenum - deplete to 55000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds3p
 58** 10r4.35
 60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Plenum - decay
 per ONE BWR Fuel Assembly - Plenum Region - ds3p
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - plen ds3 - discharge
   decay step for BWR source term - plen ds3 - 0.25 year
   decay step for BWR source term - plen ds3 - 0.50 year
   decay step for BWR source term - plen ds3 - 1 year
   decay step for BWR source term - plen ds3 - 2 year
   decay step for BWR source term - plen ds3 - 5 year
   decay step for BWR source term - plen ds3 - 10 year
   decay step for BWR source term - plen ds3 - 15 year
   decay step for BWR source term - plen ds3 - 20 year
   decay step for BWR source term - plen ds3 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
```

```
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
```

```
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
```

```
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *       neutron flux spectrum factors and cross sections were produced from  *
          *      the "presas2" case updating all nuclides on the scale "burnup" library*
          *                                                                            *
          *                   fission product yields are from endf/b-v                 *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *       neutron flux spectrum factors and cross sections were produced from  *
          *      the "presas2" case updating all nuclides on the scale "burnup" library*
          *                                                                            *
          *                   fission product yields are from endf/b-v                 *
          *                                                                            *
```

```
          *              photon libraries use an 18-energy-group structure              *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *       neutron flux spectrum factors and cross sections were produced from  *
          *      the "presas2" case updating all nuclides on the scale "burnup" library*
          *                                                                            *
          *                    fission product yields are from endf/b-v                *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
```

```
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0          ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                    .other identification and sizes of library.
0                     data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                   7/ 9/1993    date library was produced
0                        1697    total number of nuclides in library
                          689    number of light-element nuclides
                          129    number of actinide nuclides
                          879    number of fission product nuclides
0                        7935    number of nonzero off-diagonal matrix elements
0          ********************************************************************************
0     3$ array     33 entries read
0     2t
```

```
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
    BWR SNF Assembly - Plenum - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Plenum Regio
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     h  1   2.49E-04  2.49E-04  2.49E-04  2.49E-04  2.49E-04  2.49E-04  2.49E-04  2.49E-04  2.49E-04  2.49E-04  2.49E-04
     h  2   3.51E-07  3.51E-07  3.51E-07  3.51E-07  3.51E-07  3.51E-07  3.51E-07  3.51E-07  3.51E-07  3.51E-07  3.51E-07
     h  3   6.94E-11  6.94E-11  6.85E-11  6.75E-11  6.56E-11  6.21E-11  5.24E-11  3.96E-11  2.99E-11  2.26E-11  1.70E-11
    he  3   1.39E-12  1.40E-12  2.34E-12  3.31E-12  5.18E-12  8.77E-12  1.84E-11  3.12E-11  4.09E-11  4.83E-11  5.38E-11
    he  4   3.41E-04  3.41E-04  3.41E-04  3.41E-04  3.41E-04  3.41E-04  3.41E-04  3.41E-04  3.41E-04  3.41E-04  3.41E-04
    li  7   1.52E-15  1.52E-15  1.52E-15  1.52E-15  1.52E-15  1.52E-15  1.52E-15  1.52E-15  1.52E-15  1.52E-15  1.52E-15
    be 10   2.98E-09  2.98E-09  2.98E-09  2.98E-09  2.98E-09  2.98E-09  2.98E-09  2.98E-09  2.98E-09  2.98E-09  2.98E-09
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b 11	6.73E-14	6.73E-14	6.73E-14	6.73E-14	6.73E-14	6.73E-14	6.73E-14	6.73E-14	6.73E-14	6.73E-14	6.73E-14
c 12	8.85E-12	8.85E-12	8.85E-12	8.85E-12	8.85E-12	8.85E-12	8.85E-12	8.85E-12	8.85E-12	8.85E-12	8.85E-12
c 13	2.27E-04	2.27E-04	2.27E-04	2.27E-04	2.27E-04	2.27E-04	2.27E-04	2.27E-04	2.27E-04	2.27E-04	2.27E-04
c 14	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.97E-07	5.96E-07	5.96E-07	5.96E-07
n 14	2.21E-10	2.21E-10	2.39E-10	2.57E-10	2.93E-10	3.66E-10	5.82E-10	9.43E-10	1.30E-09	1.66E-09	2.03E-09
n 15	2.73E-07	2.73E-07	2.73E-07	2.73E-07	2.73E-07	2.73E-07	2.73E-07	2.73E-07	2.73E-07	2.73E-07	2.73E-07
o 16	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00
o 17	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03
o 18	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03
f 19	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08	1.11E-08
ne 20	2.53E-13	2.53E-13	2.53E-13	2.53E-13	2.53E-13	2.53E-13	2.53E-13	2.53E-13	2.53E-13	2.53E-13	2.53E-13
ar 40	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12	6.70E-12
k 41	2.21E-13	2.21E-13	2.21E-13	2.21E-13	2.21E-13	2.21E-13	2.21E-13	2.21E-13	2.21E-13	2.21E-13	2.21E-13
k 43	4.05E-15	1.92E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	4.38E-15	4.38E-15	4.38E-15	4.38E-15	4.38E-15	4.38E-15	4.38E-15	4.38E-15	4.38E-15	4.38E-15	4.38E-15
ca 43	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07
ca 44	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07	9.97E-07
ca 45	2.67E-09	2.66E-09	1.83E-09	1.23E-09	5.70E-10	1.21E-10	1.18E-12	5.17E-16	2.27E-19	1.00E-22	4.40E-26
ca 46	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07	1.28E-07
ca 47	1.15E-12	9.86E-13	1.22E-18	8.88E-25	6.60E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.84E-08	1.84E-08	1.92E-08	1.98E-08	2.05E-08	2.09E-08	2.11E-08	2.11E-08	2.11E-08	2.11E-08	2.11E-08
sc 46	1.66E-07	1.64E-07	7.87E-08	3.66E-08	8.08E-09	3.94E-10	4.57E-14	1.26E-20	3.47E-27	9.56E-34	2.63E-40
sc 47	1.07E-08	8.69E-09	8.84E-17	2.90E-24	1.88E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.53E-10	3.78E-10	7.27E-25	3.69E-40	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02
ti 47	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02
ti 48	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
ti 49	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02	1.44E-02
ti 50	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02
v 50	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05	3.85E-05
v 51	6.17E-03	6.17E-03	6.29E-03	6.30E-03	6.31E-03	6.31E-03	6.31E-03	6.31E-03	6.31E-03	6.31E-03	6.31E-03
cr 50	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01
cr 51	1.34E-04	1.31E-04	1.41E-05	1.40E-06	1.44E-08	1.55E-12	1.94E-24	.00E+00	.00E+00	.00E+00	.00E+00
cr 52	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
cr 53	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01
cr 54	9.54E-02	9.54E-02	9.55E-02	9.55E-02	9.55E-02	9.55E-02	9.55E-02	9.55E-02	9.55E-02	9.55E-02	9.55E-02
mn 54	5.06E-05	5.05E-05	4.15E-05	3.38E-05	2.25E-05	1.00E-05	8.78E-07	1.52E-08	2.64E-10	4.57E-12	7.92E-14
mn 55	9.54E-02	9.54E-02	9.54E-02	9.55E-02	9.56E-02	9.58E-02	9.61E-02	9.63E-02	9.64E-02	9.64E-02	9.64E-02
mn 56	4.77E-07	7.52E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01
fe 55	1.01E-03	1.01E-03	9.46E-04	8.87E-04	7.81E-04	6.06E-04	2.83E-04	7.95E-05	2.23E-05	6.28E-06	1.76E-06
fe 56	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00
fe 57	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
fe 58	1.83E-02	1.83E-02	1.83E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02	1.84E-02
fe 59	2.98E-06	2.93E-06	7.34E-07	1.74E-07	1.01E-08	3.41E-11	1.32E-18	5.85E-31	2.48E-43	.00E+00	.00E+00

1

BWR SNF Assembly - Plenum - decay light elements page 2

0 nuclide concentrations, grams

basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
co 58m	3.70E-11	5.99E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.26E-04	1.25E-04	5.22E-05	2.12E-05	3.54E-06	9.98E-08	2.23E-12	3.94E-20	6.96E-28	1.23E-35	2.44E-43
co 59	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02	8.40E-02
co 60	1.23E-02	1.23E-02	1.19E-02	1.15E-02	1.08E-02	9.44E-03	6.36E-03	3.29E-03	1.71E-03	8.84E-04	4.58E-04
co 61	7.86E-09	3.29E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00	2.99E+00
ni 59	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02	3.38E-02
ni 60	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.20E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
ni 61	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02	6.30E-02
ni 62	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01

ni 63	6.90E-03	6.90E-03	6.89E-03	6.87E-03	6.85E-03	6.80E-03	6.66E-03	6.44E-03	6.22E-03	6.01E-03	5.80E-03
ni 64	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02
ni 65	1.90E-08	2.59E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.48E-12	1.83E-12	3.07E-24	1.78E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.49E-04	1.49E-04	1.61E-04	1.73E-04	1.97E-04	2.44E-04	3.84E-04	6.10E-04	8.30E-04	1.04E-03	1.25E-03
cu 64	1.14E-09	3.07E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04	2.32E-04
cu 66	5.73E-12	2.85E-15	4.79E-27	2.78E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	3.49E-15	2.67E-15	1.07E-25	1.66E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	3.83E-07	3.83E-07	3.83E-07	3.83E-07	3.83E-07	3.83E-07	3.83E-07	3.83E-07	3.83E-07	3.83E-07	3.83E-07
zn 65	1.85E-10	1.84E-10	1.43E-10	1.10E-10	6.54E-11	2.32E-11	1.03E-12	5.73E-15	3.19E-17	1.78E-19	9.88E-22
zn 66	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06	1.04E-06
zn 67	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09	1.13E-09
zn 68	1.41E-11	1.41E-11	1.41E-11	1.41E-11	1.41E-11	1.41E-11	1.41E-11	1.41E-11	1.41E-11	1.41E-11	1.41E-11
ga 69	2.28E-14	2.28E-14	2.28E-14	2.28E-14	2.28E-14	2.28E-14	2.28E-14	2.28E-14	2.28E-14	2.28E-14	2.28E-14
sr 87	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05	4.73E-05
sr 88	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03	4.64E-03
sr 89	1.33E-05	1.32E-05	3.88E-06	1.09E-06	8.91E-08	5.96E-10	1.78E-16	2.38E-27	3.18E-38	.00E+00	.00E+00
sr 90	2.38E-07	2.38E-07	2.36E-07	2.35E-07	2.32E-07	2.26E-07	2.10E-07	1.86E-07	1.64E-07	1.45E-07	1.28E-07
sr 91	2.07E-08	3.61E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	3.41E-04	3.41E-04	3.50E-04	3.53E-04	3.54E-04	3.54E-04	3.54E-04	3.54E-04	3.54E-04	3.54E-04	3.54E-04
y 89m	4.56E-15	4.50E-15	1.33E-15	3.73E-16	3.05E-17	2.04E-19	6.09E-26	8.13E-37	.00E+00	.00E+00	.00E+00
y 90	2.63E-05	2.03E-05	6.14E-11	6.10E-11	6.03E-11	5.88E-11	5.46E-11	4.83E-11	4.27E-11	3.78E-11	3.34E-11
y 91	3.98E-05	3.93E-05	1.37E-05	4.58E-06	5.26E-07	6.94E-09	1.60E-14	6.41E-24	2.57E-33	1.02E-42	.00E+00
y 92	8.81E-08	8.01E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	5.04E-11	9.84E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03
zr 91	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02
zr 92	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02
zr 93	7.23E-01	7.23E-01	7.23E-01	7.23E-01	7.23E-01	7.23E-01	7.23E-01	7.23E-01	7.23E-01	7.23E-01	7.22E-01
zr 94	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02
zr 95	1.39E-02	1.37E-02	5.24E-03	1.92E-03	2.66E-04	5.10E-06	3.58E-11	9.26E-20	2.39E-28	6.18E-37	.00E+00
zr 96	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01
zr 97	2.40E-04	8.96E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.04E-09	1.04E-09	1.04E-09	1.04E-09	1.04E-09	1.04E-09	1.03E-09	1.03E-09	1.02E-09	1.02E-09	1.01E-09
nb 92	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06	2.00E-06
nb 93	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.84E-02	9.85E-02	9.85E-02	9.85E-02	9.85E-02	9.85E-02
nb 93m	4.59E-05	4.59E-05	4.55E-05	4.50E-05	4.43E-05	4.27E-05	3.85E-05	3.25E-05	2.77E-05	2.38E-05	2.07E-05
nb 94	1.46E-03	1.46E-03	1.46E-03	1.46E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03	1.45E-03
nb 95	7.48E-03	7.49E-03	4.75E-03	2.07E-03	3.13E-04	6.32E-06	4.31E-11	1.11E-19	2.88E-28	1.29E-36	.00E+00
nb 95m	9.00E-06	8.94E-06	3.47E-06	1.28E-06	1.76E-07	3.38E-09	2.38E-14	6.14E-23	1.59E-31	.00E+00	.00E+00
nb 96	1.86E-07	9.12E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 97	1.70E-05	6.40E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	2.24E-07	8.38E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	1.61E-07	1.61E-07	1.73E-07	1.86E-07	2.11E-07	2.61E-07	4.10E-07	6.58E-07	9.06E-07	1.15E-06	1.40E-06
mo 95	2.51E-01	2.51E-01	2.63E-01	2.69E-01	2.72E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01
mo 96	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02	1.96E-02
mo 97	4.51E-01	4.52E-01	4.52E-01	4.52E-01	4.52E-01	4.52E-01	4.52E-01	4.52E-01	4.52E-01	4.52E-01	4.52E-01
mo 98	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03	5.95E-03
mo 99	1.17E-07	9.12E-08	1.62E-17	1.19E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09	1.37E-09
tc 98	1.35E-11	1.35E-11	1.35E-11	1.35E-11	1.35E-11	1.35E-11	1.35E-11	1.35E-11	1.35E-11	1.35E-11	1.35E-11
tc 99	2.09E-06	2.10E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06	2.11E-06
ru 99	9.90E-12	9.92E-12	1.16E-11	1.34E-11	1.68E-11	2.37E-11	4.45E-11	7.91E-11	1.14E-10	1.48E-10	1.83E-10
ru100	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07	1.83E-07

ru101	9.78E-10	9.78E-10	9.78E-10	9.78E-10	9.78E-10	9.78E-10	9.78E-10	9.78E-10	9.78E-10	9.78E-10	9.78E-10
ru102	1.92E-11	1.92E-11	1.92E-11	1.92E-11	1.92E-11	1.92E-11	1.92E-11	1.92E-11	1.92E-11	1.92E-11	1.92E-11
ru103	4.54E-15	4.46E-15	9.27E-16	1.81E-16	7.19E-18	1.14E-20	4.51E-29	4.33E-43	.00E+00	.00E+00	.00E+00
cd111	4.63E-08	4.63E-08	4.63E-08	4.63E-08	4.63E-08	4.63E-08	4.63E-08	4.63E-08	4.63E-08	4.63E-08	4.63E-08
cd112	3.98E-07	3.98E-07	3.98E-07	3.98E-07	3.98E-07	3.98E-07	3.98E-07	3.98E-07	3.98E-07	3.98E-07	3.98E-07
cd113	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09
cd113m	1.40E-09	1.40E-09	1.39E-09	1.37E-09	1.34E-09	1.27E-09	1.10E-09	8.59E-10	6.72E-10	5.25E-10	4.11E-10
cd114	5.24E-05	5.24E-05	5.50E-05	5.58E-05	5.60E-05	5.61E-05	5.61E-05	5.61E-05	5.61E-05	5.61E-05	5.61E-05
cd115	2.21E-09	1.62E-09	1.53E-21	4.85E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	4.80E-09	4.73E-09	1.18E-09	2.81E-10	1.64E-11	5.62E-14	2.26E-21	1.06E-33	.00E+00	.00E+00	.00E+00
cd116	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07	3.00E-07
cd117	2.04E-11	2.56E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	1.15E-02	1.15E-02	1.19E-02	1.22E-02	1.25E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02
in113m	6.78E-07	6.74E-07	3.94E-07	2.26E-07	7.52E-08	8.33E-09	1.13E-11	1.90E-16	3.17E-21	5.31E-26	8.87E-31
in114	1.93E-09	1.21E-09	3.49E-10	9.57E-11	7.41E-12	4.46E-14	9.71E-21	7.66E-32	.00E+00	.00E+00	.00E+00
in114m	7.66E-05	7.55E-05	2.17E-05	5.95E-06	4.61E-07	2.77E-09	6.04E-16	4.76E-27	3.76E-38	.00E+00	.00E+00
in115	1.17E-07	1.17E-07	1.20E-07	1.21E-07	1.22E-07	1.22E-07	1.22E-07	1.22E-07	1.22E-07	1.22E-07	1.22E-07
in117	6.74E-11	1.65E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.45E-11	8.53E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.76E-01	2.76E-01	2.76E-01	2.76E-01	2.76E-01	2.76E-01	2.76E-01	2.76E-01	2.76E-01	2.76E-01	2.76E-01
sn113	1.13E-03	1.12E-03	6.57E-04	3.76E-04	1.25E-04	1.39E-05	1.89E-08	3.16E-13	5.28E-18	8.83E-23	1.48E-27
sn114	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
sn115	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02	9.95E-02
sn116	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00	4.37E+00
sn117	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00
sn117m	7.08E-04	6.73E-04	7.21E-06	6.46E-08	5.82E-12	4.79E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00
sn119	2.68E+00	2.68E+00	2.68E+00	2.69E+00	2.69E+00	2.69E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00
sn119m	1.37E-02	1.37E-02	1.11E-02	8.91E-03	5.78E-03	2.44E-03	1.82E-04	2.43E-06	3.23E-08	4.30E-10	5.72E-12
sn120	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
sn121	2.05E-05	1.11E-05	7.19E-09	7.16E-09	7.12E-09	7.03E-09	6.77E-09	6.36E-09	5.97E-09	5.60E-09	5.26E-09
sn121m	1.66E-04	1.66E-04	1.65E-04	1.65E-04	1.63E-04	1.61E-04	1.55E-04	1.46E-04	1.37E-04	1.29E-04	1.21E-04
sn122	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00
sn123	2.20E-04	2.19E-04	1.36E-04	8.27E-05	3.10E-05	4.37E-06	1.22E-08	6.77E-13	3.75E-17	2.08E-21	1.15E-25
sn124	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00
sn125	3.40E-06	3.16E-06	5.25E-09	6.79E-12	1.33E-17	5.24E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02	2.16E-02
sb122	9.81E-06	7.59E-06	9.08E-16	4.42E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.99E-03	1.99E-03	2.07E-03	2.12E-03	2.18E-03	2.20E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03	2.21E-03

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BWR SNF Assembly - Plenum - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sb124	1.28E-05	1.26E-05	4.53E-06	1.56E-06	1.91E-07	2.84E-09	9.42E-15	6.94E-24	5.11E-33	3.82E-42	.00E+00
sb125	7.92E-03	7.91E-03	7.44E-03	6.98E-03	6.15E-03	4.77E-03	2.23E-03	6.25E-04	1.76E-04	4.94E-05	1.39E-05
sb126	1.15E-06	1.09E-06	7.52E-09	4.26E-11	1.56E-15	2.10E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	2.36E-03	2.36E-03	2.37E-03	2.37E-03	2.37E-03	2.37E-03	2.37E-03	2.37E-03	2.37E-03	2.37E-03	2.37E-03
te123	2.16E-05	2.16E-05	2.42E-05	2.58E-05	2.73E-05	2.80E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05	2.81E-05
te123m	6.54E-06	6.50E-06	3.88E-06	2.27E-06	7.88E-07	9.51E-08	1.67E-10	4.25E-15	1.08E-19	2.76E-24	7.03E-29
te124	1.81E-04	1.81E-04	1.89E-04	1.92E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04
te125	7.56E-03	7.57E-03	8.05E-03	8.51E-03	9.36E-03	1.08E-02	1.33E-02	1.50E-02	1.54E-02	1.55E-02	1.56E-02
te125m	1.03E-04	1.03E-04	1.02E-04	9.81E-05	8.72E-05	6.77E-05	3.16E-05	8.88E-06	2.50E-06	7.01E-07	1.97E-07
te126	2.36E-04	2.36E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04	2.37E-04
te127	1.10E-09	2.85E-10	6.74E-11	3.74E-11	1.17E-11	1.15E-12	1.08E-15	9.78E-21	8.85E-26	8.01E-31	7.24E-36
te127m	3.41E-08	3.39E-08	1.93E-08	1.07E-08	3.34E-09	3.28E-10	3.09E-13	2.79E-18	2.53E-23	2.29E-28	2.07E-33
te128	4.72E-09	4.72E-09	4.72E-09	4.72E-09	4.72E-09	4.72E-09	4.72E-09	4.72E-09	4.72E-09	4.72E-09	4.72E-09
te129m	3.39E-14	3.32E-14	5.29E-15	7.84E-16	1.81E-17	9.66E-21	1.47E-30	.00E+00	.00E+00	.00E+00	.00E+00
i127	1.18E-06	1.18E-06	1.20E-06	1.21E-06	1.21E-06	1.22E-06	1.22E-06	1.22E-06	1.22E-06	1.22E-06	1.22E-06
i129	4.18E-12	4.18E-12	4.21E-12	4.22E-12	4.22E-12	4.22E-12	4.22E-12	4.22E-12	4.22E-12	4.22E-12	4.22E-12

xe127	2.68E-14	2.63E-14	4.83E-15	8.30E-16	2.56E-17	2.44E-20	2.11E-29	.00E+00	.00E+00	.00E+00	.00E+00
xe128	5.38E-08	5.38E-08	5.38E-08	5.38E-08	5.38E-08	5.38E-08	5.38E-08	5.38E-08	5.38E-08	5.38E-08	5.38E-08
xe129	2.40E-10	2.40E-10	2.41E-10	2.41E-10	2.41E-10	2.41E-10	2.41E-10	2.41E-10	2.41E-10	2.41E-10	2.41E-10
xe129m	5.55E-13	5.13E-13	4.97E-16	3.67E-19	2.38E-25	1.02E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	1.16E-11	1.16E-11	1.16E-11	1.16E-11	1.16E-11	1.16E-11	1.16E-11	1.16E-11	1.16E-11	1.16E-11	1.16E-11
xe131	2.96E-14	2.96E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14	2.97E-14
xe132	3.49E-15	3.49E-15	3.49E-15	3.49E-15	3.49E-15	3.49E-15	3.49E-15	3.49E-15	3.49E-15	3.49E-15	3.49E-15
total	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03

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BWR SNF Assembly - Plenum - decay light elements page 5

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	6.71E-07	6.71E-07	6.62E-07	6.53E-07	6.35E-07	6.00E-07	5.07E-07	3.83E-07	2.89E-07	2.18E-07	1.65E-07
be 10	6.67E-11	6.67E-11	6.67E-11	6.67E-11	6.67E-11	6.67E-11	6.67E-11	6.67E-11	6.67E-11	6.67E-11	6.67E-11
c 14	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06	2.66E-06
ar 41	1.07E-09	1.19E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	2.29E-11	5.96E-12	3.06E-18	3.05E-18	3.01E-18	2.95E-18	2.77E-18	2.49E-18	2.24E-18	2.02E-18	1.82E-18
k 43	1.32E-08	6.28E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	4.74E-05	4.72E-05	3.24E-05	2.19E-05	1.01E-05	2.15E-06	2.08E-08	9.16E-12	4.03E-15	1.77E-18	7.79E-22
ca 47	7.04E-07	6.04E-07	7.49E-13	5.44E-19	4.11E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	5.61E-03	5.57E-03	2.67E-03	1.24E-03	2.74E-04	1.33E-05	1.55E-09	4.26E-16	1.18E-22	3.24E-29	.00E+00
sc 47	8.88E-03	7.22E-03	7.34E-11	2.41E-18	1.57E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	8.27E-04	5.65E-04	1.09E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	8.83E-04	2.33E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	1.24E+01	1.21E+01	1.31E+00	1.29E-01	1.34E-03	1.44E-07	1.79E-19	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	3.92E-01	3.92E-01	3.21E-01	2.62E-01	1.74E-01	7.75E-02	6.80E-03	1.18E-04	2.04E-06	3.54E-08	6.14E-10
mn 56	1.03E+01	1.63E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	2.40E+00	2.40E+00	2.25E+00	2.11E+00	1.86E+00	1.44E+00	6.74E-01	1.89E-01	5.32E-02	1.50E-02	4.20E-03
fe 59	1.48E-01	1.46E-01	3.65E-02	8.64E-03	5.02E-04	1.70E-06	6.57E-14	2.91E-26	.00E+00	.00E+00	.00E+00
co 58m	2.19E-04	3.55E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	4.00E+00	3.96E+00	1.66E+00	6.72E-01	1.13E-01	3.17E-03	7.07E-08	1.25E-15	2.21E-23	3.88E-31	.00E+00
co 60	1.39E+01	1.39E+01	1.34E+01	1.30E+01	1.22E+01	1.07E+01	7.19E+00	3.73E+00	1.93E+00	1.00E+00	5.18E-01
co 61	2.45E-01	1.02E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03	2.73E-03
ni 63	3.91E-01	3.91E-01	3.91E-01	3.90E-01	3.88E-01	3.86E-01	3.78E-01	3.65E-01	3.53E-01	3.41E-01	3.29E-01
ni 65	3.65E-01	4.95E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.16E-06	1.59E-06	2.67E-18	1.55E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	4.38E-03	1.18E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	3.20E-03	1.59E-06	2.68E-18	1.55E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.64E-09	2.02E-09	8.06E-20	1.25E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	1.52E-06	1.52E-06	1.18E-06	9.06E-07	5.39E-07	1.91E-07	8.48E-09	4.72E-11	2.63E-13	1.46E-15	8.14E-18
zn 69	1.67E-10	3.59E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.12E-11	3.35E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	1.86E-15	1.75E-15	7.96E-18	2.92E-20	4.52E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.87E-01	3.82E-01	1.13E-01	3.17E-02	2.59E-03	1.73E-05	5.17E-12	6.90E-23	.00E+00	.00E+00	.00E+00
sr 90	3.36E-05	3.36E-05	3.34E-05	3.32E-05	3.27E-05	3.19E-05	2.97E-05	2.62E-05	2.32E-05	2.05E-05	1.81E-05
sr 91	7.50E-02	1.31E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.60E-05	3.55E-05	1.05E-05	2.95E-06	2.41E-07	1.61E-09	4.81E-16	6.42E-27	.00E+00	.00E+00	.00E+00
y 90	1.43E+01	1.10E+01	3.34E-05	3.32E-05	3.28E-05	3.20E-05	2.97E-05	2.62E-05	2.32E-05	2.05E-05	1.81E-05
y 90m	1.25E-06	6.80E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	9.77E-01	9.65E-01	3.36E-01	1.12E-01	1.29E-02	1.70E-04	3.92E-10	1.57E-19	6.32E-29	.00E+00	.00E+00
y 92	8.48E-01	7.71E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.68E-04	3.28E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03	1.82E-03
zr 95	2.98E+02	2.95E+02	1.12E+02	4.13E+01	5.71E+00	1.09E-01	7.70E-07	1.99E-15	5.14E-24	2.28E-32	.00E+00
zr 97	4.58E+02	1.71E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	6.00E-09	6.00E-09	6.00E-09	6.00E-09	5.99E-09	5.99E-09	5.97E-09	5.94E-09	5.91E-09	5.88E-09	5.85E-09
nb 92	2.22E-10	2.22E-10	2.22E-10	2.22E-10	2.22E-10	2.22E-10	2.22E-10	2.22E-10	2.22E-10	2.22E-10	2.22E-10
nb 93m	1.09E-02	1.09E-02	1.08E-02	1.07E-02	1.06E-02	1.02E-02	9.17E-03	7.75E-03	6.60E-03	5.68E-03	4.93E-03

nb 94	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.73E-04	2.72E-04
nb 95	2.94E+02	2.94E+02	1.87E+02	8.13E+01	1.23E+01	2.49E-01	1.70E-06	4.38E-15	1.13E-23	4.56E-32	.00E+00
nb 95m	3.43E+00	3.40E+00	1.32E+00	4.86E-01	6.72E-02	1.29E-03	9.06E-09	2.34E-17	6.05E-26	.00E+00	.00E+00
nb 96	2.60E-01	1.28E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	4.58E+02	1.72E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 6

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 97m	4.34E+02	1.63E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	5.64E-02	4.38E-02	7.78E-12	5.71E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.17E-14	1.17E-14
tc 99	3.58E-08	3.59E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08
ru103	1.47E-10	1.44E-10	2.99E-11	5.85E-12	2.32E-13	3.67E-16	1.46E-24	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	3.15E-07	3.15E-07	3.11E-07	3.08E-07	3.00E-07	2.86E-07	2.47E-07	1.93E-07	1.51E-07	1.18E-07	9.22E-08
cd115	1.13E-03	8.25E-04	7.79E-16	2.48E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.22E-04	1.20E-04	3.02E-05	7.17E-06	4.18E-07	1.43E-09	5.75E-17	2.70E-29	.00E+00	.00E+00	.00E+00
cd117	2.20E-04	2.76E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.78E-07	2.68E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	1.13E+01	1.13E+01	6.60E+00	3.78E+00	1.26E+00	1.39E-01	1.90E-04	3.17E-09	5.31E-14	8.88E-19	1.48E-23
in114	2.66E+00	1.67E+00	4.81E-01	1.32E-01	1.02E-02	6.14E-05	1.34E-11	1.05E-22	.00E+00	.00E+00	.00E+00
in114m	1.77E+00	1.75E+00	5.03E-01	1.38E-01	1.07E-02	6.42E-05	1.40E-11	1.10E-22	.00E+00	.00E+00	.00E+00
in116m	3.26E-04	3.23E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.47E-03	6.04E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	2.00E-04	1.18E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	1.13E+01	1.13E+01	6.60E+00	3.78E+00	1.26E+00	1.39E-01	1.90E-04	3.17E-09	5.30E-14	8.87E-19	1.48E-23
sn117m	5.81E+01	5.52E+01	5.92E-01	5.30E-03	4.78E-07	3.93E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	5.14E+01	5.12E+01	4.15E+01	3.34E+01	2.17E+01	9.13E+00	6.84E-01	9.09E-03	1.21E-04	1.61E-06	2.14E-08
sn121	1.96E+01	1.06E+01	6.88E-03	6.86E-03	6.82E-03	6.73E-03	6.48E-03	6.09E-03	5.71E-03	5.37E-03	5.04E-03
sn121m	8.90E-03	8.90E-03	8.87E-03	8.84E-03	8.78E-03	8.67E-03	8.35E-03	7.84E-03	7.36E-03	6.91E-03	6.49E-03
sn123	1.81E+00	1.80E+00	1.12E+00	6.80E-01	2.55E-01	3.59E-02	1.00E-04	5.56E-09	3.08E-13	1.71E-17	9.48E-22
sn123m	1.04E-02	1.60E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	3.68E-01	3.43E-01	5.70E-04	7.36E-07	1.45E-12	5.68E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.89E+00	3.01E+00	3.60E-10	1.75E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	2.24E-01	2.21E-01	7.94E-02	2.74E-02	3.33E-03	4.97E-05	1.65E-10	1.21E-19	8.94E-29	.00E+00	.00E+00
sb125	8.30E+00	8.30E+00	7.80E+00	7.31E+00	6.44E+00	5.00E+00	2.33E+00	6.56E-01	1.84E-01	5.17E-02	1.45E-02
sb126	9.64E-02	9.12E-02	6.29E-04	3.57E-06	1.30E-10	1.75E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	5.06E-15	5.07E-15	5.68E-15	6.06E-15	6.41E-15	6.57E-15	6.59E-15	6.59E-15	6.59E-15	6.59E-15	6.59E-15
te123m	5.80E-02	5.77E-02	3.45E-02	2.02E-02	7.00E-03	8.44E-04	1.48E-06	3.77E-11	9.60E-16	2.45E-20	6.24E-25
te125m	1.86E+00	1.86E+00	1.85E+00	1.77E+00	1.57E+00	1.22E+00	5.70E-01	1.60E-01	4.50E-02	1.26E-02	3.55E-03
te127	2.92E-03	7.53E-04	1.78E-04	9.88E-05	3.09E-05	3.03E-06	2.85E-09	2.58E-14	2.34E-19	2.11E-24	1.91E-29
te127m	3.22E-04	3.20E-04	1.82E-04	1.01E-04	3.16E-05	3.09E-06	2.91E-09	2.64E-14	2.39E-19	2.16E-24	1.95E-29
te129	1.57E-08	6.41E-10	1.02E-10	1.52E-11	3.49E-13	1.87E-16	2.84E-26	.00E+00	.00E+00	.00E+00	.00E+00
te129m	1.02E-09	9.99E-10	1.59E-10	2.36E-11	5.45E-13	2.91E-16	4.43E-26	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.30E-14	1.24E-14	1.08E-16	7.87E-19	4.69E-23	1.60E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	3.04E-10	7.98E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	2.86E-14	2.62E-14	1.22E-17	4.20E-21	6.05E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	7.57E-10	7.43E-10	1.36E-10	2.34E-11	7.22E-13	6.89E-16	5.97E-25	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	6.32E-08	5.85E-08	5.66E-11	4.18E-14	2.71E-20	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.08E-11	1.02E-11	5.69E-14	2.60E-16	6.18E-21	3.56E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	9.44E-15	8.34E-15	6.73E-20	3.29E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.21E+03	1.30E+03	3.88E+02	1.91E+02	6.53E+01	2.86E+01	1.19E+01	5.13E+00	2.59E+00	1.44E+00	8.91E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Plenum - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

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emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.39E+13	5.98E+12	6.05E+11	2.90E+11	1.05E+11	5.02E+10	2.16E+10	9.11E+09	4.31E+09	2.16E+09	1.13E+09
3.00E-02	6.47E+12	4.02E+12	1.06E+12	7.93E+11	5.18E+11	2.76E+11	7.98E+10	2.08E+10	6.22E+09	1.97E+09	6.69E+08
5.50E-02	2.71E+12	1.08E+12	5.73E+10	2.55E+10	8.06E+09	4.04E+09	2.26E+09	1.04E+09	5.02E+08	2.50E+08	1.27E+08
8.50E-02	1.48E+12	5.83E+11	2.20E+10	9.57E+09	2.97E+09	1.50E+09	8.70E+08	3.98E+08	1.92E+08	9.52E+07	4.82E+07
1.20E-01	1.01E+12	3.91E+11	1.18E+10	5.67E+09	2.36E+09	1.42E+09	7.29E+08	2.70E+08	1.10E+08	4.85E+07	2.28E+07
1.70E-01	2.79E+12	2.09E+12	5.01E+10	2.44E+10	1.87E+10	1.40E+10	6.56E+09	1.87E+09	5.39E+08	1.58E+08	4.82E+07
3.00E-01	2.32E+12	7.42E+11	3.09E+10	1.57E+10	8.45E+09	5.42E+09	2.48E+09	7.07E+08	2.04E+08	5.99E+07	1.82E+07
6.50E-01	6.31E+13	3.95E+13	1.32E+13	5.49E+12	9.36E+11	1.32E+11	5.28E+10	1.48E+10	4.17E+09	1.19E+09	3.53E+08
1.13E+00	2.30E+12	1.57E+12	1.11E+12	1.07E+12	1.00E+12	8.79E+11	5.92E+11	3.07E+11	1.59E+11	8.24E+10	4.27E+10
1.58E+00	4.63E+11	1.47E+11	2.03E+09	7.20E+08	9.40E+07	1.71E+06	6.33E+02	4.73E+02	3.87E+02	3.26E+02	2.80E+02
2.00E+00	1.62E+11	2.17E+10	1.88E+08	6.83E+07	1.30E+07	4.80E+06	3.16E+06	1.64E+06	8.48E+05	4.39E+05	2.28E+05
2.40E+00	4.12E+09	3.51E+07	1.22E+06	4.17E+05	6.56E+04	1.56E+04	1.00E+04	5.18E+03	2.68E+03	1.39E+03	7.20E+02
2.80E+00	3.67E+09	6.13E+06	1.16E+05	4.00E+04	4.87E+03	7.26E+01	2.41E-04	9.84E-12	8.70E-12	7.83E-12	7.05E-12
3.25E+00	6.70E+08	1.07E+06	1.25E-12	1.25E-12	1.23E-12	1.21E-12	1.13E-12	1.02E-12	9.18E-13	8.26E-13	7.44E-13
3.75E+00	1.20E+06	7.32E+01	1.52E-15	1.51E-15	1.49E-15	1.46E-15	1.37E-15	1.23E-15	1.11E-15	9.99E-16	8.99E-16
4.25E+00	4.33E+05	4.55E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.22E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	5.43E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	9.68E+13	5.61E+13	1.61E+13	7.73E+12	2.60E+12	1.36E+12	7.59E+11	3.56E+11	1.75E+11	8.83E+10	4.51E+10
0 mev/sec	4.66E+13	2.86E+13	9.87E+12	4.82E+12	1.76E+12	1.09E+12	7.05E+11	3.56E+11	1.82E+11	9.36E+10	4.83E+10

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.20E+04	1.37E+04	1.39E+03	6.67E+02	2.42E+02	1.15E+02	4.97E+01	2.09E+01	9.91E+00	4.96E+00	2.59E+00
3.00E-02	4.46E+04	2.77E+04	7.30E+03	5.47E+03	3.57E+03	1.90E+03	5.51E+02	1.43E+02	4.29E+01	1.36E+01	4.61E+00
5.50E-02	3.42E+04	1.37E+04	7.25E+02	3.22E+02	1.02E+02	5.11E+01	2.85E+01	1.31E+01	6.34E+00	3.16E+00	1.61E+00
8.50E-02	2.89E+04	1.14E+04	4.30E+02	1.87E+02	5.81E+01	2.93E+01	1.70E+01	7.78E+00	3.74E+00	1.86E+00	9.42E-01
1.20E-01	2.78E+04	1.08E+04	3.25E+02	1.56E+02	6.52E+01	3.91E+01	2.01E+01	7.46E+00	3.03E+00	1.34E+00	6.28E-01
1.70E-01	1.09E+05	8.18E+04	1.96E+03	9.54E+02	7.31E+02	5.48E+02	2.56E+02	7.30E+01	2.10E+01	6.19E+00	1.88E+00
3.00E-01	1.60E+05	5.12E+04	2.13E+03	1.08E+03	5.83E+02	3.74E+02	1.71E+02	4.88E+01	1.40E+01	4.13E+00	1.25E+00
6.50E-01	9.44E+06	5.91E+06	1.97E+06	8.21E+05	1.40E+05	1.97E+04	7.88E+03	2.21E+03	6.23E+02	1.78E+02	5.27E+01
1.13E+00	5.94E+05	4.07E+05	2.86E+05	2.77E+05	2.59E+05	2.27E+05	1.53E+05	7.94E+04	4.11E+04	2.13E+04	1.10E+04
1.58E+00	1.67E+05	5.33E+04	7.35E+02	2.61E+02	3.40E+01	6.19E-01	2.29E-04	1.71E-04	1.40E-04	1.18E-04	1.01E-04
2.00E+00	7.43E+04	9.96E+03	8.64E+01	3.14E+01	5.97E+00	2.21E+00	1.45E+00	7.53E-01	3.90E-01	2.02E-01	1.05E-01
2.40E+00	2.28E+03	1.94E+01	6.72E-01	2.30E-01	3.62E-02	8.59E-03	5.52E-03	2.86E-03	1.48E-03	7.67E-04	3.97E-04
2.80E+00	2.37E+03	3.94E+00	7.46E-02	2.57E-02	3.14E-03	4.68E-05	1.55E-10	6.34E-18	5.60E-18	5.04E-18	4.54E-18
3.25E+00	5.01E+02	8.00E-01	9.36E-19	9.31E-19	9.21E-19	9.02E-19	8.47E-19	7.62E-19	6.86E-19	6.17E-19	5.56E-19
3.75E+00	1.03E+00	6.31E-05	1.31E-21	1.30E-21	1.29E-21	1.26E-21	1.18E-21	1.06E-21	9.57E-22	8.62E-22	7.75E-22
4.25E+00	4.23E-01	4.45E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.51E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	6.86E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	1.07E+07	6.59E+06	2.27E+06	1.11E+06	4.05E+05	2.50E+05	1.62E+05	8.19E+04	4.18E+04	2.15E+04	1.11E+04
0 gamma watts	7.47E+00	4.59E+00	1.58E+00	7.72E-01	2.82E-01	1.74E-01	1.13E-01	5.71E-02	2.92E-02	1.50E-02	7.74E-03

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photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Plenum - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.49E+17	3.24E+16	8.47E+15	6.25E+15	4.21E+15	2.32E+15	8.64E+14	6.04E+14	5.21E+14	4.57E+14	4.02E+14
3.00E-02	1.10E+17	2.53E+16	3.64E+15	2.63E+15	1.78E+15	9.82E+14	3.77E+14	2.67E+14	2.30E+14	2.02E+14	1.79E+14
5.50E-02	5.91E+16	8.85E+15	1.93E+15	1.47E+15	1.00E+15	5.56E+14	2.07E+14	1.40E+14	1.17E+14	1.00E+14	8.65E+13
8.50E-02	4.04E+16	7.55E+15	1.18E+15	9.05E+14	6.19E+14	3.34E+14	1.15E+14	7.43E+13	6.17E+13	5.29E+13	4.60E+13

	1.20E-01	3.30E+16	7.05E+15	1.38E+15	1.09E+15	7.45E+14	3.89E+14	1.25E+14	7.71E+13	5.97E+13	4.78E+13	3.91E+13
	1.70E-01	5.28E+16	8.40E+15	1.18E+15	6.41E+14	3.98E+14	2.10E+14	6.70E+13	4.43E+13	3.83E+13	3.36E+13	2.96E+13
	3.00E-01	1.13E+17	1.75E+16	9.06E+14	6.83E+14	4.64E+14	2.44E+14	7.54E+13	4.89E+13	4.17E+13	3.61E+13	3.15E+13
	6.50E-01	2.34E+17	6.50E+16	1.59E+16	9.47E+15	5.50E+15	3.71E+15	1.90E+15	1.08E+15	8.44E+14	7.27E+14	6.40E+14
	1.13E+00	7.34E+16	5.22E+15	3.27E+14	2.60E+14	2.09E+14	1.51E+14	8.36E+13	4.91E+13	3.23E+13	2.19E+13	1.50E+13
	1.58E+00	3.77E+16	8.82E+15	1.65E+14	8.66E+13	6.54E+13	4.02E+13	1.30E+13	3.66E+12	1.67E+12	1.02E+12	6.99E+11
	2.00E+00	1.12E+16	6.29E+14	5.37E+13	3.84E+13	2.49E+13	1.06E+13	8.55E+11	3.26E+10	1.61E+10	1.39E+10	1.22E+10
	2.40E+00	8.85E+15	4.27E+14	6.96E+12	2.96E+12	2.06E+12	1.02E+12	1.28E+11	4.12E+09	1.44E+08	1.23E+07	7.10E+06
	2.80E+00	3.71E+15	6.80E+12	5.99E+11	4.67E+11	3.30E+11	1.65E+11	2.10E+10	6.87E+08	2.27E+07	7.51E+05	2.49E+04
	3.25E+00	1.82E+15	2.48E+12	1.10E+11	7.60E+10	5.39E+10	2.73E+10	3.54E+09	1.17E+08	3.89E+06	1.29E+05	4.28E+03
	3.75E+00	8.35E+14	1.27E+10	3.97E+07	3.34E+07	2.38E+07	1.20E+07	1.56E+06	5.17E+04	1.71E+03	5.69E+01	1.89E+00
	4.25E+00	7.87E+14	1.71E+09	1.13E-05	1.14E-05	1.15E-05	1.16E-05	1.19E-05	1.21E-05	1.22E-05	1.22E-05	1.22E-05
	4.75E+00	2.33E+14	1.27E+10	5.68E-06	5.71E-06	5.76E-06	5.84E-06	5.99E-06	6.08E-06	6.11E-06	6.11E-06	6.11E-06
	5.50E+00	1.81E+14	8.12E+07	4.21E-06	4.24E-06	4.27E-06	4.33E-06	4.44E-06	4.51E-06	4.53E-06	4.53E-06	4.54E-06
0	total	1.03E+18	1.87E+17	3.51E+16	2.35E+16	1.50E+16	8.95E+15	3.83E+15	2.39E+15	1.95E+15	1.68E+15	1.47E+15
0	mev/sec	4.22E+17	7.41E+16	1.21E+16	7.42E+15	4.47E+15	2.94E+15	1.44E+15	8.21E+14	6.38E+14	5.42E+14	4.71E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

0

emean				time after discharge						
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.73E+08	7.44E+07	1.95E+07	1.44E+07	9.68E+06	5.33E+06	1.99E+06	1.39E+06	1.20E+06	1.05E+06	9.25E+05
3.00E-02	7.61E+08	1.75E+08	2.51E+07	1.81E+07	1.23E+07	6.78E+06	2.60E+06	1.84E+06	1.59E+06	1.40E+06	1.23E+06
5.50E-02	7.47E+08	1.12E+08	2.44E+07	1.85E+07	1.27E+07	7.03E+06	2.62E+06	1.77E+06	1.48E+06	1.27E+06	1.09E+06
8.50E-02	7.89E+08	1.48E+08	2.30E+07	1.77E+07	1.21E+07	6.53E+06	2.24E+06	1.45E+06	1.21E+06	1.03E+06	8.98E+05
1.20E-01	9.11E+08	1.94E+08	3.80E+07	3.01E+07	2.06E+07	1.07E+07	3.45E+06	2.13E+06	1.65E+06	1.32E+06	1.08E+06
1.70E-01	2.06E+09	3.28E+08	4.61E+07	2.51E+07	1.56E+07	8.22E+06	2.62E+06	1.73E+06	1.50E+06	1.31E+06	1.16E+06
3.00E-01	7.81E+09	1.21E+09	6.25E+07	4.71E+07	3.20E+07	1.68E+07	5.20E+06	3.37E+06	2.87E+06	2.49E+06	2.17E+06
6.50E-01	3.49E+10	9.72E+09	2.37E+09	1.42E+09	8.22E+08	5.55E+08	2.84E+08	1.61E+08	1.26E+08	1.09E+08	9.56E+07
1.13E+00	1.90E+10	1.35E+09	8.47E+07	6.73E+07	5.41E+07	3.91E+07	2.16E+07	1.27E+07	8.36E+06	5.66E+06	3.87E+06
1.58E+00	1.37E+10	3.19E+09	5.98E+07	3.14E+07	2.37E+07	1.46E+07	4.71E+06	1.32E+06	6.04E+05	3.68E+05	2.53E+05
2.00E+00	5.14E+09	2.89E+08	2.47E+07	1.77E+07	1.14E+07	4.86E+06	3.93E+05	1.50E+04	7.42E+03	6.38E+03	5.60E+03
2.40E+00	4.88E+09	2.36E+08	3.84E+06	1.63E+06	1.14E+06	5.65E+05	7.04E+04	2.27E+03	7.93E+01	6.80E+00	3.92E+00
2.80E+00	2.39E+09	4.38E+06	3.85E+05	3.01E+05	2.12E+05	1.06E+05	1.35E+04	4.43E+02	1.46E+01	4.83E-01	1.60E-02
3.25E+00	1.36E+09	1.85E+06	8.18E+04	5.68E+04	4.03E+04	2.04E+04	2.64E+03	8.76E+01	2.91E+00	9.64E-02	3.20E-03
3.75E+00	7.20E+08	1.09E+04	3.43E+01	2.88E+01	2.05E+01	1.04E+01	1.34E+00	4.46E-02	1.48E-03	4.90E-05	1.63E-06
4.25E+00	7.68E+08	1.67E+03	1.11E-11	1.11E-11	1.12E-11	1.14E-11	1.17E-11	1.18E-11	1.19E-11	1.19E-11	1.19E-11
4.75E+00	2.55E+08	1.39E+04	6.20E-12	6.23E-12	6.29E-12	6.38E-12	6.54E-12	6.64E-12	6.67E-12	6.67E-12	6.68E-12
5.50E+00	2.28E+08	1.03E+02	5.33E-12	5.35E-12	5.40E-12	5.48E-12	5.62E-12	5.70E-12	5.73E-12	5.73E-12	5.74E-12
0 total	9.70E+10	1.70E+10	2.78E+09	1.70E+09	1.03E+09	6.76E+08	3.31E+08	1.89E+08	1.47E+08	1.25E+08	1.08E+08
0 gamma watts	6.76E+04	1.19E+04	1.94E+03	1.19E+03	7.16E+02	4.71E+02	2.31E+02	1.32E+02	1.02E+02	8.68E+01	7.55E+01

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0 principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 91	1.66E+15	1.65E+15	5.74E+14	1.92E+14	2.20E+13	2.91E+11	6.69E+05	2.69E-04	1.08E-13	4.33E-23	.00E+00
mo 99	2.25E+15	1.75E+15	3.11E+05	2.28E-05	2.17E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.95E+15	2.83E+15	2.40E+15	2.02E+15	1.44E+15	7.27E+14	9.42E+13	3.12E+12	1.04E+11	3.44E+09	1.14E+08
ba140	1.91E+15	1.81E+15	1.44E+13	9.44E+10	4.59E+06	1.10E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.54E+15	2.47E+15	2.07E+13	1.36E+11	6.61E+06	1.58E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.12E+15	4.09E+15	3.30E+15	2.63E+15	1.69E+15	6.94E+14	4.83E+13	5.68E+11	6.69E+09	7.87E+07	9.26E+05

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.23E+15	3.43E+15	2.05E+07	5.82E-02	7.58E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.34E+15	4.20E+15	3.65E+10	1.78E+05	5.74E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.60E+15	1.51E+15	1.20E+13	7.87E+10	3.83E+06	9.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.46E+15	1.43E+15	2.15E+14	2.98E+13	6.06E+11	2.51E+08	1.78E-02	2.16E-19	.00E+00	.00E+00	.00E+00

ce143	4.76E+15	2.90E+15	9.49E-05	5.33E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.36E+15	1.35E+15	1.09E+15	8.71E+14	5.59E+14	2.30E+14	1.60E+13	1.88E+11	2.21E+09	2.60E+07	3.07E+05
nd147	1.44E+15	1.35E+15	4.90E+12	1.43E+10	1.39E+05	1.35E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.85E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.97E+14	6.70E+14	5.68E+14	4.78E+14	3.40E+14	1.72E+14	2.23E+13	7.39E+11	2.45E+10	8.13E+08	2.70E+07
te132	8.16E+14	6.60E+14	3.95E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.36E+14	5.21E+14	4.37E+12	2.87E+10	1.39E+06	3.34E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.36E+15	8.25E+14	2.70E-05	1.52E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.58E+14	9.51E+14	7.66E+14	6.12E+14	3.92E+14	1.61E+14	1.12E+13	1.32E+11	1.55E+09	1.83E+07	2.15E+05
sm153	1.48E+15	1.03E+15	1.32E+01	4.78E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.55E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.14E+14	3.98E+14	3.37E+14	2.84E+14	2.02E+14	1.02E+14	1.32E+13	4.39E+11	1.46E+10	4.83E+08	1.60E+07
xe133	3.07E+15	2.97E+15	2.58E+10	1.26E+05	4.06E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.64E+14	5.60E+14	4.51E+14	3.60E+14	2.31E+14	9.49E+13	6.60E+12	7.77E+10	9.14E+08	1.08E+07	1.27E+05
nd147	8.93E+14	8.39E+14	3.05E+12	8.87E+09	8.66E+04	8.40E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.05E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.66E+15	3.11E+15	5.56E+05	4.08E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.20E+14	7.19E+14	5.79E+14	4.62E+14	2.96E+14	1.22E+14	8.48E+12	9.98E+10	1.17E+09	1.38E+07	1.63E+05
pr144	4.03E+14	4.01E+14	3.23E+14	2.58E+14	1.65E+14	6.79E+13	4.72E+12	5.56E+10	6.54E+08	7.70E+06	9.06E+04
sm153	7.05E+14	4.92E+14	6.28E+00	2.27E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.40E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.92E+14	6.16E+14	1.09E+05	8.03E-06	7.65E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.59E+15	2.20E+15	3.93E+05	2.88E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.77E+14	4.51E+14	3.58E+12	2.35E+10	1.14E+06	2.74E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.88E+15	2.84E+15	4.25E+14	5.91E+13	1.20E+12	4.96E+08	3.52E-02	4.27E-19	.00E+00	.00E+00	.00E+00
pr144	4.26E+14	4.24E+14	3.41E+14	2.72E+14	1.75E+14	7.18E+13	5.00E+12	5.88E+10	6.92E+08	8.14E+06	9.58E+04

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.31E+15	9.41E+14	6.19E-04	7.82E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.51E+15	4.21E+15	2.01E+12	6.91E+08	9.94E+01	2.10E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.13E+15	3.34E+15	2.00E+07	5.67E-02	7.39E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.41E+15	1.74E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.90E+15	1.84E+15	1.55E+13	1.01E+11	4.93E+06	1.18E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.14E+15	1.91E+15	6.25E-05	3.51E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.50E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.84E+15	7.76E+15	2.96E+15	1.09E+15	1.50E+14	2.88E+12	2.03E+07	5.24E-02	1.35E-10	3.49E-19	9.62E-28
nb 95	8.17E+15	8.17E+15	5.12E+15	2.22E+15	3.36E+14	6.78E+12	4.63E+07	1.20E-01	3.09E-10	7.98E-19	.00E+00
ru103	5.45E+15	5.35E+15	1.11E+15	2.17E+14	8.62E+12	1.36E+10	5.41E+01	5.36E-13	5.31E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.09E+07	2.30E-01	2.99E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.36E+15	3.39E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.26E+15	4.26E+15	3.92E+15	3.60E+15	3.04E+15	2.18E+15	7.94E+14	1.48E+14	2.75E+13	5.13E+12	9.54E+11
la140	6.08E+15	5.91E+15	4.96E+13	3.25E+11	1.58E+07	3.79E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.22E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
sr 91	1.64E+15	2.87E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.80E+06	2.50E-02	3.26E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.02E+15	4.79E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.93E+14	4.68E+14	4.31E+12	3.30E+10	2.18E+06	9.61E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.63E+14	6.44E+14	5.40E+12	3.54E+10	1.72E+06	4.13E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.33E+14	7.01E+14	1.21E+13	1.77E+11	4.22E+07	2.42E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.82E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	6.81E+14	5.56E+14	3.33E+06	9.45E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.86E+15	7.63E+15	6.41E+13	4.20E+11	2.04E+07	4.90E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.29E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	1.75E+14	1.43E+14	8.54E+05	2.43E-03	3.16E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.48E+14	3.56E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.26E+13	5.22E+13	4.21E+13	3.36E+13	2.15E+13	8.86E+12	6.16E+11	7.25E+09	8.54E+07	1.00E+06	1.18E+04
eu156	3.58E+14	3.43E+14	5.90E+12	8.66E+10	2.06E+07	1.18E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.27E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	3.72E+14	3.62E+14	3.04E+12	1.99E+10	9.68E+05	2.32E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.54E+13	2.43E+13	4.19E+11	6.14E+09	1.46E+06	8.41E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.80E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rh106	6.43E+11	6.19E+11	5.24E+11	4.41E+11	3.14E+11	1.59E+11	2.06E+10	6.82E+08	2.26E+07	7.50E+05	2.49E+04
ag112	1.21E+12	6.41E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.22E+12	5.07E+12	4.26E+10	2.79E+08	1.36E+04	3.25E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.48E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	2.38E+12	2.31E+12	1.94E+10	1.27E+08	6.19E+03	1.48E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.97E+12	9.22E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.73E+14	3.39E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.71E+09) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	5.52E+11	1.71E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	4.09E+12	1.27E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.12E+07) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.62E+10	8.12E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

photon spectrum as a function of time for heavy metals and their daughters

BWR SNF Assembly - Plenum - decay
actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.34E+17	6.98E+16	8.98E+13	6.65E+13	4.10E+13	2.39E+13	1.95E+13	1.95E+13	1.94E+13	1.92E+13	1.89E+13
3.00E-02	8.40E+15	1.44E+15	9.19E+10	8.61E+10	1.08E+11	1.52E+11	2.69E+11	4.28E+11	5.51E+11	6.47E+11	7.20E+11
5.50E-02	1.22E+16	3.93E+15	1.50E+12	1.42E+12	1.77E+12	2.48E+12	4.49E+12	7.24E+12	9.37E+12	1.10E+13	1.23E+13
8.50E-02	5.29E+16	7.66E+15	4.64E+11	2.71E+11	2.71E+11	2.70E+11	2.68E+11	2.65E+11	2.62E+11	2.60E+11	2.57E+11
1.20E-01	5.37E+16	3.92E+16	4.97E+11	3.65E+11	3.60E+11	3.54E+11	3.44E+11	3.28E+11	3.15E+11	3.03E+11	2.92E+11
1.70E-01	1.77E+15	2.90E+14	2.01E+10	7.25E+09	5.20E+09	3.82E+09	3.41E+09	3.34E+09	3.27E+09	3.21E+09	3.16E+09
3.00E-01	2.85E+16	2.06E+16	3.07E+11	1.99E+11	1.97E+11	1.95E+11	1.88E+11	1.77E+11	1.67E+11	1.59E+11	1.51E+11
6.50E-01	1.55E+15	5.08E+13	2.04E+09	1.65E+09	1.24E+09	1.01E+09	1.14E+09	1.33E+09	1.38E+09	1.38E+09	1.35E+09
1.13E+00	1.84E+15	1.16E+15	7.21E+08	6.79E+08	6.31E+08	5.96E+08	5.73E+08	5.48E+08	5.23E+08	4.99E+08	4.78E+08
1.58E+00	1.31E+08	1.26E+08	1.11E+08	1.02E+08	9.12E+07	8.58E+07	8.96E+07	9.08E+07	8.55E+07	7.83E+07	7.11E+07
2.00E+00	1.66E+06	1.03E+06	9.92E+05	1.02E+06	1.08E+06	1.20E+06	1.54E+06	1.84E+06	1.91E+06	1.90E+06	1.86E+06
2.40E+00	5.65E+07	5.65E+07	4.92E+07	4.39E+07	3.78E+07	3.28E+07	2.83E+07	2.34E+07	1.94E+07	1.61E+07	1.34E+07
2.80E+00	1.03E+08	1.04E+08	1.07E+08	1.14E+08	1.31E+08	1.72E+08	2.87E+08	3.88E+08	4.12E+08	4.05E+08	3.89E+08
3.25E+00	2.02E+07	2.02E+07	1.76E+07	1.57E+07	1.35E+07	1.18E+07	1.02E+07	8.40E+06	6.97E+06	5.78E+06	4.80E+06
3.75E+00	1.17E+07	1.17E+07	1.02E+07	9.12E+06	7.84E+06	6.81E+06	5.89E+06	4.87E+06	4.04E+06	3.35E+06	2.79E+06
4.25E+00	6.79E+06	6.79E+06	5.92E+06	5.29E+06	4.55E+06	3.95E+06	3.41E+06	2.82E+06	2.34E+06	1.94E+06	1.61E+06
4.75E+00	3.94E+06	3.94E+06	3.43E+06	3.07E+06	2.64E+06	2.29E+06	1.98E+06	1.64E+06	1.36E+06	1.13E+06	9.36E+05
5.50E+00	3.56E+06	3.56E+06	3.10E+06	2.77E+06	2.38E+06	2.07E+06	1.79E+06	1.48E+06	1.23E+06	1.02E+06	8.47E+05
total	2.95E+17	1.44E+17	9.27E+13	6.89E+13	4.37E+13	2.74E+13	2.50E+13	2.79E+13	3.00E+13	3.16E+13	3.26E+13
mev/sec	2.51E+16	1.39E+16	1.18E+12	8.77E+11	6.39E+11	5.07E+11	5.73E+11	7.24E+11	8.39E+11	9.27E+11	9.92E+11

actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.07E+08	1.60E+08	2.06E+05	1.53E+05	9.43E+04	5.50E+04	4.48E+04	4.48E+04	4.45E+04	4.41E+04	4.36E+04
3.00E-02	5.80E+07	9.92E+06	6.34E+02	5.94E+02	7.48E+02	1.05E+03	1.85E+03	2.95E+03	3.80E+03	4.46E+03	4.96E+03
5.50E-02	1.54E+08	4.97E+07	1.89E+04	1.80E+04	2.24E+04	3.14E+04	5.68E+04	9.16E+04	1.18E+05	1.39E+05	1.55E+05
8.50E-02	1.03E+09	1.50E+08	9.06E+03	5.29E+03	5.29E+03	5.27E+03	5.24E+03	5.18E+03	5.13E+03	5.08E+03	5.03E+03
1.20E-01	1.48E+09	1.08E+09	1.37E+04	1.01E+04	9.93E+03	9.78E+03	9.48E+03	9.06E+03	8.68E+03	8.35E+03	8.04E+03
1.70E-01	6.94E+07	1.13E+07	7.86E+02	2.83E+02	2.03E+02	1.49E+02	1.33E+02	1.30E+02	1.28E+02	1.26E+02	1.24E+02
3.00E-01	1.97E+09	1.42E+09	2.12E+04	1.37E+04	1.36E+04	1.34E+04	1.29E+04	1.22E+04	1.15E+04	1.10E+04	1.04E+04
6.50E-01	2.32E+08	7.59E+06	3.04E+02	2.47E+02	1.85E+02	1.51E+02	1.71E+02	1.99E+02	2.07E+02	2.06E+02	2.02E+02
1.13E+00	4.75E+08	3.01E+08	1.86E+02	1.76E+02	1.63E+02	1.54E+02	1.48E+02	1.42E+02	1.35E+02	1.29E+02	1.24E+02
1.58E+00	4.76E+01	4.56E+01	4.03E+01	3.68E+01	3.30E+01	3.11E+01	3.24E+01	3.29E+01	3.10E+01	2.83E+01	2.58E+01
2.00E+00	7.61E-01	4.72E-01	4.56E-01	4.69E-01	4.96E-01	5.54E-01	7.09E-01	8.44E-01	8.79E-01	8.73E-01	8.55E-01
2.40E+00	3.12E+01	3.12E+01	2.71E+01	2.42E+01	2.08E+01	1.81E+01	1.56E+01	1.29E+01	1.07E+01	8.90E+00	7.40E+00
2.80E+00	6.62E+01	6.71E+01	6.91E+01	7.33E+01	8.43E+01	1.11E+02	1.85E+02	2.50E+02	2.65E+02	2.61E+02	2.50E+02
3.25E+00	1.51E+01	1.51E+01	1.32E+01	1.18E+01	1.01E+01	8.78E+00	7.59E+00	6.28E+00	5.20E+00	4.32E+00	3.59E+00
3.75E+00	1.01E+01	1.01E+01	8.81E+00	7.86E+00	6.76E+00	5.87E+00	5.08E+00	4.20E+00	3.48E+00	2.89E+00	2.40E+00
4.25E+00	6.64E+00	6.64E+00	5.78E+00	5.17E+00	4.44E+00	3.86E+00	3.34E+00	2.76E+00	2.29E+00	1.90E+00	1.58E+00
4.75E+00	4.30E+00	4.30E+00	3.75E+00	3.35E+00	2.88E+00	2.50E+00	2.16E+00	1.79E+00	1.48E+00	1.23E+00	1.02E+00
5.50E+00	4.50E+00	4.50E+00	3.92E+00	3.51E+00	3.01E+00	2.62E+00	2.26E+00	1.87E+00	1.55E+00	1.29E+00	1.07E+00
total	5.78E+09	3.19E+09	2.71E+05	2.02E+05	1.47E+05	1.17E+05	1.32E+05	1.66E+05	1.93E+05	2.13E+05	2.28E+05
gamma watts	4.03E+03	2.23E+03	1.89E-01	1.41E-01	1.02E-01	8.13E-02	9.19E-02	1.16E-01	1.35E-01	1.49E-01	1.59E-01

```
1                    * gamma sources determined *
0case applies the following photon data base
                    master photon library
                    in binary mode
0    the sources include photons of nuclides for...

       light elements
1                    gamma source spectrum for   decay step for BWR source term - plen ds3 - discharge
0                                        1.00  day time of the requested nuclides
0                         energy interval in mev       photons / second     mev / second
0
                     1.0000E-02 to       5.0000E-02        5.9474E+12        1.7842E+11
                     5.0000E-02 to       1.0000E-01        1.1357E+12        8.5181E+10
                     1.0000E-01 to       2.0000E-01        2.6955E+12        4.0432E+11
                     2.0000E-01 to       3.0000E-01        3.8354E+11        9.5884E+10
                     3.0000E-01 to       4.0000E-01        3.6299E+11        1.2705E+11
                     4.0000E-01 to       6.0000E-01        8.1567E+11        4.0784E+11
                     6.0000E-01 to       8.0000E-01        3.5981E+13        2.5186E+13
                     8.0000E-01 to       1.0000E+00        2.3843E+11        2.1458E+11
                     1.0000E+00 to       1.3300E+00        1.1603E+12        1.3517E+12
                     1.3300E+00 to       1.6600E+00        3.1854E+11        4.7622E+11
                     1.6600E+00 to       2.0000E+00        1.0928E+11        1.9998E+11
                     2.0000E+00 to       2.5000E+00        6.9081E+08        1.5543E+09
                     2.5000E+00 to       3.0000E+00        1.1825E+07        3.2519E+07
                     3.0000E+00 to       4.0000E+00        9.9809E+05        3.4933E+06
                     4.0000E+00 to       5.0000E+00        4.3206E-20        1.9443E-19
                     5.0000E+00 to       6.5000E+00         .0000E+00         .0000E+00
                     6.5000E+00 to       8.0000E+00         .0000E+00         .0000E+00
                     8.0000E+00 to       1.0000E+01         .0000E+00         .0000E+00
0                    totals                                4.9149E+13        2.8729E+13
0
0                    total energy from nuclides with spectrum data     =   2.8622E+13
0                    total energy from nuclides with no spectrum data =    1.0739E+11
1                    gamma source spectrum for   decay step for BWR source term - plen ds3 - 0.25 year
0                                        90.00  day time of the requested nuclides
0                         energy interval in mev       photons / second     mev / second
0
                     1.0000E-02 to       5.0000E-02        1.2063E+12        3.6189E+10
                     5.0000E-02 to       1.0000E-01        4.9120E+10        3.6840E+09
                     1.0000E-01 to       2.0000E-01        6.6036E+10        9.9054E+09
                     2.0000E-01 to       3.0000E-01        2.1279E+10        5.3198E+09
                     3.0000E-01 to       4.0000E-01        1.1474E+10        4.0160E+09
                     4.0000E-01 to       6.0000E-01        1.5518E+11        7.7592E+10
                     6.0000E-01 to       8.0000E-01        1.2104E+13        8.4729E+12
                     8.0000E-01 to       1.0000E+00        6.7097E+10        6.0387E+10
                     1.0000E+00 to       1.3300E+00        7.9007E+11        9.2043E+11
                     1.3300E+00 to       1.6600E+00        2.2316E+11        3.3362E+11
                     1.6600E+00 to       2.0000E+00        1.6277E+09        2.9787E+09
                     2.0000E+00 to       2.5000E+00        1.6787E+08        3.7771E+08
                     2.5000E+00 to       3.0000E+00        1.2701E+05        3.4927E+05
                     3.0000E+00 to       4.0000E+00        1.1726E-12        4.1040E-12
                     4.0000E+00 to       5.0000E+00         .0000E+00         .0000E+00
                     5.0000E+00 to       6.5000E+00         .0000E+00         .0000E+00
                     6.5000E+00 to       8.0000E+00         .0000E+00         .0000E+00
                     8.0000E+00 to       1.0000E+01         .0000E+00         .0000E+00
0                    totals                                1.4696E+13        9.9274E+12
0
0                    total energy from nuclides with spectrum data     =   9.8646E+12
0                    total energy from nuclides with no spectrum data =    6.2880E+10
1                    gamma source spectrum for   decay step for BWR source term - plen ds3 - 0.50 year
```

182.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	8.6026E+11	2.5808E+10
5.0000E-02	to	1.0000E-01	2.1732E+10	1.6299E+09
1.0000E-01	to	2.0000E-01	3.1920E+10	4.7880E+09
2.0000E-01	to	3.0000E-01	9.8827E+09	2.4707E+09
3.0000E-01	to	4.0000E-01	6.5340E+09	2.2869E+09
4.0000E-01	to	6.0000E-01	1.3358E+11	6.6792E+10
6.0000E-01	to	8.0000E-01	5.0045E+12	3.5031E+12
8.0000E-01	to	1.0000E+00	3.1766E+10	2.8589E+10
1.0000E+00	to	1.3300E+00	7.6478E+11	8.9097E+11
1.3300E+00	to	1.6600E+00	2.1597E+11	3.2287E+11
1.6600E+00	to	2.0000E+00	5.7918E+08	1.0599E+09
2.0000E+00	to	2.5000E+00	6.1139E+07	1.3756E+08
2.5000E+00	to	3.0000E+00	4.8940E+04	1.3458E+05
3.0000E+00	to	4.0000E+00	1.1676E-12	4.0865E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			7.0815E+12	4.8505E+12

total energy from nuclides with spectrum data = 4.8144E+12
total energy from nuclides with no spectrum data = 3.6074E+10

gamma source spectrum for decay step for BWR source term - plen ds3 - 1 year

365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	5.3902E+11	1.6171E+10
5.0000E-02	to	1.0000E-01	6.9170E+09	5.1877E+08
1.0000E-01	to	2.0000E-01	2.2793E+10	3.4189E+09
2.0000E-01	to	3.0000E-01	3.1043E+09	7.7606E+08
3.0000E-01	to	4.0000E-01	5.0844E+09	1.7795E+09
4.0000E-01	to	6.0000E-01	1.1128E+11	5.5641E+10
6.0000E-01	to	8.0000E-01	7.8347E+11	5.4843E+11
8.0000E-01	to	1.0000E+00	9.8649E+09	8.8784E+09
1.0000E+00	to	1.3300E+00	7.1546E+11	8.3351E+11
1.3300E+00	to	1.6600E+00	2.0203E+11	3.0204E+11
1.6600E+00	to	2.0000E+00	7.5979E+07	1.3904E+08
2.0000E+00	to	2.5000E+00	1.1620E+07	2.6145E+07
2.5000E+00	to	3.0000E+00	1.2429E+04	3.4181E+04
3.0000E+00	to	4.0000E+00	1.1546E-12	4.0410E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			2.3991E+12	1.7713E+12

total energy from nuclides with spectrum data = 1.7592E+12
total energy from nuclides with no spectrum data = 1.2073E+10

gamma source spectrum for decay step for BWR source term - plen ds3 - 2 year

730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.8432E+11	8.5297E+09
5.0000E-02	to	1.0000E-01	3.4499E+09	2.5874E+08
1.0000E-01	to	2.0000E-01	1.6709E+10	2.5063E+09
2.0000E-01	to	3.0000E-01	1.1298E+09	2.8244E+08
3.0000E-01	to	4.0000E-01	3.8513E+09	1.3480E+09

	4.0000E-01 to	6.0000E-01	8.4787E+10	4.2394E+10
	6.0000E-01 to	8.0000E-01	5.8239E+10	4.0767E+10
	8.0000E-01 to	1.0000E+00	2.8061E+09	2.5255E+09
	1.0000E+00 to	1.3300E+00	6.2376E+11	7.2668E+11
	1.3300E+00 to	1.6600E+00	1.7615E+11	2.6334E+11
	1.6600E+00 to	2.0000E+00	1.3879E+06	2.5399E+06
	2.0000E+00 to	2.5000E+00	4.2814E+06	9.6332E+06
	2.5000E+00 to	3.0000E+00	6.5559E+03	1.8029E+04
	3.0000E+00 to	4.0000E+00	1.1242E-12	3.9346E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.2552E+12	1.0886E+12

0
0 total energy from nuclides with spectrum data = 1.0872E+12
0 total energy from nuclides with no spectrum data = 1.4161E+09
1 gamma source spectrum for decay step for BWR source term - plen ds3 - 5 year
0 1826.25 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

	1.0000E-02 to	5.0000E-02	8.4807E+10	2.5442E+09
	5.0000E-02 to	1.0000E-01	1.9214E+09	1.4410E+08
	1.0000E-01 to	2.0000E-01	7.8523E+09	1.1778E+09
	2.0000E-01 to	3.0000E-01	4.6599E+08	1.1650E+08
	3.0000E-01 to	4.0000E-01	1.7973E+09	6.2907E+08
	4.0000E-01 to	6.0000E-01	3.9515E+10	1.9758E+10
	6.0000E-01 to	8.0000E-01	2.0469E+10	1.4328E+10
	8.0000E-01 to	1.0000E+00	2.6177E+08	2.3559E+08
	1.0000E+00 to	1.3300E+00	4.1985E+11	4.8913E+11
	1.3300E+00 to	1.6600E+00	1.1857E+11	1.7726E+11
	1.6600E+00 to	2.0000E+00	8.7505E+01	1.6013E+02
	2.0000E+00 to	2.5000E+00	2.8138E+06	6.3310E+06
	2.5000E+00 to	3.0000E+00	4.3630E+03	1.1998E+04
	3.0000E+00 to	4.0000E+00	1.0539E-12	3.6888E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		6.9551E+11	7.0533E+11

0
0 total energy from nuclides with spectrum data = 7.0528E+11
0 total energy from nuclides with no spectrum data = 4.5215E+07
1 gamma source spectrum for decay step for BWR source term - plen ds3 - 10 year
0 3652.50 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	2.3087E+10	6.9262E+08
5.0000E-02 to	1.0000E-01	8.7729E+08	6.5797E+07
1.0000E-01 to	2.0000E-01	2.2884E+09	3.4326E+08
2.0000E-01 to	3.0000E-01	1.3498E+08	3.3744E+07
3.0000E-01 to	4.0000E-01	5.1034E+08	1.7862E+08
4.0000E-01 to	6.0000E-01	1.1102E+10	5.5512E+09
6.0000E-01 to	8.0000E-01	5.7582E+09	4.0308E+09
8.0000E-01 to	1.0000E+00	2.3497E+07	2.1147E+07
1.0000E+00 to	1.3300E+00	2.1750E+11	2.5339E+11
1.3300E+00 to	1.6600E+00	6.1423E+10	9.1827E+10
1.6600E+00 to	2.0000E+00	6.3985E+01	1.1709E+02
2.0000E+00 to	2.5000E+00	1.4577E+06	3.2797E+06
2.5000E+00 to	3.0000E+00	2.2602E+03	6.2157E+03

	3.0000E+00 to	4.0000E+00	9.4851E-13	3.3198E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.2271E+11	3.5614E+11

0
0 total energy from nuclides with spectrum data = 3.5612E+11
0 total energy from nuclides with no spectrum data = 1.3427E+07
1 gamma source spectrum for decay step for BWR source term - plen ds3 - 15 year
0 5478.75 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	7.3608E+09	2.2082E+08
	5.0000E-02 to	1.0000E-01	4.2323E+08	3.1742E+07
	1.0000E-01 to	2.0000E-01	6.8565E+08	1.0285E+08
	2.0000E-01 to	3.0000E-01	4.0063E+07	1.0016E+07
	3.0000E-01 to	4.0000E-01	1.4617E+08	5.1161E+07
	4.0000E-01 to	6.0000E-01	3.1195E+09	1.5597E+09
	6.0000E-01 to	8.0000E-01	1.6252E+09	1.1376E+09
	8.0000E-01 to	1.0000E+00	1.4852E+07	1.3367E+07
	1.0000E+00 to	1.3300E+00	1.1268E+11	1.3127E+11
	1.3300E+00 to	1.6600E+00	3.1820E+10	4.7571E+10
	1.6600E+00 to	2.0000E+00	5.6572E+01	1.0353E+02
	2.0000E+00 to	2.5000E+00	7.5514E+05	1.6991E+06
	2.5000E+00 to	3.0000E+00	1.1709E+03	3.2200E+03
	3.0000E+00 to	4.0000E+00	8.5364E-13	2.9877E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.5791E+11	1.8197E+11

0
0 total energy from nuclides with spectrum data = 1.8196E+11
0 total energy from nuclides with no spectrum data = 4.9409E+06
1 gamma source spectrum for decay step for BWR source term - plen ds3 - 20 year
0 7305.00 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	2.5461E+09	7.6383E+07
	5.0000E-02 to	1.0000E-01	2.1058E+08	1.5793E+07
	1.0000E-01 to	2.0000E-01	2.1480E+08	3.2220E+07
	2.0000E-01 to	3.0000E-01	1.2374E+07	3.0935E+06
	3.0000E-01 to	4.0000E-01	4.2521E+07	1.4882E+07
	4.0000E-01 to	6.0000E-01	8.7655E+08	4.3827E+08
	6.0000E-01 to	8.0000E-01	4.6392E+08	3.2474E+08
	8.0000E-01 to	1.0000E+00	1.2362E+07	1.1126E+07
	1.0000E+00 to	1.3300E+00	5.8373E+10	6.8005E+10
	1.3300E+00 to	1.6600E+00	1.6485E+10	2.4644E+10
	1.6600E+00 to	2.0000E+00	5.0019E+01	9.1534E+01
	2.0000E+00 to	2.5000E+00	3.9121E+05	8.8021E+05
	2.5000E+00 to	3.0000E+00	6.0660E+02	1.6682E+03
	3.0000E+00 to	4.0000E+00	7.6826E-13	2.6889E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		7.9237E+10	9.3567E+10

0
0 total energy from nuclides with spectrum data = 9.3564E+10

total energy from nuclides with no spectrum data = 2.4983E+06
gamma source spectrum for decay step for BWR source term - plen ds3 - 25 year
9131.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	9.7115E+08	2.9134E+07
5.0000E-02	to	1.0000E-01	1.0673E+08	8.0046E+06
1.0000E-01	to	2.0000E-01	7.1866E+07	1.0780E+07
2.0000E-01	to	3.0000E-01	4.0644E+06	1.0161E+06
3.0000E-01	to	4.0000E-01	1.2704E+07	4.4464E+06
4.0000E-01	to	6.0000E-01	2.4633E+08	1.2317E+08
6.0000E-01	to	8.0000E-01	1.3764E+08	9.6347E+07
8.0000E-01	to	1.0000E+00	1.1105E+07	9.9949E+06
1.0000E+00	to	1.3300E+00	3.0241E+10	3.5231E+10
1.3300E+00	to	1.6600E+00	8.5400E+09	1.2767E+10
1.6600E+00	to	2.0000E+00	4.4225E+01	8.0931E+01
2.0000E+00	to	2.5000E+00	2.0267E+05	4.5601E+05
2.5000E+00	to	3.0000E+00	3.1426E+02	8.6421E+02
3.0000E+00	to	4.0000E+00	6.9144E-13	2.4200E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			4.0343E+10	4.8281E+10

total energy from nuclides with spectrum data = 4.8280E+10
total energy from nuclides with no spectrum data = 1.7573E+06

* normal termination of execution *

table of contents for material tables

case or subcase printed	page
1	1

```
Ondset          33
          33           4           1          27           6           0           0           0           0           0
           0           0           0           0           0           2          -1        1698         690         130
         880        7935           0           5          99           7           9          93          18          18
          18           0           0
   35$ array      1 entries read
    4t
   56$ array     20 entries read
   57* array      5 entries read
    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
   58* array     10 entries read
   60* array     10 entries read
   66$ array     12 entries read
   73$ array     14 entries read
   74* array     14 entries read
   75$ array     14 entries read
    6t
     l140  71971
     used   107088 in size   150000
Ojopt           12
           0           0           0           0           0           0           0           0           0           0
           0           0
```

```
Otherm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
Onon              5
          7935            20             6            18          1697
Ommn             19
            10            10             0             0             1             3             0             0             0             0
            21           100            14             4             3             0             2             1             0
Otconst           5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
Omzero            4
             0           689           129           879
Opow              3
   .000000E+00  .000000E+00  .000000E+00
0 linp            9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              3.4634E+00    1.9421E+02    1.9768E+02
 start of interval flux =          1.59016E+13
 n-gamma, fission and total mev/fission =              3.8366E+00    1.9431E+02    1.9815E+02
 start of interval flux =          1.59426E+13
 n-gamma, fission and total mev/fission =              3.9266E+00    1.9441E+02    1.9834E+02
 start of interval flux =          1.59937E+13
 n-gamma, fission and total mev/fission =              4.0155E+00    1.9451E+02    1.9852E+02
 start of interval flux =          1.60555E+13
 n-gamma, fission and total mev/fission =              4.1071E+00    1.9460E+02    1.9871E+02
 start of interval flux =          1.61265E+13
 n-gamma, fission and total mev/fission =              4.2012E+00    1.9469E+02    1.9889E+02
 start of interval flux =          1.62057E+13
 n-gamma, fission and total mev/fission =              4.2975E+00    1.9477E+02    1.9907E+02
 start of interval flux =          1.62923E+13
 n-gamma, fission and total mev/fission =              4.3955E+00    1.9486E+02    1.9925E+02
 start of interval flux =          1.63856E+13
 n-gamma, fission and total mev/fission =              4.4950E+00    1.9494E+02    1.9943E+02
 start of interval flux =          1.64852E+13
 n-gamma, fission and total mev/fission =              4.5958E+00    1.9502E+02    1.9961E+02
 start of interval flux =          1.65903E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
Ondset           33
            33             4             2            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
```

```
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 1.799989E+03 1.624719E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =                4.6634E+00   1.9507E+02   1.9974E+02
 start of interval flux =          1.65420E+13
 n-gamma, fission and total mev/fission =                4.7547E+00   1.9515E+02   1.9990E+02
 start of interval flux =          1.66661E+13
 n-gamma, fission and total mev/fission =                4.8528E+00   1.9522E+02   2.0007E+02
 start of interval flux =          1.67942E+13
 n-gamma, fission and total mev/fission =                4.9526E+00   1.9529E+02   2.0025E+02
 start of interval flux =          1.69266E+13
 n-gamma, fission and total mev/fission =                5.0535E+00   1.9536E+02   2.0042E+02
 start of interval flux =          1.70633E+13
 n-gamma, fission and total mev/fission =                5.1554E+00   1.9544E+02   2.0059E+02
 start of interval flux =          1.72039E+13
 n-gamma, fission and total mev/fission =                5.2582E+00   1.9551E+02   2.0077E+02
 start of interval flux =          1.73483E+13
 n-gamma, fission and total mev/fission =                5.3619E+00   1.9558E+02   2.0094E+02
 start of interval flux =          1.74963E+13
 n-gamma, fission and total mev/fission =                5.4664E+00   1.9565E+02   2.0111E+02
 start of interval flux =          1.76478E+13
 n-gamma, fission and total mev/fission =                5.5717E+00   1.9572E+02   2.0129E+02
 start of interval flux =          1.78027E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
0ndset           33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
```

```
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935            20             6            18          1697
0mmn            19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21           689           129           879
0pow             3
  4.349999E+00 3.599977E+03 1.723304E+13
0 linp           9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              5.4841E+00    1.9575E+02    2.0124E+02
 start of interval flux =          1.78777E+13
 n-gamma, fission and total mev/fission =              5.5780E+00    1.9582E+02    2.0139E+02
 start of interval flux =          1.80675E+13
 n-gamma, fission and total mev/fission =              5.6853E+00    1.9588E+02    2.0156E+02
 start of interval flux =          1.82599E+13
 n-gamma, fission and total mev/fission =              5.7941E+00    1.9594E+02    2.0174E+02
 start of interval flux =          1.84550E+13
 n-gamma, fission and total mev/fission =              5.9038E+00    1.9601E+02    2.0191E+02
 start of interval flux =          1.86527E+13
 n-gamma, fission and total mev/fission =              6.0146E+00    1.9607E+02    2.0209E+02
 start of interval flux =          1.88529E+13
 n-gamma, fission and total mev/fission =              6.1262E+00    1.9614E+02    2.0226E+02
 start of interval flux =          1.90557E+13
 n-gamma, fission and total mev/fission =              6.2387E+00    1.9620E+02    2.0244E+02
 start of interval flux =          1.92610E+13
 n-gamma, fission and total mev/fission =              6.3520E+00    1.9627E+02    2.0262E+02
 start of interval flux =          1.94687E+13
 n-gamma, fission and total mev/fission =              6.4662E+00    1.9633E+02    2.0280E+02
 start of interval flux =          1.96787E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
0ndset          33
            33             4             4            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0             0             0             0             0             0             0             0             0             0
             0             0
```

```
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935             20              6             18           1697
0mmn             19
            10             10              0              0              1              3              0              0              0             10
            21            100              0              4              3              0              2              1              0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21            689            129            879
0pow              3
  4.349999E+00 5.399966E+03 1.888091E+13
0 linp            9
             6              0             51             26              2           3000           1000           1697              5
 n-gamma, fission and total mev/fission =                6.4027E+00     1.9638E+02     2.0278E+02
 start of interval flux =          1.98457E+13
 n-gamma, fission and total mev/fission =                6.5157E+00     1.9644E+02     2.0296E+02
 start of interval flux =          2.00911E+13
 n-gamma, fission and total mev/fission =                6.6367E+00     1.9650E+02     2.0314E+02
 start of interval flux =          2.03381E+13
 n-gamma, fission and total mev/fission =                6.7589E+00     1.9656E+02     2.0332E+02
 start of interval flux =          2.05866E+13
 n-gamma, fission and total mev/fission =                6.8818E+00     1.9663E+02     2.0351E+02
 start of interval flux =          2.08365E+13
 n-gamma, fission and total mev/fission =                7.0055E+00     1.9669E+02     2.0370E+02
 start of interval flux =          2.10878E+13
 n-gamma, fission and total mev/fission =                7.1300E+00     1.9676E+02     2.0389E+02
 start of interval flux =          2.13403E+13
 n-gamma, fission and total mev/fission =                7.2552E+00     1.9682E+02     2.0408E+02
 start of interval flux =          2.15940E+13
 n-gamma, fission and total mev/fission =                7.3810E+00     1.9689E+02     2.0427E+02
 start of interval flux =          2.18489E+13
 n-gamma, fission and total mev/fission =                7.5075E+00     1.9695E+02     2.0446E+02
 start of interval flux =          2.21048E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
0ndset           33
            33              4              5             27              6              0              0              0              0              0
             0              0              0              0              0              2             -1           1698            690            130
           880           7935              0              5             99              7              9             93             18             18
            18              0              0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0              0              0              0              0              0              0              0              0              0
             0              0
```

```
Otherm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
Onon              5
          7935           20            6           18         1697
Ommn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
Otconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
Omzero            4
            21          689          129          879
Opow              3
  4.349999E+00 7.199954E+03 2.111540E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              7.4484E+00       1.9701E+02       2.0446E+02
 start of interval flux =         2.23562E+13
 n-gamma, fission and total mev/fission =              7.5771E+00       1.9707E+02       2.0465E+02
 start of interval flux =         2.26543E+13
 n-gamma, fission and total mev/fission =              7.7133E+00       1.9713E+02       2.0484E+02
 start of interval flux =         2.29524E+13
 n-gamma, fission and total mev/fission =              7.8500E+00       1.9719E+02       2.0504E+02
 start of interval flux =         2.32498E+13
 n-gamma, fission and total mev/fission =              7.9870E+00       1.9726E+02       2.0524E+02
 start of interval flux =         2.35464E+13
 n-gamma, fission and total mev/fission =              8.1243E+00       1.9732E+02       2.0545E+02
 start of interval flux =         2.38421E+13
 n-gamma, fission and total mev/fission =              8.2617E+00       1.9739E+02       2.0565E+02
 start of interval flux =         2.41369E+13
 n-gamma, fission and total mev/fission =              8.3993E+00       1.9745E+02       2.0585E+02
 start of interval flux =         2.44307E+13
 n-gamma, fission and total mev/fission =              8.5368E+00       1.9752E+02       2.0606E+02
 start of interval flux =         2.47234E+13
 n-gamma, fission and total mev/fission =              8.6744E+00       1.9759E+02       2.0626E+02
 start of interval flux =         2.50148E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
Ondset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
Ojopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
```

```
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935            20             6            18          1697
0mmn             19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21           689           129           879
0pow              3
  4.349999E+00 8.999942E+03 2.386569E+13
0 linp            9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              8.8247E+00    1.9766E+02    2.0648E+02
 start of interval flux =          2.53316E+13
 n-gamma, fission and total mev/fission =              8.9779E+00    1.9773E+02    2.0671E+02
 start of interval flux =          2.56553E+13
 n-gamma, fission and total mev/fission =              9.1317E+00    1.9781E+02    2.0694E+02
 start of interval flux =          2.59769E+13
 n-gamma, fission and total mev/fission =              9.2850E+00    1.9788E+02    2.0717E+02
 start of interval flux =          2.62963E+13
 n-gamma, fission and total mev/fission =              9.4380E+00    1.9796E+02    2.0740E+02
 start of interval flux =          2.66133E+13
 n-gamma, fission and total mev/fission =              9.5903E+00    1.9803E+02    2.0762E+02
 start of interval flux =          2.69277E+13
 n-gamma, fission and total mev/fission =              9.7420E+00    1.9811E+02    2.0785E+02
 start of interval flux =          2.72393E+13
 n-gamma, fission and total mev/fission =              9.8931E+00    1.9818E+02    2.0807E+02
 start of interval flux =          2.75479E+13
 n-gamma, fission and total mev/fission =              1.0043E+01    1.9825E+02    2.0830E+02
 start of interval flux =          2.78534E+13
 n-gamma, fission and total mev/fission =              1.0192E+01    1.9832E+02    2.0852E+02
 start of interval flux =          2.81553E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 55000 MWd/MTU
0ndset           33
            33             4             5            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
```

```
             0            0
Otherm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
Onon             5
          7935           20            6           18         1697
Ommn            19
             0           10            0            0            1            1            0            0            0           10
            21          100            0            4            3            0            2            0            0
Otconst          5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
Omzero           4
            21          689          129          879
Opow             3
  4.349999E+00 1.099993E+04 2.082559E+13
0 linp           9
             6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Plenum - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
       0$$  a4 33 a8 26 e
       1$$  1
          1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     80000    130000     140000
       220000    240000    250000     260000
       270000    280000    290000     400000
       410000    500000
74**     89.4    10100.0      46.5  189764.1
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
```

```
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 55000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.181818 e
   5t
BWR SNF Assembly - Top - deplete to 55000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Top - decay
per ONE BWR Fuel Assembly - Top Region - ds3t
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - top ds3 - discharge
  decay step for BWR source term - top ds3 - 0.25 year
  decay step for BWR source term - top ds3 - 0.50 year
  decay step for BWR source term - top ds3 - 1 year
  decay step for BWR source term - top ds3 - 2 year
  decay step for BWR source term - top ds3 - 5 year
  decay step for BWR source term - top ds3 - 10 year
  decay step for BWR source term - top ds3 - 15 year
  decay step for BWR source term - top ds3 - 20 year
  decay step for BWR source term - top ds3 - 25 year
```

```
     56$$ f0
        5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
   oooooooooooooo   rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nnn         nn  sssssssssssss
   oo         oo    rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
   oo         oo    rr         rr        ii         gg              ee              nn nn       nn  ss
   oo         oo    rr         rr        ii         gg              ee              nn   nn     nn  ss
   oo         oo    rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn    nn    nn  sssssssssssss
   oo         oo    rrrrrrrrrrrrr        ii         gg    gggggggg   eeeeeeeee       nn     nn   nn   sssssssssssss
   oo         oo    rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
   oo         oo    rr        rr         ii         gg         gg   ee              nn       nn nn             ss
   oo         oo    rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
   oooooooooooooo   rr          rr  iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
    ooooooooooo     rr          rr  iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

   ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
   ll             oooooooooooooo  tttttttttttt    zzzzzzzzzzzz
   ll             oo         oo        tt                   zz
   ll             oo         oo        tt                  zz
   ll             oo         oo        tt                 zz
   ll             oo         oo        tt                zz
   ll             oo         oo        tt               zz
   ll             oo         oo        tt              zz
   ll             oo         oo        tt             zz
   ll             oo         oo        tt            zz
   lllllllllllll  oooooooooooooo        tt          zzzzzzzzzzzz
   lllllllllllll   ooooooooooo          tt         zzzzzzzzzzzzz
0

        11        22222222222                //     0000000      666666666666              //   99999999999    666666666666
       111       2222222222222               //    000000000    6666666666666             //   9999999999999  6666666666666
      1111       22         22              //    00       00   66                       //   99         99  66
        11                  22             //    00         00  66                      //    99         99  66
        11                  22            //     00         00  66                     //     99         99  66
        11                22             //      00         00  666666666666          //      9999999999999  666666666666
        11              22              //       00         00  6666666666666        //       999999999999  6666666666666
        11            22               //        00         00  66         66       //                  99  66         66
        11          22                //         00         00  66         66      //                   99  66         66
        11        22                 //          00       00   66         66     //                    99  66         66
     11111111    2222222222222     //             000000000    6666666666666    //           9999999999999  6666666666666
     11111111    2222222222222    //               0000000      66666666666    //            999999999999    66666666666
0

        11        33333333333                    5555555555555           44                   5555555555555  7777777777777
       111       3333333333333                   5555555555555          444                   5555555555555  777777777777
      1111       33         33         :::       55                    4444          :::      55             77         77
        11                  33         :::       55                   44 44          :::      55                      77
        11                  33         :::       55                  44  44          :::      55                     77
        11                333                    555555555555       44   44                   555555555555          77
        11                333                    5555555555555     44    44                   5555555555555         77
        11                  33         :::                  55   444444444444        :::                  55        77
        11                  33         :::                  55  4444444444444        :::                  55        77
        11        33         33         :::       55         55           44          :::      55         55       77
     11111111    3333333333333                   5555555555555           44                   5555555555555        77
     11111111     33333333333                     55555555555            44                    55555555555         77
1
0                                 sssssssssss    cccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                 sssssssssssss  cccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
```

```
ss         ss   cc         cc   aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ssssssssssss    cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 ssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
           ss   cc              aa         aa   ll              ee
           ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
ssssssssssss    cccccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
 ssssssssss      cccccccccc     aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  13:54:57                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    500000
74**     89.4   10100.0      46.5  189764.1
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1636364 e
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds3t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1636364 e
    5t
 BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds3t
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 55000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.181818 e
    5t
 BWR SNF Assembly - Top - deplete to 55000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds3t
 58** 10r4.35
 60** 46.0 92.0 138.0 184.0 230.0 276.0 322.0 368.0 414.0 459.770115
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Top - decay
 per ONE BWR Fuel Assembly - Top Region - ds3t
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - top ds3 - discharge
   decay step for BWR source term - top ds3 - 0.25 year
   decay step for BWR source term - top ds3 - 0.50 year
   decay step for BWR source term - top ds3 - 1 year
   decay step for BWR source term - top ds3 - 2 year
   decay step for BWR source term - top ds3 - 5 year
   decay step for BWR source term - top ds3 - 10 year
   decay step for BWR source term - top ds3 - 15 year
   decay step for BWR source term - top ds3 - 20 year
   decay step for BWR source term - top ds3 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                   fission product yields are from endf/b-v                   *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *           prelim lwr origen-s binary working library--id = 1143              *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                     fission product yields are from endf/b-v                 *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
     BWR SNF Assembly - Top - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Top Region -
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03	1.35E-03
h 2	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06	1.79E-06
h 3	6.69E-10	6.68E-10	6.59E-10	6.50E-10	6.32E-10	5.97E-10	5.05E-10	3.81E-10	2.88E-10	2.17E-10	1.64E-10
he 3	1.78E-11	1.79E-11	2.70E-11	3.64E-11	5.44E-11	8.89E-11	1.82E-10	3.05E-10	3.99E-10	4.69E-10	5.22E-10
he 4	6.39E-04	6.39E-04	6.39E-04	6.39E-04	6.39E-04	6.39E-04	6.39E-04	6.39E-04	6.39E-04	6.39E-04	6.39E-04
li 6	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10	1.07E-10
li 7	9.04E-14	9.04E-14	9.04E-14	9.04E-14	9.04E-14	9.04E-14	9.04E-14	9.04E-14	9.04E-14	9.04E-14	9.04E-14
be 9	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06	1.45E-06
be 10	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08	3.22E-08
b 10	4.62E-15	4.66E-15	8.06E-15	1.16E-14	1.86E-14	3.25E-14	7.44E-14	1.44E-13	2.14E-13	2.84E-13	3.53E-13
b 11	4.50E-14	4.50E-14	4.50E-14	4.50E-14	4.50E-14	4.50E-14	4.50E-14	4.50E-14	4.50E-14	4.50E-14	4.50E-14
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03
c 14	5.14E-08	5.14E-08	5.14E-08	5.14E-08	5.14E-08	5.14E-08	5.14E-08	5.13E-08	5.13E-08	5.13E-08	5.13E-08
n 14	1.91E-11	1.91E-11	2.06E-11	2.22E-11	2.53E-11	3.15E-11	5.01E-11	8.12E-11	1.12E-10	1.43E-10	1.74E-10
n 15	2.10E-08	2.10E-08	2.10E-08	2.10E-08	2.10E-08	2.10E-08	2.10E-08	2.10E-08	2.10E-08	2.10E-08	2.10E-08
o 16	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
o 17	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05
o 18	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04
f 19	8.55E-10	8.55E-10	8.55E-10	8.55E-10	8.55E-10	8.55E-10	8.55E-10	8.55E-10	8.55E-10	8.55E-10	8.55E-10
ne 20	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14	2.03E-14
ne 21	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11	3.43E-11
ne 22	3.52E-09	3.52E-09	3.52E-09	3.52E-09	3.52E-09	3.52E-09	3.52E-09	3.52E-09	3.52E-09	3.52E-09	3.52E-09
na 23	2.87E-10	2.87E-10	2.87E-10	2.87E-10	2.87E-10	2.87E-10	2.87E-10	2.87E-10	2.87E-10	2.87E-10	2.87E-10
na 24	1.81E-09	5.81E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	3.94E-06	3.94E-06	3.94E-06	3.94E-06	3.94E-06	3.94E-06	3.94E-06	3.94E-06	3.94E-06	3.94E-06	3.94E-06
mg 25	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05	3.54E-05
mg 26	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05	1.63E-05
al 27	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
si 28	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00
si 29	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01
si 30	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
si 31	5.32E-09	9.33E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	4.30E-12	4.30E-12	4.29E-12	4.29E-12	4.28E-12	4.26E-12	4.21E-12	4.13E-12	4.05E-12	3.96E-12	3.89E-12
p 31	6.26E-05	6.26E-05	6.26E-05	6.26E-05	6.26E-05	6.26E-05	6.26E-05	6.26E-05	6.26E-05	6.26E-05	6.26E-05
p 32	5.90E-10	5.62E-10	7.43E-12	8.38E-14	9.83E-16	9.67E-16	9.56E-16	9.37E-16	9.18E-16	9.00E-16	8.82E-16
p 33	1.31E-13	1.28E-13	1.12E-14	8.92E-16	6.01E-18	2.75E-22	2.63E-35	.00E+00	.00E+00	.00E+00	.00E+00
s 32	2.63E-08	2.63E-08	2.69E-08	2.69E-08	2.69E-08	2.69E-08	2.69E-08	2.69E-08	2.69E-08	2.69E-08	2.69E-08
s 33	8.49E-12	8.50E-12	8.61E-12	8.62E-12	8.62E-12	8.62E-12	8.62E-12	8.62E-12	8.62E-12	8.62E-12	8.62E-12
ar 40	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11	4.02E-11
k 41	1.32E-12	1.32E-12	1.32E-12	1.32E-12	1.32E-12	1.32E-12	1.32E-12	1.32E-12	1.32E-12	1.32E-12	1.32E-12
k 43	2.43E-14	1.15E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	2.63E-14	2.63E-14	2.63E-14	2.63E-14	2.63E-14	2.63E-14	2.63E-14	2.63E-14	2.63E-14	2.63E-14	2.63E-14
ca 43	7.71E-07	7.71E-07	7.71E-07	7.71E-07	7.71E-07	7.71E-07	7.71E-07	7.71E-07	7.71E-07	7.71E-07	7.71E-07
ca 44	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06	5.99E-06
ca 45	1.60E-08	1.60E-08	1.10E-08	7.41E-09	3.42E-09	7.29E-10	7.05E-12	3.10E-15	1.36E-18	6.00E-22	2.64E-25
ca 46	7.68E-07	7.68E-07	7.68E-07	7.68E-07	7.68E-07	7.68E-07	7.68E-07	7.68E-07	7.68E-07	7.68E-07	7.68E-07
ca 47	6.90E-12	5.92E-12	7.34E-18	5.33E-24	3.96E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.10E-07	1.10E-07	1.15E-07	1.19E-07	1.23E-07	1.26E-07	1.26E-07	1.26E-07	1.26E-07	1.26E-07	1.26E-07
sc 46	9.94E-07	9.86E-07	4.72E-07	2.20E-07	4.85E-08	2.36E-09	2.74E-13	7.55E-20	2.08E-26	5.73E-33	1.58E-39
sc 47	6.42E-08	5.21E-08	5.30E-16	1.74E-23	1.11E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	3.35E-09	2.29E-09	4.40E-24	2.23E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

BWR SNF Assembly - Top - decay light elements page 2

0

nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02
ti 47	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02	8.73E-02

ti 48	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01	8.66E-01
ti 49	8.66E-02	8.66E-02	8.66E-02	8.66E-02	8.66E-02	8.66E-02	8.66E-02	8.66E-02	8.66E-02	8.66E-02	8.66E-02
ti 50	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02	6.58E-02
v 50	6.45E-04	6.45E-04	6.45E-04	6.45E-04	6.45E-04	6.45E-04	6.45E-04	6.45E-04	6.45E-04	6.45E-04	6.45E-04
v 51	1.04E-01	1.04E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01	1.06E-01
cr 50	2.14E+00	2.14E+00	2.14E+00	2.14E+00	2.14E+00	2.14E+00	2.14E+00	2.14E+00	2.14E+00	2.14E+00	2.14E+00
cr 51	2.26E-03	2.20E-03	2.37E-04	2.35E-05	2.43E-07	2.61E-11	3.25E-23	5.00E-43	.00E+00	.00E+00	.00E+00
cr 52	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01
cr 53	5.04E+00	5.04E+00	5.04E+00	5.04E+00	5.04E+00	5.04E+00	5.04E+00	5.04E+00	5.04E+00	5.04E+00	5.04E+00
cr 54	1.60E+00	1.60E+00	1.61E+00	1.61E+00	1.61E+00	1.61E+00	1.61E+00	1.61E+00	1.61E+00	1.61E+00	1.61E+00
mn 54	1.69E-03	1.69E-03	1.39E-03	1.13E-03	7.52E-04	3.34E-04	2.93E-05	5.08E-07	8.81E-09	1.53E-10	2.65E-12
mn 55	3.24E+00	3.24E+00	3.24E+00	3.24E+00	3.25E+00	3.25E+00	3.26E+00	3.27E+00	3.27E+00	3.27E+00	3.27E+00
mn 56	1.62E-05	2.56E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00	9.12E+00
fe 55	3.36E-02	3.35E-02	3.15E-02	2.96E-02	2.60E-02	2.02E-02	9.43E-03	2.65E-03	7.44E-04	2.09E-04	5.87E-05
fe 56	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02	1.50E+02
fe 57	4.80E+00	4.80E+00	4.80E+00	4.80E+00	4.80E+00	4.80E+00	4.80E+00	4.80E+00	4.80E+00	4.80E+00	4.80E+00
fe 58	5.61E-01	5.61E-01	5.62E-01	5.62E-01	5.62E-01	5.62E-01	5.62E-01	5.62E-01	5.62E-01	5.62E-01	5.62E-01
fe 59	8.91E-05	8.78E-05	2.19E-05	5.19E-06	3.02E-07	1.02E-09	3.95E-17	1.75E-29	7.77E-42	.00E+00	.00E+00
co 58m	1.93E-10	3.12E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.81E-03	1.80E-03	7.52E-04	3.05E-04	5.10E-05	1.44E-06	3.21E-11	5.67E-19	1.00E-26	1.77E-34	3.17E-42
co 59	4.37E-01	4.37E-01	4.37E-01	4.37E-01	4.37E-01	4.37E-01	4.37E-01	4.37E-01	4.37E-01	4.37E-01	4.37E-01
co 60	6.29E-02	6.28E-02	6.09E-02	5.89E-02	5.51E-02	4.83E-02	3.26E-02	1.69E-02	8.74E-03	4.53E-03	2.35E-03
co 61	4.09E-08	1.71E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01	4.30E+01
ni 59	4.86E-01	4.86E-01	4.86E-01	4.86E-01	4.86E-01	4.86E-01	4.86E-01	4.86E-01	4.86E-01	4.86E-01	4.86E-01
ni 60	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01
ni 61	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01	9.06E-01
ni 62	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00	2.36E+00
ni 63	9.93E-02	9.93E-02	9.92E-02	9.90E-02	9.87E-02	9.80E-02	9.60E-02	9.27E-02	8.95E-02	8.65E-02	8.36E-02
ni 64	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01	6.43E-01
ni 65	2.75E-07	3.74E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	3.58E-11	2.64E-11	4.44E-23	2.57E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.38E-01	1.40E-01	1.43E-01	1.47E-01	1.50E-01	1.52E-01
cu 64	1.04E-06	2.81E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02	6.57E-02
cu 66	1.63E-09	4.11E-14	6.92E-26	4.00E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	9.91E-13	7.57E-13	3.02E-23	4.70E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	9.40E-04	9.40E-04	9.40E-04	9.40E-04	9.40E-04	9.40E-04	9.40E-04	9.40E-04	9.40E-04	9.40E-04	9.40E-04
zn 65	5.73E-07	5.71E-07	4.44E-07	3.41E-07	2.03E-07	7.18E-08	3.19E-09	1.78E-11	9.88E-14	5.50E-16	3.06E-18
zn 66	5.79E-04	5.79E-04	5.79E-04	5.79E-04	5.79E-04	5.79E-04	5.79E-04	5.79E-04	5.79E-04	5.79E-04	5.79E-04
zn 67	9.31E-07	9.31E-07	9.31E-07	9.31E-07	9.31E-07	9.31E-07	9.31E-07	9.31E-07	9.31E-07	9.31E-07	9.31E-07
zn 68	1.55E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08	1.55E-08
zn 69m	3.74E-15	1.12E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 69	3.13E-11	3.13E-11	3.13E-11	3.13E-11	3.13E-11	3.13E-11	3.13E-11	3.13E-11	3.13E-11	3.13E-11	3.13E-11
ge 70	1.92E-13	1.92E-13	1.92E-13	1.92E-13	1.92E-13	1.92E-13	1.92E-13	1.92E-13	1.92E-13	1.92E-13	1.92E-13
sr 87	3.86E-06	3.86E-06	3.86E-06	3.86E-06	3.86E-06	3.86E-06	3.86E-06	3.86E-06	3.86E-06	3.86E-06	3.86E-06
sr 88	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04	3.79E-04
sr 89	1.09E-06	1.07E-06	3.17E-07	8.91E-08	7.28E-09	4.86E-11	1.45E-17	1.94E-28	2.59E-39	.00E+00	.00E+00
sr 90	1.94E-08	1.94E-08	1.93E-08	1.92E-08	1.89E-08	1.85E-08	1.72E-08	1.52E-08	1.34E-08	1.19E-08	1.05E-08

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BWR SNF Assembly - Top - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.69E-09	2.95E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	2.79E-05	2.79E-05	2.87E-05	2.89E-05	2.90E-05	2.90E-05	2.90E-05	2.90E-05	2.90E-05	2.90E-05	2.90E-05
y 90	2.15E-06	1.66E-06	5.01E-12	4.98E-12	4.92E-12	4.80E-12	4.46E-12	3.94E-12	3.49E-12	3.08E-12	2.72E-12
y 91	3.25E-06	3.21E-06	1.12E-06	3.74E-07	4.29E-08	5.67E-10	1.30E-15	5.23E-25	2.10E-34	1.28E-43	.00E+00
y 92	7.19E-09	6.53E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

y 93	4.12E-12	8.03E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01
zr 91	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01	1.96E+01
zr 92	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01
zr 93	5.90E-02	5.90E-02	5.90E-02	5.90E-02	5.90E-02	5.90E-02	5.90E-02	5.90E-02	5.90E-02	5.90E-02	5.90E-02
zr 94	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01
zr 95	1.13E-03	1.12E-03	4.27E-04	1.57E-04	2.17E-05	4.16E-07	2.93E-12	7.56E-21	1.95E-29	5.05E-38	.00E+00
zr 96	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00
zr 97	1.96E-05	7.31E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	5.19E-09	5.19E-09	5.19E-09	5.19E-09	5.19E-09	5.18E-09	5.16E-09	5.14E-09	5.11E-09	5.09E-09	5.06E-09
nb 92	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05	1.00E-05
nb 93	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01	4.92E-01
nb 93m	2.25E-04	2.25E-04	2.22E-04	2.20E-04	2.15E-04	2.06E-04	1.81E-04	1.46E-04	1.18E-04	9.55E-05	7.71E-05
nb 94	7.28E-03	7.28E-03	7.28E-03	7.28E-03	7.27E-03	7.27E-03	7.27E-03	7.27E-03	7.27E-03	7.27E-03	7.27E-03
nb 95	6.40E-04	6.40E-04	3.93E-04	1.69E-04	2.56E-05	5.16E-07	3.52E-12	9.10E-21	2.35E-29	6.74E-40	.00E+00
nb 95m	7.35E-07	7.29E-07	2.84E-07	1.04E-07	1.44E-08	2.76E-10	1.94E-15	5.01E-24	1.30E-32	.00E+00	.00E+00
nb 96	1.59E-08	7.81E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.39E-06	5.22E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.83E-08	6.84E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	8.06E-07	8.07E-07	8.67E-07	9.30E-07	1.05E-06	1.30E-06	2.05E-06	3.29E-06	4.53E-06	5.77E-06	7.01E-06
mo 95	2.10E-02	2.11E-02	2.20E-02	2.25E-02	2.28E-02	2.28E-02	2.28E-02	2.28E-02	2.28E-02	2.28E-02	2.28E-02
mo 96	1.63E-03	1.63E-03	1.63E-03	1.63E-03	1.63E-03	1.63E-03	1.63E-03	1.63E-03	1.63E-03	1.63E-03	1.63E-03
mo 97	3.68E-02	3.69E-02	3.69E-02	3.69E-02	3.69E-02	3.69E-02	3.69E-02	3.69E-02	3.69E-02	3.69E-02	3.69E-02
mo 98	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04	4.86E-04
mo 99	9.58E-09	7.44E-09	1.32E-18	9.70E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10	1.12E-10
tc 98	1.10E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12	1.10E-12
tc 99	1.71E-07	1.71E-07	1.72E-07	1.72E-07	1.72E-07	1.72E-07	1.72E-07	1.72E-07	1.72E-07	1.72E-07	1.72E-07
ru 99	8.08E-13	8.10E-13	9.47E-13	1.09E-12	1.37E-12	1.94E-12	3.63E-12	6.45E-12	9.27E-12	1.21E-11	1.49E-11
ru100	1.49E-08	1.49E-08	1.49E-08	1.49E-08	1.49E-08	1.49E-08	1.49E-08	1.49E-08	1.49E-08	1.49E-08	1.49E-08
ru101	7.99E-11	7.99E-11	7.99E-11	7.99E-11	7.99E-11	7.99E-11	7.99E-11	7.99E-11	7.99E-11	7.99E-11	7.99E-11
ru102	1.56E-12	1.56E-12	1.56E-12	1.56E-12	1.56E-12	1.56E-12	1.56E-12	1.56E-12	1.56E-12	1.56E-12	1.56E-12
cd111	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09	3.76E-09
cd112	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08	3.23E-08
cd113	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.58E-11	8.59E-11	8.59E-11	8.59E-11	8.59E-11
cd113m	1.14E-10	1.14E-10	1.13E-10	1.11E-10	1.09E-10	1.03E-10	8.92E-11	6.97E-11	5.45E-11	4.26E-11	3.34E-11
cd114	4.25E-06	4.26E-06	4.47E-06	4.53E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06	4.55E-06
cd115	1.79E-10	1.31E-10	1.24E-22	3.94E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	3.90E-10	3.84E-10	9.62E-11	2.28E-11	1.33E-12	4.57E-15	1.83E-22	8.61E-35	.00E+00	.00E+00	.00E+00
cd116	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08	2.44E-08
cd117	1.66E-12	2.08E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	9.31E-04	9.32E-04	9.69E-04	9.92E-04	1.01E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03	1.02E-03
in113m	5.50E-08	5.47E-08	3.20E-08	1.83E-08	6.10E-09	6.76E-10	9.21E-13	1.54E-17	2.57E-22	4.31E-27	7.20E-32
in114	1.57E-10	9.86E-11	2.84E-11	7.77E-12	6.01E-13	3.62E-15	7.88E-22	6.22E-33	.00E+00	.00E+00	.00E+00
in114m	6.21E-06	6.13E-06	1.76E-06	4.83E-07	3.74E-08	2.25E-10	4.90E-17	3.87E-28	3.05E-39	.00E+00	.00E+00
in115	9.49E-09	9.49E-09	9.78E-09	9.85E-09	9.87E-09	9.88E-09	9.88E-09	9.88E-09	9.88E-09	9.88E-09	9.88E-09
in117	5.47E-12	1.34E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 4

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
in117m	1.18E-12	6.93E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02	2.24E-02
sn113	9.16E-05	9.11E-05	5.33E-05	3.05E-05	1.02E-05	1.13E-06	1.53E-09	2.56E-14	4.29E-19	7.17E-24	1.20E-28
sn114	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02
sn115	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03	8.07E-03
sn116	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
sn117m	5.75E-05	5.46E-05	5.85E-07	5.24E-09	4.72E-13	3.89E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
sn119	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
sn119m	1.11E-03	1.11E-03	9.00E-04	7.23E-04	4.69E-04	1.98E-04	1.48E-05	1.97E-07	2.62E-09	3.49E-11	4.64E-13
sn120	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01
sn121	1.66E-06	8.99E-07	5.83E-10	5.82E-10	5.78E-10	5.71E-10	5.49E-10	5.16E-10	4.84E-10	4.55E-10	4.27E-10
sn121m	1.34E-05	1.34E-05	1.34E-05	1.34E-05	1.33E-05	1.31E-05	1.26E-05	1.18E-05	1.11E-05	1.04E-05	9.81E-06
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.79E-05	1.78E-05	1.10E-05	6.71E-06	2.52E-06	3.55E-07	9.91E-10	5.49E-14	3.05E-18	1.69E-22	9.36E-27
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	2.76E-07	2.56E-07	4.26E-10	5.51E-13	1.08E-18	4.25E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.75E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03
sb122	7.96E-07	6.16E-07	7.37E-17	3.59E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.61E-04	1.61E-04	1.68E-04	1.72E-04	1.77E-04	1.79E-04	1.79E-04	1.79E-04	1.79E-04	1.79E-04	1.79E-04
sb124	1.04E-06	1.03E-06	3.68E-07	1.27E-07	1.55E-08	2.31E-10	7.64E-16	5.63E-25	4.15E-34	3.48E-43	.00E+00
sb125	6.43E-04	6.42E-04	6.04E-04	5.67E-04	4.99E-04	3.87E-04	1.81E-04	5.08E-05	1.43E-05	4.01E-06	1.13E-06
sb126	9.36E-08	8.85E-08	6.10E-10	3.46E-12	1.26E-16	1.70E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.92E-04	1.92E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04	1.93E-04
te123	1.75E-06	1.75E-06	1.97E-06	2.10E-06	2.22E-06	2.27E-06	2.28E-06	2.28E-06	2.28E-06	2.28E-06	2.28E-06
te123m	5.31E-07	5.28E-07	3.15E-07	1.84E-07	6.40E-08	7.72E-09	1.35E-11	3.45E-16	8.78E-21	2.24E-25	5.70E-30
te124	1.47E-05	1.47E-05	1.53E-05	1.56E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05	1.57E-05
te125	6.14E-04	6.14E-04	6.53E-04	6.91E-04	7.60E-04	8.73E-04	1.08E-03	1.21E-03	1.25E-03	1.26E-03	1.26E-03
te125m	8.37E-06	8.37E-06	8.32E-06	7.96E-06	7.08E-06	5.50E-06	2.57E-06	7.21E-07	2.03E-07	5.69E-08	1.60E-08
te126	1.91E-05	1.91E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05	1.92E-05
te127	8.97E-11	2.31E-11	5.47E-12	3.04E-12	9.50E-13	9.32E-14	8.77E-17	7.94E-22	7.18E-27	6.50E-32	5.90E-37
te127m	2.77E-09	2.75E-09	1.56E-09	8.68E-10	2.72E-10	2.66E-11	2.51E-14	2.27E-19	2.05E-24	1.86E-29	1.68E-34
te128	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10	3.83E-10
te129m	2.75E-15	2.69E-15	4.29E-16	6.37E-17	1.47E-18	7.84E-22	1.19E-31	.00E+00	.00E+00	.00E+00	.00E+00
i127	9.59E-08	9.60E-08	9.72E-08	9.79E-08	9.85E-08	9.87E-08	9.87E-08	9.87E-08	9.87E-08	9.87E-08	9.87E-08
i129	3.39E-13	3.40E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13	3.42E-13
xe127	2.18E-15	2.13E-15	3.92E-16	6.74E-17	2.07E-18	1.98E-21	1.72E-30	.00E+00	.00E+00	.00E+00	.00E+00
xe128	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09	4.37E-09
xe129	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11	1.95E-11
xe129m	4.50E-14	4.17E-14	4.04E-17	2.98E-20	1.93E-26	8.27E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	9.43E-13	9.43E-13	9.43E-13	9.43E-13	9.43E-13	9.43E-13	9.43E-13	9.43E-13	9.43E-13	9.43E-13	9.43E-13
xe131	2.40E-15	2.40E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15	2.41E-15
total	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02

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BWR SNF Assembly - Top - decay light elements page 5

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	6.46E-06	6.46E-06	6.38E-06	6.28E-06	6.11E-06	5.78E-06	4.88E-06	3.68E-06	2.78E-06	2.10E-06	1.59E-06
be 10	7.20E-10	7.20E-10	7.20E-10	7.20E-10	7.20E-10	7.20E-10	7.20E-10	7.20E-10	7.20E-10	7.20E-10	7.20E-10
c 14	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07	2.29E-07
na 24	1.61E-02	5.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	3.40E-11	1.53E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	2.01E+00	1.54E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	2.05E-01	3.60E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	2.79E-10	2.79E-10	2.79E-10	2.79E-10	2.78E-10	2.77E-10	2.74E-10	2.68E-10	2.63E-10	2.58E-10	2.52E-10
p 32	1.69E-04	1.61E-04	2.13E-06	2.40E-08	2.81E-10	2.77E-10	2.74E-10	2.68E-10	2.63E-10	2.58E-10	2.52E-10
p 33	2.05E-08	2.00E-08	1.75E-09	1.39E-10	9.39E-13	4.30E-17	4.11E-30	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	6.42E-09	7.13E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	1.37E-10	3.58E-11	1.84E-17	1.83E-17	1.81E-17	1.77E-17	1.66E-17	1.50E-17	1.35E-17	1.21E-17	1.09E-17
k 43	7.94E-08	3.77E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	2.84E-04	2.83E-04	1.94E-04	1.31E-04	6.06E-05	1.29E-05	1.25E-07	5.50E-11	2.42E-14	1.06E-17	4.67E-21
ca 47	4.23E-06	3.63E-06	4.50E-12	3.27E-18	2.42E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	3.37E-02	3.34E-02	1.60E-02	7.45E-03	1.64E-03	8.01E-05	9.28E-09	2.56E-15	7.05E-22	1.94E-28	.00E+00
sc 47	5.33E-02	4.33E-02	4.41E-10	1.44E-17	9.22E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.01E-03	3.42E-03	6.58E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	5.30E-03	1.40E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

cr 51	2.08E+02	2.03E+02	2.19E+01	2.17E+00	2.24E-02	2.41E-06	3.01E-18	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	1.31E+01	1.31E+01	1.07E+01	8.75E+00	5.83E+00	2.59E+00	2.27E-01	3.94E-03	6.83E-05	1.18E-06	2.05E-08
mn 56	3.52E+02	5.55E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	7.99E+01	7.99E+01	7.51E+01	7.04E+01	6.20E+01	4.81E+01	2.25E+01	6.31E+00	1.77E+00	4.98E-01	1.40E-01
fe 59	4.43E+00	4.37E+00	1.09E+00	2.58E-01	1.50E-02	5.08E-05	1.97E-12	8.71E-25	.00E+00	.00E+00	.00E+00
co 58m	1.14E-03	1.84E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	5.76E+01	5.70E+01	2.39E+01	9.67E+00	1.62E+00	4.56E-02	1.02E-06	1.80E-14	3.18E-22	5.64E-30	.00E+00
co 60	7.11E+01	7.11E+01	6.88E+01	6.66E+01	6.23E+01	5.47E+01	3.68E+01	1.91E+01	9.89E+00	5.12E+00	2.65E+00
co 61	1.28E+00	5.33E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02	3.93E-02
ni 63	5.63E+00	5.63E+00	5.62E+00	5.61E+00	5.59E+00	5.56E+00	5.44E+00	5.26E+00	5.08E+00	4.91E+00	4.74E+00
ni 65	5.26E+00	7.15E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	3.11E-05	2.29E-05	3.86E-17	2.23E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	4.02E+00	1.08E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	9.09E-01	2.30E-05	3.87E-17	2.24E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	7.50E-07	5.73E-07	2.29E-17	3.56E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	4.72E-03	4.71E-03	3.66E-03	2.81E-03	1.67E-03	5.92E-04	2.63E-05	1.46E-07	8.15E-10	4.54E-12	2.52E-14
zn 69	1.84E-07	3.95E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.23E-08	3.68E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	3.28E-14	1.01E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	3.11E-12	2.92E-12	1.33E-14	4.87E-17	7.53E-22	1.83E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.16E-02	3.12E-02	9.20E-03	2.59E-03	2.11E-04	1.41E-06	4.22E-13	5.64E-24	.00E+00	.00E+00	.00E+00
sr 90	2.74E-06	2.74E-06	2.72E-06	2.71E-06	2.67E-06	2.61E-06	2.42E-06	2.14E-06	1.89E-06	1.67E-06	1.48E-06
sr 91	6.12E-03	1.07E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	2.94E-06	2.90E-06	8.55E-07	2.41E-07	1.96E-08	1.31E-10	3.92E-17	5.24E-28	.00E+00	.00E+00	.00E+00
y 90	1.17E+00	9.00E-01	2.72E-06	2.71E-06	2.67E-06	2.61E-06	2.42E-06	2.14E-06	1.89E-06	1.67E-06	1.48E-06
y 90m	1.03E-07	5.58E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	7.97E-02	7.88E-02	2.75E-02	9.18E-03	1.05E-03	1.39E-05	3.20E-11	1.28E-20	5.16E-30	.00E+00	.00E+00
y 92	6.92E-02	6.29E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.37E-05	2.68E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04	1.48E-04
zr 95	2.43E+01	2.41E+01	9.18E+00	3.37E+00	4.66E-01	8.93E-03	6.28E-08	1.62E-16	4.19E-25	.00E+00	.00E+00
zr 97	3.74E+01	1.40E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 6

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 91	3.00E-08	3.00E-08	3.00E-08	3.00E-08	3.00E-08	2.99E-08	2.98E-08	2.97E-08	2.95E-08	2.94E-08	2.92E-08
nb 92	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09	1.11E-09
nb 93m	5.36E-02	5.36E-02	5.30E-02	5.24E-02	5.13E-02	4.92E-02	4.32E-02	3.49E-02	2.82E-02	2.28E-02	1.84E-02
nb 94	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03	1.36E-03
nb 95	2.52E+01	2.52E+01	1.55E+01	6.66E+00	1.01E+00	2.03E-02	1.38E-07	3.58E-16	9.24E-25	.00E+00	.00E+00
nb 95m	2.80E-01	2.78E-01	1.08E-01	3.97E-02	5.48E-03	1.05E-04	7.39E-10	1.91E-18	4.93E-27	.00E+00	.00E+00
nb 96	2.23E-02	1.09E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	3.74E+01	1.40E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.55E+01	1.33E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	4.60E-03	3.57E-03	6.35E-13	4.66E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	2.92E-09	2.93E-09	2.94E-09	2.94E-09	2.94E-09	2.94E-09	2.94E-09	2.94E-09	2.94E-09	2.94E-09	2.94E-09
ru103	1.20E-11	1.18E-11	2.44E-12	4.77E-13	1.89E-14	3.00E-17	1.19E-25	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	2.56E-08	2.56E-08	2.53E-08	2.50E-08	2.44E-08	2.32E-08	2.00E-08	1.57E-08	1.22E-08	9.57E-09	7.49E-09
cd115	9.14E-05	6.70E-05	6.32E-17	2.01E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	9.92E-06	9.77E-06	2.45E-06	5.82E-07	3.40E-08	1.16E-10	4.66E-18	2.19E-30	.00E+00	.00E+00	.00E+00
cd117	1.78E-05	2.24E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.07E-08	2.17E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	9.21E-01	9.16E-01	5.36E-01	3.07E-01	1.02E-01	1.13E-02	1.54E-05	2.58E-10	4.31E-15	7.21E-20	1.21E-24
in114	2.16E-01	1.36E-01	3.90E-02	1.07E-02	8.28E-04	4.98E-06	1.09E-12	8.56E-24	.00E+00	.00E+00	.00E+00
in114m	1.44E-01	1.42E-01	4.08E-02	1.12E-02	8.65E-04	5.21E-06	1.13E-12	8.95E-24	.00E+00	.00E+00	.00E+00
in116m	2.65E-05	2.62E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.01E-04	4.90E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

in117m	1.62E-05	9.56E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	9.21E-01	9.15E-01	5.35E-01	3.07E-01	1.02E-01	1.13E-02	1.54E-05	2.57E-10	4.31E-15	7.20E-20	1.20E-24
sn117m	4.72E+00	4.48E+00	4.80E-02	4.30E-04	3.88E-08	3.19E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	4.17E+00	4.16E+00	3.37E+00	2.71E+00	1.76E+00	7.41E-01	5.55E-02	7.38E-04	9.82E-06	1.31E-07	1.74E-09
sn121	1.59E+00	8.60E-01	5.59E-04	5.57E-04	5.53E-04	5.46E-04	5.26E-04	4.94E-04	4.64E-04	4.36E-04	4.09E-04
sn121m	7.22E-04	7.22E-04	7.20E-04	7.18E-04	7.13E-04	7.04E-04	6.78E-04	6.37E-04	5.98E-04	5.61E-04	5.27E-04
sn123	1.47E-01	1.46E-01	9.07E-02	5.52E-02	2.07E-02	2.92E-03	8.15E-06	4.52E-10	2.50E-14	1.39E-18	7.70E-23
sn123m	8.46E-04	1.30E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	2.99E-02	2.78E-02	4.62E-05	5.98E-08	1.17E-13	4.61E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.16E-01	2.44E-01	2.92E-11	1.42E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	1.82E-02	1.79E-02	6.44E-03	2.22E-03	2.71E-04	4.04E-06	1.34E-11	9.85E-21	7.26E-30	.00E+00	.00E+00
sb125	6.74E-01	6.73E-01	6.33E-01	5.94E-01	5.23E-01	4.06E-01	1.89E-01	5.32E-02	1.49E-02	4.20E-03	1.18E-03
sb126	7.83E-03	7.40E-03	5.11E-05	2.90E-07	1.06E-11	1.42E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	4.71E-03	4.68E-03	2.80E-03	1.64E-03	5.68E-04	6.85E-05	1.20E-07	3.06E-12	7.80E-17	1.99E-21	5.06E-26
te125m	1.51E-01	1.51E-01	1.50E-01	1.43E-01	1.28E-01	9.91E-02	4.62E-02	1.30E-02	3.65E-03	1.03E-03	2.88E-04
te127	2.37E-04	6.11E-05	1.44E-05	8.02E-06	2.51E-06	2.46E-07	2.32E-10	2.10E-15	1.90E-20	1.72E-25	1.55E-30
te127m	2.61E-05	2.60E-05	1.47E-05	8.19E-06	2.56E-06	2.51E-07	2.36E-10	2.14E-15	1.94E-20	1.75E-25	1.57E-30
te129	1.27E-09	5.20E-11	8.29E-12	1.23E-12	2.83E-14	1.51E-17	2.31E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	8.28E-11	8.11E-11	1.29E-11	1.92E-12	4.42E-14	2.36E-17	3.60E-27	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.06E-15	1.00E-15	8.79E-18	6.39E-20	3.81E-24	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	2.47E-11	6.47E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	2.32E-15	2.13E-15	9.91E-19	3.41E-22	4.91E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	6.15E-11	6.03E-11	1.11E-11	1.90E-12	5.86E-14	5.59E-17	4.85E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	5.13E-09	4.74E-09	4.60E-12	3.39E-15	2.20E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	8.74E-13	8.25E-13	4.62E-15	2.11E-17	5.02E-22	2.97E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	1.07E+03	5.41E+02	2.38E+02	1.78E+02	1.42E+02	1.12E+02	6.53E+01	3.08E+01	1.68E+01	1.06E+01	7.59E+00

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Top - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	9.80E+12	2.02E+12	5.23E+11	2.83E+11	1.69E+11	1.21E+11	7.30E+10	3.76E+10	2.00E+10	1.09E+10	6.12E+09
3.00E-02	2.71E+12	4.02E+11	1.34E+11	1.02E+11	7.22E+10	4.79E+10	2.37E+10	1.07E+10	5.18E+09	2.62E+09	1.36E+09
5.50E-02	1.83E+12	1.33E+11	3.12E+10	2.18E+10	1.60E+10	1.32E+10	8.82E+09	4.56E+09	2.36E+09	1.22E+09	6.36E+08
8.50E-02	9.84E+11	6.95E+10	1.37E+10	9.00E+09	6.16E+09	4.98E+09	3.34E+09	1.73E+09	8.93E+08	4.62E+08	2.40E+08
1.20E-01	6.88E+11	4.52E+10	7.47E+09	4.55E+09	2.81E+09	2.19E+09	1.45E+09	7.42E+08	3.82E+08	1.97E+08	1.02E+08
1.70E-01	8.51E+11	1.82E+11	8.90E+09	4.52E+09	2.72E+09	1.98E+09	1.09E+09	4.42E+08	1.94E+08	9.10E+07	4.44E+07
3.00E-01	1.70E+12	8.54E+11	9.10E+10	1.15E+10	1.37E+09	7.52E+08	4.07E+08	1.64E+08	7.16E+07	3.34E+07	1.63E+07
6.50E-01	2.60E+13	7.05E+12	2.90E+12	1.39E+12	4.42E+11	1.36E+11	1.53E+10	1.58E+09	4.99E+08	2.36E+08	1.59E+08
1.13E+00	6.07E+12	5.89E+12	5.67E+12	5.48E+12	5.13E+12	4.50E+12	3.03E+12	1.57E+12	8.14E+11	4.22E+11	2.19E+11
1.58E+00	2.37E+12	2.71E+10	5.00E+09	2.01E+09	3.35E+08	9.37E+06	1.09E+03	4.68E+02	2.54E+02	1.42E+02	8.25E+01
2.00E+00	3.58E+12	7.42E+09	4.50E+07	3.43E+07	2.80E+07	2.40E+07	1.62E+07	8.38E+06	4.34E+06	2.25E+06	1.17E+06
2.40E+00	1.37E+11	2.18E+08	1.93E+05	1.25E+05	9.06E+04	7.60E+04	5.12E+04	2.65E+04	1.37E+04	7.12E+03	3.69E+03
2.80E+00	1.24E+11	3.83E+08	9.41E+03	3.24E+03	3.96E+02	5.90E+00	1.95E-05	5.80E-11	5.22E-11	4.70E-11	4.23E-11
3.25E+00	2.27E+10	3.58E+07	7.52E-12	7.48E-12	7.40E-12	7.24E-12	6.80E-12	6.12E-12	5.51E-12	4.96E-12	4.46E-12
3.75E+00	7.70E+05	1.22E+05	9.09E-15	9.04E-15	8.95E-15	8.76E-15	8.23E-15	7.40E-15	6.66E-15	6.00E-15	5.40E-15
4.25E+00	5.83E+05	1.60E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	4.59E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	4.18E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	5.69E+13	1.67E+13	9.38E+12	7.32E+12	5.85E+12	4.83E+12	3.16E+12	1.63E+12	8.44E+11	4.38E+11	2.27E+11
0 mev/sec	3.65E+13	1.16E+13	8.31E+12	7.09E+12	6.07E+12	5.16E+12	3.43E+12	1.77E+12	9.17E+11	4.75E+11	2.46E+11

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge									
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d

	1.00E-02	2.25E+04	4.65E+03	1.20E+03	6.50E+02	3.89E+02	2.78E+02	1.68E+02	8.65E+01	4.60E+01	2.50E+01	1.41E+01
	3.00E-02	1.87E+04	2.77E+03	9.22E+02	7.01E+02	4.98E+02	3.31E+02	1.64E+02	7.35E+01	3.58E+01	1.80E+01	9.37E+00
	5.50E-02	2.31E+04	1.68E+03	3.95E+02	2.76E+02	2.02E+02	1.66E+02	1.12E+02	5.77E+01	2.99E+01	1.55E+01	8.04E+00
	8.50E-02	1.92E+04	1.36E+03	2.67E+02	1.76E+02	1.20E+02	9.73E+01	6.52E+01	3.37E+01	1.74E+01	9.03E+00	4.68E+00
	1.20E-01	1.90E+04	1.25E+03	2.06E+02	1.25E+02	7.74E+01	6.03E+01	4.00E+01	2.05E+01	1.05E+01	5.45E+00	2.82E+00
	1.70E-01	3.33E+04	7.13E+03	3.48E+02	1.77E+02	1.06E+02	7.73E+01	4.27E+01	1.73E+01	7.60E+00	3.56E+00	1.74E+00
	3.00E-01	1.18E+05	5.89E+04	6.28E+03	7.93E+02	9.45E+01	5.18E+01	2.81E+01	1.13E+01	4.94E+00	2.30E+00	1.12E+00
	6.50E-01	3.89E+06	1.05E+06	4.33E+05	2.08E+05	6.60E+04	2.04E+04	2.29E+03	2.36E+02	7.45E+01	3.53E+01	2.37E+01
	1.13E+00	1.57E+06	1.52E+06	1.47E+06	1.42E+06	1.33E+06	1.16E+06	7.85E+05	4.06E+05	2.11E+05	1.09E+05	5.65E+04
	1.58E+00	8.58E+05	9.80E+03	1.81E+03	7.29E+02	1.21E+02	3.39E+00	3.93E-04	1.69E-04	9.19E-05	5.13E-05	2.99E-05
	2.00E+00	1.64E+06	3.41E+03	2.07E+01	1.58E+01	1.29E+01	1.10E+01	7.44E+00	3.85E+00	2.00E+00	1.03E+00	5.36E-01
	2.40E+00	7.56E+04	1.21E+02	1.07E-01	6.89E-02	5.00E-02	4.20E-02	2.83E-02	1.46E-02	7.58E-03	3.93E-03	2.03E-03
	2.80E+00	8.01E+04	2.47E+02	6.06E-03	2.09E-03	2.55E-04	3.80E-06	1.26E-11	3.73E-17	3.36E-17	3.02E-17	2.72E-17
	3.25E+00	1.69E+04	2.67E+01	5.62E-18	5.59E-18	5.53E-18	5.41E-18	5.08E-18	4.57E-18	4.12E-18	3.70E-18	3.33E-18
	3.75E+00	6.64E-01	1.05E-01	7.84E-21	7.80E-21	7.71E-21	7.55E-21	7.09E-21	6.38E-21	5.74E-21	5.17E-21	4.65E-21
	4.25E+00	5.70E-01	1.57E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	5.02E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	5.28E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	8.39E+06	2.67E+06	1.91E+06	1.63E+06	1.40E+06	1.19E+06	7.87E+05	4.07E+05	2.11E+05	1.09E+05	5.66E+04
0	gamma watts	5.85E+00	1.86E+00	1.33E+00	1.14E+00	9.73E-01	8.27E-01	5.49E-01	2.84E-01	1.47E-01	7.61E-02	3.95E-02

1

photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Top - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.49E+17	3.24E+16	8.47E+15	6.25E+15	4.21E+15	2.32E+15	8.64E+14	6.04E+14	5.21E+14	4.57E+14	4.02E+14
3.00E-02	1.10E+17	2.53E+16	3.64E+15	2.63E+15	1.78E+15	9.82E+14	3.77E+14	2.67E+14	2.30E+14	2.02E+14	1.79E+14
5.50E-02	5.91E+16	8.85E+15	1.93E+15	1.47E+15	1.00E+15	5.56E+14	2.07E+14	1.40E+14	1.17E+14	1.00E+14	8.65E+13
8.50E-02	4.04E+16	7.55E+15	1.18E+15	9.05E+14	6.19E+14	3.34E+14	1.15E+14	7.43E+13	6.17E+13	5.29E+13	4.60E+13
1.20E-01	3.30E+16	7.05E+15	1.38E+15	1.09E+15	7.45E+14	3.89E+14	1.25E+14	7.71E+13	5.97E+13	4.78E+13	3.91E+13
1.70E-01	5.28E+16	8.40E+15	1.18E+15	6.41E+14	3.98E+14	2.10E+14	6.70E+13	4.43E+13	3.83E+13	3.36E+13	2.96E+13
3.00E-01	1.13E+17	1.75E+16	9.06E+14	6.83E+14	4.64E+14	2.44E+14	7.54E+13	4.89E+13	4.17E+13	3.61E+13	3.15E+13
6.50E-01	2.34E+17	6.50E+16	1.59E+16	9.47E+15	5.50E+15	3.71E+15	1.90E+15	1.08E+15	8.44E+14	7.27E+14	6.40E+14
1.13E+00	7.34E+16	5.22E+15	3.27E+14	2.60E+14	2.09E+14	1.51E+14	8.36E+13	4.91E+13	3.23E+13	2.19E+13	1.50E+13
1.58E+00	3.77E+16	8.82E+15	1.65E+14	8.66E+13	6.54E+13	4.02E+13	1.30E+13	3.66E+12	1.67E+12	1.02E+12	6.99E+11
2.00E+00	1.12E+16	6.29E+14	5.37E+13	3.84E+13	2.49E+13	1.06E+13	8.55E+11	3.26E+10	1.61E+10	1.39E+10	1.22E+10
2.40E+00	8.85E+15	4.27E+14	6.96E+12	2.96E+12	2.06E+12	1.02E+12	1.28E+11	4.12E+09	1.44E+08	1.23E+07	7.10E+06
2.80E+00	3.71E+15	6.80E+12	5.99E+11	4.67E+11	3.30E+11	1.65E+11	2.10E+10	6.87E+08	2.27E+07	7.51E+05	2.49E+04
3.25E+00	1.82E+15	2.48E+12	1.10E+11	7.60E+10	5.39E+10	2.73E+10	3.54E+09	1.17E+08	3.89E+06	1.29E+05	4.28E+03
3.75E+00	8.35E+14	1.27E+10	3.97E+07	3.34E+07	2.38E+07	1.20E+07	1.56E+06	5.17E+04	1.71E+03	5.69E+01	1.89E+00
4.25E+00	7.87E+14	1.71E+09	1.13E-05	1.14E-05	1.15E-05	1.16E-05	1.19E-05	1.21E-05	1.22E-05	1.22E-05	1.22E-05
4.75E+00	2.33E+14	1.27E+10	5.68E-06	5.71E-06	5.76E-06	5.84E-06	5.99E-06	6.08E-06	6.11E-06	6.11E-06	6.11E-06
5.50E+00	1.81E+14	8.12E+07	4.21E-06	4.24E-06	4.27E-06	4.33E-06	4.44E-06	4.51E-06	4.53E-06	4.53E-06	4.54E-06
0 total	1.03E+18	1.87E+17	3.51E+16	2.35E+16	1.50E+16	8.95E+15	3.83E+15	2.39E+15	1.95E+15	1.68E+15	1.47E+15
0 mev/sec	4.22E+17	7.41E+16	1.21E+16	7.42E+15	4.47E+15	2.94E+15	1.44E+15	8.21E+14	6.38E+14	5.42E+14	4.71E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.73E+08	7.44E+07	1.95E+07	1.44E+07	9.68E+06	5.33E+06	1.99E+06	1.39E+06	1.20E+06	1.05E+06	9.25E+05
3.00E-02	7.61E+08	1.75E+08	2.51E+07	1.81E+07	1.23E+07	6.78E+06	2.60E+06	1.84E+06	1.59E+06	1.40E+06	1.23E+06
5.50E-02	7.47E+08	1.12E+08	2.44E+07	1.85E+07	1.27E+07	7.03E+06	2.62E+06	1.77E+06	1.48E+06	1.27E+06	1.09E+06
8.50E-02	7.89E+08	1.48E+08	2.30E+07	1.77E+07	1.21E+07	6.53E+06	2.24E+06	1.45E+06	1.21E+06	1.03E+06	8.98E+05
1.20E-01	9.11E+08	1.94E+08	3.80E+07	3.01E+07	2.06E+07	1.07E+07	3.45E+06	2.13E+06	1.65E+06	1.32E+06	1.08E+06
1.70E-01	2.06E+09	3.28E+08	4.61E+07	2.51E+07	1.56E+07	8.22E+06	2.62E+06	1.73E+06	1.50E+06	1.31E+06	1.16E+06

	3.00E-01	7.81E+09	1.21E+09	6.25E+07	4.71E+07	3.20E+07	1.68E+07	5.20E+06	3.37E+06	2.87E+06	2.49E+06	2.17E+06
	6.50E-01	3.49E+10	9.72E+09	2.37E+09	1.42E+09	8.22E+08	5.55E+08	2.84E+08	1.61E+08	1.26E+08	1.09E+08	9.56E+07
	1.13E+00	1.90E+10	1.35E+09	8.47E+07	6.73E+07	5.41E+07	3.91E+07	2.16E+07	1.27E+07	8.36E+06	5.66E+06	3.87E+06
	1.58E+00	1.37E+10	3.19E+09	5.98E+07	3.14E+07	2.37E+07	1.46E+07	4.71E+06	1.32E+06	6.04E+05	3.68E+05	2.53E+05
	2.00E+00	5.14E+09	2.89E+08	2.47E+07	1.77E+07	1.14E+07	4.86E+06	3.93E+05	1.50E+04	7.42E+03	6.38E+03	5.60E+03
	2.40E+00	4.88E+09	2.36E+08	3.84E+06	1.63E+06	1.14E+06	5.65E+05	7.04E+04	2.27E+03	7.93E+01	6.80E+00	3.92E+00
	2.80E+00	2.39E+09	4.38E+06	3.85E+05	3.01E+05	2.12E+05	1.06E+05	1.35E+04	4.43E+02	1.46E+01	4.83E-01	1.60E-02
	3.25E+00	1.36E+09	1.85E+06	8.18E+04	5.68E+04	4.03E+04	2.04E+04	2.64E+03	8.76E+01	2.91E+00	9.64E-02	3.20E-03
	3.75E+00	7.20E+08	1.09E+04	3.43E+01	2.88E+01	2.05E+01	1.04E+01	1.34E+00	4.46E-02	1.48E-03	4.90E-05	1.63E-06
	4.25E+00	7.68E+08	1.67E+03	1.11E-11	1.11E-11	1.12E-11	1.14E-11	1.17E-11	1.18E-11	1.19E-11	1.19E-11	1.19E-11
	4.75E+00	2.55E+08	1.39E+04	6.20E-12	6.23E-12	6.29E-12	6.38E-12	6.54E-12	6.64E-12	6.67E-12	6.67E-12	6.68E-12
	5.50E+00	2.28E+08	1.03E+02	5.33E-12	5.35E-12	5.40E-12	5.48E-12	5.62E-12	5.70E-12	5.73E-12	5.73E-12	5.74E-12
0	total	9.70E+10	1.70E+10	2.78E+09	1.70E+09	1.03E+09	6.76E+08	3.31E+08	1.89E+08	1.47E+08	1.25E+08	1.08E+08
0	gamma watts	6.76E+04	1.19E+04	1.94E+03	1.19E+03	7.16E+02	4.71E+02	2.31E+02	1.32E+02	1.02E+02	8.68E+01	7.55E+01

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0 principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 91	1.66E+15	1.65E+15	5.74E+14	1.92E+14	2.20E+13	2.91E+11	6.69E+05	2.69E-04	1.08E-13	4.33E-23	.00E+00
mo 99	2.25E+15	1.75E+15	3.11E+05	2.28E-05	2.17E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	2.95E+15	2.83E+15	2.40E+15	2.02E+15	1.44E+15	7.27E+14	9.42E+13	3.12E+12	1.04E+11	3.44E+09	1.14E+08
ba140	1.91E+15	1.81E+15	1.44E+13	9.44E+10	4.59E+06	1.10E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.54E+15	2.47E+15	2.07E+13	1.36E+11	6.61E+06	1.58E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.12E+15	4.09E+15	3.30E+15	2.63E+15	1.69E+15	6.94E+14	4.83E+13	5.68E+11	6.69E+09	7.87E+07	9.26E+05

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.23E+15	3.43E+15	2.05E+07	5.82E-02	7.58E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.34E+15	4.20E+15	3.65E+10	1.78E+05	5.74E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.60E+15	1.51E+15	1.20E+13	7.87E+10	3.83E+06	9.17E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.46E+15	1.43E+15	2.15E+14	2.98E+13	6.06E+11	2.51E+08	1.78E-02	2.16E-19	.00E+00	.00E+00	.00E+00
ce143	4.76E+15	2.90E+15	9.49E-05	5.33E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.36E+15	1.35E+15	1.09E+15	8.71E+14	5.59E+14	2.30E+14	1.60E+13	1.88E+11	2.21E+09	2.60E+07	3.07E+05
nd147	1.44E+15	1.35E+15	4.90E+12	1.43E+10	1.39E+05	1.35E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.85E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.97E+14	6.70E+14	5.68E+14	4.78E+14	3.40E+14	1.72E+14	2.23E+13	7.39E+11	2.45E+10	8.13E+08	2.70E+07
te132	8.16E+14	6.60E+14	3.95E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.36E+14	5.21E+14	4.37E+12	2.87E+10	1.39E+06	3.34E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.36E+15	8.25E+14	2.70E-05	1.52E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.58E+14	9.51E+14	7.66E+14	6.12E+14	3.92E+14	1.61E+14	1.12E+13	1.32E+11	1.55E+09	1.83E+07	2.15E+05
sm153	1.48E+15	1.03E+15	1.32E+01	4.78E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.55E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.14E+14	3.98E+14	3.37E+14	2.84E+14	2.02E+14	1.02E+14	1.32E+13	4.39E+11	1.46E+10	4.83E+08	1.60E+07
xe133	3.07E+15	2.97E+15	2.58E+10	1.26E+05	4.06E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.64E+14	5.60E+14	4.51E+14	3.60E+14	2.31E+14	9.49E+13	6.60E+12	7.77E+10	9.14E+08	1.08E+07	1.27E+05
nd147	8.93E+14	8.39E+14	3.05E+12	8.87E+09	8.66E+04	8.40E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.05E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.66E+15	3.11E+15	5.56E+05	4.08E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ce144	7.20E+14	7.19E+14	5.79E+14	4.62E+14	2.96E+14	1.22E+14	8.48E+12	9.98E+10	1.17E+09	1.38E+07	1.63E+05
pr144	4.03E+14	4.01E+14	3.23E+14	2.58E+14	1.65E+14	6.79E+13	4.72E+12	5.56E+10	6.54E+08	7.70E+06	9.06E+04
sm153	7.05E+14	4.92E+14	6.28E+00	2.27E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.40E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.92E+14	6.16E+14	1.09E+05	8.03E-06	7.65E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.59E+15	2.20E+15	3.93E+05	2.88E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.77E+14	4.51E+14	3.58E+12	2.35E+10	1.14E+06	2.74E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.88E+15	2.84E+15	4.25E+14	5.91E+13	1.20E+12	4.96E+08	3.52E-02	4.27E-19	.00E+00	.00E+00	.00E+00
pr144	4.26E+14	4.24E+14	3.41E+14	2.72E+14	1.75E+14	7.18E+13	5.00E+12	5.88E+10	6.92E+08	8.14E+06	9.58E+04

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.31E+15	9.41E+14	6.19E-04	7.82E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.51E+15	4.21E+15	2.01E+12	6.91E+08	9.94E+01	2.10E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.13E+15	3.34E+15	2.00E+07	5.67E-02	7.39E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.41E+15	1.74E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.90E+15	1.84E+15	1.55E+13	1.01E+11	4.93E+06	1.18E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.14E+15	1.91E+15	6.25E-05	3.51E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.50E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.84E+15	7.76E+15	2.96E+15	1.09E+15	1.50E+14	2.88E+12	2.03E+07	5.24E-02	1.35E-10	3.49E-19	9.62E-28
nb 95	8.17E+15	8.17E+15	5.12E+15	2.22E+15	3.36E+14	6.78E+12	4.63E+07	1.20E-01	3.09E-10	7.98E-19	.00E+00
ru103	5.45E+15	5.35E+15	1.11E+15	2.17E+14	8.62E+12	1.36E+10	5.41E+01	5.36E-13	5.31E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.09E+07	2.30E-01	2.99E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.36E+15	3.39E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.26E+15	4.26E+15	3.92E+15	3.60E+15	3.04E+15	2.18E+15	7.94E+14	1.48E+14	2.75E+13	5.13E+12	9.54E+11
la140	6.08E+15	5.91E+15	4.96E+13	3.25E+11	1.58E+07	3.79E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec
mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.22E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 91	1.64E+15	2.87E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.80E+15	1.47E+15	8.80E+06	2.50E-02	3.26E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	6.02E+15	4.79E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	4.93E+14	4.68E+14	4.31E+12	3.30E+10	2.18E+06	9.61E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.63E+14	6.44E+14	5.40E+12	3.54E+10	1.72E+06	4.13E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	7.33E+14	7.01E+14	1.21E+13	1.77E+11	4.22E+07	2.42E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec
mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.82E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.81E+14	5.56E+14	3.33E+06	9.45E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.86E+15	7.63E+15	6.41E+13	4.20E+11	2.04E+07	4.90E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec
mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.29E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.75E+14	1.43E+14	8.54E+05	2.43E-03	3.16E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.48E+14	3.56E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.26E+13	5.22E+13	4.21E+13	3.36E+13	2.15E+13	8.86E+12	6.16E+11	7.25E+09	8.54E+07	1.00E+06	1.18E+04
eu156	3.58E+14	3.43E+14	5.90E+12	8.66E+10	2.06E+07	1.18E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec
mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.27E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.72E+14	3.62E+14	3.04E+12	1.99E+10	9.68E+05	2.32E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	2.54E+13	2.43E+13	4.19E+11	6.14E+09	1.46E+06	8.41E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec
mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.80E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.43E+11	6.19E+11	5.24E+11	4.41E+11	3.14E+11	1.59E+11	2.06E+10	6.82E+08	2.26E+07	7.50E+05	2.49E+04
ag112	1.21E+12	6.41E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.22E+12	5.07E+12	4.26E+10	2.79E+08	1.36E+04	3.25E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 14, photons/sec
mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.48E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.38E+12	2.31E+12	1.94E+10	1.27E+08	6.19E+03	1.48E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec
mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.97E+12	9.22E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.73E+14	3.39E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.71E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.52E+11	1.71E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.27E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	4.09E+12	1.27E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (8.12E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.62E+10	8.12E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Top - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -
0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.34E+17	6.98E+16	8.98E+13	6.65E+13	4.10E+13	2.39E+13	1.95E+13	1.95E+13	1.94E+13	1.92E+13	1.89E+13
3.00E-02	8.40E+15	1.44E+15	9.19E+10	8.61E+10	1.08E+11	1.52E+11	2.69E+11	4.28E+11	5.51E+11	6.47E+11	7.20E+11
5.50E-02	1.22E+16	3.93E+15	1.50E+12	1.42E+12	1.77E+12	2.48E+12	4.49E+12	7.24E+12	9.37E+12	1.10E+13	1.23E+13
8.50E-02	5.29E+16	7.66E+15	4.64E+11	2.71E+11	2.71E+11	2.70E+11	2.68E+11	2.65E+11	2.62E+11	2.60E+11	2.57E+11
1.20E-01	5.37E+16	3.92E+16	4.97E+11	3.65E+11	3.60E+11	3.54E+11	3.44E+11	3.28E+11	3.15E+11	3.03E+11	2.92E+11
1.70E-01	1.77E+15	2.90E+14	2.01E+10	7.25E+09	5.20E+09	3.82E+09	3.41E+09	3.34E+09	3.27E+09	3.21E+09	3.16E+09
3.00E-01	2.85E+16	2.06E+16	3.07E+11	1.99E+11	1.97E+11	1.95E+11	1.88E+11	1.77E+11	1.67E+11	1.59E+11	1.51E+11
6.50E-01	1.55E+15	5.08E+13	2.04E+09	1.65E+09	1.24E+09	1.01E+09	1.14E+09	1.33E+09	1.38E+09	1.38E+09	1.35E+09
1.13E+00	1.84E+15	1.16E+15	7.21E+08	6.79E+08	6.31E+08	5.96E+08	5.73E+08	5.48E+08	5.23E+08	4.99E+08	4.78E+08
1.58E+00	1.31E+08	1.26E+08	1.11E+08	1.02E+08	9.12E+07	8.58E+07	8.96E+07	9.08E+07	8.55E+07	7.83E+07	7.11E+07
2.00E+00	1.66E+06	1.03E+06	9.92E+05	1.02E+06	1.08E+06	1.20E+06	1.54E+06	1.84E+06	1.91E+06	1.90E+06	1.86E+06
2.40E+00	5.65E+07	5.65E+07	4.92E+07	4.39E+07	3.78E+07	3.28E+07	2.83E+07	2.34E+07	1.94E+07	1.61E+07	1.34E+07
2.80E+00	1.03E+08	1.04E+08	1.07E+08	1.14E+08	1.31E+08	1.72E+08	2.87E+08	3.88E+08	4.12E+08	4.05E+08	3.89E+08

	3.25E+00	2.02E+07	2.02E+07	1.76E+07	1.57E+07	1.35E+07	1.18E+07	1.02E+07	8.40E+06	6.97E+06	5.78E+06	4.80E+06
	3.75E+00	1.17E+07	1.17E+07	1.02E+07	9.12E+06	7.84E+06	6.81E+06	5.89E+06	4.87E+06	4.04E+06	3.35E+06	2.79E+06
	4.25E+00	6.79E+06	6.79E+06	5.92E+06	5.29E+06	4.55E+06	3.95E+06	3.41E+06	2.82E+06	2.34E+06	1.94E+06	1.61E+06
	4.75E+00	3.94E+06	3.94E+06	3.43E+06	3.07E+06	2.64E+06	2.29E+06	1.98E+06	1.64E+06	1.36E+06	1.13E+06	9.36E+05
	5.50E+00	3.56E+06	3.56E+06	3.10E+06	2.77E+06	2.38E+06	2.07E+06	1.79E+06	1.48E+06	1.23E+06	1.02E+06	8.47E+05
0	total	2.95E+17	1.44E+17	9.27E+13	6.89E+13	4.37E+13	2.74E+13	2.50E+13	2.79E+13	3.00E+13	3.16E+13	3.26E+13
0	mev/sec	2.51E+16	1.39E+16	1.18E+12	8.77E+11	6.39E+11	5.07E+11	5.73E+11	7.24E+11	8.39E+11	9.27E+11	9.92E+11

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.07E+08	1.60E+08	2.06E+05	1.53E+05	9.43E+04	5.50E+04	4.48E+04	4.48E+04	4.45E+04	4.41E+04	4.36E+04
3.00E-02	5.80E+07	9.92E+06	6.34E+02	5.94E+02	7.48E+02	1.05E+03	1.85E+03	2.95E+03	3.80E+03	4.46E+03	4.96E+03
5.50E-02	1.54E+08	4.97E+07	1.89E+04	1.80E+04	2.24E+04	3.14E+04	5.68E+04	9.16E+04	1.18E+05	1.39E+05	1.55E+05
8.50E-02	1.03E+09	1.50E+08	9.06E+03	5.29E+03	5.29E+03	5.27E+03	5.24E+03	5.18E+03	5.13E+03	5.08E+03	5.03E+03
1.20E-01	1.48E+09	1.08E+09	1.37E+04	1.01E+04	9.93E+03	9.78E+03	9.48E+03	9.06E+03	8.68E+03	8.35E+03	8.04E+03
1.70E-01	6.94E+07	1.13E+07	7.86E+02	2.83E+02	2.03E+02	1.49E+02	1.33E+02	1.30E+02	1.28E+02	1.26E+02	1.24E+02
3.00E-01	1.97E+09	1.42E+09	2.12E+04	1.37E+04	1.36E+04	1.34E+04	1.29E+04	1.22E+04	1.15E+04	1.10E+04	1.04E+04
6.50E-01	2.32E+08	7.59E+06	3.04E+02	2.47E+02	1.85E+02	1.51E+02	1.71E+02	1.99E+02	2.07E+02	2.06E+02	2.02E+02
1.13E+00	4.75E+08	3.01E+08	1.86E+02	1.76E+02	1.63E+02	1.54E+02	1.48E+02	1.42E+02	1.35E+02	1.29E+02	1.24E+02
1.58E+00	4.76E+01	4.56E+01	4.03E+01	3.68E+01	3.30E+01	3.11E+01	3.24E+01	3.29E+01	3.10E+01	2.83E+01	2.58E+01
2.00E+00	7.61E-01	4.72E-01	4.56E-01	4.69E-01	4.96E-01	5.54E-01	7.09E-01	8.44E-01	8.79E-01	8.73E-01	8.55E-01
2.40E+00	3.12E+01	3.12E+01	2.71E+01	2.42E+01	2.08E+01	1.81E+01	1.56E+01	1.29E+01	1.07E+01	8.90E+00	7.40E+00
2.80E+00	6.62E+01	6.71E+01	6.91E+01	7.33E+01	8.43E+01	1.11E+02	1.85E+02	2.50E+02	2.65E+02	2.61E+02	2.50E+02
3.25E+00	1.51E+01	1.51E+01	1.32E+01	1.18E+01	1.01E+01	8.78E+00	7.59E+00	6.28E+00	5.20E+00	4.32E+00	3.59E+00
3.75E+00	1.01E+01	1.01E+01	8.81E+00	7.86E+00	6.76E+00	5.87E+00	5.08E+00	4.20E+00	3.48E+00	2.89E+00	2.40E+00
4.25E+00	6.64E+00	6.64E+00	5.78E+00	5.17E+00	4.44E+00	3.86E+00	3.34E+00	2.76E+00	2.29E+00	1.90E+00	1.58E+00
4.75E+00	4.30E+00	4.30E+00	3.75E+00	3.35E+00	2.88E+00	2.50E+00	2.16E+00	1.79E+00	1.48E+00	1.23E+00	1.02E+00
5.50E+00	4.50E+00	4.50E+00	3.92E+00	3.51E+00	3.01E+00	2.62E+00	2.26E+00	1.87E+00	1.55E+00	1.29E+00	1.07E+00
0 total	5.78E+09	3.19E+09	2.71E+05	2.02E+05	1.47E+05	1.17E+05	1.32E+05	1.66E+05	1.93E+05	2.13E+05	2.28E+05
0 gamma watts	4.03E+03	2.23E+03	1.89E-01	1.41E-01	1.02E-01	8.13E-02	9.19E-02	1.16E-01	1.35E-01	1.49E-01	1.59E-01

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1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - top ds3 - discharge
0 1.00 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02	to 5.0000E-02	6.4238E+11	1.9271E+10
5.0000E-02	to 1.0000E-01	1.3653E+11	1.0240E+10
1.0000E-01	to 2.0000E-01	2.4313E+11	3.6470E+10
2.0000E-01	to 3.0000E-01	3.7609E+10	9.4022E+09
3.0000E-01	to 4.0000E-01	7.0557E+11	2.4695E+11
4.0000E-01	to 6.0000E-01	7.2721E+11	3.6361E+11
6.0000E-01	to 8.0000E-01	2.9758E+12	2.0831E+12
8.0000E-01	to 1.0000E+00	2.3832E+12	2.1449E+12
1.0000E+00	to 1.3300E+00	4.1838E+12	4.8741E+12
1.3300E+00	to 1.6600E+00	1.1807E+12	1.7652E+12
1.6600E+00	to 2.0000E+00	2.4351E+10	4.4562E+10
2.0000E+00	to 2.5000E+00	2.8444E+09	6.3999E+09
2.5000E+00	to 3.0000E+00	5.7908E+08	1.5925E+09
3.0000E+00	to 4.0000E+00	3.3382E+07	1.1684E+08
4.0000E+00	to 5.0000E+00	1.5161E+03	6.8223E+03
5.0000E+00	to 6.5000E+00	.0000E+00	.0000E+00

	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.3244E+13	1.1606E+13

0
0 total energy from nuclides with spectrum data = 1.1592E+13
0 total energy from nuclides with no spectrum data = 1.3633E+10
1 gamma source spectrum for decay step for BWR source term - top ds3 - 0.25 year
0 90.00 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	1.9851E+11	5.9554E+09
	5.0000E-02 to	1.0000E-01	2.8676E+10	2.1507E+09
	1.0000E-01 to	2.0000E-01	1.6045E+10	2.4068E+09
	2.0000E-01 to	3.0000E-01	4.1871E+09	1.0468E+09
	3.0000E-01 to	4.0000E-01	7.5142E+10	2.6300E+10
	4.0000E-01 to	6.0000E-01	2.8316E+11	1.4158E+11
	6.0000E-01 to	8.0000E-01	9.9096E+11	6.9367E+11
	8.0000E-01 to	1.0000E+00	1.1681E+12	1.0513E+12
	1.0000E+00 to	1.3300E+00	4.0235E+12	4.6873E+12
	1.3300E+00 to	1.6600E+00	1.1360E+12	1.6984E+12
	1.6600E+00 to	2.0000E+00	4.2945E+09	7.8590E+09
	2.0000E+00 to	2.5000E+00	4.0088E+07	9.0198E+07
	2.5000E+00 to	3.0000E+00	5.1397E+04	1.4134E+05
	3.0000E+00 to	4.0000E+00	6.9980E-12	2.4493E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		7.9286E+12	8.3181E+12

0
0 total energy from nuclides with spectrum data = 8.3083E+12
0 total energy from nuclides with no spectrum data = 9.7256E+09
1 gamma source spectrum for decay step for BWR source term - top ds3 - 0.50 year
0 182.50 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	1.4851E+11	4.4552E+09
	5.0000E-02 to	1.0000E-01	1.9324E+10	1.4493E+09
	1.0000E-01 to	2.0000E-01	8.7321E+09	1.3098E+09
	2.0000E-01 to	3.0000E-01	1.8854E+09	4.7134E+08
	3.0000E-01 to	4.0000E-01	8.5143E+09	2.9800E+09
	4.0000E-01 to	6.0000E-01	1.2034E+11	6.0170E+10
	6.0000E-01 to	8.0000E-01	4.0722E+11	2.8505E+11
	8.0000E-01 to	1.0000E+00	6.2406E+11	5.6166E+11
	1.0000E+00 to	1.3300E+00	3.8908E+12	4.5327E+12
	1.3300E+00 to	1.6600E+00	1.0987E+12	1.6425E+12
	1.6600E+00 to	2.0000E+00	1.7321E+09	3.1697E+09
	2.0000E+00 to	2.5000E+00	3.0590E+07	6.8828E+07
	2.5000E+00 to	3.0000E+00	4.3734E+04	1.2027E+05
	3.0000E+00 to	4.0000E+00	6.9597E-12	2.4359E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		6.3298E+12	7.0960E+12

0
0 total energy from nuclides with spectrum data = 7.0887E+12
0 total energy from nuclides with no spectrum data = 7.2623E+09
1 gamma source spectrum for decay step for BWR source term - top ds3 - 1 year
0 365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.0755E+11	3.2264E+09
5.0000E-02	to	1.0000E-01	1.3572E+10	1.0179E+09
1.0000E-01	to	2.0000E-01	5.2993E+09	7.9489E+08
2.0000E-01	to	3.0000E-01	5.5314E+08	1.3829E+08
3.0000E-01	to	4.0000E-01	7.8044E+08	2.7316E+08
4.0000E-01	to	6.0000E-01	2.7346E+10	1.3673E+10
6.0000E-01	to	8.0000E-01	6.3639E+10	4.4548E+10
8.0000E-01	to	1.0000E+00	2.5455E+11	2.2909E+11
1.0000E+00	to	1.3300E+00	3.6419E+12	4.2428E+12
1.3300E+00	to	1.6600E+00	1.0284E+12	1.5375E+12
1.6600E+00	to	2.0000E+00	2.8850E+08	5.2795E+08
2.0000E+00	to	2.5000E+00	2.4957E+07	5.6153E+07
2.5000E+00	to	3.0000E+00	3.8247E+04	1.0518E+05
3.0000E+00	to	4.0000E+00	6.8851E-12	2.4098E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			5.1439E+12	6.0736E+12

total energy from nuclides with spectrum data = 6.0688E+12
total energy from nuclides with no spectrum data = 4.7976E+09
gamma source spectrum for decay step for BWR source term - top ds3 - 2 year
730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	7.7436E+10	2.3231E+09
5.0000E-02	to	1.0000E-01	1.1061E+10	8.2958E+08
1.0000E-01	to	2.0000E-01	3.9654E+09	5.9481E+08
2.0000E-01	to	3.0000E-01	2.2494E+08	5.6234E+07
3.0000E-01	to	4.0000E-01	4.8443E+08	1.6955E+08
4.0000E-01	to	6.0000E-01	7.4052E+09	3.7026E+09
6.0000E-01	to	8.0000E-01	4.7844E+09	3.3491E+09
8.0000E-01	to	1.0000E+00	9.0634E+10	8.1571E+10
1.0000E+00	to	1.3300E+00	3.1923E+12	3.7191E+12
1.3300E+00	to	1.6600E+00	9.0151E+11	1.3478E+12
1.6600E+00	to	2.0000E+00	8.0604E+06	1.4750E+07
2.0000E+00	to	2.5000E+00	2.1402E+07	4.8155E+07
2.5000E+00	to	3.0000E+00	3.3180E+04	9.1244E+04
3.0000E+00	to	4.0000E+00	6.7402E-12	2.3591E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			4.2898E+12	5.1595E+12

total energy from nuclides with spectrum data = 5.1564E+12
total energy from nuclides with no spectrum data = 3.0774E+09
gamma source spectrum for decay step for BWR source term - top ds3 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	4.3579E+10	1.3074E+09
5.0000E-02	to	1.0000E-01	7.4069E+09	5.5552E+08
1.0000E-01	to	2.0000E-01	2.3870E+09	3.5804E+08
2.0000E-01	to	3.0000E-01	1.2472E+08	3.1179E+07
3.0000E-01	to	4.0000E-01	2.5990E+08	9.0964E+07
4.0000E-01	to	6.0000E-01	3.2158E+09	1.6079E+09

	6.0000E-01 to	8.0000E-01	1.7143E+09	1.2000E+09
	8.0000E-01 to	1.0000E+00	7.9464E+09	7.1517E+09
	1.0000E+00 to	1.3300E+00	2.1510E+12	2.5060E+12
	1.3300E+00 to	1.6600E+00	6.0745E+11	9.0814E+11
	1.6600E+00 to	2.0000E+00	1.8444E+02	3.3752E+02
	2.0000E+00 to	2.5000E+00	1.4416E+07	3.2435E+07
	2.5000E+00 to	3.0000E+00	2.2353E+04	6.1471E+04
	3.0000E+00 to	4.0000E+00	6.3261E-12	2.2141E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		2.8251E+12	3.4264E+12

0
0 total energy from nuclides with spectrum data = 3.4250E+12
0 total energy from nuclides with no spectrum data = 1.3890E+09
1 gamma source spectrum for decay step for BWR source term - top ds3 - 10 year
0 3652.50 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	2.1012E+10	6.3035E+08
5.0000E-02 to	1.0000E-01	3.8273E+09	2.8705E+08
1.0000E-01 to	2.0000E-01	1.0920E+09	1.6380E+08
2.0000E-01 to	3.0000E-01	5.5971E+07	1.3993E+07
3.0000E-01 to	4.0000E-01	1.0046E+08	3.5161E+07
4.0000E-01 to	6.0000E-01	9.0506E+08	4.5253E+08
6.0000E-01 to	8.0000E-01	5.1857E+08	3.6300E+08
8.0000E-01 to	1.0000E+00	2.3363E+08	2.1027E+08
1.0000E+00 to	1.3300E+00	1.1142E+12	1.2980E+12
1.3300E+00 to	1.6600E+00	3.1464E+11	4.7038E+11
1.6600E+00 to	2.0000E+00	5.2236E+00	9.5591E+00
2.0000E+00 to	2.5000E+00	7.4668E+06	1.6800E+07
2.5000E+00 to	3.0000E+00	1.1578E+04	3.1840E+04
3.0000E+00 to	4.0000E+00	5.6924E-12	1.9923E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		1.4565E+12	1.7705E+12

0
0 total energy from nuclides with spectrum data = 1.7701E+12
0 total energy from nuclides with no spectrum data = 3.9338E+08
1 gamma source spectrum for decay step for BWR source term - top ds3 - 15 year
0 5478.75 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	1.0634E+10	3.1901E+08
5.0000E-02 to	1.0000E-01	1.9804E+09	1.4853E+08
1.0000E-01 to	2.0000E-01	5.2518E+08	7.8777E+07
2.0000E-01 to	3.0000E-01	2.6582E+07	6.6456E+06
3.0000E-01 to	4.0000E-01	4.2445E+07	1.4856E+07
4.0000E-01 to	6.0000E-01	2.5516E+08	1.2758E+08
6.0000E-01 to	8.0000E-01	1.8238E+08	1.2767E+08
8.0000E-01 to	1.0000E+00	7.6855E+07	6.9170E+07
1.0000E+00 to	1.3300E+00	5.7714E+11	6.7236E+11
1.3300E+00 to	1.6600E+00	1.6298E+11	2.4366E+11
1.6600E+00 to	2.0000E+00	4.6180E+00	8.4509E+00
2.0000E+00 to	2.5000E+00	3.8678E+06	8.7026E+06
2.5000E+00 to	3.0000E+00	5.9975E+03	1.6493E+04
3.0000E+00 to	4.0000E+00	5.1226E-12	1.7929E-11

	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		7.5385E+11	9.1693E+11

0
0 total energy from nuclides with spectrum data = 9.1681E+11
0 total energy from nuclides with no spectrum data = 1.1369E+08
1 gamma source spectrum for decay step for BWR source term - top ds3 - 20 year
0 7305.00 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	5.5209E+09	1.6563E+08
5.0000E-02 to	1.0000E-01	1.0256E+09	7.6921E+07
1.0000E-01 to	2.0000E-01	2.6077E+08	3.9115E+07
2.0000E-01 to	3.0000E-01	1.3103E+07	3.2759E+06
3.0000E-01 to	4.0000E-01	1.9294E+07	6.7530E+06
4.0000E-01 to	6.0000E-01	7.2153E+07	3.6077E+07
6.0000E-01 to	8.0000E-01	8.7782E+07	6.1447E+07
8.0000E-01 to	1.0000E+00	6.2150E+07	5.5935E+07
1.0000E+00 to	1.3300E+00	2.9897E+11	3.4831E+11
1.3300E+00 to	1.6600E+00	8.4430E+10	1.2622E+11
1.6600E+00 to	2.0000E+00	4.0828E+00	7.4715E+00
2.0000E+00 to	2.5000E+00	2.0037E+06	4.5082E+06
2.5000E+00 to	3.0000E+00	3.1069E+03	8.5439E+03
3.0000E+00 to	4.0000E+00	4.6100E-12	1.6135E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		3.9047E+11	4.7498E+11

0
0 total energy from nuclides with spectrum data = 4.7494E+11
0 total energy from nuclides with no spectrum data = 3.5096E+07
1 gamma source spectrum for decay step for BWR source term - top ds3 - 25 year
0 9131.25 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	2.9403E+09	8.8210E+07
5.0000E-02 to	1.0000E-01	5.3151E+08	3.9863E+07
1.0000E-01 to	2.0000E-01	1.3199E+08	1.9799E+07
2.0000E-01 to	3.0000E-01	6.6109E+06	1.6527E+06
3.0000E-01 to	4.0000E-01	9.2404E+06	3.2341E+06
4.0000E-01 to	6.0000E-01	2.0514E+07	1.0257E+07
6.0000E-01 to	8.0000E-01	6.1119E+07	4.2784E+07
8.0000E-01 to	1.0000E+00	5.5682E+07	5.0114E+07
1.0000E+00 to	1.3300E+00	1.5488E+11	1.8044E+11
1.3300E+00 to	1.6600E+00	4.3739E+10	6.5389E+10
1.6600E+00 to	2.0000E+00	3.6098E+00	6.6059E+00
2.0000E+00 to	2.5000E+00	1.0380E+06	2.3355E+06
2.5000E+00 to	3.0000E+00	1.6095E+03	4.4261E+03
3.0000E+00 to	4.0000E+00	4.1489E-12	1.4521E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		2.0238E+11	2.4609E+11

0
0 total energy from nuclides with spectrum data = 2.4607E+11
0 total energy from nuclides with no spectrum data = 1.3011E+07

```
1
1  * normal termination of execution *
0                                        table of contents for material tables
0                                          case or subcase printed      page

                                                     1                  1
0ndset          33
          33          4          1         27          6          0          0          0          0          0
           0          0          0          0          0          2         -1       1698        690        130
         880       7935          0          5         99          7          9         93         18         18
          18          0          0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     18 entries read
0   74* array     18 entries read
0   75$ array     18 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
           0          0          0          0          0          0          0          0          0          0
           0          0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
        7935         20          6         18       1697
0mmn            19
          10         10          0          0          1          3          0          0          0          0
          21        100         18          4          3          0          2          1          0
0tconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero           4
           0        689        129        879
0pow             3
   .000000E+00  .000000E+00  .000000E+00
0 linp           9
           6          0         51         26          2       3000       1000       1697          5
 n-gamma, fission and total mev/fission =          3.4627E+00     1.9421E+02     1.9768E+02
 start of interval flux =        1.59016E+13
 n-gamma, fission and total mev/fission =          3.8360E+00     1.9431E+02     1.9815E+02
 start of interval flux =        1.59426E+13
 n-gamma, fission and total mev/fission =          3.9259E+00     1.9441E+02     1.9834E+02
 start of interval flux =        1.59938E+13
 n-gamma, fission and total mev/fission =          4.0149E+00     1.9451E+02     1.9852E+02
 start of interval flux =        1.60555E+13
 n-gamma, fission and total mev/fission =          4.1065E+00     1.9460E+02     1.9870E+02
 start of interval flux =        1.61265E+13
 n-gamma, fission and total mev/fission =          4.2006E+00     1.9469E+02     1.9889E+02
 start of interval flux =        1.62057E+13
```

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 n-gamma, fission and total mev/fission =              4.2968E+00       1.9477E+02       1.9907E+02
 start of interval flux =         1.62923E+13
 n-gamma, fission and total mev/fission =              4.3948E+00       1.9486E+02       1.9925E+02
 start of interval flux =         1.63857E+13
 n-gamma, fission and total mev/fission =              4.4943E+00       1.9494E+02       1.9943E+02
 start of interval flux =         1.64852E+13
 n-gamma, fission and total mev/fission =              4.5951E+00       1.9502E+02       1.9961E+02
 start of interval flux =         1.65904E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
0ndset          33
           33           4           2          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 1.799989E+03 1.624725E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              4.6628E+00       1.9507E+02       1.9973E+02
 start of interval flux =         1.65420E+13
 n-gamma, fission and total mev/fission =              4.7541E+00       1.9515E+02       1.9990E+02
 start of interval flux =         1.66661E+13
 n-gamma, fission and total mev/fission =              4.8521E+00       1.9522E+02       2.0007E+02
 start of interval flux =         1.67942E+13
 n-gamma, fission and total mev/fission =              4.9519E+00       1.9529E+02       2.0024E+02
 start of interval flux =         1.69267E+13
 n-gamma, fission and total mev/fission =              5.0528E+00       1.9536E+02       2.0042E+02
 start of interval flux =         1.70633E+13
 n-gamma, fission and total mev/fission =              5.1547E+00       1.9544E+02       2.0059E+02
 start of interval flux =         1.72040E+13
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```
 n-gamma, fission and total mev/fission =              5.2576E+00       1.9551E+02       2.0076E+02
 start of interval flux =         1.73484E+13
 n-gamma, fission and total mev/fission =              5.3612E+00       1.9558E+02       2.0094E+02
 start of interval flux =         1.74964E+13
 n-gamma, fission and total mev/fission =              5.4657E+00       1.9565E+02       2.0111E+02
 start of interval flux =         1.76479E+13
 n-gamma, fission and total mev/fission =              5.5710E+00       1.9572E+02       2.0129E+02
 start of interval flux =         1.78028E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
0ndset           33
           33           4           3          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
         7935          20           6          18        1697
0mmn             19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
           21         689         129         879
0pow              3
  4.349999E+00 3.599977E+03 1.723310E+13
0 linp            9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              5.4836E+00       1.9575E+02       2.0124E+02
 start of interval flux =         1.78777E+13
 n-gamma, fission and total mev/fission =              5.5775E+00       1.9582E+02       2.0139E+02
 start of interval flux =         1.80675E+13
 n-gamma, fission and total mev/fission =              5.6848E+00       1.9588E+02       2.0156E+02
 start of interval flux =         1.82599E+13
 n-gamma, fission and total mev/fission =              5.7936E+00       1.9594E+02       2.0174E+02
 start of interval flux =         1.84550E+13
 n-gamma, fission and total mev/fission =              5.9034E+00       1.9601E+02       2.0191E+02
 start of interval flux =         1.86527E+13
 n-gamma, fission and total mev/fission =              6.0141E+00       1.9607E+02       2.0208E+02
 start of interval flux =         1.88530E+13
```

```
 n-gamma, fission and total mev/fission =              6.1257E+00       1.9614E+02       2.0226E+02
 start of interval flux =         1.90558E+13
 n-gamma, fission and total mev/fission =              6.2382E+00       1.9620E+02       2.0244E+02
 start of interval flux =         1.92610E+13
 n-gamma, fission and total mev/fission =              6.3515E+00       1.9627E+02       2.0262E+02
 start of interval flux =         1.94687E+13
 n-gamma, fission and total mev/fission =              6.4657E+00       1.9633E+02       2.0280E+02
 start of interval flux =         1.96787E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
0ndset          33
            33            4            4           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 5.399966E+03 1.888097E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              6.4023E+00       1.9638E+02       2.0278E+02
 start of interval flux =         1.98457E+13
 n-gamma, fission and total mev/fission =              6.5154E+00       1.9644E+02       2.0296E+02
 start of interval flux =         2.00911E+13
 n-gamma, fission and total mev/fission =              6.6364E+00       1.9650E+02       2.0314E+02
 start of interval flux =         2.03382E+13
 n-gamma, fission and total mev/fission =              6.7585E+00       1.9656E+02       2.0332E+02
 start of interval flux =         2.05867E+13
 n-gamma, fission and total mev/fission =              6.8815E+00       1.9663E+02       2.0351E+02
 start of interval flux =         2.08366E+13
 n-gamma, fission and total mev/fission =              7.0052E+00       1.9669E+02       2.0370E+02
 start of interval flux =         2.10878E+13
```

```
 n-gamma, fission and total mev/fission =              7.1297E+00       1.9676E+02       2.0389E+02
 start of interval flux =         2.13404E+13
 n-gamma, fission and total mev/fission =              7.2549E+00       1.9682E+02       2.0408E+02
 start of interval flux =         2.15941E+13
 n-gamma, fission and total mev/fission =              7.3807E+00       1.9689E+02       2.0427E+02
 start of interval flux =         2.18490E+13
 n-gamma, fission and total mev/fission =              7.5071E+00       1.9695E+02       2.0446E+02
 start of interval flux =         2.21049E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
0ndset          33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 7.199954E+03 2.111546E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              7.4483E+00       1.9701E+02       2.0446E+02
 start of interval flux =         2.23562E+13
 n-gamma, fission and total mev/fission =              7.5770E+00       1.9707E+02       2.0465E+02
 start of interval flux =         2.26544E+13
 n-gamma, fission and total mev/fission =              7.7132E+00       1.9713E+02       2.0484E+02
 start of interval flux =         2.29525E+13
 n-gamma, fission and total mev/fission =              7.8499E+00       1.9719E+02       2.0504E+02
 start of interval flux =         2.32498E+13
 n-gamma, fission and total mev/fission =              7.9869E+00       1.9726E+02       2.0524E+02
 start of interval flux =         2.35464E+13
 n-gamma, fission and total mev/fission =              8.1242E+00       1.9732E+02       2.0545E+02
 start of interval flux =         2.38422E+13
```

```
 n-gamma, fission and total mev/fission =              8.2616E+00       1.9739E+02       2.0565E+02
 start of interval flux =         2.41370E+13
 n-gamma, fission and total mev/fission =              8.3992E+00       1.9745E+02       2.0585E+02
 start of interval flux =         2.44308E+13
 n-gamma, fission and total mev/fission =              8.5367E+00       1.9752E+02       2.0606E+02
 start of interval flux =         2.47234E+13
 n-gamma, fission and total mev/fission =              8.6743E+00       1.9759E+02       2.0626E+02
 start of interval flux =         2.50148E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
0ndset           33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn             19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 8.999942E+03 2.386573E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              8.8246E+00       1.9766E+02       2.0648E+02
 start of interval flux =         2.53317E+13
 n-gamma, fission and total mev/fission =              8.9778E+00       1.9773E+02       2.0671E+02
 start of interval flux =         2.56554E+13
 n-gamma, fission and total mev/fission =              9.1316E+00       1.9781E+02       2.0694E+02
 start of interval flux =         2.59770E+13
 n-gamma, fission and total mev/fission =              9.2850E+00       1.9788E+02       2.0717E+02
 start of interval flux =         2.62963E+13
 n-gamma, fission and total mev/fission =              9.4379E+00       1.9796E+02       2.0740E+02
 start of interval flux =         2.66133E+13
 n-gamma, fission and total mev/fission =              9.5903E+00       1.9803E+02       2.0762E+02
 start of interval flux =         2.69278E+13
```

```
 n-gamma, fission and total mev/fission =              9.7420E+00       1.9811E+02       2.0785E+02
 start of interval flux =         2.72394E+13
 n-gamma, fission and total mev/fission =              9.8930E+00       1.9818E+02       2.0807E+02
 start of interval flux =         2.75480E+13
 n-gamma, fission and total mev/fission =              1.0043E+01       1.9825E+02       2.0830E+02
 start of interval flux =         2.78534E+13
 n-gamma, fission and total mev/fission =              1.0192E+01       1.9832E+02       2.0852E+02
 start of interval flux =         2.81554E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 55000 MWd/MTU
0ndset          33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm          4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
         7935          20           6          18        1697
0mmn           19
            0          10           0           0           1           1           0           0           0          10
           21         100           0           4           3           0           2           0           0
0tconst         5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero          4
           21         689         129         879
0pow            3
  4.349999E+00 1.099993E+04 2.082564E+13
0 linp          9
            6           2           0          26           1       14808        1000        1697           5
0 case or subcase    1  BWR SNF Assembly - Top - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                    scale4.2  bulletin  board                                  *
 *                    --------  --------  -----                                  *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*       and expanded decay data and fission product yield libraries.  (mrr     *
*       92-088, 92-025, 92-026)                                                *
*                                                                              *
*       origen-s libraries:  the six standard origen-s card image libraries    *
*       have been replaced by two new libraries, end6dec and xsectpho.         *
*       end6dec contains the updated and expanded decay data library based     *
*       on endf/b-vi data.  xsectpho contains the basic cross section and      *
*       photon spectra data and updated fission product yield data based on    *
*       endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*       002, 003, 006, 008, 009)                                               *
*                                                                              *
*       std. comp. library:  in drr 92-033, the following nuclides were        *
*       changed to turn on resonance processing flag but should not have       *
*       been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*       feinconel.  flags for these nuclides have now been returned to off.    *
*       (drr 93-014)                                                           *
*                                                                              *
*       heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                              *
*       htas1:  updated for compatibility with heating7 and to interact        *
*       effectively with ocular.  fin effectiveness technique was added.       *
*       (mrr 93-036)                                                           *
*                                                                              *
*       ocular:  made compatible with heating7 and htas1 on mainframe and      *
*       workstation.  (mrr 93-037)                                             *
*                                                                              *
*       sas2:  corrected so that 'parm=skipshipdata' would work on             *
*       workstation.  (mrr 93-051)                                             *
*                                                                              *
*       aim:  ft47ft001 is no longer require for aim to execute on             *
*       workstation.  (mrr 93-052)                                             *
*                                                                              *
*       27group, 27burnup, and 218group - these libraries have been            *
*       updated to correct an error found in the chlorine cross-sections.      *
*       (drr93-022)                                                            *
*                                                                              *
*       bonami:  corrected so that a case with a number density of zero        *
*       for a nuclide that has bondarenko data will run without failing.       *
*       (mrr 93-060)                                                           *
*                                                                              *
*       csas:  corrected calculation of dancoff correction factor for          *
*       cylindrical cells.  note that previous calculations of small           *
*       cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*       values.  also corrected dancoff factor for multiregion slab            *
*       cell with vacuum boundary conditions to be set to zero.                *
*       (mrr 93-065)                                                           *
*                                                                              *
*       csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*       resonance materials that are not part of the unit cell in lattice-     *
*       cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*       check your nitawl output in any previous scale-4.2 calculations        *
*       for dancoff factors =-1.                                               *
*       (mrr 93-070)                                                           *
*                                                                              *
********************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
       0$$  a4 33 a8 26 e
       1$$  1
          1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     80000    130000     140000
       220000    240000    250000     260000
       270000    280000    290000     400000
       410000    420000    500000
74**     89.4    10100.0      46.5  189764.1
          0.1    27013.3       1.5       0.6
          2.0      140.0       0.6     225.4
          2.5      133.1       0.5   91535.0
         12.3        7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
```

```
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 60000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.2500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 60000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Fuel - decay
per ONE BWR Fuel Assembly - Fuel Region - ds4f
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
81$$ 2 0 26 1 e
82$$ f2
   6t
  decay step for BWR source term - fuel ds4 - discharge
  decay step for BWR source term - fuel ds4 - 0.25 year
  decay step for BWR source term - fuel ds4 - 0.50 year
  decay step for BWR source term - fuel ds4 - 1 year
  decay step for BWR source term - fuel ds4 - 2 year
  decay step for BWR source term - fuel ds4 - 5 year
  decay step for BWR source term - fuel ds4 - 10 year
  decay step for BWR source term - fuel ds4 - 15 year
  decay step for BWR source term - fuel ds4 - 20 year
  decay step for BWR source term - fuel ds4 - 25 year
```

```
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    20.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooooo  rrrrrrrrrrrrr   iiiiiiiiiiii    ggggggggggggg   eeeeeeeeeeeee   nnn         nn  sssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    ggggggg   eeeeeeeee       nn    nn    nn  sssssssssssss
    oo         oo   rrrrrrrrrrrrr        ii         gg    ggggggg   eeeeeeeee       nn     nn   nn   sssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooooo  rr          rr  iiiiiiiiiiii    ggggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
     ooooooooooo    rr          rr  iiiiiiiiiiii     gggggggggggg   eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooooo  tttttttttttt    zzzzzzzzzzzzz
    ll             oo         oo        tt                   zz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    llllllllllllll oooooooooooooo        tt          zzzzzzzzzzzzz
    llllllllllllll  ooooooooooo          tt         zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666                //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666               //  9999999999999  6666666666666
       1111       22         22              //    00       00  66                          //  99         99  66
         11                  22             //    00         00 66                         //  99         99  66
         11                  22            //     00         00 66                        //   99         99  66
         11                22             //      00         00 666666666666             //   9999999999999  666666666666
         11               22             //       00         00 6666666666666           //     999999999999  6666666666666
         11             22              //        00         00 66         66          //                 99  66         66
         11           22               //         00         00 66         66         //                  99  66         66
         11         22                //          00       00  66         66        //                   99  66         66
      11111111     2222222222222     //            000000000    6666666666666     //           9999999999999  6666666666666
      11111111     2222222222222    //              0000000      66666666666     //            999999999999    66666666666
0

         11          0000000                        0000000      666666666666                        11          0000000
        111         000000000                      000000000    6666666666666                      111         000000000
       1111        00       00         :::        00       00  66                  :::           1111        00       00
         11       00         00        :::       00         00 66                  :::             11       00         00
         11       00         00        :::       00         00 66                  :::             11       00         00
         11       00         00                  00         00 666666666666                        11       00         00
         11       00         00                  00         00 6666666666666                       11       00         00
         11       00         00        :::       00         00 66         66       :::             11       00         00
         11       00         00        :::       00         00 66         66       :::             11       00         00
         11        00       00         :::        00       00  66         66       :::             11        00       00
      11111111      000000000                      000000000    6666666666666                   11111111      000000000
      11111111       0000000                        0000000      66666666666                    11111111       0000000
1
0                                 sssssssssss    cccccccccc     aaaaaaaaa    ll              eeeeeeeeeeeee
                                 sssssssssssss  cccccccccccc   aaaaaaaaaaa   ll              eeeeeeeeeeeee
```

```
ss         ss   cc         cc   aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
           ss   cc              aa         aa   ll              ee
           ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     cccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  10:06:10                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 19 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    420000    500000
74**     89.4   10100.0      46.5  189764.1
          0.1   27013.3       1.5       0.6
          2.0     140.0       0.6     225.4
          2.5     133.1       0.5   91535.0
         12.3       7.5    1305.2
75$$  4r2 15r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Fuel Region - ds4f
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1500000 e
    5t
 BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds4f
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 60000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.2500000 e
    5t
 BWR SNF Assembly - Fuel - deplete to 60000 MWd/MTU
 per ONE BWR Fuel Assembly - Fuel Region - ds4f
 58** 10r4.35
 60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Fuel - decay
 per ONE BWR Fuel Assembly - Fuel Region - ds4f
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 1 2z 1 a46 1 2z 1 e
 81$$ 2 0 26 1 e
 82$$ f2
    6t
   decay step for BWR source term - fuel ds4 - discharge
   decay step for BWR source term - fuel ds4 - 0.25 year
   decay step for BWR source term - fuel ds4 - 0.50 year
   decay step for BWR source term - fuel ds4 - 1 year
   decay step for BWR source term - fuel ds4 - 2 year
   decay step for BWR source term - fuel ds4 - 5 year
   decay step for BWR source term - fuel ds4 - 10 year
   decay step for BWR source term - fuel ds4 - 15 year
   decay step for BWR source term - fuel ds4 - 20 year
   decay step for BWR source term - fuel ds4 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993     date library was produced
0                      1697     total number of nuclides in library
                        689     number of light-element nuclides
                        129     number of actinide nuclides
                        879     number of fission product nuclides
0                      7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *      data from the light element, actinide, and fission product libraries  *
          *        decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
    BWR SNF Assembly - Fuel - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Fuel Region
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02	1.15E-02
h 2	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04	2.87E-04
h 3	2.91E-09	2.91E-09	2.87E-09	2.83E-09	2.75E-09	2.60E-09	2.19E-09	1.66E-09	1.25E-09	9.44E-10	7.13E-10
he 3	4.88E-11	4.92E-11	8.88E-11	1.29E-10	2.08E-10	3.58E-10	7.61E-10	1.30E-09	1.70E-09	2.01E-09	2.24E-09
he 4	8.31E-01	8.31E-01	8.31E-01	8.31E-01	8.31E-01	8.31E-01	8.31E-01	8.31E-01	8.31E-01	8.31E-01	8.31E-01
li 6	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10
li 7	2.19E-11	2.19E-11	2.19E-11	2.19E-11	2.19E-11	2.19E-11	2.19E-11	2.19E-11	2.19E-11	2.19E-11	2.19E-11
be 9	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06
be 10	3.91E-05	3.91E-05	3.91E-05	3.91E-05	3.91E-05	3.91E-05	3.91E-05	3.91E-05	3.91E-05	3.91E-05	3.91E-05
b 10	5.07E-12	5.11E-12	9.24E-12	1.35E-11	2.20E-11	3.89E-11	8.97E-11	1.74E-10	2.59E-10	3.44E-10	4.28E-10
b 11	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	2.65E+00	2.65E+00	2.65E+00	2.65E+00	2.65E+00	2.65E+00	2.65E+00	2.65E+00	2.65E+00	2.65E+00	2.65E+00
c 14	6.99E-03	6.99E-03	6.99E-03	6.99E-03	6.99E-03	6.99E-03	6.99E-03	6.98E-03	6.98E-03	6.97E-03	6.97E-03
n 14	2.79E-06	2.79E-06	3.00E-06	3.21E-06	3.64E-06	4.48E-06	7.02E-06	1.12E-05	1.55E-05	1.97E-05	2.39E-05
n 15	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03	3.18E-03
o 16	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04	2.69E+04
o 17	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01	1.09E+01
o 18	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01	6.20E+01
f 19	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04	1.29E-04
ne 20	3.31E-09	3.31E-09	3.31E-09	3.31E-09	3.31E-09	3.31E-09	3.31E-09	3.31E-09	3.31E-09	3.31E-09	3.31E-09
ne 21	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10
ne 22	6.05E-10	6.05E-10	6.05E-10	6.05E-10	6.05E-10	6.05E-10	6.05E-10	6.05E-10	6.05E-10	6.05E-10	6.05E-10
na 23	5.61E-11	5.61E-11	5.61E-11	5.61E-11	5.61E-11	5.61E-11	5.61E-11	5.61E-11	5.61E-11	5.61E-11	5.61E-11
na 24	7.08E-09	2.27E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	1.65E-05	1.65E-05	1.65E-05	1.65E-05	1.65E-05	1.65E-05	1.65E-05	1.65E-05	1.65E-05	1.65E-05	1.65E-05
mg 25	5.43E-06	5.43E-06	5.43E-06	5.43E-06	5.43E-06	5.43E-06	5.43E-06	5.43E-06	5.43E-06	5.43E-06	5.43E-06
mg 26	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06	2.85E-06
al 27	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00	1.50E+00
si 28	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01	5.52E-01
si 29	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02	2.92E-02
si 30	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02	1.99E-02
si 31	7.58E-10	1.33E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	6.86E-13	6.86E-13	6.85E-13	6.84E-13	6.83E-13	6.80E-13	6.72E-13	6.58E-13	6.45E-13	6.32E-13	6.20E-13
p 31	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06	9.60E-06
p 32	9.47E-11	9.02E-11	1.19E-12	1.35E-14	1.57E-16	1.54E-16	1.52E-16	1.49E-16	1.46E-16	1.44E-16	1.41E-16
p 33	2.63E-14	2.56E-14	2.24E-15	1.79E-16	1.20E-18	5.50E-23	5.26E-36	.00E+00	.00E+00	.00E+00	.00E+00
s 32	4.54E-09	4.55E-09	4.64E-09	4.64E-09	4.64E-09	4.64E-09	4.64E-09	4.64E-09	4.64E-09	4.64E-09	4.64E-09
s 33	1.62E-12	1.62E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12	1.64E-12
ar 40	8.40E-11	8.40E-11	8.40E-11	8.40E-11	8.40E-11	8.40E-11	8.40E-11	8.40E-11	8.40E-11	8.40E-11	8.40E-11
k 41	2.78E-12	2.78E-12	2.78E-12	2.78E-12	2.78E-12	2.78E-12	2.78E-12	2.78E-12	2.78E-12	2.78E-12	2.78E-12
k 43	4.73E-14	2.25E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	5.64E-14	5.65E-14	5.65E-14	5.65E-14	5.65E-14	5.65E-14	5.65E-14	5.65E-14	5.65E-14	5.65E-14	5.65E-14
ca 43	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06	1.44E-06
ca 44	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05
ca 45	2.85E-08	2.84E-08	1.95E-08	1.32E-08	6.08E-09	1.30E-09	1.25E-11	5.52E-15	2.43E-18	1.07E-21	4.69E-25
ca 46	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06	1.46E-06
ca 47	1.35E-11	1.15E-11	1.43E-17	1.04E-23	7.73E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	2.08E-07	2.09E-07	2.17E-07	2.24E-07	2.31E-07	2.36E-07	2.37E-07	2.37E-07	2.37E-07	2.37E-07	2.37E-07
sc 46	1.74E-06	1.72E-06	8.26E-07	3.84E-07	8.48E-08	4.13E-09	4.79E-13	1.32E-19	3.64E-26	1.00E-32	2.76E-39
sc 47	1.12E-07	9.08E-08	9.27E-16	3.34E-23	2.18E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.88E-09	4.02E-09	7.73E-24	3.92E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 2

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01	1.58E-01
ti 47	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01

ti 48	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00	1.44E+00
ti 49	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01
ti 50	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01	1.10E-01
v 50	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03	1.85E-03
v 51	3.03E-01	3.03E-01	3.09E-01	3.09E-01	3.09E-01	3.09E-01	3.09E-01	3.09E-01	3.09E-01	3.09E-01	3.09E-01
cr 50	5.54E+00	5.54E+00	5.54E+00	5.54E+00	5.54E+00	5.54E+00	5.54E+00	5.54E+00	5.54E+00	5.54E+00	5.54E+00
cr 51	6.11E-03	5.96E-03	6.43E-04	6.36E-05	6.58E-07	7.08E-11	8.82E-23	1.29E-42	.00E+00	.00E+00	.00E+00
cr 52	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
cr 53	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01	1.31E+01
cr 54	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00	4.27E+00
mn 54	2.45E-03	2.44E-03	2.01E-03	1.63E-03	1.09E-03	4.84E-04	4.24E-05	7.36E-07	1.27E-08	2.21E-10	3.83E-12
mn 55	6.16E-01	6.16E-01	6.19E-01	6.22E-01	6.28E-01	6.36E-01	6.52E-01	6.62E-01	6.65E-01	6.66E-01	6.66E-01
mn 56	3.39E-06	5.35E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01	1.25E+01
fe 55	4.99E-02	4.98E-02	4.69E-02	4.39E-02	3.87E-02	3.00E-02	1.40E-02	3.94E-03	1.11E-03	3.11E-04	8.73E-05
fe 56	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02	2.05E+02
fe 57	6.81E+00	6.81E+00	6.81E+00	6.81E+00	6.81E+00	6.81E+00	6.81E+00	6.81E+00	6.81E+00	6.81E+00	6.81E+00
fe 58	8.11E-01	8.11E-01	8.14E-01	8.15E-01	8.15E-01	8.15E-01	8.15E-01	8.15E-01	8.15E-01	8.15E-01	8.15E-01
fe 59	1.37E-04	1.35E-04	3.37E-05	7.97E-06	4.63E-07	1.57E-09	6.06E-17	2.69E-29	1.19E-41	.00E+00	.00E+00
co 58m	9.48E-10	1.53E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.81E-03	3.77E-03	1.58E-03	6.40E-04	1.07E-04	3.02E-06	6.74E-11	1.19E-18	2.11E-26	3.73E-34	6.58E-42
co 59	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00	2.07E+00
co 60	3.32E-01	3.32E-01	3.22E-01	3.11E-01	2.91E-01	2.55E-01	1.72E-01	8.91E-02	4.62E-02	2.39E-02	1.24E-02
co 61	2.22E-07	9.30E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.82E+01	8.82E+01	8.82E+01	8.82E+01	8.82E+01	8.82E+01	8.82E+01	8.82E+01	8.82E+01	8.82E+01	8.82E+01
ni 59	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00	1.09E+00
ni 60	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.56E+01	3.57E+01	3.58E+01	3.58E+01	3.59E+01	3.59E+01	3.59E+01
ni 61	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00	1.90E+00
ni 62	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00	4.82E+00
ni 63	2.28E-01	2.28E-01	2.28E-01	2.27E-01	2.27E-01	2.25E-01	2.20E-01	2.13E-01	2.06E-01	1.99E-01	1.92E-01
ni 64	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00
ni 65	5.91E-07	8.03E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	8.03E-11	5.92E-11	9.96E-23	5.77E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	3.41E-01	3.41E-01	3.41E-01	3.42E-01	3.43E-01	3.44E-01	3.49E-01	3.56E-01	3.63E-01	3.70E-01	3.77E-01
cu 64	2.71E-06	7.33E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01	1.64E-01
cu 66	4.23E-09	9.23E-14	1.55E-25	8.99E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.69E-12	2.06E-12	8.20E-23	1.28E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03	2.64E-03
zn 65	1.71E-06	1.71E-06	1.33E-06	1.02E-06	6.07E-07	2.15E-07	9.54E-09	5.31E-11	2.96E-13	1.65E-15	9.17E-18
zn 66	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03
zn 67	2.93E-06	2.93E-06	2.93E-06	2.93E-06	2.93E-06	2.93E-06	2.93E-06	2.93E-06	2.93E-06	2.93E-06	2.93E-06
zn 68	5.49E-08	5.49E-08	5.49E-08	5.49E-08	5.49E-08	5.49E-08	5.49E-08	5.49E-08	5.49E-08	5.49E-08	5.49E-08
zn 69m	1.38E-14	4.12E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 70	3.53E-15	3.53E-15	3.53E-15	3.53E-15	3.53E-15	3.53E-15	3.53E-15	3.53E-15	3.53E-15	3.53E-15	3.53E-15
ga 69	1.24E-10	1.24E-10	1.24E-10	1.24E-10	1.24E-10	1.24E-10	1.24E-10	1.24E-10	1.24E-10	1.24E-10	1.24E-10
ga 71	1.81E-15	1.82E-15	1.90E-15	1.90E-15	1.90E-15	1.90E-15	1.90E-15	1.90E-15	1.90E-15	1.90E-15	1.90E-15
ge 70	8.56E-13	8.56E-13	8.56E-13	8.56E-13	8.56E-13	8.56E-13	8.56E-13	8.56E-13	8.56E-13	8.56E-13	8.56E-13
sr 87	2.23E-03	2.23E-03	2.23E-03	2.23E-03	2.23E-03	2.23E-03	2.23E-03	2.23E-03	2.23E-03	2.23E-03	2.23E-03
sr 88	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01	2.20E-01

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BWR SNF Assembly - Fuel - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 89	5.93E-04	5.84E-04	1.73E-04	4.85E-05	3.96E-06	2.65E-08	7.91E-15	1.06E-25	1.41E-36	.00E+00	.00E+00
sr 90	1.25E-05	1.25E-05	1.25E-05	1.24E-05	1.22E-05	1.19E-05	1.11E-05	9.80E-06	8.66E-06	7.66E-06	6.77E-06
sr 91	9.18E-07	1.60E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	1.62E-02	1.62E-02	1.66E-02	1.68E-02	1.68E-02	1.68E-02	1.68E-02	1.68E-02	1.68E-02	1.68E-02	1.68E-02
y 89m	2.65E-13	2.50E-13	5.90E-14	1.66E-14	1.35E-15	9.06E-18	2.71E-24	3.61E-35	.00E+00	.00E+00	.00E+00

y 90	1.16E-03	8.98E-04	3.24E-09	3.22E-09	3.18E-09	3.10E-09	2.88E-09	2.55E-09	2.25E-09	1.99E-09	1.76E-09
y 90m	5.71E-12	3.10E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.77E-03	1.75E-03	6.09E-04	2.03E-04	2.33E-05	3.08E-07	7.10E-13	2.85E-22	1.14E-31	4.59E-41	.00E+00
y 92	3.90E-06	3.55E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	2.23E-09	4.35E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	1.09E-09	8.82E-10	5.61E-18	1.70E-26	2.49E-43	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04	4.64E+04
zr 91	1.01E+04	1.01E+04	1.01E+04	1.01E+04	1.01E+04	1.01E+04	1.01E+04	1.01E+04	1.01E+04	1.01E+04	1.01E+04
zr 92	1.59E+04	1.59E+04	1.59E+04	1.59E+04	1.59E+04	1.59E+04	1.59E+04	1.59E+04	1.59E+04	1.59E+04	1.59E+04
zr 93	3.43E+01	3.43E+01	3.43E+01	3.43E+01	3.43E+01	3.43E+01	3.43E+01	3.43E+01	3.43E+01	3.43E+01	3.43E+01
zr 94	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04	1.64E+04
zr 95	6.17E-01	6.10E-01	2.33E-01	8.55E-02	1.18E-02	2.26E-04	1.59E-09	4.12E-18	1.06E-26	2.75E-35	1.33E-43
zr 96	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03	2.67E+03
zr 97	1.06E-02	3.96E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.43E-07	1.43E-07	1.43E-07	1.43E-07	1.43E-07	1.43E-07	1.42E-07	1.41E-07	1.41E-07	1.40E-07	1.39E-07
nb 92	3.73E-04	3.73E-04	3.73E-04	3.73E-04	3.73E-04	3.73E-04	3.73E-04	3.73E-04	3.73E-04	3.73E-04	3.73E-04
nb 93	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01
nb 93m	6.17E-03	6.17E-03	6.11E-03	6.05E-03	5.92E-03	5.69E-03	5.05E-03	4.14E-03	3.41E-03	2.82E-03	2.35E-03
nb 94	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.98E-01	1.98E-01	1.98E-01
nb 95	3.34E-01	3.34E-01	2.11E-01	9.19E-02	1.39E-02	2.81E-04	1.92E-09	4.95E-18	1.28E-26	3.36E-35	.00E+00
nb 95m	3.97E-04	3.95E-04	1.54E-04	5.67E-05	7.84E-06	1.50E-07	1.06E-12	2.73E-21	7.05E-30	.00E+00	.00E+00
nb 96	8.64E-06	4.24E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	7.54E-04	2.83E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	9.91E-06	3.71E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 92	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00	1.06E+00
mo 93	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03	1.21E-03
mo 94	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01	6.82E-01
mo 95	1.29E+01	1.29E+01	1.34E+01	1.37E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01	1.38E+01
mo 96	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00	2.45E+00
mo 97	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01	2.21E+01
mo 98	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00	2.16E+00
mo 99	4.46E-05	3.46E-05	6.15E-15	4.52E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01	7.45E-01
tc 98	3.05E-08	3.05E-08	3.05E-08	3.05E-08	3.05E-08	3.05E-08	3.05E-08	3.05E-08	3.05E-08	3.05E-08	3.05E-08
tc 99	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03	2.10E-03
ru 98	1.09E-14	1.09E-14	1.21E-14	1.34E-14	1.59E-14	2.09E-14	3.60E-14	6.12E-14	8.63E-14	1.11E-13	1.37E-13
ru 99	2.27E-08	2.27E-08	2.44E-08	2.62E-08	2.96E-08	3.65E-08	5.72E-08	9.17E-08	1.26E-07	1.61E-07	1.95E-07
ru100	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04
ru101	4.59E-03	4.59E-03	4.59E-03	4.59E-03	4.59E-03	4.59E-03	4.59E-03	4.59E-03	4.59E-03	4.59E-03	4.59E-03
ru102	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04	3.05E-04
ru103	8.43E-08	8.29E-08	1.72E-08	3.36E-09	1.33E-10	2.11E-13	8.37E-22	8.31E-36	.00E+00	.00E+00	.00E+00
ru104	2.83E-09	2.83E-09	2.83E-09	2.83E-09	2.83E-09	2.83E-09	2.83E-09	2.83E-09	2.83E-09	2.83E-09	2.83E-09
rh102	4.02E-15	4.02E-15	3.79E-15	3.57E-15	3.16E-15	2.49E-15	1.22E-15	3.68E-16	1.11E-16	3.37E-17	1.02E-17
rh103	1.95E-09	1.95E-09	2.13E-09	2.17E-09	2.17E-09	2.18E-09	2.18E-09	2.18E-09	2.18E-09	2.18E-09	2.18E-09
rh105	3.23E-14	2.31E-14	1.52E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd104	7.63E-10	7.63E-10	7.63E-10	7.63E-10	7.63E-10	7.63E-10	7.63E-10	7.63E-10	7.63E-10	7.63E-10	7.63E-10
pd105	1.14E-11	1.14E-11	1.14E-11	1.14E-11	1.14E-11	1.14E-11	1.14E-11	1.14E-11	1.14E-11	1.14E-11	1.14E-11

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BWR SNF Assembly - Fuel - decay light elements page 4

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pd106	5.84E-13	5.84E-13	5.84E-13	5.84E-13	5.84E-13	5.84E-13	5.84E-13	5.84E-13	5.84E-13	5.84E-13	5.84E-13
pd107	1.13E-15	1.13E-15	1.13E-15	1.13E-15	1.13E-15	1.13E-15	1.13E-15	1.13E-15	1.13E-15	1.13E-15	1.13E-15
cd111	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06	2.18E-06
cd112	1.87E-05	1.87E-05	1.87E-05	1.87E-05	1.87E-05	1.87E-05	1.87E-05	1.87E-05	1.87E-05	1.87E-05	1.87E-05
cd113	4.50E-08	4.50E-08	4.50E-08	4.50E-08	4.50E-08	4.50E-08	4.50E-08	4.50E-08	4.50E-08	4.51E-08	4.51E-08
cd113m	7.38E-08	7.38E-08	7.30E-08	7.21E-08	7.03E-08	6.69E-08	5.78E-08	4.52E-08	3.53E-08	2.76E-08	2.16E-08
cd114	2.78E-03	2.78E-03	2.91E-03	2.95E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03
cd115	1.22E-07	8.94E-08	8.44E-20	2.68E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

cd115m	2.68E-07	2.64E-07	6.61E-08	1.57E-08	9.17E-10	3.14E-12	1.26E-19	5.92E-32	.00E+00	.00E+00	.00E+00
cd116	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05
cd117	9.05E-10	1.14E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.35E-12	1.67E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	5.37E-01	5.37E-01	5.58E-01	5.70E-01	5.81E-01	5.86E-01	5.87E-01	5.87E-01	5.87E-01	5.87E-01	5.87E-01
in113m	3.00E-05	2.98E-05	1.75E-05	1.00E-05	3.33E-06	3.69E-07	5.02E-10	8.40E-15	1.40E-19	2.35E-24	3.93E-29
in114	9.48E-08	5.97E-08	1.72E-08	4.71E-09	3.65E-10	2.19E-12	4.78E-19	3.77E-30	3.31E-41	.00E+00	.00E+00
in114m	3.77E-03	3.71E-03	1.07E-03	2.93E-04	2.27E-05	1.36E-07	2.97E-14	2.34E-25	1.85E-36	.00E+00	.00E+00
in115	5.20E-06	5.21E-06	5.41E-06	5.46E-06	5.47E-06	5.47E-06	5.47E-06	5.47E-06	5.47E-06	5.47E-06	5.47E-06
in117	2.98E-09	7.29E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	6.42E-10	3.78E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01	1.16E+01
sn113	5.00E-02	4.97E-02	2.91E-02	1.67E-02	5.54E-03	6.14E-04	8.36E-07	1.40E-11	2.34E-16	3.91E-21	6.54E-26
sn114	8.45E+00	8.45E+00	8.46E+00	8.46E+00	8.46E+00	8.46E+00	8.46E+00	8.46E+00	8.46E+00	8.46E+00	8.46E+00
sn115	4.15E+00	4.15E+00	4.15E+00	4.15E+00	4.15E+00	4.15E+00	4.15E+00	4.15E+00	4.15E+00	4.15E+00	4.15E+00
sn116	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02
sn117	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01	9.97E+01
sn117m	3.13E-02	2.98E-02	3.19E-04	2.86E-06	2.58E-10	2.12E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02	3.15E+02
sn119	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02	1.14E+02
sn119m	6.13E-01	6.11E-01	4.95E-01	3.98E-01	2.58E-01	1.09E-01	8.15E-03	1.08E-04	1.44E-06	1.92E-08	2.55E-10
sn120	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02	4.27E+02
sn121	9.06E-04	4.90E-04	3.40E-07	3.39E-07	3.37E-07	3.33E-07	3.21E-07	3.01E-07	2.83E-07	2.65E-07	2.49E-07
sn121m	7.84E-03	7.84E-03	7.82E-03	7.79E-03	7.74E-03	7.64E-03	7.36E-03	6.91E-03	6.49E-03	6.09E-03	5.72E-03
sn122	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01	6.16E+01
sn123	9.81E-03	9.76E-03	6.05E-03	3.68E-03	1.38E-03	1.95E-04	5.44E-07	3.01E-11	1.67E-15	9.26E-20	5.14E-24
sn124	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01	7.56E+01
sn125	1.50E-04	1.40E-04	2.32E-07	3.00E-10	5.90E-16	2.32E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.02E+00
sb122	4.80E-04	3.72E-04	4.45E-14	2.17E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	9.42E-02	9.42E-02	9.79E-02	1.00E-01	1.03E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01	1.04E-01
sb124	6.38E-04	6.30E-04	2.26E-04	7.80E-05	9.51E-06	1.42E-07	4.70E-13	3.46E-22	2.55E-31	1.88E-40	.00E+00
sb125	3.60E-01	3.60E-01	3.38E-01	3.17E-01	2.79E-01	2.17E-01	1.01E-01	2.84E-02	7.98E-03	2.24E-03	6.30E-04
sb126	5.48E-05	5.18E-05	3.57E-07	2.03E-09	7.39E-14	9.97E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.24E-01	1.24E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
te123	1.17E-03	1.17E-03	1.32E-03	1.41E-03	1.49E-03	1.53E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03	1.54E-03
te123m	3.65E-04	3.63E-04	2.17E-04	1.27E-04	4.40E-05	5.30E-06	9.30E-09	2.37E-13	6.04E-18	1.54E-22	3.92E-27
te124	1.01E-02	1.01E-02	1.05E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02	1.07E-02
te125	3.74E-01	3.74E-01	3.95E-01	4.17E-01	4.55E-01	5.19E-01	6.36E-01	7.09E-01	7.30E-01	7.36E-01	7.38E-01
te125m	4.69E-03	4.69E-03	4.66E-03	4.46E-03	3.96E-03	3.08E-03	1.44E-03	4.04E-04	1.13E-04	3.19E-05	8.95E-06
te126	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02	1.26E-02
te127	6.17E-08	1.60E-08	3.81E-09	2.12E-09	6.63E-10	6.50E-11	6.12E-14	5.53E-19	5.01E-24	4.53E-29	4.10E-34
te127m	1.93E-06	1.92E-06	1.09E-06	6.05E-07	1.89E-07	1.86E-08	1.75E-11	1.58E-16	1.43E-21	1.29E-26	1.17E-31
te128	3.14E-07	3.14E-07	3.14E-07	3.14E-07	3.14E-07	3.14E-07	3.14E-07	3.14E-07	3.14E-07	3.14E-07	3.14E-07

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0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te129	5.20E-14	2.14E-15	3.41E-16	5.06E-17	1.17E-18	6.23E-22	9.49E-32	.00E+00	.00E+00	.00E+00	.00E+00
te129m	2.37E-12	2.32E-12	3.70E-13	5.49E-14	1.27E-15	6.76E-19	1.03E-28	.00E+00	.00E+00	.00E+00	.00E+00
te130	5.29E-15	5.29E-15	5.29E-15	5.29E-15	5.29E-15	5.29E-15	5.29E-15	5.29E-15	5.29E-15	5.29E-15	5.29E-15
i127	7.04E-05	7.05E-05	7.13E-05	7.18E-05	7.22E-05	7.24E-05	7.24E-05	7.24E-05	7.24E-05	7.24E-05	7.24E-05
i129	3.11E-10	3.11E-10	3.13E-10	3.13E-10	3.13E-10	3.13E-10	3.13E-10	3.13E-10	3.13E-10	3.13E-10	3.13E-10
i130	1.21E-14	3.18E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe126	1.47E-14	1.47E-14	1.47E-14	1.47E-14	1.47E-14	1.47E-14	1.47E-14	1.47E-14	1.47E-14	1.47E-14	1.47E-14
xe127	1.89E-12	1.86E-12	3.41E-13	5.85E-14	1.80E-15	1.72E-18	1.49E-27	1.25E-42	.00E+00	.00E+00	.00E+00
xe128	3.60E-06	3.60E-06	3.60E-06	3.60E-06	3.60E-06	3.60E-06	3.60E-06	3.60E-06	3.60E-06	3.60E-06	3.60E-06
xe129	1.79E-08	1.79E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08
xe129m	3.89E-11	3.60E-11	3.48E-14	2.57E-17	1.67E-23	7.14E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

xe130	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10	9.75E-10
xe131	2.75E-12	2.75E-12	2.76E-12	2.76E-12	2.76E-12	2.76E-12	2.76E-12	2.76E-12	2.76E-12	2.76E-12	2.76E-12
xe131m	1.13E-14	1.07E-14	5.98E-17	2.73E-19	6.50E-24	3.73E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13	3.66E-13
total	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05	1.20E+05

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BWR SNF Assembly - Fuel - decay light elements page 6

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	2.81E-05	2.81E-05	2.77E-05	2.73E-05	2.66E-05	2.51E-05	2.12E-05	1.60E-05	1.21E-05	9.13E-06	6.89E-06
be 10	8.73E-07	8.73E-07	8.73E-07	8.73E-07	8.73E-07	8.73E-07	8.73E-07	8.73E-07	8.73E-07	8.73E-07	8.73E-07
c 14	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.12E-02	3.11E-02	3.11E-02	3.11E-02	3.11E-02	3.11E-02
na 24	6.31E-02	2.03E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.38E-10	6.23E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	5.03E+00	6.24E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	2.92E-02	5.13E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	4.45E-11	4.45E-11	4.45E-11	4.44E-11	4.44E-11	4.42E-11	4.36E-11	4.28E-11	4.19E-11	4.11E-11	4.03E-11
p 32	2.71E-05	2.58E-05	3.41E-07	3.85E-09	4.49E-11	4.42E-11	4.37E-11	4.28E-11	4.19E-11	4.11E-11	4.03E-11
p 33	4.11E-09	4.00E-09	3.50E-10	2.79E-11	1.88E-13	8.60E-18	8.21E-31	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	1.26E-08	1.40E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	2.75E-10	7.16E-11	4.03E-17	4.01E-17	3.97E-17	3.88E-17	3.65E-17	3.28E-17	2.95E-17	2.66E-17	2.39E-17
k 43	1.55E-07	7.34E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	5.06E-04	5.04E-04	3.46E-04	2.34E-04	1.08E-04	2.30E-05	2.22E-07	9.78E-11	4.30E-14	1.89E-17	8.31E-21
ca 47	8.24E-06	7.08E-06	8.77E-12	6.37E-18	4.75E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	5.89E-02	5.84E-02	2.80E-02	1.30E-02	2.87E-03	1.40E-04	1.62E-08	4.47E-15	1.23E-21	3.40E-28	.00E+00
sc 47	9.28E-02	7.54E-02	7.71E-10	2.78E-17	1.81E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	8.79E-03	6.00E-03	1.15E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	9.50E-03	2.51E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	5.65E+02	5.51E+02	5.95E+01	5.88E+00	6.08E-02	6.54E-06	8.15E-18	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	1.90E+01	1.89E+01	1.55E+01	1.27E+01	8.44E+00	3.75E+00	3.29E-01	5.70E-03	9.88E-05	1.71E-06	2.97E-08
mn 56	7.36E+01	1.16E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	1.19E+02	1.19E+02	1.12E+02	1.05E+02	9.22E+01	7.15E+01	3.34E+01	9.38E+00	2.64E+00	7.40E-01	2.08E-01
fe 59	6.81E+00	6.70E+00	1.68E+00	3.97E-01	2.30E-02	7.79E-05	3.02E-12	1.34E-24	.00E+00	.00E+00	.00E+00
co 58m	5.60E-03	9.08E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.21E+02	1.20E+02	5.02E+01	2.03E+01	3.41E+00	9.59E-02	2.14E-06	3.78E-14	6.69E-22	1.18E-29	.00E+00
co 60	3.76E+02	3.76E+02	3.64E+02	3.52E+02	3.29E+02	2.89E+02	1.95E+02	1.01E+02	5.22E+01	2.71E+01	1.40E+01
co 61	6.93E+00	2.90E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	8.84E-02	8.84E-02	8.84E-02	8.84E-02	8.84E-02	8.84E-02	8.84E-02	8.84E-02	8.84E-02	8.84E-02	8.84E-02
ni 63	1.29E+01	1.29E+01	1.29E+01	1.29E+01	1.28E+01	1.28E+01	1.25E+01	1.21E+01	1.17E+01	1.13E+01	1.09E+01
ni 65	1.13E+01	1.54E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	6.99E-05	5.15E-05	8.67E-17	5.02E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	1.05E+01	2.83E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	2.36E+00	5.16E-05	8.68E-17	5.02E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	2.04E-06	1.56E-06	6.21E-17	9.66E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	1.41E-02	1.41E-02	1.09E-02	8.41E-03	5.00E-03	1.77E-03	7.87E-05	4.38E-07	2.44E-09	1.36E-11	7.56E-14
zn 69	6.79E-07	1.46E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	4.56E-08	1.36E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	1.72E-13	5.27E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	1.45E-11	1.37E-11	6.20E-14	2.28E-16	3.52E-21	8.44E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	1.72E+01	1.70E+01	5.01E+00	1.41E+00	1.15E-01	7.69E-04	2.30E-10	3.07E-21	4.56E-32	.00E+00	.00E+00
sr 90	1.77E-03	1.77E-03	1.76E-03	1.75E-03	1.73E-03	1.68E-03	1.56E-03	1.38E-03	1.22E-03	1.08E-03	9.56E-04
sr 91	3.32E+00	5.79E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	2.09E-03	1.97E-03	4.66E-04	1.31E-04	1.07E-05	7.15E-08	2.14E-14	2.85E-25	.00E+00	.00E+00	.00E+00
y 90	6.33E+02	4.88E+02	1.76E-03	1.75E-03	1.73E-03	1.68E-03	1.56E-03	1.38E-03	1.22E-03	1.08E-03	9.56E-04
y 90m	6.24E-05	3.38E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	4.34E+01	4.29E+01	1.49E+01	4.99E+00	5.73E-01	7.56E-03	1.74E-08	6.99E-18	2.80E-27	.00E+00	.00E+00
y 92	3.76E+01	3.41E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	7.45E-03	1.45E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 89	4.90E-04	3.96E-04	2.52E-12	7.62E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

zr 93	8.61E-02	8.61E-02	8.61E-02	8.61E-02	8.61E-02	8.61E-02	8.61E-02	8.61E-02	8.61E-02	8.61E-02	8.61E-02
zr 95	1.32E+04	1.31E+04	5.00E+03	1.84E+03	2.54E+02	4.86E+00	3.42E-05	8.84E-14	2.28E-22	5.93E-31	.00E+00

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BWR SNF Assembly - Fuel - decay light elements page 7

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 97	2.03E+04	7.58E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	8.26E-07	8.26E-07	8.26E-07	8.25E-07	8.25E-07	8.24E-07	8.22E-07	8.18E-07	8.13E-07	8.09E-07	8.05E-07
nb 92	4.15E-08	4.15E-08	4.15E-08	4.15E-08	4.15E-08	4.15E-08	4.15E-08	4.15E-08	4.15E-08	4.15E-08	4.15E-08
nb 93m	1.47E+00	1.47E+00	1.46E+00	1.44E+00	1.41E+00	1.36E+00	1.20E+00	9.87E-01	8.13E-01	6.73E-01	5.60E-01
nb 94	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02	3.72E-02
nb 95	1.31E+04	1.31E+04	8.31E+03	3.61E+03	5.47E+02	1.10E+01	7.54E-05	1.95E-13	5.03E-22	1.32E-30	.00E+00
nb 95m	1.51E+02	1.50E+02	5.88E+01	2.16E+01	2.99E+00	5.72E-02	4.03E-07	1.04E-15	2.69E-24	.00E+00	.00E+00
nb 96	1.21E+01	5.92E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	2.03E+04	7.61E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.92E+04	7.19E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 93	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03	1.33E-03
mo 99	2.14E+01	1.66E+01	2.95E-09	2.17E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	2.65E-11	2.65E-11	2.65E-11	2.65E-11	2.65E-11	2.65E-11	2.65E-11	2.65E-11	2.65E-11	2.65E-11	2.65E-11
tc 99	3.59E-05	3.59E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05
ru103	2.72E-03	2.68E-03	5.56E-04	1.09E-04	4.31E-06	6.82E-09	2.70E-17	2.74E-31	.00E+00	.00E+00	.00E+00
ru105	2.84E-08	6.69E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	2.17E-14	2.17E-14	1.84E-14	1.54E-14	1.10E-14	5.56E-15	7.20E-16	2.39E-17	7.92E-19	2.63E-20	8.71E-22
rh102	4.86E-12	4.86E-12	4.58E-12	4.31E-12	3.83E-12	3.01E-12	1.47E-12	4.45E-13	1.35E-13	4.08E-14	1.23E-14
rh105	2.73E-08	1.95E-08	1.28E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	8.06E-09	1.91E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	7.59E-10	2.17E-14	1.84E-14	1.54E-14	1.10E-14	5.56E-15	7.20E-16	2.39E-17	7.92E-19	2.63E-20	8.71E-22
rh106m	3.16E-10	1.46E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd109	4.88E-15	1.45E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109m	4.88E-15	1.45E-15	6.04E-24	5.26E-24	4.00E-24	2.31E-24	4.48E-25	2.90E-26	1.88E-27	1.22E-28	7.89E-30
ag111	3.44E-15	3.15E-15	7.99E-19	1.46E-22	6.05E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	1.66E-05	1.66E-05	1.64E-05	1.62E-05	1.58E-05	1.50E-05	1.30E-05	1.01E-05	7.93E-06	6.20E-06	4.85E-06
cd115	6.22E-02	4.56E-02	4.30E-14	1.37E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	6.82E-03	6.72E-03	1.68E-03	4.00E-04	2.34E-05	8.00E-08	3.21E-15	1.51E-27	.00E+00	.00E+00	.00E+00
cd117	9.74E-03	1.22E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	1.88E-05	1.33E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	5.02E+02	4.99E+02	2.92E+02	1.67E+02	5.57E+01	6.17E+00	8.40E-03	1.41E-07	2.35E-12	3.93E-17	6.57E-22
in114	1.31E+02	8.23E+01	2.37E+01	6.48E+00	5.02E-01	3.02E-03	6.58E-10	5.19E-21	4.56E-32	.00E+00	.00E+00
in114m	8.72E+01	8.60E+01	2.47E+01	6.77E+00	5.25E-01	3.16E-03	6.88E-10	5.42E-21	4.56E-32	.00E+00	.00E+00
in116m	1.52E-02	1.50E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	1.10E-01	2.68E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	8.86E-03	5.22E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	5.02E+02	4.99E+02	2.92E+02	1.67E+02	5.56E+01	6.17E+00	8.40E-03	1.40E-07	2.35E-12	3.93E-17	6.57E-22
sn117m	2.57E+03	2.44E+03	2.62E+01	2.35E-01	2.11E-05	1.74E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	2.29E+03	2.29E+03	1.85E+03	1.49E+03	9.67E+02	4.08E+02	3.05E+01	4.06E-01	5.41E-03	7.19E-05	9.57E-07
sn121	8.68E+02	4.69E+02	3.26E-01	3.25E-01	3.23E-01	3.19E-01	3.07E-01	2.88E-01	2.71E-01	2.54E-01	2.39E-01
sn121m	4.21E-01	4.21E-01	4.20E-01	4.19E-01	4.16E-01	4.11E-01	3.96E-01	3.71E-01	3.49E-01	3.27E-01	3.07E-01
sn123	8.06E+01	8.02E+01	4.98E+01	3.03E+01	1.14E+01	1.60E+00	4.47E-03	2.48E-07	1.37E-11	7.62E-16	4.22E-20
sn123m	4.61E-01	7.07E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	1.63E+01	1.52E+01	2.52E-02	3.26E-05	6.40E-11	2.51E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	1.91E+02	1.47E+02	1.76E-08	8.59E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	1.12E+01	1.10E+01	3.96E+00	1.36E+00	1.66E-01	2.48E-03	8.22E-09	6.06E-18	4.46E-27	.00E+00	.00E+00
sb125	3.77E+02	3.77E+02	3.54E+02	3.32E+02	2.93E+02	2.27E+02	1.06E+02	2.98E+01	8.37E+00	2.35E+00	6.60E-01
sb126	4.58E+00	4.33E+00	2.99E-02	1.69E-04	6.18E-09	8.34E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	2.75E-13	2.75E-13	3.10E-13	3.31E-13	3.50E-13	3.59E-13	3.60E-13	3.60E-13	3.60E-13	3.60E-13	3.60E-13
te123m	3.24E+00	3.22E+00	1.92E+00	1.13E+00	3.90E-01	4.71E-02	8.25E-05	2.10E-09	5.36E-14	1.37E-18	3.48E-23
te125m	8.45E+01	8.46E+01	8.39E+01	8.03E+01	7.14E+01	5.54E+01	2.59E+01	7.27E+00	2.04E+00	5.74E-01	1.61E-01
te127	1.63E-01	4.22E-02	1.01E-02	5.59E-03	1.75E-03	1.72E-04	1.62E-07	1.46E-12	1.32E-17	1.20E-22	1.08E-27

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BWR SNF Assembly - Fuel - decay light elements page 8

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te127m	1.82E-02	1.81E-02	1.03E-02	5.71E-03	1.79E-03	1.75E-04	1.65E-07	1.49E-12	1.35E-17	1.22E-22	1.11E-27
te129	1.09E-06	4.48E-08	7.15E-09	1.06E-09	2.44E-11	1.31E-14	1.99E-24	.00E+00	.00E+00	.00E+00	.00E+00
te129m	7.14E-08	6.99E-08	1.12E-08	1.65E-09	3.81E-11	2.04E-14	3.10E-24	.00E+00	.00E+00	.00E+00	.00E+00
i126	8.95E-13	8.49E-13	7.43E-15	5.40E-17	3.22E-21	1.16E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i129	5.49E-14	5.49E-14	5.53E-14	5.53E-14	5.53E-14	5.53E-14	5.53E-14	5.53E-14	5.53E-14	5.53E-14	5.53E-14
i130	2.36E-08	6.20E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	2.34E-12	2.14E-12	9.97E-16	3.43E-19	4.94E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	5.34E-08	5.24E-08	9.63E-09	1.65E-09	5.10E-11	4.86E-14	4.22E-23	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	4.43E-06	4.10E-06	3.97E-09	2.93E-12	1.90E-18	8.21E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	9.48E-10	8.95E-10	5.01E-12	2.29E-14	5.44E-19	3.13E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.07E-12	9.46E-13	7.63E-18	3.73E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	6.98E-14	5.08E-14	2.96E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	7.54E-15	7.53E-15	6.94E-15	6.37E-15	5.38E-15	3.85E-15	1.40E-15	2.61E-16	4.87E-17	9.06E-18	1.69E-18
total	9.73E+04	5.76E+04	1.70E+04	8.27E+03	2.71E+03	1.10E+03	4.05E+02	1.62E+02	7.86E+01	4.35E+01	2.73E+01

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BWR SNF Assembly - Fuel - decay actinides page 9

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
he 4	4.34E-01	4.34E-01	4.73E-01	5.03E-01	5.43E-01	5.91E-01	6.90E-01	8.42E-01	9.88E-01	1.13E+00	1.26E+00
tl207	1.33E-14	1.33E-14	1.42E-14	1.51E-14	1.70E-14	2.07E-14	3.04E-14	4.48E-14	5.73E-14	6.82E-14	7.78E-14
tl208	8.78E-12	8.97E-12	9.82E-12	1.10E-11	1.34E-11	1.86E-11	3.26E-11	4.50E-11	4.81E-11	4.75E-11	4.58E-11
pb206	4.71E-12	4.71E-12	5.48E-12	6.36E-12	8.23E-12	1.23E-11	2.69E-11	6.44E-11	1.32E-10	2.49E-10	4.45E-10
pb207	2.35E-09	2.36E-09	2.61E-09	2.90E-09	3.57E-09	5.00E-09	1.09E-08	2.53E-08	4.48E-08	6.89E-08	9.69E-08
pb208	5.19E-06	5.20E-06	5.95E-06	6.82E-06	8.83E-06	1.41E-05	4.00E-05	1.06E-04	1.84E-04	2.64E-04	3.42E-04
pb209	1.45E-13	1.38E-13	3.80E-14	3.35E-14	3.35E-14	3.37E-14	3.43E-14	3.55E-14	3.70E-14	3.88E-14	4.09E-14
pb210	1.24E-10	1.24E-10	1.30E-10	1.32E-10	1.36E-10	1.46E-10	1.90E-10	3.31E-10	5.93E-10	1.02E-09	1.64E-09
pb211	1.03E-13	1.03E-13	1.10E-13	1.17E-13	1.32E-13	1.60E-13	2.35E-13	3.47E-13	4.44E-13	5.28E-13	6.02E-13
pb212	5.21E-09	5.20E-09	5.82E-09	6.51E-09	7.96E-09	1.10E-08	1.93E-08	2.67E-08	2.85E-08	2.82E-08	2.72E-08
bi209	4.37E-10	4.37E-10	4.72E-10	4.89E-10	5.20E-10	5.83E-10	7.73E-10	1.10E-09	1.44E-09	1.79E-09	2.16E-09
bi210	7.64E-14	7.64E-14	8.00E-14	8.14E-14	8.41E-14	9.02E-14	1.17E-13	2.04E-13	3.65E-13	6.25E-13	1.01E-12
bi211	6.10E-15	6.11E-15	6.50E-15	6.92E-15	7.81E-15	9.49E-15	1.39E-14	2.05E-14	2.63E-14	3.13E-14	3.57E-14
bi212	4.94E-10	5.04E-10	5.52E-10	6.17E-10	7.55E-10	1.05E-09	1.84E-09	2.53E-09	2.70E-09	2.67E-09	2.58E-09
bi213	3.45E-14	3.45E-14	9.05E-15	7.97E-15	7.98E-15	8.02E-15	8.16E-15	8.45E-15	8.81E-15	9.24E-15	9.74E-15
po210	1.62E-12	1.62E-12	1.81E-12	1.95E-12	2.14E-12	2.35E-12	3.06E-12	5.63E-12	1.01E-11	1.73E-11	2.79E-11
po216	2.01E-14	2.01E-14	2.25E-14	2.51E-14	3.07E-14	4.26E-14	7.46E-14	1.03E-13	1.10E-13	1.09E-13	1.05E-13
rn220	7.84E-12	7.84E-12	8.77E-12	9.81E-12	1.20E-11	1.66E-11	2.91E-11	4.02E-11	4.30E-11	4.25E-11	4.09E-11
rn222	1.82E-13	1.82E-13	1.89E-13	1.96E-13	2.12E-13	2.48E-13	3.96E-13	7.86E-13	1.37E-12	2.16E-12	3.17E-12
fr221	3.85E-15	3.85E-15	1.01E-15	8.89E-16	8.90E-16	8.94E-16	9.10E-16	9.42E-16	9.82E-16	1.03E-15	1.09E-15
ra223	4.96E-11	4.97E-11	5.29E-11	5.62E-11	6.35E-11	7.72E-11	1.13E-10	1.67E-10	2.14E-10	2.54E-10	2.90E-10
ra224	4.54E-08	4.54E-08	5.08E-08	5.68E-08	6.94E-08	9.63E-08	1.69E-07	2.33E-07	2.49E-07	2.46E-07	2.37E-07
ra225	1.71E-11	1.65E-11	4.12E-12	3.93E-12	3.94E-12	3.96E-12	4.03E-12	4.17E-12	4.35E-12	4.56E-12	4.81E-12
ra226	2.84E-08	2.84E-08	2.94E-08	3.05E-08	3.30E-08	3.86E-08	6.17E-08	1.22E-07	2.13E-07	3.36E-07	4.93E-07
ra228	2.27E-14	2.27E-14	2.45E-14	2.64E-14	3.03E-14	3.91E-14	7.04E-14	1.35E-13	2.09E-13	2.88E-13	3.70E-13
ac225	1.15E-11	1.15E-11	3.02E-12	2.66E-12	2.66E-12	2.67E-12	2.72E-12	2.82E-12	2.94E-12	3.08E-12	3.25E-12
ac227	3.62E-08	3.63E-08	3.85E-08	4.09E-08	4.55E-08	5.46E-08	8.01E-08	1.18E-07	1.51E-07	1.80E-07	2.05E-07
th226	4.72E-15	4.57E-15	2.35E-16	1.08E-17	2.44E-20	1.26E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	8.25E-11	8.26E-11	8.79E-11	9.34E-11	1.04E-10	1.27E-10	1.86E-10	2.75E-10	3.51E-10	4.18E-10	4.76E-10
th228	8.78E-06	8.79E-06	9.83E-06	1.10E-05	1.34E-05	1.87E-05	3.28E-05	4.52E-05	4.83E-05	4.77E-05	4.60E-05
th229	7.76E-07	7.76E-07	7.77E-07	7.78E-07	7.80E-07	7.84E-07	7.97E-07	8.26E-07	8.61E-07	9.03E-07	9.53E-07
th230	4.54E-04	4.54E-04	4.81E-04	5.09E-04	5.65E-04	6.79E-04	1.03E-03	1.67E-03	2.36E-03	3.11E-03	3.90E-03
th231	6.89E-07	3.62E-07	5.15E-09	5.15E-09	5.15E-09	5.15E-09	5.15E-09	5.15E-09	5.15E-09	5.15E-09	5.15E-09
th232	2.02E-04	2.02E-04	2.13E-04	2.23E-04	2.44E-04	2.87E-04	4.14E-04	6.26E-04	8.38E-04	1.05E-03	1.26E-03
th234	2.65E-06	2.65E-06	2.64E-06	2.64E-06	2.64E-06	2.64E-06	2.64E-06	2.64E-06	2.64E-06	2.64E-06	2.64E-06
pa231	5.08E-04	5.09E-04	5.09E-04	5.10E-04	5.10E-04	5.11E-04	5.15E-04	5.21E-04	5.27E-04	5.33E-04	5.39E-04
pa232	6.81E-07	4.01E-07	1.43E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

pa233	7.04E-06	7.03E-06	6.87E-06	6.85E-06	6.85E-06	6.86E-06	6.87E-06	6.90E-06	6.95E-06	7.01E-06	7.07E-06
pa234m	9.16E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11	8.92E-11
pa234	8.18E-10	1.05E-10	3.98E-11	3.98E-11	3.98E-11	3.98E-11	3.98E-11	3.98E-11	3.98E-11	3.98E-11	3.98E-11
u230	4.66E-12	4.51E-12	2.32E-13	1.06E-14	2.41E-17	1.25E-22	1.72E-38	.00E+00	.00E+00	.00E+00	.00E+00
u231	8.49E-11	7.20E-11	3.02E-17	7.12E-24	5.74E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	7.42E-04	7.44E-04	8.18E-04	8.90E-04	1.02E-03	1.23E-03	1.61E-03	1.81E-03	1.81E-03	1.74E-03	1.67E-03
u233	8.44E-04	8.44E-04	8.60E-04	8.76E-04	9.09E-04	9.80E-04	1.18E-03	1.50E-03	1.83E-03	2.15E-03	2.48E-03
u234	3.97E+01	3.97E+01	3.99E+01	4.01E+01	4.06E+01	4.14E+01	4.39E+01	4.79E+01	5.18E+01	5.55E+01	5.91E+01
u235	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03	1.27E+03
u236	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03	1.46E+03
u237	2.09E+00	1.88E+00	2.13E-04	1.06E-05	1.04E-05	9.87E-06	8.54E-06	6.71E-06	5.27E-06	4.14E-06	3.25E-06
u238	1.82E+05	1.82E+05	1.82E+05	1.82E+05	1.82E+05	1.82E+05	1.82E+05	1.82E+05	1.82E+05	1.82E+05	1.82E+05
np235	9.83E-06	9.82E-06	8.40E-06	7.15E-06	5.19E-06	2.74E-06	4.03E-07	1.65E-08	6.76E-10	2.77E-11	1.13E-12
np236m	6.43E-06	3.07E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	1.66E-03	1.66E-03	1.66E-03	1.66E-03	1.66E-03	1.66E-03	1.66E-03	1.66E-03	1.66E-03	1.66E-03	1.66E-03

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BWR SNF Assembly - Fuel - decay actinides page 10

0 nuclide concentrations, grams

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
np237	2.00E+02	2.00E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.02E+02	2.03E+02	2.05E+02	2.06E+02	2.08E+02
np238	4.05E-01	2.92E-01	1.01E-07	1.01E-07	1.00E-07	1.00E-07	9.85E-08	9.61E-08	9.38E-08	9.15E-08	8.93E-08
np239	1.11E+01	8.31E+00	4.94E-05	4.94E-05	4.94E-05	4.94E-05	4.94E-05	4.93E-05	4.93E-05	4.93E-05	4.93E-05
np240	3.23E-04	3.21E-11	3.35E-24	4.24E-24	6.00E-24	9.51E-24	2.01E-23	3.77E-23	5.53E-23	7.29E-23	9.05E-23
pu236	1.36E-03	1.36E-03	1.29E-03	1.21E-03	1.07E-03	8.46E-04	4.13E-04	1.25E-04	3.78E-05	1.15E-05	3.47E-06
pu237	3.63E-05	3.57E-05	9.12E-06	2.21E-06	1.34E-07	4.92E-10	2.45E-17	1.66E-29	1.13E-41	.00E+00	.00E+00
pu238	1.04E+02	1.04E+02	1.06E+02	1.07E+02	1.08E+02	1.08E+02	1.06E+02	1.02E+02	9.76E+01	9.38E+01	9.02E+01
pu239	1.12E+03	1.12E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03	1.13E+03
pu240	5.55E+02	5.55E+02	5.56E+02	5.56E+02	5.56E+02	5.57E+02	5.59E+02	5.63E+02	5.65E+02	5.67E+02	5.69E+02
pu241	3.59E+02	3.59E+02	3.54E+02	3.50E+02	3.42E+02	3.26E+02	2.82E+02	2.21E+02	1.74E+02	1.36E+02	1.07E+02
pu242	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02	1.85E+02
pu243	3.49E-02	1.22E-03	2.52E-13	2.52E-13	2.52E-13	2.52E-13	2.52E-13	2.52E-13	2.52E-13	2.52E-13	2.52E-13
pu244	1.43E-09	1.44E-09	1.93E-09	2.45E-09	3.46E-09	5.49E-09	1.16E-08	2.17E-08	3.19E-08	4.20E-08	5.22E-08
am239	4.89E-10	1.21E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	2.14E-07	1.54E-07	3.57E-20	2.63E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	1.91E+01	1.91E+01	2.33E+01	2.76E+01	3.60E+01	5.20E+01	9.56E+01	1.55E+02	2.01E+02	2.37E+02	2.64E+02
am242m	5.55E-01	5.55E-01	5.54E-01	5.54E-01	5.52E-01	5.50E-01	5.42E-01	5.28E-01	5.16E-01	5.03E-01	4.91E-01
am242	3.41E-02	1.21E-02	7.15E-06	7.14E-06	7.13E-06	7.09E-06	6.99E-06	6.82E-06	6.65E-06	6.49E-06	6.33E-06
am243	5.74E+01	5.74E+01	5.74E+01	5.74E+01	5.74E+01	5.74E+01	5.74E+01	5.73E+01	5.73E+01	5.73E+01	5.73E+01
am244	3.15E-02	6.07E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	7.86E-14	7.82E-14	6.45E-14	5.28E-14	3.55E-14	1.61E-14	1.50E-15	2.87E-17	5.50E-19	1.05E-20	2.02E-22
cm241	4.23E-09	4.14E-09	6.31E-10	8.94E-11	1.88E-12	8.36E-16	7.34E-26	1.35E-42	.00E+00	.00E+00	.00E+00
cm242	5.91E+00	5.91E+00	4.05E+00	2.73E+00	1.26E+00	2.67E-01	3.93E-03	1.38E-03	1.34E-03	1.31E-03	1.28E-03
cm243	2.60E-01	2.60E-01	2.58E-01	2.57E-01	2.54E-01	2.47E-01	2.30E-01	2.04E-01	1.80E-01	1.60E-01	1.41E-01
cm244	2.44E+01	2.45E+01	2.42E+01	2.40E+01	2.36E+01	2.27E+01	2.02E+01	1.67E+01	1.38E+01	1.14E+01	9.40E+00
cm245	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00	1.25E+00
cm246	2.85E-01	2.85E-01	2.85E-01	2.85E-01	2.85E-01	2.85E-01	2.84E-01	2.84E-01	2.84E-01	2.84E-01	2.84E-01
cm247	7.24E-03	7.24E-03	7.24E-03	7.24E-03	7.24E-03	7.24E-03	7.24E-03	7.24E-03	7.24E-03	7.24E-03	7.24E-03
cm248	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03	1.10E-03
cm249	1.18E-08	2.82E-14	8.20E-16	2.24E-17	1.83E-20	1.23E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	9.80E-12	9.80E-12	9.80E-12	9.80E-12	9.81E-12	9.80E-12	9.80E-12	9.80E-12	9.80E-12	9.80E-12	9.80E-12
bk249	2.05E-05	2.05E-05	1.69E-05	1.39E-05	9.32E-06	4.23E-06	3.94E-07	7.54E-09	1.44E-10	2.76E-12	5.29E-14
bk250	1.19E-08	6.77E-11	7.40E-14	5.87E-14	3.71E-14	1.48E-14	9.41E-16	9.57E-18	1.26E-19	2.99E-20	2.89E-20
cf249	4.77E-06	4.81E-06	8.41E-06	1.15E-05	1.60E-05	2.10E-05	2.47E-05	2.49E-05	2.46E-05	2.44E-05	2.42E-05
cf250	3.69E-06	3.70E-06	3.65E-06	3.60E-06	3.51E-06	3.33E-06	2.84E-06	2.18E-06	1.67E-06	1.28E-06	9.83E-07
cf251	2.62E-06	2.62E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.61E-06	2.60E-06	2.59E-06	2.58E-06	2.57E-06
cf252	2.41E-06	2.41E-06	2.26E-06	2.12E-06	1.86E-06	1.43E-06	6.51E-07	1.76E-07	4.74E-08	1.28E-08	3.45E-09
cf253	3.56E-09	3.42E-09	1.07E-10	2.93E-12	2.39E-15	1.61E-21	4.87E-40	.00E+00	.00E+00	.00E+00	.00E+00
cf254	3.10E-12	3.07E-12	1.11E-12	3.84E-13	4.73E-14	7.20E-16	2.54E-21	2.08E-30	1.70E-39	.00E+00	.00E+00
es253	3.53E-09	3.55E-09	6.42E-10	4.14E-11	1.13E-13	5.48E-19	4.25E-35	.00E+00	.00E+00	.00E+00	.00E+00

es254	1.94E-10	1.93E-10	1.55E-10	1.23E-10	7.74E-11	3.09E-11	1.97E-12	1.99E-14	2.02E-16	2.05E-18	2.08E-20
es255	2.19E-13	2.16E-13	4.44E-14	8.57E-15	3.33E-16	5.05E-19	1.76E-27	1.39E-41	.00E+00	.00E+00	.00E+00
total	1.88E+05	1.88E+05	1.88E+05	1.88E+05	1.88E+05	1.88E+05	1.88E+05	1.88E+05	1.88E+05	1.88E+05	1.88E+05

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BWR SNF Assembly - Fuel - decay actinides page 11

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tl206	1.25E-14	1.25E-14	1.31E-14	1.33E-14	1.38E-14	1.48E-14	1.92E-14	3.34E-14	5.98E-14	1.02E-13	1.65E-13
tl207	2.54E-06	2.54E-06	2.70E-06	2.87E-06	3.24E-06	3.94E-06	5.79E-06	8.54E-06	1.09E-05	1.30E-05	1.48E-05
tl208	2.60E-03	2.66E-03	2.91E-03	3.25E-03	3.98E-03	5.51E-03	9.67E-03	1.33E-02	1.42E-02	1.41E-02	1.36E-02
tl209	1.40E-08	1.40E-08	3.68E-09	3.24E-09	3.25E-09	3.26E-09	3.32E-09	3.44E-09	3.58E-09	3.76E-09	3.96E-09
pb209	6.69E-07	6.37E-07	1.75E-07	1.54E-07	1.55E-07	1.55E-07	1.58E-07	1.64E-07	1.71E-07	1.79E-07	1.89E-07
pb210	9.47E-09	9.49E-09	9.93E-09	1.01E-08	1.04E-08	1.12E-08	1.45E-08	2.53E-08	4.53E-08	7.76E-08	1.25E-07
pb211	2.54E-06	2.54E-06	2.71E-06	2.88E-06	3.25E-06	3.96E-06	5.81E-06	8.56E-06	1.10E-05	1.30E-05	1.49E-05
pb212	7.24E-03	7.23E-03	8.09E-03	9.05E-03	1.11E-02	1.53E-02	2.69E-02	3.71E-02	3.96E-02	3.92E-02	3.78E-02
pb214	2.81E-08	2.81E-08	2.91E-08	3.02E-08	3.26E-08	3.81E-08	6.10E-08	1.21E-07	2.11E-07	3.32E-07	4.87E-07
bi210	9.48E-09	9.48E-09	9.93E-09	1.01E-08	1.04E-08	1.12E-08	1.45E-08	2.53E-08	4.53E-08	7.76E-08	1.25E-07
bi211	2.54E-06	2.54E-06	2.71E-06	2.88E-06	3.25E-06	3.96E-06	5.81E-06	8.56E-06	1.10E-05	1.30E-05	1.49E-05
bi212	7.24E-03	7.39E-03	8.09E-03	9.05E-03	1.11E-02	1.53E-02	2.69E-02	3.71E-02	3.96E-02	3.92E-02	3.78E-02
bi213	6.69E-07	6.68E-07	1.75E-07	1.54E-07	1.55E-07	1.55E-07	1.58E-07	1.64E-07	1.71E-07	1.79E-07	1.89E-07
bi214	2.81E-08	2.81E-08	2.91E-08	3.02E-08	3.26E-08	3.81E-08	6.10E-08	1.21E-07	2.11E-07	3.32E-07	4.87E-07
po210	7.29E-09	7.30E-09	8.14E-09	8.78E-09	9.60E-09	1.06E-08	1.37E-08	2.53E-08	4.53E-08	7.76E-08	1.25E-07
po211	6.99E-09	7.00E-09	7.45E-09	7.92E-09	8.94E-09	1.09E-08	1.60E-08	2.35E-08	3.01E-08	3.59E-08	4.09E-08
po212	4.64E-03	4.74E-03	5.19E-03	5.80E-03	7.09E-03	9.83E-03	1.72E-02	2.37E-02	2.54E-02	2.51E-02	2.42E-02
po213	6.55E-07	6.54E-07	1.72E-07	1.51E-07	1.51E-07	1.52E-07	1.55E-07	1.60E-07	1.67E-07	1.75E-07	1.85E-07
po214	1.55E-07	1.51E-07	3.54E-08	3.05E-08	3.26E-08	3.81E-08	6.10E-08	1.21E-07	2.10E-07	3.32E-07	4.87E-07
po215	2.54E-06	2.54E-06	2.71E-06	2.88E-06	3.25E-06	3.96E-06	5.81E-06	8.56E-06	1.10E-05	1.30E-05	1.49E-05
po216	7.24E-03	7.23E-03	8.09E-03	9.05E-03	1.11E-02	1.53E-02	2.69E-02	3.71E-02	3.96E-02	3.92E-02	3.78E-02
po218	2.81E-08	2.81E-08	2.91E-08	3.02E-08	3.26E-08	3.82E-08	6.10E-08	1.21E-07	2.11E-07	3.32E-07	4.87E-07
at217	6.69E-07	6.68E-07	1.75E-07	1.54E-07	1.55E-07	1.55E-07	1.58E-07	1.64E-07	1.71E-07	1.79E-07	1.89E-07
rn218	1.27E-07	1.23E-07	6.34E-09	2.91E-10	6.58E-13	3.40E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	2.54E-06	2.54E-06	2.71E-06	2.88E-06	3.25E-06	3.96E-06	5.81E-06	8.56E-06	1.10E-05	1.30E-05	1.49E-05
rn220	7.24E-03	7.23E-03	8.09E-03	9.05E-03	1.11E-02	1.53E-02	2.69E-02	3.71E-02	3.96E-02	3.92E-02	3.78E-02
rn222	2.81E-08	2.81E-08	2.91E-08	3.02E-08	3.26E-08	3.82E-08	6.10E-08	1.21E-07	2.11E-07	3.32E-07	4.87E-07
fr221	6.69E-07	6.68E-07	1.75E-07	1.54E-07	1.55E-07	1.55E-07	1.58E-07	1.64E-07	1.71E-07	1.79E-07	1.89E-07
fr223	3.62E-08	3.62E-08	3.85E-08	4.09E-08	4.55E-08	5.45E-08	8.00E-08	1.18E-07	1.51E-07	1.80E-07	2.05E-07
ra222	1.27E-07	1.23E-07	6.34E-09	2.91E-10	6.58E-13	3.40E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	2.54E-06	2.54E-06	2.71E-06	2.88E-06	3.25E-06	3.96E-06	5.81E-06	8.56E-06	1.10E-05	1.30E-05	1.49E-05
ra224	7.24E-03	7.23E-03	8.09E-03	9.05E-03	1.11E-02	1.53E-02	2.69E-02	3.71E-02	3.96E-02	3.92E-02	3.78E-02
ra225	6.71E-07	6.47E-07	1.62E-07	1.54E-07	1.55E-07	1.55E-07	1.58E-07	1.64E-07	1.71E-07	1.79E-07	1.89E-07
ra226	2.81E-08	2.81E-08	2.91E-08	3.02E-08	3.26E-08	3.82E-08	6.10E-08	1.21E-07	2.11E-07	3.32E-07	4.87E-07
ra228	6.20E-12	6.20E-12	6.68E-12	7.20E-12	8.28E-12	1.07E-11	1.92E-11	3.69E-11	5.71E-11	7.87E-11	1.01E-10
ac225	6.69E-07	6.68E-07	1.75E-07	1.54E-07	1.55E-07	1.55E-07	1.58E-07	1.64E-07	1.71E-07	1.79E-07	1.89E-07
ac227	2.62E-06	2.62E-06	2.79E-06	2.96E-06	3.29E-06	3.95E-06	5.80E-06	8.55E-06	1.09E-05	1.30E-05	1.48E-05
ac228	6.20E-12	6.20E-12	6.68E-12	7.20E-12	8.28E-12	1.07E-11	1.92E-11	3.69E-11	5.71E-11	7.87E-11	1.01E-10
th226	1.27E-07	1.23E-07	6.34E-09	2.91E-10	6.58E-13	3.40E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	2.54E-06	2.54E-06	2.70E-06	2.87E-06	3.20E-06	3.90E-06	5.73E-06	8.44E-06	1.08E-05	1.29E-05	1.47E-05
th228	7.20E-03	7.21E-03	8.06E-03	9.01E-03	1.10E-02	1.53E-02	2.69E-02	3.70E-02	3.96E-02	3.91E-02	3.77E-02
th229	1.54E-07	1.54E-07	1.54E-07	1.54E-07	1.55E-07	1.55E-07	1.58E-07	1.64E-07	1.71E-07	1.79E-07	1.89E-07
th230	9.37E-06	9.37E-06	9.93E-06	1.05E-05	1.17E-05	1.40E-05	2.13E-05	3.45E-05	4.87E-05	6.41E-05	8.04E-05
th231	3.66E-01	1.92E-01	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03
th232	2.22E-11	2.22E-11	2.33E-11	2.45E-11	2.68E-11	3.15E-11	4.54E-11	6.87E-11	9.20E-11	1.15E-10	1.38E-10
th234	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02
pa231	2.40E-05	2.40E-05	2.41E-05	2.41E-05	2.41E-05	2.42E-05	2.43E-05	2.46E-05	2.49E-05	2.52E-05	2.55E-05
pa232	2.93E-01	1.72E-01	6.13E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pa233	1.46E-01	1.46E-01	1.43E-01	1.42E-01	1.42E-01	1.42E-01	1.43E-01	1.43E-01	1.44E-01	1.46E-01	1.47E-01
pa234m	6.29E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02
pa234	1.64E-03	2.10E-04	7.96E-05	7.96E-05	7.96E-05	7.96E-05	7.96E-05	7.96E-05	7.96E-05	7.96E-05	7.96E-05
u230	1.27E-07	1.23E-07	6.34E-09	2.90E-10	6.58E-13	3.40E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay actinides page 12

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
u231	1.14E-05	9.69E-06	4.07E-12	9.59E-19	6.85E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.64E-02	1.64E-02	1.81E-02	1.97E-02	2.25E-02	2.72E-02	3.57E-02	4.00E-02	3.99E-02	3.85E-02	3.68E-02
u233	8.14E-06	8.14E-06	8.29E-06	8.45E-06	8.76E-06	9.45E-06	1.14E-05	1.45E-05	1.76E-05	2.08E-05	2.39E-05
u234	2.47E-01	2.47E-01	2.48E-01	2.50E-01	2.52E-01	2.58E-01	2.73E-01	2.98E-01	3.22E-01	3.45E-01	3.67E-01
u235	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03
u236	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.43E-02	9.44E-02
u237	1.70E+05	1.54E+05	1.74E+01	8.68E-01	8.46E-01	8.06E-01	6.97E-01	5.48E-01	4.30E-01	3.38E-01	2.65E-01
u238	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02	6.13E-02
u239	2.57E+06	8.68E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u240	2.62E-14	2.63E-14	3.54E-14	4.47E-14	6.33E-14	1.00E-13	2.12E-13	3.97E-13	5.83E-13	7.69E-13	9.55E-13
np235	1.38E-02	1.38E-02	1.18E-02	1.00E-02	7.28E-03	3.84E-03	5.65E-04	2.31E-05	9.48E-07	3.88E-08	1.59E-09
np236m	3.80E+00	1.81E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05	2.19E-05
np237	1.41E-01	1.41E-01	1.42E-01	1.42E-01	1.42E-01	1.42E-01	1.43E-01	1.43E-01	1.44E-01	1.46E-01	1.47E-01
np238	1.05E+05	7.57E+04	2.61E-02	2.61E-02	2.61E-02	2.59E-02	2.55E-02	2.49E-02	2.43E-02	2.37E-02	2.32E-02
np239	2.57E+06	1.93E+06	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.14E+01	1.14E+01	1.14E+01	1.14E+01
np240m	2.62E-14	2.63E-14	3.54E-14	4.47E-14	6.33E-14	1.00E-13	2.12E-13	3.97E-13	5.83E-13	7.69E-13	9.55E-13
np240	4.09E+03	4.06E-04	4.24E-17	5.37E-17	7.60E-17	1.20E-16	2.54E-16	4.77E-16	7.00E-16	9.23E-16	1.15E-15
pu236	7.11E-01	7.11E-01	6.72E-01	6.32E-01	5.61E-01	4.42E-01	2.16E-01	6.53E-02	1.98E-02	5.98E-03	1.81E-03
pu237	4.43E-01	4.36E-01	1.11E-01	2.69E-02	1.63E-03	6.00E-06	2.99E-13	2.02E-25	.00E+00	.00E+00	.00E+00
pu238	1.77E+03	1.78E+03	1.81E+03	1.83E+03	1.85E+03	1.85E+03	1.81E+03	1.74E+03	1.67E+03	1.61E+03	1.55E+03
pu239	6.94E+01	6.96E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01	7.01E+01
pu240	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.27E+02	1.27E+02	1.28E+02	1.28E+02	1.29E+02	1.29E+02
pu241	3.71E+04	3.71E+04	3.67E+04	3.62E+04	3.53E+04	3.37E+04	2.91E+04	2.29E+04	1.80E+04	1.41E+04	1.11E+04
pu242	7.31E-01	7.31E-01	7.31E-01	7.31E-01	7.31E-01	7.31E-01	7.31E-01	7.31E-01	7.31E-01	7.31E-01	7.31E-01
pu243	9.08E+04	3.16E+03	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07
pu244	2.63E-14	2.64E-14	3.54E-14	4.48E-14	6.34E-14	1.01E-13	2.12E-13	3.98E-13	5.84E-13	7.70E-13	9.56E-13
pu245	2.21E-09	4.54E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pu246	6.40E-13	6.13E-13	2.03E-13	2.02E-13	2.02E-13	2.02E-13	2.02E-13	2.01E-13	2.01E-13	2.01E-13	2.01E-13
am239	5.40E-04	1.33E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	5.49E-02	3.96E-02	9.16E-15	6.76E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	6.55E+01	6.56E+01	8.00E+01	9.47E+01	1.23E+02	1.78E+02	3.28E+02	5.32E+02	6.90E+02	8.12E+02	9.05E+02
am242m	5.82E+00	5.82E+00	5.81E+00	5.80E+00	5.79E+00	5.76E+00	5.68E+00	5.54E+00	5.40E+00	5.27E+00	5.15E+00
am242	2.76E+04	9.77E+03	5.78E+00	5.78E+00	5.76E+00	5.74E+00	5.65E+00	5.51E+00	5.38E+00	5.25E+00	5.12E+00
am243	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.15E+01	1.14E+01	1.14E+01	1.14E+01	1.14E+01
am244	4.01E+04	7.72E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am245	4.91E-07	4.88E-07	4.02E-07	3.29E-07	2.22E-07	1.00E-07	9.36E-09	1.79E-10	3.43E-12	6.57E-14	1.26E-15
am246	6.40E-13	6.14E-13	2.03E-13	2.02E-13	2.02E-13	2.02E-13	2.02E-13	2.01E-13	2.01E-13	2.01E-13	2.01E-13
cm241	6.99E-05	6.84E-05	1.04E-05	1.48E-06	3.11E-08	1.38E-11	1.21E-21	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.96E+04	1.96E+04	1.34E+04	9.06E+03	4.17E+03	8.85E+02	1.30E+01	4.57E+00	4.45E+00	4.34E+00	4.24E+00
cm243	1.34E+01	1.34E+01	1.33E+01	1.33E+01	1.31E+01	1.28E+01	1.19E+01	1.05E+01	9.32E+00	8.25E+00	7.31E+00
cm244	1.98E+03	1.98E+03	1.96E+03	1.94E+03	1.91E+03	1.84E+03	1.64E+03	1.35E+03	1.12E+03	9.22E+02	7.61E+02
cm245	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01
cm246	8.75E-02	8.75E-02	8.75E-02	8.75E-02	8.74E-02	8.74E-02	8.74E-02	8.73E-02	8.73E-02	8.72E-02	8.71E-02
cm247	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07	6.55E-07
cm248	4.67E-06	4.67E-06	4.67E-06	4.67E-06	4.67E-06	4.67E-06	4.68E-06	4.68E-06	4.68E-06	4.68E-06	4.68E-06
cm249	1.38E-01	3.33E-07	9.66E-09	2.64E-10	2.15E-13	1.45E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm250	8.05E-13	8.05E-13	8.06E-13	8.06E-13	8.06E-13	8.06E-13	8.06E-13	8.06E-13	8.06E-13	8.06E-13	8.05E-13
bk249	3.37E-02	3.36E-02	2.77E-02	2.27E-02	1.53E-02	6.93E-03	6.46E-04	1.24E-05	2.37E-07	4.53E-09	8.68E-11
bk250	4.64E-02	2.64E-04	2.89E-07	2.29E-07	1.44E-07	5.77E-08	3.67E-09	3.73E-11	4.90E-13	1.17E-13	1.13E-13
bk251	3.93E-06	2.84E-09	5.83E-10	1.13E-10	4.38E-12	6.64E-15	2.31E-23	.00E+00	.00E+00	.00E+00	.00E+00
cf249	1.96E-05	1.97E-05	3.45E-05	4.70E-05	6.55E-05	8.63E-05	1.01E-04	1.02E-04	1.01E-04	1.00E-04	9.90E-05

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BWR SNF Assembly - Fuel - decay actinides page 13

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cf250	4.03E-04	4.04E-04	3.99E-04	3.94E-04	3.84E-04	3.64E-04	3.10E-04	2.38E-04	1.83E-04	1.40E-04	1.08E-04
cf251	4.15E-06	4.15E-06	4.15E-06	4.15E-06	4.15E-06	4.14E-06	4.13E-06	4.12E-06	4.10E-06	4.09E-06	4.07E-06
cf252	1.30E-03	1.29E-03	1.21E-03	1.14E-03	9.97E-04	7.67E-04	3.49E-04	9.43E-05	2.54E-05	6.86E-06	1.85E-06
cf253	1.03E-04	9.92E-05	3.11E-06	8.50E-08	6.93E-11	4.66E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	2.64E-08	2.61E-08	9.41E-09	3.26E-09	4.02E-10	6.12E-12	2.16E-17	1.77E-26	.00E+00	.00E+00	.00E+00
cf255	3.75E-09	5.71E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
es253	8.90E-05	8.94E-05	1.62E-05	1.04E-06	2.85E-09	1.38E-14	1.07E-30	.00E+00	.00E+00	.00E+00	.00E+00
es254	3.62E-07	3.61E-07	2.89E-07	2.29E-07	1.44E-07	5.76E-08	3.67E-09	3.72E-11	3.77E-13	3.82E-15	3.87E-17
es255	2.88E-09	2.83E-09	5.83E-10	1.13E-10	4.37E-12	6.63E-15	2.31E-23	.00E+00	.00E+00	.00E+00	.00E+00
total	5.64E+06	2.24E+06	5.42E+04	4.94E+04	4.36E+04	3.87E+04	3.32E+04	2.68E+04	2.17E+04	1.77E+04	1.45E+04

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BWR SNF Assembly - Fuel - decay fission products page 14

0 nuclide concentrations, grams

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.59E-02	1.59E-02	1.57E-02	1.55E-02	1.51E-02	1.42E-02	1.20E-02	9.08E-03	6.86E-03	5.18E-03	3.91E-03
li 6	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05	4.38E-05
li 7	3.69E-06	3.69E-06	3.69E-06	3.69E-06	3.69E-06	3.69E-06	3.69E-06	3.69E-06	3.69E-06	3.69E-06	3.69E-06
be 9	7.10E-06	7.10E-06	7.10E-06	7.10E-06	7.10E-06	7.10E-06	7.10E-06	7.10E-06	7.10E-06	7.10E-06	7.10E-06
be 10	4.74E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05	4.74E-05
c 14	9.57E-06	9.57E-06	9.57E-06	9.57E-06	9.57E-06	9.57E-06	9.57E-06	9.56E-06	9.56E-06	9.55E-06	9.54E-06
ni 66	3.76E-10	2.77E-10	4.66E-22	2.70E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	5.88E-13	4.32E-13	7.27E-25	4.21E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 66	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07
cu 67	4.88E-11	3.73E-11	1.49E-21	2.32E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 67	3.08E-08	3.08E-08	3.09E-08	3.09E-08	3.09E-08	3.09E-08	3.09E-08	3.09E-08	3.09E-08	3.09E-08	3.09E-08
zn 68	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09	2.88E-09
zn 69	3.15E-12	8.17E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	3.74E-11	1.12E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 69	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07	1.07E-07
zn 70	2.87E-06	2.87E-06	2.87E-06	2.87E-06	2.87E-06	2.87E-06	2.87E-06	2.87E-06	2.87E-06	2.87E-06	2.87E-06
ge 70	3.99E-09	3.99E-09	3.99E-09	3.99E-09	3.99E-09	3.99E-09	3.99E-09	3.99E-09	3.99E-09	3.99E-09	3.99E-09
zn 71m	2.69E-09	4.04E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 71	2.78E-05	2.78E-05	2.78E-05	2.78E-05	2.78E-05	2.78E-05	2.78E-05	2.78E-05	2.78E-05	2.78E-05	2.78E-05
ge 71	5.58E-13	5.25E-13	2.38E-15	8.75E-18	1.35E-22	3.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 72	2.18E-06	1.52E-06	2.27E-20	9.62E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	6.63E-07	5.76E-07	9.86E-21	4.19E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 72	1.75E-03	1.75E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03	1.76E-03
ga 73	6.10E-07	1.99E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73	5.09E-03	5.09E-03	5.09E-03	5.09E-03	5.09E-03	5.09E-03	5.09E-03	5.09E-03	5.09E-03	5.09E-03	5.09E-03
ge 73m	1.72E-11	5.61E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 74	4.72E-03	4.72E-03	4.72E-03	4.72E-03	4.72E-03	4.72E-03	4.72E-03	4.72E-03	4.72E-03	4.72E-03	4.72E-03
ge 75	1.11E-06	6.62E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 75	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02	4.04E-02
ge 76	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01	1.26E-01
as 76	2.98E-06	1.59E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 76	2.05E-03	2.05E-03	2.05E-03	2.05E-03	2.05E-03	2.05E-03	2.05E-03	2.05E-03	2.05E-03	2.05E-03	2.05E-03
ge 77	1.99E-05	4.57E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.08E-04	1.48E-04	4.27E-21	2.64E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 77	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01	2.74E-01
se 77m	1.04E-10	5.90E-11	1.70E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	2.73E-05	3.24E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	2.86E-05	4.85E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 78	9.38E-01	9.38E-01	9.38E-01	9.38E-01	9.38E-01	9.38E-01	9.38E-01	9.38E-01	9.38E-01	9.38E-01	9.38E-01
se 79	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00
br 79	1.33E-04	1.33E-04	1.42E-04	1.51E-04	1.70E-04	2.07E-04	3.17E-04	5.01E-04	6.85E-04	8.70E-04	1.05E-03
kr 79	1.10E-13	6.82E-14	3.00E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 80	4.88E+00	4.88E+00	4.88E+00	4.88E+00	4.88E+00	4.88E+00	4.88E+00	4.88E+00	4.88E+00	4.88E+00	4.88E+00

br 80	4.53E-10	5.39E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80m	3.26E-09	7.55E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 80	2.88E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05	2.88E-05
se 81	4.22E-05	1.23E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81m	9.65E-06	2.60E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 81	7.08E+00	7.08E+00	7.08E+00	7.08E+00	7.08E+00	7.08E+00	7.08E+00	7.08E+00	7.08E+00	7.08E+00	7.08E+00
kr 81	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06	2.59E-06
se 82	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01	1.18E+01
br 82	6.30E-04	3.94E-04	2.42E-22	2.85E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 15

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
kr 82	3.38E-01	3.38E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01	3.39E-01
br 83	7.68E-04	8.20E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01	1.27E+01
kr 83m	5.86E-04	2.70E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 84	4.39E+01	4.39E+01	4.39E+01	4.39E+01	4.39E+01	4.39E+01	4.39E+01	4.39E+01	4.39E+01	4.39E+01	4.39E+01
kr 85	7.08E+00	7.08E+00	6.96E+00	6.85E+00	6.63E+00	6.22E+00	5.12E+00	3.71E+00	2.68E+00	1.94E+00	1.41E+00
kr 85m	2.93E-03	7.23E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 85	3.50E+01	3.50E+01	3.51E+01	3.53E+01	3.55E+01	3.59E+01	3.70E+01	3.84E+01	3.94E+01	4.02E+01	4.07E+01
kr 86	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01	6.74E+01
rb 86	5.01E-03	4.83E-03	1.76E-04	5.64E-06	6.30E-09	7.92E-15	1.58E-32	.00E+00	.00E+00	.00E+00	.00E+00
sr 86	2.21E-01	2.22E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01	2.26E-01
kr 87	1.69E-03	3.56E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	8.78E+01	8.78E+01	8.78E+01	8.78E+01	8.78E+01	8.78E+01	8.78E+01	8.78E+01	8.78E+01	8.78E+01	8.78E+01
sr 87	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03	1.40E-03
sr 87m	2.84E-07	7.63E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	5.22E-03	1.49E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	5.60E-04	1.74E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 88	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02	1.26E+02
sr 89	3.09E+00	3.05E+00	8.99E-01	2.53E-01	2.06E-02	1.38E-04	4.12E-11	5.51E-22	7.36E-33	1.25E-43	.00E+00
y 89	1.65E+02	1.65E+02	1.67E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02
y 89m	1.06E-09	1.04E-09	3.07E-10	8.65E-11	7.06E-12	4.72E-14	1.41E-20	1.88E-31	2.87E-42	.00E+00	.00E+00
sr 90	1.86E+02	1.86E+02	1.84E+02	1.83E+02	1.81E+02	1.77E+02	1.64E+02	1.45E+02	1.28E+02	1.13E+02	1.00E+02
y 90	4.97E-02	4.94E-02	4.79E-02	4.76E-02	4.71E-02	4.59E-02	4.26E-02	3.77E-02	3.33E-02	2.95E-02	2.61E-02
y 90m	7.44E-08	4.04E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	2.03E+01	2.03E+01	2.15E+01	2.26E+01	2.48E+01	2.93E+01	4.18E+01	6.08E+01	7.77E+01	9.25E+01	1.06E+02
sr 91	3.25E-02	5.68E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	4.92E+00	4.89E+00	1.71E+00	5.70E-01	6.55E-02	8.64E-04	1.99E-09	7.99E-19	3.21E-28	1.29E-37	.00E+00
y 91m	1.64E-03	3.14E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 91	2.12E+02	2.12E+02	2.16E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02	2.17E+02
nb 91	3.68E-10	3.68E-10	3.67E-10	3.67E-10	3.67E-10	3.67E-10	3.66E-10	3.64E-10	3.62E-10	3.60E-10	3.58E-10
sr 92	1.03E-02	2.22E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.35E-02	4.27E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 92	2.33E+02	2.33E+02	2.33E+02	2.33E+02	2.33E+02	2.33E+02	2.33E+02	2.33E+02	2.33E+02	2.33E+02	2.33E+02
nb 92	4.53E-08	4.53E-08	4.53E-08	4.53E-08	4.53E-08	4.53E-08	4.53E-08	4.53E-08	4.53E-08	4.53E-08	4.53E-08
y 93	3.06E-02	5.97E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02	1.68E+02
nb 93	3.57E-05	3.57E-05	3.87E-05	4.20E-05	4.91E-05	6.50E-05	1.28E-04	2.76E-04	4.69E-04	6.98E-04	9.56E-04
nb 93m	2.79E-04	2.79E-04	2.95E-04	3.11E-04	3.42E-04	4.02E-04	5.68E-04	8.01E-04	9.88E-04	1.14E-03	1.26E-03
zr 94	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02	2.82E+02
nb 94	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04
zr 95	8.45E+00	8.36E+00	3.19E+00	1.17E+00	1.62E-01	3.10E-03	2.18E-08	5.64E-17	1.46E-25	3.76E-34	9.32E-43
nb 95	4.64E+00	4.64E+00	2.91E+00	1.26E+00	1.91E-01	3.85E-03	2.63E-08	6.79E-17	1.75E-25	4.53E-34	.00E+00
nb 95m	5.45E-03	5.41E-03	2.12E-03	7.77E-04	1.07E-04	2.06E-06	1.45E-11	3.74E-20	9.67E-29	2.54E-37	.00E+00
mo 95	2.51E+02	2.51E+02	2.58E+02	2.62E+02	2.64E+02	2.64E+02	2.64E+02	2.64E+02	2.64E+02	2.64E+02	2.64E+02
zr 96	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02	2.91E+02
nb 96	2.21E-04	1.08E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

mo 96	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01	2.54E+01
zr 97	9.46E-02	3.53E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	6.78E-03	2.53E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	8.85E-05	3.31E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 97	2.74E+02	2.74E+02	2.75E+02	2.75E+02	2.75E+02	2.75E+02	2.75E+02	2.75E+02	2.75E+02	2.75E+02	2.75E+02
nb 98m	4.50E-05	1.60E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

BWR SNF Assembly - Fuel - decay fission products page 16

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 98	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02	3.00E+02
tc 98	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03	4.39E-03
mo 99	4.46E-01	3.47E-01	6.16E-11	4.52E-21	4.30E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	2.61E+02	2.61E+02	2.62E+02	2.62E+02	2.62E+02	2.62E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02	2.61E+02
tc 99m	3.58E-02	3.04E-02	5.44E-12	3.99E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru 99	1.27E-02	1.27E-02	1.30E-02	1.32E-02	1.36E-02	1.45E-02	1.70E-02	2.13E-02	2.56E-02	2.99E-02	3.42E-02
mo100	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02	3.38E+02
ru100	5.96E+01	5.96E+01	5.96E+01	5.96E+01	5.96E+01	5.96E+01	5.96E+01	5.96E+01	5.96E+01	5.96E+01	5.96E+01
ru101	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02	2.71E+02
ru102	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02	2.87E+02
rh102	4.93E-04	4.93E-04	4.65E-04	4.38E-04	3.88E-04	3.06E-04	1.49E-04	4.52E-05	1.37E-05	4.14E-06	1.25E-06
ru103	6.21E+00	6.10E+00	1.27E+00	2.48E-01	9.83E-03	1.56E-05	6.16E-14	6.12E-28	6.06E-42	.00E+00	.00E+00
rh103	1.25E+02	1.25E+02	1.30E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02
rh103m	6.15E-03	6.05E-03	1.26E-03	2.45E-04	9.74E-06	1.54E-08	6.11E-17	6.06E-31	.00E+00	.00E+00	.00E+00
ru104	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02	1.94E+02
pd104	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02	1.17E+02
ru105	2.21E-02	5.37E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.70E-01	1.22E-01	8.00E-20	1.01E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	1.77E-05	4.31E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd105	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02	1.41E+02
ru106	3.10E+01	3.10E+01	2.62E+01	2.21E+01	1.57E+01	7.95E+00	1.03E+00	3.41E-02	1.13E-03	3.76E-05	1.25E-06
rh106	2.99E-05	2.88E-05	2.44E-05	2.05E-05	1.46E-05	7.38E-06	9.55E-07	3.17E-08	1.05E-09	3.49E-11	1.16E-12
rh106m	1.28E-04	5.94E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd106	9.74E+01	9.75E+01	1.02E+02	1.06E+02	1.13E+02	1.21E+02	1.27E+02	1.28E+02	1.28E+02	1.28E+02	1.28E+02
pd107	7.96E+01	7.96E+01	7.96E+01	7.96E+01	7.96E+01	7.96E+01	7.96E+01	7.96E+01	7.96E+01	7.96E+01	7.96E+01
ag107	2.23E-05	2.23E-05	2.43E-05	2.65E-05	3.07E-05	3.92E-05	6.47E-05	1.07E-04	1.50E-04	1.92E-04	2.35E-04
pd108	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01	5.20E+01
ag108	3.90E-10	4.71E-13	4.71E-13	4.70E-13	4.69E-13	4.66E-13	4.59E-13	4.46E-13	4.34E-13	4.23E-13	4.11E-13
ag108m	1.53E-04	1.53E-04	1.53E-04	1.52E-04	1.52E-04	1.51E-04	1.49E-04	1.45E-04	1.41E-04	1.37E-04	1.33E-04
cd108	1.54E-04	1.54E-04	1.54E-04	1.54E-04	1.55E-04	1.55E-04	1.55E-04	1.55E-04	1.55E-04	1.56E-04	1.56E-04
pd109	2.84E-02	8.46E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109	2.69E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01	2.70E+01
ag109m	2.28E-05	6.80E-06	1.60E-13	1.39E-13	1.06E-13	6.13E-14	1.19E-14	7.69E-16	4.99E-17	3.23E-18	2.09E-19
cd109	1.85E-07	1.85E-07	1.62E-07	1.41E-07	1.07E-07	6.19E-08	1.20E-08	7.76E-10	5.03E-11	3.26E-12	2.11E-13
pd110	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01	1.60E+01
ag110	8.96E-06	3.79E-09	2.96E-09	2.29E-09	1.38E-09	5.00E-10	2.39E-11	1.50E-13	9.47E-16	5.96E-18	3.75E-20
ag110m	2.45E-01	2.44E-01	1.91E-01	1.48E-01	8.89E-02	3.23E-02	1.54E-03	9.71E-06	6.11E-08	3.85E-10	2.42E-12
cd110	2.11E+01	2.11E+01	2.11E+01	2.12E+01	2.12E+01	2.13E+01	2.13E+01	2.13E+01	2.13E+01	2.13E+01	2.13E+01
pd111	1.23E-04	1.91E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	7.07E-05	3.43E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	5.67E-02	5.18E-02	1.31E-05	2.40E-09	9.92E-17	1.73E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	5.69E-06	1.10E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111	8.39E+00	8.39E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00	8.44E+00
cd111m	1.38E-06	1.66E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd112	2.95E-03	1.34E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	4.42E-04	2.35E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd112	4.38E+00	4.38E+00	4.38E+00	4.38E+00	4.38E+00	4.38E+00	4.38E+00	4.38E+00	4.38E+00	4.38E+00	4.38E+00
ag113	4.19E-04	1.90E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	2.13E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.17E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02	2.18E-02

cd113m	4.91E-02	4.91E-02	4.85E-02	4.79E-02	4.68E-02	4.45E-02	3.84E-02	3.00E-02	2.35E-02	1.84E-02	1.44E-02
in113	6.18E-03	6.19E-03	6.77E-03	7.37E-03	8.53E-03	1.08E-02	1.69E-02	2.52E-02	3.18E-02	3.69E-02	4.09E-02
cd114	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00

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BWR SNF Assembly - Fuel - decay fission products page 17

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
in114	1.06E-09	7.38E-10	2.12E-10	5.82E-11	4.50E-12	2.71E-14	5.90E-21	4.66E-32	.00E+00	.00E+00	.00E+00
in114m	4.65E-05	4.59E-05	1.32E-05	3.62E-06	2.80E-07	1.68E-09	3.67E-16	2.89E-27	2.28E-38	.00E+00	.00E+00
sn114	6.09E-04	6.10E-04	6.41E-04	6.50E-04	6.53E-04	6.54E-04	6.54E-04	6.54E-04	6.54E-04	6.54E-04	6.54E-04
cd115	2.21E-03	1.63E-03	1.54E-15	4.88E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	2.20E-03	2.17E-03	5.44E-04	1.29E-04	7.54E-06	2.58E-08	1.04E-15	4.87E-28	2.29E-40	.00E+00	.00E+00
in115	2.96E-01	2.96E-01	2.99E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01	3.00E-01
in115m	1.86E-04	1.49E-04	2.52E-10	5.98E-11	3.49E-12	1.20E-14	4.79E-22	2.25E-34	.00E+00	.00E+00	.00E+00
sn115	6.24E-02	6.25E-02	6.26E-02	6.26E-02	6.26E-02	6.26E-02	6.26E-02	6.26E-02	6.26E-02	6.26E-02	6.26E-02
cd116	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00	1.75E+00
in116m	2.93E-05	2.89E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn116	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00	1.05E+00
cd117	9.87E-05	1.24E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.05E-05	2.17E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.16E-05	1.39E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	7.03E-05	4.19E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00	1.63E+00
sn117m	2.06E-04	1.97E-04	2.11E-06	1.89E-08	1.70E-12	1.40E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	3.04E-05	7.34E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00	1.32E+00
sn119	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00	1.39E+00
sn119m	3.21E-03	3.20E-03	2.59E-03	2.08E-03	1.35E-03	5.70E-04	4.27E-05	5.68E-07	7.56E-09	1.01E-10	1.34E-12
sn120	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00	1.36E+00
sn121	1.06E-03	5.75E-04	6.37E-07	6.35E-07	6.31E-07	6.23E-07	6.00E-07	5.63E-07	5.29E-07	4.97E-07	4.66E-07
sn121m	1.47E-02	1.47E-02	1.46E-02	1.46E-02	1.45E-02	1.43E-02	1.38E-02	1.29E-02	1.21E-02	1.14E-02	1.07E-02
sb121	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.28E+00	1.29E+00
sn122	1.76E+00	1.76E+00	1.76E+00	1.76E+00	1.76E+00	1.76E+00	1.76E+00	1.76E+00	1.76E+00	1.76E+00	1.76E+00
sb122	6.08E-04	4.70E-04	5.63E-14	2.74E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	1.58E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01	1.59E-01
sn123	9.36E-03	9.31E-03	5.77E-03	3.51E-03	1.32E-03	1.86E-04	5.19E-07	2.88E-11	1.59E-15	8.84E-20	4.90E-24
sb123	1.55E+00	1.55E+00	1.55E+00	1.55E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00	1.56E+00
te123	1.51E-03	1.52E-03	1.67E-03	1.77E-03	1.86E-03	1.90E-03	1.91E-03	1.91E-03	1.91E-03	1.91E-03	1.91E-03
te123m	3.95E-04	3.93E-04	2.35E-04	1.37E-04	4.76E-05	5.74E-06	1.01E-08	2.57E-13	6.54E-18	1.67E-22	4.25E-27
sn124	2.94E+00	2.94E+00	2.94E+00	2.94E+00	2.94E+00	2.94E+00	2.94E+00	2.94E+00	2.94E+00	2.94E+00	2.94E+00
sb124	1.06E-02	1.05E-02	3.76E-03	1.30E-03	1.58E-04	2.35E-06	7.80E-12	5.75E-21	4.24E-30	3.12E-39	.00E+00
te124	1.30E-01	1.31E-01	1.37E-01	1.40E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01	1.41E-01
sn125	5.83E-03	5.42E-03	9.02E-06	1.17E-08	2.29E-14	9.00E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb125	1.77E+00	1.77E+00	1.67E+00	1.56E+00	1.38E+00	1.07E+00	4.98E-01	1.40E-01	3.93E-02	1.10E-02	3.10E-03
te125	1.81E+00	1.81E+00	1.92E+00	2.02E+00	2.21E+00	2.52E+00	3.10E+00	3.46E+00	3.57E+00	3.60E+00	3.60E+00
te125m	2.32E-02	2.32E-02	2.30E-02	2.20E-02	1.95E-02	1.52E-02	7.08E-03	1.99E-03	5.59E-04	1.57E-04	4.41E-05
sn126	6.76E+00	6.76E+00	6.76E+00	6.76E+00	6.76E+00	6.76E+00	6.76E+00	6.76E+00	6.76E+00	6.76E+00	6.76E+00
sb126	6.61E-04	6.25E-04	4.63E-06	3.46E-07	3.21E-07	3.21E-07	3.21E-07	3.21E-07	3.21E-07	3.21E-07	3.21E-07
sb126m	8.26E-07	2.44E-09	2.44E-09	2.44E-09	2.44E-09	2.44E-09	2.44E-09	2.44E-09	2.44E-09	2.44E-09	2.44E-09
te126	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.49E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01	1.50E-01
xe126	1.02E-08	1.02E-08	1.02E-08	1.02E-08	1.02E-08	1.02E-08	1.02E-08	1.02E-08	1.02E-08	1.02E-08	1.02E-08
sn127	3.79E-04	1.37E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	4.13E-02	3.48E-02	3.82E-09	2.23E-16	1.14E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te127	4.15E-03	3.86E-03	4.09E-04	2.27E-04	7.10E-05	6.96E-06	6.56E-09	5.93E-14	5.37E-19	4.86E-24	4.40E-29
te127m	1.99E-01	1.99E-01	1.17E-01	6.49E-02	2.03E-02	1.99E-03	1.87E-06	1.69E-11	1.53E-16	1.39E-21	1.26E-26
i127	1.41E+01	1.41E+01	1.43E+01	1.43E+01	1.43E+01	1.44E+01	1.44E+01	1.44E+01	1.44E+01	1.44E+01	1.44E+01
xe127	8.07E-07	7.92E-07	1.45E-07	2.50E-08	7.70E-10	7.34E-13	6.37E-22	5.02E-37	.00E+00	.00E+00	.00E+00
sn128	6.75E-04	3.12E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	6.80E-04	1.12E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 18

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sb128m	1.27E-04	6.67E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te128	3.21E+01	3.21E+01	3.21E+01	3.21E+01	3.21E+01	3.21E+01	3.21E+01	3.21E+01	3.21E+01	3.21E+01	3.21E+01
xe128	1.46E+00	1.46E+00	1.46E+00	1.46E+00	1.46E+00	1.46E+00	1.46E+00	1.46E+00	1.46E+00	1.46E+00	1.46E+00
sb129	6.98E-03	1.61E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	1.75E-03	2.72E-04	3.58E-05	5.31E-06	1.22E-07	6.54E-11	9.96E-21	4.33E-37	.00E+00	.00E+00	.00E+00
te129m	2.47E-01	2.44E-01	3.88E-02	5.76E-03	1.33E-04	7.09E-08	1.08E-17	4.69E-34	.00E+00	.00E+00	.00E+00
i129	6.27E+01	6.28E+01	6.30E+01	6.30E+01	6.30E+01	6.30E+01	6.30E+01	6.30E+01	6.30E+01	6.30E+01	6.30E+01
xe129	1.18E-02	1.18E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02	1.19E-02
xe129m	1.19E-04	1.11E-04	1.07E-07	7.90E-11	5.12E-17	2.19E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	3.49E-04	3.70E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te130	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02
i130	2.56E-03	6.71E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00	4.13E+00
te131	1.69E-03	5.48E-05	2.02E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	3.04E-02	1.75E-02	6.47E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	9.36E-01	8.74E-01	4.16E-04	1.43E-07	2.06E-14	4.36E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131	1.29E+02	1.29E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02	1.30E+02
xe131m	1.59E-02	1.59E-02	2.42E-04	1.17E-06	2.79E-11	1.60E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	5.45E-01	4.41E-01	2.64E-09	7.49E-18	9.76E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.62E-02	1.33E-02	7.93E-11	2.25E-19	2.94E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe132	4.14E+02	4.14E+02	4.14E+02	4.14E+02	4.14E+02	4.14E+02	4.14E+02	4.14E+02	4.14E+02	4.14E+02	4.14E+02
cs132	6.46E-05	5.81E-05	4.25E-09	2.14E-13	6.92E-22	7.42E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba132	1.57E-04	1.57E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04	1.58E-04
te133	1.11E-03	3.08E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	4.02E-03	6.05E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.07E-01	9.54E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	1.98E-06	1.67E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	1.26E+00	1.21E+00	1.05E-05	5.14E-11	1.65E-21	1.68E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	1.68E-02	1.51E-02	1.14E-14	2.20E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs133	3.78E+02	3.78E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02	3.80E+02
ba133	3.28E-08	3.28E-08	3.23E-08	3.17E-08	3.07E-08	2.87E-08	2.36E-08	1.70E-08	1.22E-08	8.78E-09	6.32E-09
te134	5.90E-03	2.51E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	9.62E-03	2.19E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe134	5.46E+02	5.46E+02	5.46E+02	5.46E+02	5.46E+02	5.46E+02	5.46E+02	5.46E+02	5.46E+02	5.46E+02	5.46E+02
cs134	4.48E+01	4.47E+01	4.12E+01	3.78E+01	3.20E+01	2.28E+01	8.33E+00	1.55E+00	2.89E-01	5.38E-02	1.00E-02
cs134m	1.06E-03	3.49E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba134	4.22E+01	4.23E+01	4.58E+01	4.91E+01	5.50E+01	6.41E+01	7.86E+01	8.54E+01	8.67E+01	8.69E+01	8.70E+01
i135	6.37E-02	5.06E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	3.26E-02	2.40E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.58E-04	3.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	2.08E+02	2.08E+02	2.09E+02	2.09E+02	2.09E+02	2.09E+02	2.09E+02	2.09E+02	2.09E+02	2.09E+02	2.09E+02
cs135m	3.57E-04	2.36E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.31E-01	5.32E-01	5.32E-01	5.32E-01
ba135m	2.29E-04	1.28E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe136	7.46E+02	7.46E+02	7.46E+02	7.46E+02	7.46E+02	7.46E+02	7.46E+02	7.46E+02	7.46E+02	7.46E+02	7.46E+02
cs136	2.12E-01	2.01E-01	1.85E-03	1.42E-05	9.36E-10	4.13E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136	1.39E+01	1.39E+01	1.41E+01	1.41E+01	1.41E+01	1.41E+01	1.41E+01	1.41E+01	1.41E+01	1.41E+01	1.41E+01
ba136m	6.44E-09	6.11E-09	5.63E-11	4.31E-13	2.84E-17	1.26E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	4.26E+02	4.26E+02	4.24E+02	4.21E+02	4.17E+02	4.07E+02	3.80E+02	3.38E+02	3.01E+02	2.69E+02	2.39E+02
ba137	3.83E+01	3.83E+01	4.07E+01	4.32E+01	4.80E+01	5.76E+01	8.48E+01	1.26E+02	1.63E+02	1.96E+02	2.25E+02
ba137m	6.53E-05	6.51E-05	6.47E-05	6.44E-05	6.36E-05	6.22E-05	5.80E-05	5.17E-05	4.60E-05	4.10E-05	3.65E-05
ba138	4.67E+02	4.67E+02	4.67E+02	4.67E+02	4.67E+02	4.67E+02	4.67E+02	4.67E+02	4.67E+02	4.67E+02	4.67E+02

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BWR SNF Assembly - Fuel - decay fission products page 19

0 nuclide concentrations, grams

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la138	2.84E-03	2.84E-03	2.84E-03	2.84E-03	2.84E-03	2.84E-03	2.84E-03	2.84E-03	2.84E-03	2.84E-03	2.84E-03
ba139	1.27E-02	1.08E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la139	4.36E+02	4.36E+02	4.36E+02	4.36E+02	4.36E+02	4.36E+02	4.36E+02	4.36E+02	4.36E+02	4.36E+02	4.36E+02
ce139	3.55E-06	3.54E-06	2.26E-06	1.42E-06	5.64E-07	8.97E-08	3.60E-10	3.64E-14	3.68E-18	3.72E-22	3.77E-26
pr139	3.97E-10	9.14E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	2.79E+00	2.64E+00	2.09E-02	1.37E-04	6.67E-09	1.60E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	3.88E-01	3.77E-01	3.17E-03	2.08E-05	1.01E-09	2.42E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce140	4.70E+02	4.70E+02	4.73E+02	4.73E+02	4.73E+02	4.73E+02	4.73E+02	4.73E+02	4.73E+02	4.73E+02	4.73E+02
la141	3.25E-02	5.06E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	6.53E+00	6.43E+00	9.63E-01	1.34E-01	2.72E-03	1.12E-06	7.97E-17	9.68E-34	.00E+00	.00E+00	.00E+00
pr141	3.94E+02	3.94E+02	4.00E+02	4.00E+02	4.00E+02	4.01E+02	4.01E+02	4.01E+02	4.01E+02	4.01E+02	4.01E+02
nd141	7.33E-10	9.17E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.23E-02	2.42E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	4.10E+02	4.10E+02	4.10E+02	4.10E+02	4.10E+02	4.10E+02	4.10E+02	4.10E+02	4.10E+02	4.10E+02	4.10E+02
pr142	1.25E-02	5.23E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd142	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01
ce143	2.54E-01	1.54E-01	5.05E-21	2.83E-41	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	2.45E+00	2.42E+00	2.75E-02	2.44E-04	2.14E-08	1.68E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd143	2.42E+02	2.42E+02	2.45E+02	2.45E+02	2.45E+02	2.45E+02	2.45E+02	2.45E+02	2.45E+02	2.45E+02	2.45E+02
ce144	4.93E+01	4.92E+01	3.96E+01	3.16E+01	2.03E+01	8.35E+00	5.81E-01	6.83E-03	8.04E-05	9.46E-07	1.11E-08
pr144	2.09E-03	2.07E-03	1.67E-03	1.33E-03	8.55E-04	3.52E-04	2.45E-05	2.88E-07	3.39E-09	3.99E-11	4.69E-13
pr144m	1.22E-05	1.21E-05	9.74E-06	7.77E-06	4.98E-06	2.05E-06	1.43E-07	1.68E-09	1.98E-11	2.32E-13	2.74E-15
nd144	4.74E+02	4.74E+02	4.84E+02	4.92E+02	5.03E+02	5.15E+02	5.23E+02	5.23E+02	5.23E+02	5.23E+02	5.23E+02
pr145	3.20E-02	2.00E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nd145	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02	2.30E+02
pm145	4.75E-04	4.75E-04	5.10E-04	5.40E-04	5.80E-04	6.17E-04	5.93E-04	4.93E-04	4.05E-04	3.33E-04	2.74E-04
sm145	2.41E-04	2.41E-04	2.01E-04	1.66E-04	1.15E-04	5.44E-05	5.83E-06	1.41E-07	3.41E-09	8.23E-11	1.99E-12
nd146	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02	2.66E+02
pm146	3.13E-03	3.13E-03	3.04E-03	2.94E-03	2.76E-03	2.44E-03	1.67E-03	8.94E-04	4.78E-04	2.55E-04	1.36E-04
sm146	8.54E-03	8.54E-03	8.57E-03	8.61E-03	8.67E-03	8.78E-03	9.04E-03	9.30E-03	9.44E-03	9.52E-03	9.56E-03
nd147	9.50E-01	8.93E-01	3.24E-03	9.43E-06	9.22E-11	8.93E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	3.29E+01	3.30E+01	3.17E+01	2.97E+01	2.60E+01	2.00E+01	9.04E+00	2.41E+00	6.44E-01	1.72E-01	4.58E-02
sm147	3.65E+01	3.65E+01	3.86E+01	4.07E+01	4.44E+01	5.04E+01	6.13E+01	6.80E+01	6.97E+01	7.02E+01	7.03E+01
nd148	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02	1.31E+02
pm148	1.42E-01	1.25E-01	3.45E-04	7.29E-05	3.39E-06	7.38E-09	7.59E-17	3.70E-30	.00E+00	.00E+00	.00E+00
pm148m	2.27E-01	2.23E-01	5.01E-02	1.06E-02	4.93E-04	1.07E-06	1.10E-14	5.38E-28	2.61E-41	.00E+00	.00E+00
sm148	6.63E+01	6.63E+01	6.66E+01	6.66E+01	6.67E+01	6.67E+01	6.67E+01	6.67E+01	6.67E+01	6.67E+01	6.67E+01
nd149	3.84E-03	2.54E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	1.80E-01	1.35E-01	1.04E-13	2.67E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	5.24E-01	5.73E-01	7.08E-01	7.08E-01	7.08E-01	7.08E-01	7.08E-01	7.08E-01	7.08E-01	7.08E-01	7.08E-01
eu149	2.57E-11	2.55E-11	1.31E-11	6.60E-12	1.69E-12	1.11E-13	3.18E-17	3.93E-23	4.86E-29	6.00E-35	7.43E-41
nd150	6.36E+01	6.36E+01	6.36E+01	6.36E+01	6.36E+01	6.36E+01	6.36E+01	6.36E+01	6.36E+01	6.36E+01	6.36E+01
pm150	6.89E-05	1.39E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm150	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02	1.01E+02
eu150	3.54E-07	3.54E-07	3.52E-07	3.51E-07	3.47E-07	3.41E-07	3.21E-07	2.92E-07	2.65E-07	2.40E-07	2.18E-07
pm151	3.49E-02	1.95E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	4.27E+00	4.28E+00	4.29E+00	4.28E+00	4.27E+00	4.24E+00	4.14E+00	3.98E+00	3.83E+00	3.69E+00	3.55E+00
eu151	6.84E-03	6.93E-03	1.50E-02	2.34E-02	3.98E-02	7.26E-02	1.69E-01	3.26E-01	4.76E-01	6.21E-01	7.60E-01
sm152	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01
eu152	1.59E-02	1.59E-02	1.57E-02	1.55E-02	1.51E-02	1.43E-02	1.22E-02	9.43E-03	7.27E-03	5.61E-03	4.32E-03
eu152m	1.84E-05	3.08E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	3.88E-02	3.88E-02	3.88E-02	3.89E-02	3.90E-02	3.92E-02	3.98E-02	4.06E-02	4.12E-02	4.16E-02	4.20E-02

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BWR SNF Assembly - Fuel - decay fission products page 20

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sm153	1.88E-01	1.31E-01	1.67E-15	6.06E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

eu153	3.83E+01	3.84E+01	3.85E+01	3.85E+01	3.85E+01	3.85E+01	3.85E+01	3.85E+01	3.85E+01	3.85E+01	3.85E+01
gd153	2.47E-03	2.47E-03	1.91E-03	1.46E-03	8.67E-04	3.04E-04	1.31E-05	6.94E-08	3.68E-10	1.95E-12	1.03E-14
sm154	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01	1.30E+01
eu154	1.71E+01	1.71E+01	1.67E+01	1.64E+01	1.58E+01	1.45E+01	1.14E+01	7.62E+00	5.09E+00	3.40E+00	2.27E+00
gd154	3.20E+00	3.20E+00	3.53E+00	3.87E+00	4.52E+00	5.74E+00	8.87E+00	1.27E+01	1.52E+01	1.69E+01	1.80E+01
eu155	6.42E+00	6.42E+00	6.19E+00	5.97E+00	5.54E+00	4.78E+00	3.06E+00	1.46E+00	6.97E-01	3.32E-01	1.58E-01
gd155	8.57E-02	8.83E-02	3.16E-01	5.44E-01	9.70E-01	1.73E+00	3.45E+00	5.05E+00	5.81E+00	6.18E+00	6.35E+00
sm156	1.55E-03	2.64E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	8.80E-01	8.42E-01	1.45E-02	2.13E-04	5.07E-08	2.91E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd156	3.77E+01	3.78E+01	3.86E+01	3.86E+01	3.86E+01	3.86E+01	3.86E+01	3.86E+01	3.86E+01	3.86E+01	3.86E+01
eu157	2.84E-03	9.55E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd157	3.45E-02	3.64E-02	3.74E-02	3.74E-02	3.74E-02	3.74E-02	3.74E-02	3.74E-02	3.74E-02	3.74E-02	3.74E-02
eu158	4.89E-05	1.98E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd158	7.22E+00	7.22E+00	7.22E+00	7.22E+00	7.22E+00	7.22E+00	7.22E+00	7.22E+00	7.22E+00	7.22E+00	7.22E+00
gd159	8.74E-04	3.61E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb159	8.06E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01	8.07E-01
gd160	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01	3.72E-01
tb160	2.15E-02	2.13E-02	9.09E-03	3.74E-03	6.49E-04	1.96E-05	5.37E-10	1.34E-17	3.33E-25	8.30E-33	2.07E-40
dy160	1.00E-01	1.00E-01	1.13E-01	1.18E-01	1.21E-01	1.22E-01	1.22E-01	1.22E-01	1.22E-01	1.22E-01	1.22E-01
tb161	1.46E-03	1.32E-03	1.73E-07	1.60E-11	1.70E-19	1.98E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy161	1.23E-01	1.24E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01	1.25E-01
tb162m	1.06E-07	6.08E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy162	9.62E-02	9.62E-02	9.62E-02	9.62E-02	9.62E-02	9.62E-02	9.62E-02	9.62E-02	9.62E-02	9.62E-02	9.62E-02
dy163	9.06E-02	9.06E-02	9.06E-02	9.06E-02	9.06E-02	9.06E-02	9.06E-02	9.06E-02	9.06E-02	9.06E-02	9.06E-02
dy164	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02	2.56E-02
dy165	1.17E-05	9.48E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho165	4.74E-02	4.74E-02	4.74E-02	4.74E-02	4.74E-02	4.74E-02	4.74E-02	4.74E-02	4.74E-02	4.74E-02	4.74E-02
dy166	2.20E-06	1.79E-06	2.37E-14	1.53E-22	1.02E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	3.95E-05	2.15E-05	1.16E-14	7.50E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	2.16E-04	2.16E-04	2.16E-04	2.16E-04	2.15E-04	2.15E-04	2.15E-04	2.14E-04	2.14E-04	2.13E-04	2.13E-04
er166	1.34E-02	1.34E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02	1.35E-02
er167	2.90E-04	2.90E-04	2.90E-04	2.90E-04	2.90E-04	2.90E-04	2.90E-04	2.90E-04	2.90E-04	2.90E-04	2.90E-04
er168	5.40E-04	5.40E-04	5.40E-04	5.40E-04	5.40E-04	5.40E-04	5.40E-04	5.40E-04	5.40E-04	5.40E-04	5.40E-04
er169	8.91E-09	8.28E-09	1.17E-11	1.28E-14	1.79E-20	3.61E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm169	1.09E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06	1.10E-06
er170	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06	1.21E-06
tm170	7.23E-10	7.19E-10	4.45E-10	2.70E-10	1.01E-10	1.41E-11	3.83E-14	2.03E-18	1.08E-22	5.72E-27	3.04E-31
yb170	6.08E-09	6.08E-09	6.36E-09	6.53E-09	6.70E-09	6.79E-09	6.80E-09	6.80E-09	6.80E-09	6.80E-09	6.80E-09
er171	4.24E-10	4.63E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	7.07E-07	7.06E-07	6.47E-07	5.90E-07	4.93E-07	3.44E-07	1.16E-07	1.91E-08	3.15E-09	5.18E-10	8.52E-11
yb171	8.79E-07	8.80E-07	9.39E-07	9.96E-07	1.09E-06	1.24E-06	1.47E-06	1.57E-06	1.58E-06	1.59E-06	1.59E-06
er172	1.85E-09	1.32E-09	1.20E-22	3.35E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm172	2.49E-09	2.38E-09	6.41E-19	2.00E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
yb172	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06	1.05E-06
total	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04	1.23E+04

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BWR SNF Assembly - Fuel - decay fission products page 21

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.54E+02	1.54E+02	1.52E+02	1.50E+02	1.46E+02	1.38E+02	1.16E+02	8.78E+01	6.63E+01	5.01E+01	3.78E+01
be 10	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06	1.06E-06
c 14	4.27E-05	4.27E-05	4.27E-05	4.27E-05	4.27E-05	4.27E-05	4.27E-05	4.26E-05	4.26E-05	4.26E-05	4.26E-05
ni 66	3.27E-04	2.41E-04	4.06E-16	2.35E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	3.29E-04	2.42E-04	4.06E-16	2.35E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	3.70E-05	2.82E-05	1.13E-15	1.75E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69	1.52E-04	3.95E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.23E-04	3.69E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 71m	3.00E-02	4.50E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	8.98E-08	8.45E-08	3.84E-10	1.41E-12	2.18E-17	5.28E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

zn 72	2.04E+00	1.43E+00	2.12E-14	9.01E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	2.05E+00	1.78E+00	3.04E-14	1.29E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 73	5.39E+00	1.76E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 73m	5.32E+00	1.74E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 75	3.36E+01	2.00E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 76	4.67E+00	2.48E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 77	7.17E+01	1.65E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 77	2.19E+02	1.55E+02	4.47E-15	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 77m	8.76E-01	4.96E-01	1.43E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 78	7.48E+02	8.88E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
as 78	7.59E+02	1.29E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 79	2.41E-01	2.41E-01	2.41E-01	2.41E-01	2.41E-01	2.41E-01	2.41E-01	2.41E-01	2.41E-01	2.41E-01	2.40E-01
kr 79	1.24E-07	7.73E-08	3.40E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80	6.02E-02	7.17E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 80m	2.89E-02	6.69E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81	5.31E+03	1.55E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
se 81m	3.91E+02	1.05E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 81	5.37E-08	5.37E-08	5.37E-08	5.37E-08	5.37E-08	5.37E-08	5.37E-08	5.37E-08	5.37E-08	5.37E-08	5.37E-08
br 82	6.82E+02	4.27E+02	2.62E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 83	1.21E+04	1.29E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 83m	1.21E+04	5.57E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
br 84	2.21E+04	5.73E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 85	2.78E+03	2.78E+03	2.73E+03	2.69E+03	2.60E+03	2.44E+03	2.01E+03	1.45E+03	1.05E+03	7.62E+02	5.52E+02
kr 85m	2.41E+04	5.95E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 86	4.08E+02	3.93E+02	1.44E+01	4.60E-01	5.14E-04	6.46E-10	1.28E-27	.00E+00	.00E+00	.00E+00	.00E+00
kr 87	4.78E+04	1.01E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 87	7.52E-06	7.52E-06	7.52E-06	7.52E-06	7.52E-06	7.52E-06	7.52E-06	7.52E-06	7.52E-06	7.52E-06	7.52E-06
sr 87m	3.63E+00	9.78E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
kr 88	6.55E+04	1.87E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rb 88	6.74E+04	2.09E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	8.96E+04	8.84E+04	2.61E+04	7.34E+03	5.99E+02	4.01E+00	1.20E-06	1.60E-17	2.14E-28	.00E+00	.00E+00
y 89m	8.39E+00	8.22E+00	2.43E+00	6.83E-01	5.57E-02	3.73E-04	1.11E-10	1.49E-21	2.28E-32	.00E+00	.00E+00
sr 90	2.62E+04	2.62E+04	2.60E+04	2.59E+04	2.56E+04	2.49E+04	2.32E+04	2.05E+04	1.81E+04	1.60E+04	1.42E+04
y 90	2.70E+04	2.68E+04	2.60E+04	2.59E+04	2.56E+04	2.49E+04	2.32E+04	2.05E+04	1.81E+04	1.60E+04	1.42E+04
y 90m	8.13E-01	4.41E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 91	1.18E+05	2.05E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.21E+05	1.20E+05	4.19E+04	1.40E+04	1.61E+03	2.12E+01	4.88E-05	1.96E-14	7.86E-24	.00E+00	.00E+00
y 91m	6.83E+04	1.30E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	2.12E-09	2.12E-09	2.12E-09	2.12E-09	2.12E-09	2.12E-09	2.11E-09	2.10E-09	2.09E-09	2.08E-09	2.07E-09
sr 92	1.29E+05	2.79E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 92	1.30E+05	4.11E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	5.03E-12	5.03E-12	5.03E-12	5.03E-12	5.03E-12	5.03E-12	5.03E-12	5.03E-12	5.03E-12	5.03E-12	5.03E-12

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
y 93	1.02E+05	1.99E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	4.22E-01	4.22E-01	4.22E-01	4.22E-01	4.22E-01	4.22E-01	4.22E-01	4.22E-01	4.22E-01	4.22E-01	4.22E-01
nb 93m	6.66E-02	6.66E-02	7.03E-02	7.41E-02	8.15E-02	9.59E-02	1.35E-01	1.91E-01	2.36E-01	2.72E-01	3.01E-01
nb 94	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05	3.01E-05
zr 95	1.82E+05	1.80E+05	6.85E+04	2.52E+04	3.48E+03	6.67E+01	4.69E-04	1.21E-12	3.13E-21	8.08E-30	.00E+00
nb 95	1.82E+05	1.82E+05	1.14E+05	4.96E+04	7.50E+03	1.51E+02	1.03E-03	2.67E-12	6.90E-21	1.78E-29	.00E+00
nb 95m	2.07E+03	2.06E+03	8.06E+02	2.96E+02	4.09E+01	7.84E-01	5.52E-06	1.43E-14	3.68E-23	9.13E-32	.00E+00
nb 96	3.09E+02	1.51E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 97	1.81E+05	6.76E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.82E+05	6.79E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.72E+05	6.41E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 98m	1.68E+03	5.97E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	3.82E-06	3.82E-06	3.82E-06	3.82E-06	3.82E-06	3.82E-06	3.82E-06	3.82E-06	3.82E-06	3.82E-06	3.82E-06

mo 99	2.14E+05	1.67E+05	2.96E-05	2.17E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99	4.47E+00	4.47E+00	4.48E+00	4.48E+00	4.48E+00	4.48E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00
tc 99m	1.89E+05	1.60E+05	2.86E-05	2.10E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh102	5.96E-01	5.96E-01	5.62E-01	5.29E-01	4.69E-01	3.70E-01	1.80E-01	5.46E-02	1.65E-02	5.00E-03	1.51E-03
ru103	2.01E+05	1.97E+05	4.09E+04	8.00E+03	3.17E+02	5.02E-01	1.99E-09	1.98E-23	.00E+00	.00E+00	.00E+00
rh103m	2.00E+05	1.97E+05	4.09E+04	7.98E+03	3.17E+02	5.02E-01	1.99E-09	1.97E-23	.00E+00	.00E+00	.00E+00
ru105	1.49E+05	3.62E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.43E+05	1.03E+05	6.76E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh105m	4.23E+04	1.03E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ru106	1.03E+05	1.03E+05	8.70E+04	7.32E+04	5.21E+04	2.64E+04	3.41E+03	1.13E+02	3.76E+00	1.25E-01	4.13E-03
rh106	1.07E+05	1.03E+05	8.70E+04	7.32E+04	5.21E+04	2.64E+04	3.41E+03	1.13E+02	3.76E+00	1.25E-01	4.13E-03
rh106m	1.75E+03	8.10E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh107	9.24E+04	1.20E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd107	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02	4.10E-02
ag108	2.86E-01	3.47E-04	3.46E-04	3.46E-04	3.45E-04	3.43E-04	3.37E-04	3.28E-04	3.19E-04	3.11E-04	3.02E-04
ag108m	3.98E-03	3.98E-03	3.98E-03	3.97E-03	3.96E-03	3.94E-03	3.88E-03	3.77E-03	3.67E-03	3.57E-03	3.47E-03
pd109	5.97E+04	1.78E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag109m	5.97E+04	1.78E+04	4.18E-04	3.64E-04	2.77E-04	1.60E-04	3.10E-05	2.01E-06	1.30E-07	8.45E-09	5.48E-10
cd109	4.79E-04	4.78E-04	4.18E-04	3.64E-04	2.77E-04	1.60E-04	3.10E-05	2.01E-06	1.30E-07	8.45E-09	5.48E-10
ag110	3.74E+04	1.58E+01	1.23E+01	9.55E+00	5.75E+00	2.09E+00	9.97E-02	6.28E-04	3.95E-06	2.49E-08	1.56E-10
ag110m	1.17E+03	1.16E+03	9.08E+02	7.02E+02	4.23E+02	1.53E+02	7.33E+00	4.62E-02	2.90E-04	1.83E-06	1.15E-08
pd111	8.92E+03	1.39E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd111m	3.63E+02	1.76E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111	8.95E+03	8.18E+03	2.07E+00	3.80E-04	1.57E-11	2.74E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag111m	8.93E+03	1.72E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd111m	4.80E+01	5.78E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pd112	3.93E+03	1.78E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag112	3.94E+03	2.09E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ag113	2.17E+03	9.83E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113	7.26E-15	7.39E-15	7.40E-15	7.40E-15	7.40E-15	7.40E-15	7.40E-15	7.41E-15	7.41E-15	7.41E-15	7.42E-15
cd113m	1.10E+01	1.10E+01	1.09E+01	1.08E+01	1.05E+01	9.99E+00	8.62E+00	6.74E+00	5.27E+00	4.12E+00	3.23E+00
in113m	2.07E-06	9.07E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in114	1.46E+00	1.02E+00	2.92E-01	8.01E-02	6.20E-03	3.73E-05	8.13E-12	6.41E-23	.00E+00	.00E+00	.00E+00
in114m	1.08E+00	1.06E+00	3.06E-01	8.37E-02	6.48E-03	3.90E-05	8.49E-12	6.70E-23	.00E+00	.00E+00	.00E+00
cd115	1.13E+03	8.30E+02	7.83E-10	2.49E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	5.61E+01	5.52E+01	1.39E+01	3.29E+00	1.92E-01	6.58E-04	2.64E-11	1.24E-23	.00E+00	.00E+00	.00E+00
in115	2.08E-12	2.09E-12	2.11E-12	2.11E-12	2.12E-12	2.12E-12	2.12E-12	2.12E-12	2.12E-12	2.12E-12	2.12E-12
in115m	1.13E+03	9.03E+02	1.53E-03	3.63E-04	2.12E-05	7.26E-08	2.91E-15	1.37E-27	.00E+00	.00E+00	.00E+00
in116m	8.77E+02	8.66E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 23

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cd117	1.06E+03	1.34E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	2.43E+02	1.73E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	7.93E+02	5.12E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	9.70E+02	5.78E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn117m	1.69E+01	1.61E+01	1.73E-01	1.55E-03	1.40E-07	1.15E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd118	9.64E+02	2.33E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in118	9.65E+02	2.33E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	1.20E+01	1.20E+01	9.72E+00	7.81E+00	5.07E+00	2.14E+00	1.60E-01	2.13E-03	2.83E-05	3.77E-07	5.02E-09
sn121	1.02E+03	5.51E+02	6.10E-01	6.08E-01	6.04E-01	5.96E-01	5.74E-01	5.39E-01	5.06E-01	4.75E-01	4.46E-01
sn121m	7.88E-01	7.88E-01	7.86E-01	7.83E-01	7.78E-01	7.69E-01	7.40E-01	6.95E-01	6.52E-01	6.13E-01	5.75E-01
sb122	2.41E+02	1.86E+02	2.23E-08	1.09E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn123	7.69E+01	7.65E+01	4.75E+01	2.89E+01	1.08E+01	1.53E+00	4.27E-03	2.36E-07	1.31E-11	7.27E-16	4.03E-20
sn123m	1.07E+03	1.65E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	3.55E-13	3.56E-13	3.93E-13	4.15E-13	4.36E-13	4.46E-13	4.48E-13	4.48E-13	4.48E-13	4.48E-13	4.48E-13
te123m	3.51E+00	3.48E+00	2.08E+00	1.22E+00	4.23E-01	5.10E-02	8.93E-05	2.28E-09	5.80E-14	1.48E-18	3.77E-23
sb124	1.85E+02	1.83E+02	6.58E+01	2.27E+01	2.76E+00	4.12E-02	1.37E-07	1.01E-16	7.41E-26	.00E+00	.00E+00

sn125	6.32E+02	5.88E+02	9.77E-01	1.26E-03	2.48E-09	9.75E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb125	1.85E+03	1.85E+03	1.75E+03	1.64E+03	1.44E+03	1.12E+03	5.22E+02	1.47E+02	4.12E+01	1.16E+01	3.25E+00
te125m	4.19E+02	4.19E+02	4.14E+02	3.96E+02	3.52E+02	2.73E+02	1.28E+02	3.58E+01	1.01E+01	2.83E+00	7.95E-01
sn126	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01
sb126	5.52E+01	5.23E+01	3.87E-01	2.89E-02	2.69E-02	2.69E-02	2.69E-02	2.69E-02	2.69E-02	2.69E-02	2.69E-02
sb126m	6.49E+01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01	1.92E-01
sn127	4.45E+03	1.61E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb127	1.10E+04	9.31E+03	1.02E-03	5.96E-11	3.05E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te127	1.09E+04	1.02E+04	1.08E+03	6.00E+02	1.88E+02	1.84E+01	1.73E-02	1.57E-07	1.42E-12	1.28E-17	1.16E-22
te127m	1.88E+03	1.88E+03	1.10E+03	6.12E+02	1.91E+02	1.88E+01	1.77E-02	1.60E-07	1.45E-12	1.31E-17	1.18E-22
xe127	2.28E-02	2.24E-02	4.11E-03	7.06E-04	2.18E-05	2.07E-08	1.80E-17	2.28E-32	.00E+00	.00E+00	.00E+00
sn128	1.68E+04	7.77E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128	1.85E+03	3.06E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb128m	1.79E+04	9.43E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i128	2.24E+03	9.97E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb129	3.85E+04	8.90E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te129	3.67E+04	5.70E+03	7.50E+02	1.11E+02	2.57E+00	1.37E-03	2.09E-13	9.08E-30	.00E+00	.00E+00	.00E+00
te129m	7.46E+03	7.34E+03	1.17E+03	1.74E+02	4.00E+00	2.14E-03	3.26E-13	1.41E-29	.00E+00	.00E+00	.00E+00
i129	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02	1.11E-02
xe129m	1.36E+01	1.26E+01	1.22E-02	9.00E-06	5.83E-12	2.50E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb130	1.28E+04	1.35E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	5.00E+03	1.31E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb131	8.89E+04	1.28E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131	9.70E+04	3.15E+03	1.16E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te131m	2.43E+04	1.40E+04	5.16E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	1.16E+05	1.08E+05	5.16E+01	1.78E-02	2.56E-09	5.41E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.34E+03	1.33E+03	2.03E+01	9.77E-02	2.33E-06	1.34E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	1.65E+05	1.34E+05	8.01E-04	2.27E-12	2.96E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.69E+05	1.38E+05	8.25E-04	2.34E-12	3.05E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs132	9.87E+00	8.87E+00	6.50E-04	3.27E-08	1.06E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133	1.25E+05	3.49E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te133m	1.03E+05	1.54E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	2.34E+05	1.08E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133m	1.87E+04	1.58E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	2.36E+05	2.27E+05	1.97E+00	9.64E-06	3.10E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	7.55E+03	6.77E+03	5.13E-09	9.87E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Fuel - decay fission products page 24

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ba133	8.38E-06	8.38E-06	8.25E-06	8.11E-06	7.85E-06	7.35E-06	6.03E-06	4.34E-06	3.12E-06	2.24E-06	1.61E-06
te134	1.98E+05	8.44E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i134	2.57E+05	5.85E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	5.79E+04	5.79E+04	5.33E+04	4.90E+04	4.14E+04	2.96E+04	1.08E+04	2.01E+03	3.74E+02	6.97E+01	1.30E+01
cs134m	8.50E+03	2.80E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	2.25E+05	1.79E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	8.28E+04	6.11E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135m	5.08E+04	2.92E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs135	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01	2.40E-01
cs135m	9.38E+03	6.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba135m	1.85E+02	1.04E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	1.55E+04	1.47E+04	1.35E+02	1.04E+00	6.83E-05	3.02E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba136m	1.73E+03	1.64E+03	1.51E+01	1.16E-01	7.65E-06	3.38E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs137	3.71E+04	3.71E+04	3.69E+04	3.67E+04	3.63E+04	3.54E+04	3.31E+04	2.94E+04	2.62E+04	2.34E+04	2.08E+04
ba137m	3.51E+04	3.50E+04	3.48E+04	3.46E+04	3.42E+04	3.35E+04	3.12E+04	2.78E+04	2.48E+04	2.21E+04	1.97E+04
cs138	2.13E+05	1.26E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la138	7.00E-11	7.00E-11	7.00E-11	7.00E-11	7.00E-11	7.00E-11	7.00E-11	7.00E-11	7.00E-11	7.00E-11	7.00E-11
ba139	2.03E+05	1.72E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce139	2.43E-02	2.41E-02	1.54E-02	9.68E-03	3.85E-03	6.12E-04	2.46E-06	2.48E-10	2.51E-14	2.54E-18	2.57E-22

pr139	2.03E-03	4.67E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	2.04E+05	1.93E+05	1.53E+03	1.00E+01	4.88E-04	1.17E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.16E+05	2.10E+05	1.76E+03	1.16E+01	5.62E-04	1.35E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la141	1.84E+05	2.87E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.86E+05	1.83E+05	2.74E+04	3.82E+03	7.74E+01	3.21E-02	2.27E-12	2.76E-29	.00E+00	.00E+00	.00E+00
nd141	6.55E-03	8.20E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.79E+05	3.51E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce142	9.85E-06	9.85E-06	9.85E-06	9.85E-06	9.85E-06	9.85E-06	9.85E-06	9.85E-06	9.85E-06	9.85E-06	9.85E-06
pr142	1.44E+04	6.04E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.69E+05	1.03E+05	3.36E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr143	1.65E+05	1.63E+05	1.85E+03	1.64E+01	1.44E-03	1.13E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	1.57E+05	1.57E+05	1.26E+05	1.01E+05	6.46E+04	2.66E+04	1.85E+03	2.18E+01	2.56E-01	3.01E-03	3.55E-05
pr144	1.58E+05	1.57E+05	1.26E+05	1.01E+05	6.46E+04	2.66E+04	1.85E+03	2.18E+01	2.56E-01	3.01E-03	3.55E-05
pr144m	2.21E+03	2.19E+03	1.77E+03	1.41E+03	9.04E+02	3.72E+02	2.59E+01	3.05E-01	3.58E-03	4.22E-05	4.96E-07
nd144	5.63E-10	5.63E-10	5.74E-10	5.84E-10	5.97E-10	6.12E-10	6.21E-10	6.21E-10	6.21E-10	6.21E-10	6.21E-10
pr145	1.15E+05	7.23E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm145	6.61E-02	6.62E-02	7.11E-02	7.52E-02	8.09E-02	8.60E-02	8.27E-02	6.87E-02	5.65E-02	4.64E-02	3.82E-02
sm145	6.39E-01	6.38E-01	5.32E-01	4.41E-01	3.04E-01	1.44E-01	1.55E-02	3.73E-04	9.03E-06	2.18E-07	5.27E-09
pr146	9.43E+04	2.40E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm146	1.39E+00	1.39E+00	1.35E+00	1.30E+00	1.22E+00	1.08E+00	7.41E-01	3.96E-01	2.12E-01	1.13E-01	6.04E-02
sm146	2.03E-07	2.03E-07	2.04E-07	2.05E-07	2.06E-07	2.09E-07	2.15E-07	2.21E-07	2.25E-07	2.26E-07	2.27E-07
nd147	7.69E+04	7.22E+04	2.62E+02	7.64E-01	7.46E-06	7.23E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm147	3.05E+04	3.06E+04	2.94E+04	2.75E+04	2.41E+04	1.85E+04	8.38E+03	2.24E+03	5.97E+02	1.59E+02	4.25E+01
sm147	8.38E-07	8.39E-07	8.87E-07	9.34E-07	1.02E-06	1.16E-06	1.41E-06	1.56E-06	1.60E-06	1.61E-06	1.61E-06
pm148	2.34E+04	2.06E+04	5.68E+01	1.20E+01	5.57E-01	1.21E-03	1.25E-11	6.08E-25	.00E+00	.00E+00	.00E+00
pm148m	4.85E+03	4.77E+03	1.07E+03	2.26E+02	1.05E+01	2.29E-02	2.36E-10	1.15E-23	.00E+00	.00E+00	.00E+00
sm148	2.02E-11	2.02E-11	2.03E-11	2.03E-11	2.03E-11	2.03E-11	2.03E-11	2.03E-11	2.03E-11	2.03E-11	2.03E-11
nd149	4.69E+04	3.10E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pm149	7.14E+04	5.33E+04	4.11E-08	1.06E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm149	1.26E-13	1.38E-13	1.70E-13	1.70E-13	1.70E-13	1.70E-13	1.70E-13	1.70E-13	1.70E-13	1.70E-13	1.70E-13
eu149	2.42E-07	2.40E-07	1.24E-07	6.22E-08	1.59E-08	1.05E-09	2.99E-13	3.70E-19	4.57E-25	5.70E-31	.00E+00
pm150	5.37E+02	1.08E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu150	2.36E-05	2.36E-05	2.35E-05	2.33E-05	2.31E-05	2.27E-05	2.14E-05	1.94E-05	1.76E-05	1.60E-05	1.45E-05

1

BWR SNF Assembly - Fuel - decay fission products page 25

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pm151	2.55E+04	1.43E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sm151	1.12E+02	1.13E+02	1.13E+02	1.13E+02	1.12E+02	1.11E+02	1.09E+02	1.05E+02	1.01E+02	9.70E+01	9.34E+01
eu152	2.80E+00	2.80E+00	2.76E+00	2.73E+00	2.66E+00	2.52E+00	2.16E+00	1.66E+00	1.28E+00	9.90E-01	7.63E-01
eu152m	4.06E+01	6.82E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd152	8.45E-13	8.45E-13	8.46E-13	8.47E-13	8.50E-13	8.54E-13	8.67E-13	8.84E-13	8.97E-13	9.07E-13	9.15E-13
sm153	8.32E+04	5.81E+04	7.41E-10	2.69E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd153	8.74E+00	8.72E+00	6.75E+00	5.18E+00	3.06E+00	1.07E+00	4.63E-02	2.45E-04	1.30E-06	6.88E-09	3.64E-11
eu154	4.62E+03	4.62E+03	4.53E+03	4.44E+03	4.26E+03	3.93E+03	3.08E+03	2.06E+03	1.38E+03	9.20E+02	6.14E+02
eu155	3.17E+03	3.17E+03	3.05E+03	2.94E+03	2.73E+03	2.36E+03	1.51E+03	7.20E+02	3.43E+02	1.64E+02	7.81E+01
sm156	3.31E+03	5.65E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	4.85E+04	4.64E+04	7.99E+02	1.17E+01	2.79E-03	1.60E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu157	3.74E+03	1.26E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu158	1.27E+03	5.13E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
gd159	9.28E+02	3.84E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb160	2.43E+02	2.41E+02	1.03E+02	4.23E+01	7.33E+00	2.21E-01	6.06E-06	1.51E-13	3.76E-21	9.38E-29	.00E+00
tb161	1.72E+02	1.56E+02	2.04E-02	1.88E-06	2.00E-14	2.33E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tb162m	9.17E-01	5.28E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy165	9.55E+01	7.72E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
dy166	5.09E-01	4.15E-01	5.48E-09	3.55E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166	2.78E+01	1.52E+01	8.16E-09	5.29E-17	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ho166m	3.87E-04	3.87E-04	3.87E-04	3.87E-04	3.87E-04	3.87E-04	3.86E-04	3.85E-04	3.84E-04	3.83E-04	3.82E-04
er169	7.33E-04	6.81E-04	9.61E-07	1.05E-09	1.47E-15	2.97E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

tm170	4.32E-06	4.30E-06	2.66E-06	1.61E-06	6.03E-07	8.42E-08	2.29E-10	1.22E-14	6.45E-19	3.42E-23	1.81E-27
er171	1.03E-03	1.13E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm171	7.70E-04	7.69E-04	7.05E-04	6.43E-04	5.37E-04	3.74E-04	1.27E-04	2.08E-05	3.43E-06	5.64E-07	9.28E-08
er172	6.83E-04	4.87E-04	4.43E-17	1.23E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tm172	7.13E-04	6.82E-04	1.84E-13	5.74E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.06E+07	4.48E+06	1.02E+06	6.80E+05	4.48E+05	2.84E+05	1.48E+05	1.07E+05	9.12E+04	7.97E+04	7.02E+04

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Fuel - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	6.12E+14	2.64E+14	2.63E+13	1.24E+13	4.31E+12	1.90E+12	7.36E+11	2.88E+11	1.32E+11	6.53E+10	3.48E+10
3.00E-02	2.87E+14	1.78E+14	4.73E+13	3.54E+13	2.32E+13	1.23E+13	3.56E+12	9.11E+11	2.66E+11	8.07E+10	2.59E+10
5.50E-02	1.19E+14	4.78E+13	2.49E+12	1.08E+12	3.09E+11	1.37E+11	7.10E+10	3.08E+10	1.44E+10	7.00E+09	3.52E+09
8.50E-02	6.53E+13	2.58E+13	9.57E+11	4.05E+11	1.13E+11	5.04E+10	2.76E+10	1.19E+10	5.51E+09	2.67E+09	1.34E+09
1.20E-01	4.45E+13	1.73E+13	5.16E+11	2.44E+11	9.80E+10	5.69E+10	2.81E+10	9.66E+09	3.63E+09	1.50E+09	6.72E+08
1.70E-01	1.24E+14	9.28E+13	2.27E+12	1.11E+12	8.48E+11	6.34E+11	2.96E+11	8.38E+10	2.39E+10	6.92E+09	2.05E+09
3.00E-01	1.03E+14	3.30E+13	1.39E+12	7.05E+11	3.81E+11	2.45E+11	1.12E+11	3.17E+10	9.05E+09	2.62E+09	7.73E+08
6.50E-01	2.78E+15	1.75E+15	5.84E+14	2.44E+14	4.17E+13	5.97E+12	2.40E+12	6.73E+11	1.91E+11	5.62E+10	1.82E+10
1.13E+00	8.21E+13	5.00E+13	3.00E+13	2.90E+13	2.71E+13	2.38E+13	1.60E+13	8.30E+12	4.30E+12	2.23E+12	1.15E+12
1.58E+00	1.86E+13	6.52E+12	9.46E+10	3.32E+10	4.24E+09	7.26E+07	2.87E+04	2.28E+04	1.93E+04	1.66E+04	1.45E+04
2.00E+00	3.31E+12	9.54E+11	9.24E+09	3.28E+09	5.25E+08	1.32E+08	8.55E+07	4.43E+07	2.29E+07	1.19E+07	6.16E+06
2.40E+00	5.80E+10	1.33E+09	6.01E+07	2.04E+07	2.88E+06	4.38E+05	2.70E+05	1.40E+05	7.26E+04	3.76E+04	1.95E+04
2.80E+00	6.37E+10	7.96E+08	5.78E+06	1.99E+06	2.43E+05	3.62E+03	1.20E-02	2.91E-10	1.20E-10	1.03E-10	9.27E-11
3.25E+00	1.50E+10	8.29E+06	2.05E-08	1.73E-08	1.23E-08	6.22E-09	8.19E-10	4.01E-11	1.30E-11	1.09E-11	9.79E-12
3.75E+00	1.13E+10	4.83E+05	9.06E-12	7.63E-12	5.43E-12	2.76E-12	3.73E-13	2.80E-14	1.50E-14	1.32E-14	1.18E-14
4.25E+00	4.03E+09	6.28E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.47E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	5.87E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	4.24E+15	2.47E+15	6.96E+14	3.24E+14	9.81E+13	4.51E+13	2.33E+13	1.03E+13	4.95E+12	2.45E+12	1.24E+12
0 mev/sec	2.02E+15	1.25E+15	4.16E+14	1.93E+14	5.87E+13	3.12E+13	1.98E+13	9.83E+12	4.98E+12	2.55E+12	1.31E+12

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.41E+06	6.08E+05	6.05E+04	2.86E+04	9.90E+03	4.38E+03	1.69E+03	6.62E+02	3.02E+02	1.50E+02	8.00E+01
3.00E-02	1.98E+06	1.23E+06	3.26E+05	2.44E+05	1.60E+05	8.50E+04	2.45E+04	6.28E+03	1.83E+03	5.57E+02	1.78E+02
5.50E-02	1.50E+06	6.05E+05	3.15E+04	1.36E+04	3.90E+03	1.73E+03	8.98E+02	3.89E+02	1.81E+02	8.86E+01	4.45E+01
8.50E-02	1.28E+06	5.05E+05	1.87E+04	7.91E+03	2.21E+03	9.85E+02	5.40E+02	2.33E+02	1.08E+02	5.22E+01	2.61E+01
1.20E-01	1.23E+06	4.78E+05	1.42E+04	6.74E+03	2.70E+03	1.57E+03	7.74E+02	2.66E+02	1.00E+02	4.14E+01	1.85E+01
1.70E-01	4.83E+06	3.63E+06	8.85E+04	4.34E+04	3.31E+04	2.48E+04	1.16E+04	3.28E+03	9.35E+02	2.70E+02	7.99E+01
3.00E-01	7.10E+06	2.27E+06	9.56E+04	4.86E+04	2.63E+04	1.69E+04	7.73E+03	2.19E+03	6.24E+02	1.80E+02	5.33E+01
6.50E-01	4.16E+08	2.62E+08	8.73E+07	3.64E+07	6.23E+06	8.92E+05	3.59E+05	1.01E+05	2.86E+04	8.40E+03	2.72E+03
1.13E+00	2.12E+07	1.29E+07	7.75E+06	7.49E+06	7.01E+06	6.15E+06	4.14E+06	2.15E+06	1.11E+06	5.76E+05	2.99E+05
1.58E+00	6.73E+06	2.36E+06	3.43E+04	1.20E+04	1.53E+03	2.63E+01	1.04E-02	8.24E-03	6.98E-03	6.01E-03	5.24E-03
2.00E+00	1.52E+06	4.39E+05	4.25E+03	1.51E+03	2.41E+02	6.09E+01	3.93E+01	2.04E+01	1.05E+01	5.46E+00	2.83E+00
2.40E+00	3.20E+04	7.36E+02	3.32E+01	1.13E+01	1.59E+00	2.41E-01	1.49E-01	7.73E-02	4.01E-02	2.07E-02	1.07E-02
2.80E+00	4.10E+04	5.12E+02	3.72E+00	1.28E+00	1.56E-01	2.33E-03	7.73E-09	1.87E-16	7.70E-17	6.64E-17	5.97E-17
3.25E+00	1.12E+04	6.19E+00	1.53E-14	1.29E-14	9.18E-15	4.65E-15	6.12E-16	3.00E-17	9.69E-18	8.15E-18	7.31E-18
3.75E+00	9.75E+03	4.16E-01	7.81E-18	6.57E-18	4.68E-18	2.38E-18	3.21E-19	2.41E-20	1.29E-20	1.13E-20	1.02E-20
4.25E+00	3.93E+03	6.14E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.79E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	7.42E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	4.64E+08	2.87E+08	9.57E+07	4.43E+07	1.35E+07	7.18E+06	4.55E+06	2.26E+06	1.14E+06	5.86E+05	3.02E+05
0 gamma watts	3.24E+02	2.00E+02	6.67E+01	3.09E+01	9.40E+00	5.00E+00	3.17E+00	1.58E+00	7.98E-01	4.09E-01	2.10E-01

photon spectrum as a function of time for fission products

BWR SNF Assembly - Fuel - decay

spectrum of photon release rates, photons/sec

basis = per ONE BWR Fuel Assembly - Fuel Region

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.47E+17	3.23E+16	8.58E+15	6.39E+15	4.34E+15	2.41E+15	9.14E+14	6.39E+14	5.51E+14	4.83E+14	4.25E+14
3.00E-02	1.09E+17	2.53E+16	3.67E+15	2.67E+15	1.82E+15	1.02E+15	4.00E+14	2.84E+14	2.45E+14	2.15E+14	1.90E+14
5.50E-02	5.86E+16	8.96E+15	1.97E+15	1.50E+15	1.04E+15	5.82E+14	2.22E+14	1.50E+14	1.25E+14	1.06E+14	9.17E+13
8.50E-02	4.00E+16	7.63E+15	1.20E+15	9.26E+14	6.38E+14	3.49E+14	1.22E+14	7.92E+13	6.54E+13	5.60E+13	4.86E+13
1.20E-01	3.27E+16	7.06E+15	1.39E+15	1.10E+15	7.60E+14	4.04E+14	1.36E+14	8.42E+13	6.48E+13	5.16E+13	4.21E+13
1.70E-01	5.21E+16	8.34E+15	1.18E+15	6.54E+14	4.10E+14	2.18E+14	7.06E+13	4.67E+13	4.03E+13	3.54E+13	3.12E+13
3.00E-01	1.13E+17	1.75E+16	9.22E+14	6.99E+14	4.78E+14	2.54E+14	7.99E+13	5.18E+13	4.41E+13	3.82E+13	3.33E+13
6.50E-01	2.32E+17	6.54E+16	1.64E+16	1.01E+16	6.08E+15	4.15E+15	2.11E+15	1.18E+15	9.15E+14	7.86E+14	6.92E+14
1.13E+00	7.23E+16	5.40E+15	3.59E+14	2.87E+14	2.33E+14	1.70E+14	9.51E+13	5.59E+13	3.68E+13	2.48E+13	1.70E+13
1.58E+00	3.70E+16	8.72E+15	1.75E+14	9.57E+13	7.26E+13	4.50E+13	1.48E+13	4.16E+12	1.88E+12	1.14E+12	7.80E+11
2.00E+00	1.10E+16	6.94E+14	5.43E+13	3.80E+13	2.46E+13	1.05E+13	8.59E+11	3.40E+10	1.70E+10	1.46E+10	1.28E+10
2.40E+00	8.61E+15	4.26E+14	7.23E+12	3.16E+12	2.20E+12	1.10E+12	1.37E+11	4.44E+09	1.55E+08	1.31E+07	7.47E+06
2.80E+00	3.63E+15	6.79E+12	6.39E+11	5.01E+11	3.54E+11	1.78E+11	2.26E+10	7.41E+08	2.45E+07	8.10E+05	2.69E+04
3.25E+00	1.75E+15	2.45E+12	1.16E+11	8.19E+10	5.82E+10	2.94E+10	3.81E+09	1.26E+08	4.20E+06	1.39E+05	4.62E+03
3.75E+00	7.93E+14	1.20E+10	4.29E+07	3.61E+07	2.56E+07	1.30E+07	1.68E+06	5.58E+04	1.85E+03	6.14E+01	2.04E+00
4.25E+00	7.31E+14	1.60E+09	1.22E-05	1.23E-05	1.24E-05	1.25E-05	1.28E-05	1.30E-05	1.30E-05	1.31E-05	1.31E-05
4.75E+00	2.17E+14	1.19E+10	6.13E-06	6.16E-06	6.21E-06	6.29E-06	6.43E-06	6.52E-06	6.54E-06	6.55E-06	6.55E-06
5.50E+00	1.69E+14	7.59E+07	4.55E-06	4.57E-06	4.60E-06	4.66E-06	4.77E-06	4.84E-06	4.85E-06	4.86E-06	4.86E-06
total	1.02E+18	1.88E+17	3.59E+16	2.45E+16	1.59E+16	9.62E+15	4.16E+15	2.57E+15	2.09E+15	1.80E+15	1.57E+15
mev/sec	4.16E+17	7.45E+16	1.25E+16	7.88E+15	4.90E+15	3.26E+15	1.60E+15	8.97E+14	6.92E+14	5.86E+14	5.10E+14

spectrum of energy release rates, mev/watt-sec

basis = per ONE BWR Fuel Assembly - Fuel Region

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.67E+08	7.43E+07	1.97E+07	1.47E+07	9.98E+06	5.55E+06	2.10E+06	1.47E+06	1.27E+06	1.11E+06	9.78E+05
3.00E-02	7.54E+08	1.74E+08	2.53E+07	1.84E+07	1.26E+07	7.03E+06	2.76E+06	1.96E+06	1.69E+06	1.48E+06	1.31E+06
5.50E-02	7.40E+08	1.13E+08	2.48E+07	1.90E+07	1.31E+07	7.36E+06	2.80E+06	1.89E+06	1.57E+06	1.34E+06	1.16E+06
8.50E-02	7.82E+08	1.49E+08	2.34E+07	1.81E+07	1.25E+07	6.81E+06	2.39E+06	1.55E+06	1.28E+06	1.09E+06	9.49E+05
1.20E-01	9.01E+08	1.95E+08	3.82E+07	3.05E+07	2.10E+07	1.11E+07	3.75E+06	2.32E+06	1.79E+06	1.42E+06	1.16E+06
1.70E-01	2.04E+09	3.26E+08	4.63E+07	2.55E+07	1.60E+07	8.54E+06	2.76E+06	1.83E+06	1.58E+06	1.38E+06	1.22E+06
3.00E-01	7.76E+09	1.21E+09	6.36E+07	4.82E+07	3.30E+07	1.75E+07	5.51E+06	3.57E+06	3.04E+06	2.63E+06	2.29E+06
6.50E-01	3.47E+10	9.77E+09	2.46E+09	1.51E+09	9.09E+08	6.20E+08	3.15E+08	1.76E+08	1.37E+08	1.17E+08	1.03E+08
1.13E+00	1.87E+10	1.40E+09	9.29E+07	7.43E+07	6.02E+07	4.39E+07	2.46E+07	1.45E+07	9.51E+06	6.42E+06	4.39E+06
1.58E+00	1.34E+10	3.16E+09	6.33E+07	3.46E+07	2.63E+07	1.63E+07	5.35E+06	1.50E+06	6.81E+05	4.13E+05	2.83E+05
2.00E+00	5.07E+09	3.19E+08	2.50E+07	1.75E+07	1.13E+07	4.82E+06	3.95E+05	1.56E+04	7.83E+03	6.72E+03	5.89E+03
2.40E+00	4.75E+09	2.35E+08	3.99E+06	1.74E+06	1.22E+06	6.05E+05	7.56E+04	2.45E+03	8.54E+01	7.21E+00	4.12E+00
2.80E+00	2.34E+09	4.37E+06	4.11E+05	3.22E+05	2.28E+05	1.14E+05	1.46E+04	4.77E+02	1.57E+01	5.21E-01	1.73E-02
3.25E+00	1.30E+09	1.83E+06	8.69E+04	6.12E+04	4.35E+04	2.20E+04	2.85E+03	9.45E+01	3.13E+00	1.04E-01	3.45E-03
3.75E+00	6.83E+08	1.04E+04	3.69E+01	3.11E+01	2.21E+01	1.12E+01	1.45E+00	4.81E-02	1.59E-03	5.29E-05	1.75E-06
4.25E+00	7.14E+08	1.56E+03	1.19E-11	1.20E-11	1.21E-11	1.22E-11	1.25E-11	1.27E-11	1.27E-11	1.28E-11	1.28E-11
4.75E+00	2.37E+08	1.29E+04	6.70E-12	6.73E-12	6.78E-12	6.87E-12	7.02E-12	7.12E-12	7.15E-12	7.15E-12	7.16E-12
5.50E+00	2.14E+08	9.59E+01	5.75E-12	5.78E-12	5.82E-12	5.90E-12	6.12E-12	6.14E-12	6.14E-12	6.15E-12	6.15E-12
total	9.57E+10	1.71E+10	2.88E+09	1.81E+09	1.13E+09	7.50E+08	3.67E+08	2.06E+08	1.59E+08	1.35E+08	1.17E+08
gamma watts	6.67E+04	1.19E+04	2.01E+03	1.26E+03	7.85E+02	5.23E+02	2.56E+02	1.44E+02	1.11E+02	9.40E+01	8.17E+01

principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.23E+16) at 1.0 d

nuclide	time after discharge									
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	2.23E+15	1.73E+15	3.08E+05	2.26E-05	2.15E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

rh106	3.18E+15	3.06E+15	2.59E+15	2.18E+15	1.55E+15	7.84E+14	1.02E+14	3.37E+12	1.12E+11	3.71E+09	1.23E+08
ba140	1.89E+15	1.79E+15	1.42E+13	9.30E+10	4.52E+06	1.08E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.50E+15	2.43E+15	2.04E+13	1.34E+11	6.52E+06	1.56E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.03E+15	4.00E+15	3.22E+15	2.57E+15	1.65E+15	6.78E+14	4.71E+13	5.55E+11	6.53E+09	7.68E+07	9.04E+05

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.53E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.21E+15	3.41E+15	2.04E+07	5.79E-02	7.55E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.42E+15	4.26E+15	3.70E+10	1.81E+05	5.81E-06	5.89E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.57E+15	1.49E+15	1.18E+13	7.76E+10	3.77E+06	9.04E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.43E+15	1.41E+15	2.11E+14	2.94E+13	5.97E+11	2.47E+08	1.75E-02	2.13E-19	.00E+00	.00E+00	.00E+00
ce143	4.65E+15	2.83E+15	9.27E-05	5.18E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.33E+15	1.32E+15	1.06E+15	8.50E+14	5.45E+14	2.24E+14	1.56E+13	1.84E+11	2.16E+09	2.54E+07	2.99E+05
nd147	1.42E+15	1.34E+15	4.86E+12	1.41E+10	1.38E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec
mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.96E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.52E+14	7.23E+14	6.13E+14	5.15E+14	3.67E+14	1.85E+14	2.40E+13	7.97E+11	2.64E+10	8.77E+08	2.91E+07
te132	8.12E+14	6.57E+14	3.93E+06	1.12E-02	1.45E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.27E+14	5.13E+14	4.31E+12	2.83E+10	1.37E+06	3.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.32E+15	8.06E+14	2.64E-05	1.47E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.35E+14	9.28E+14	7.48E+14	5.97E+14	3.83E+14	1.57E+14	1.10E+13	1.29E+11	1.52E+09	1.78E+07	2.10E+05
sm153	1.62E+15	1.13E+15	1.44E+01	5.22E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec
mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.63E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.47E+14	4.30E+14	3.64E+14	3.06E+14	2.18E+14	1.10E+14	1.43E+13	4.74E+11	1.57E+10	5.21E+08	1.73E+07
xe133	3.13E+15	3.01E+15	2.61E+10	1.28E+05	4.11E-06	4.16E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.50E+14	5.46E+14	4.40E+14	3.51E+14	2.25E+14	9.26E+13	6.45E+12	7.59E+10	8.93E+08	1.05E+07	1.24E+05
nd147	8.85E+14	8.31E+14	3.02E+12	8.79E+09	8.58E+04	8.32E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec
mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.06E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.63E+15	3.08E+15	5.52E+05	4.05E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.03E+14	7.02E+14	5.65E+14	4.51E+14	2.89E+14	1.19E+14	8.28E+12	9.74E+10	1.15E+09	1.35E+07	1.59E+05
pr144	3.94E+14	3.91E+14	3.15E+14	2.51E+14	1.61E+14	6.63E+13	4.61E+12	5.43E+10	6.39E+08	7.52E+06	8.85E+04
sm153	7.69E+14	5.37E+14	6.85E+00	2.48E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.34E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.86E+14	6.11E+14	1.08E+05	7.96E-06	7.57E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.57E+15	2.18E+15	3.90E+05	2.86E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.70E+14	4.45E+14	3.53E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.84E+15	2.79E+15	4.19E+14	5.82E+13	1.18E+12	4.89E+08	3.47E-02	4.21E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.37E+15	9.84E+14	6.47E-04	8.17E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.51E+15	4.21E+15	2.01E+12	6.91E+08	9.94E+01	2.10E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.11E+15	3.32E+15	1.99E+07	5.64E-02	7.35E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.33E+15	1.72E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.87E+15	1.81E+15	1.52E+13	1.00E+11	4.86E+06	1.16E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.07E+15	1.87E+15	6.11E-05	3.41E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.54E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
zr 95	7.63E+15	7.55E+15	2.88E+15	1.06E+15	1.46E+14	2.80E+12	1.97E+07	5.09E-02	1.32E-10	3.40E-19	8.42E-28
nb 95	7.95E+15	7.95E+15	4.98E+15	2.16E+15	3.27E+14	6.60E+12	4.50E+07	1.16E-01	3.01E-10	7.76E-19	.00E+00
ru103	5.58E+15	5.48E+15	1.14E+15	2.22E+14	8.82E+12	1.40E+10	5.53E+01	5.49E-13	5.44E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.04E+07	2.29E-01	2.98E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.29E+15	3.36E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.89E+15	4.88E+15	4.50E+15	4.13E+15	3.49E+15	2.49E+15	9.10E+14	1.69E+14	3.15E+13	5.88E+12	1.09E+12
la140	5.98E+15	5.81E+15	4.89E+13	3.21E+11	1.56E+07	3.73E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.40E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
sr 91	1.55E+15	2.70E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i132	1.79E+15	1.46E+15	8.76E+06	2.49E-02	3.24E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	5.98E+15	4.75E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	5.50E+14	5.22E+14	4.80E+12	3.68E+10	2.43E+06	1.07E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.52E+14	6.34E+14	5.33E+12	3.49E+10	1.70E+06	4.07E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	8.76E+14	8.38E+14	1.44E+13	2.11E+11	5.04E+07	2.90E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.72E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	6.78E+14	5.53E+14	3.31E+06	9.40E-03	1.22E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.73E+15	7.51E+15	6.32E+13	4.14E+11	2.01E+07	4.83E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.94E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	1.74E+14	1.42E+14	8.50E+05	2.41E-03	3.15E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.45E+14	3.54E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.14E+13	5.10E+13	4.11E+13	3.28E+13	2.10E+13	8.65E+12	6.02E+11	7.08E+09	8.33E+07	9.80E+05	1.15E+04
eu156	4.28E+14	4.10E+14	7.05E+12	1.03E+11	2.46E+07	1.42E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.26E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	3.66E+14	3.56E+14	2.99E+12	1.96E+10	9.54E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	3.04E+13	2.91E+13	5.00E+11	7.34E+09	1.75E+06	1.00E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.79E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rh106	6.94E+11	6.67E+11	5.65E+11	4.76E+11	3.38E+11	1.71E+11	2.22E+10	7.36E+08	2.44E+07	8.09E+05	2.68E+04
ag112	1.28E+12	6.78E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.13E+12	4.99E+12	4.19E+10	2.75E+08	1.34E+04	3.20E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.45E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	2.34E+12	2.28E+12	1.91E+10	1.26E+08	6.10E+03	1.46E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.20E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.78E+12	8.61E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

la142	1.69E+14	3.33E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.60E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.16E+11	1.60E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.19E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	3.82E+12	1.19E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.59E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.45E+10	7.59E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Fuel - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.40E+17	7.29E+16	1.06E+14	7.92E+13	4.99E+13	3.02E+13	2.48E+13	2.43E+13	2.37E+13	2.32E+13	2.26E+13
3.00E-02	8.78E+15	1.51E+15	9.95E+10	9.34E+10	1.17E+11	1.63E+11	2.88E+11	4.58E+11	5.90E+11	6.92E+11	7.70E+11
5.50E-02	1.28E+16	4.14E+15	1.62E+12	1.54E+12	1.90E+12	2.66E+12	4.81E+12	7.74E+12	1.00E+13	1.18E+13	1.31E+13
8.50E-02	5.52E+16	8.01E+15	5.54E+11	3.49E+11	3.49E+11	3.48E+11	3.46E+11	3.42E+11	3.39E+11	3.35E+11	3.32E+11
1.20E-01	5.59E+16	4.08E+16	5.99E+11	4.59E+11	4.53E+11	4.46E+11	4.33E+11	4.15E+11	3.98E+11	3.83E+11	3.70E+11
1.70E-01	1.85E+15	3.06E+14	2.23E+10	8.54E+09	6.20E+09	4.61E+09	4.15E+09	4.07E+09	4.00E+09	3.93E+09	3.87E+09
3.00E-01	2.97E+16	2.15E+16	3.64E+11	2.50E+11	2.48E+11	2.45E+11	2.37E+11	2.24E+11	2.12E+11	2.02E+11	1.93E+11
6.50E-01	1.63E+15	5.67E+13	2.48E+09	2.04E+09	1.56E+09	1.30E+09	1.45E+09	1.65E+09	1.70E+09	1.68E+09	1.63E+09
1.13E+00	2.09E+15	1.34E+15	8.45E+08	7.97E+08	7.41E+08	6.99E+08	6.69E+08	6.34E+08	6.00E+08	5.68E+08	5.40E+08
1.58E+00	1.77E+08	1.70E+08	1.53E+08	1.42E+08	1.30E+08	1.23E+08	1.25E+08	1.24E+08	1.15E+08	1.04E+08	9.40E+07
2.00E+00	1.82E+06	1.09E+06	1.05E+06	1.09E+06	1.16E+06	1.31E+06	1.72E+06	2.08E+06	2.17E+06	2.15E+06	2.10E+06
2.40E+00	7.70E+07	7.71E+07	6.86E+07	6.24E+07	5.50E+07	4.88E+07	4.24E+07	3.50E+07	2.90E+07	2.41E+07	2.00E+07
2.80E+00	1.36E+08	1.38E+08	1.42E+08	1.50E+08	1.70E+08	2.20E+08	3.59E+08	4.80E+08	5.09E+08	5.00E+08	4.80E+08
3.25E+00	2.76E+07	2.76E+07	2.46E+07	2.24E+07	1.97E+07	1.75E+07	1.52E+07	1.26E+07	1.04E+07	8.63E+06	7.17E+06
3.75E+00	1.60E+07	1.60E+07	1.42E+07	1.30E+07	1.14E+07	1.02E+07	8.82E+06	7.28E+06	6.03E+06	5.00E+06	4.16E+06
4.25E+00	9.27E+06	9.27E+06	8.25E+06	7.51E+06	6.63E+06	5.88E+06	5.11E+06	4.22E+06	3.50E+06	2.90E+06	2.41E+06
4.75E+00	5.37E+06	5.37E+06	4.78E+06	4.35E+06	3.84E+06	3.41E+06	2.96E+06	2.45E+06	2.03E+06	1.68E+06	1.40E+06
5.50E+00	4.86E+06	4.86E+06	4.33E+06	3.94E+06	3.48E+06	3.09E+06	2.68E+06	2.21E+06	1.83E+06	1.52E+06	1.26E+06
0 total	3.08E+17	1.51E+17	1.09E+14	8.19E+13	5.30E+13	3.41E+13	3.09E+13	3.34E+13	3.53E+13	3.66E+13	3.74E+13
0 mev/sec	2.64E+16	1.46E+16	1.39E+12	1.04E+12	7.70E+11	6.14E+11	6.77E+11	8.32E+11	9.50E+11	1.04E+12	1.10E+12

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Fuel Region

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.21E+08	1.68E+08	2.43E+05	1.82E+05	1.15E+05	6.95E+04	5.69E+04	5.58E+04	5.46E+04	5.33E+04	5.20E+04
3.00E-02	6.05E+07	1.04E+07	6.86E+02	6.44E+02	8.09E+02	1.13E+03	1.99E+03	3.16E+03	4.07E+03	4.77E+03	5.31E+03
5.50E-02	1.62E+08	5.24E+07	2.05E+04	1.95E+04	2.41E+04	3.37E+04	6.08E+04	9.78E+04	1.27E+05	1.49E+05	1.66E+05
8.50E-02	1.08E+09	1.57E+08	1.08E+04	6.82E+03	6.81E+03	6.80E+03	6.75E+03	6.68E+03	6.61E+03	6.55E+03	6.49E+03
1.20E-01	1.54E+09	1.13E+09	1.65E+04	1.27E+04	1.25E+04	1.23E+04	1.19E+04	1.14E+04	1.10E+04	1.06E+04	1.02E+04
1.70E-01	7.25E+07	1.19E+07	8.73E+02	3.34E+02	2.42E+02	1.80E+02	1.62E+02	1.59E+02	1.56E+02	1.54E+02	1.51E+02
3.00E-01	2.05E+09	1.48E+09	2.51E+04	1.72E+04	1.71E+04	1.69E+04	1.63E+04	1.54E+04	1.46E+04	1.39E+04	1.33E+04
6.50E-01	2.43E+08	8.47E+06	3.71E+02	3.04E+02	2.33E+02	1.95E+02	2.17E+02	2.47E+02	2.54E+02	2.50E+02	2.44E+02
1.13E+00	5.41E+08	3.46E+08	2.19E+02	2.06E+02	1.92E+02	1.81E+02	1.73E+02	1.64E+02	1.55E+02	1.47E+02	1.40E+02
1.58E+00	6.40E+01	6.17E+01	5.55E+01	5.14E+01	4.70E+01	4.45E+01	4.53E+01	4.48E+01	4.16E+01	3.78E+01	3.41E+01

	2.00E+00	8.39E-01	5.03E-01	4.84E-01	5.00E-01	5.33E-01	6.02E-01	7.90E-01	9.55E-01	9.97E-01	9.90E-01	9.67E-01
	2.40E+00	4.25E+01	4.25E+01	3.78E+01	3.44E+01	3.04E+01	2.69E+01	2.34E+01	1.93E+01	1.60E+01	1.33E+01	1.10E+01
	2.80E+00	8.78E+01	8.90E+01	9.13E+01	9.65E+01	1.10E+02	1.41E+02	2.31E+02	3.09E+02	3.27E+02	3.22E+02	3.09E+02
	3.25E+00	2.06E+01	2.06E+01	1.84E+01	1.67E+01	1.47E+01	1.31E+01	1.14E+01	9.38E+00	7.77E+00	6.45E+00	5.36E+00
	3.75E+00	1.38E+01	1.38E+01	1.23E+01	1.12E+01	9.86E+00	8.75E+00	7.60E+00	6.28E+00	5.20E+00	4.31E+00	3.58E+00
	4.25E+00	9.05E+00	9.06E+00	8.06E+00	7.34E+00	6.48E+00	5.75E+00	4.99E+00	4.12E+00	3.42E+00	2.83E+00	2.35E+00
	4.75E+00	5.87E+00	5.87E+00	5.22E+00	4.75E+00	4.20E+00	3.73E+00	3.24E+00	2.67E+00	2.21E+00	1.84E+00	1.53E+00
	5.50E+00	6.14E+00	6.15E+00	5.47E+00	4.98E+00	4.40E+00	3.90E+00	3.39E+00	2.80E+00	2.32E+00	1.92E+00	1.60E+00
0	total	6.07E+09	3.36E+09	3.19E+05	2.40E+05	1.77E+05	1.41E+05	1.56E+05	1.91E+05	2.18E+05	2.39E+05	2.54E+05
0	gamma watts	4.23E+03	2.34E+03	2.22E-01	1.67E-01	1.23E-01	9.84E-02	1.08E-01	1.33E-01	1.52E-01	1.66E-01	1.77E-01

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pb210	2.29E-14	2.30E-14	2.40E-14	2.44E-14	2.52E-14	2.71E-14	3.52E-14	6.12E-14	1.10E-13	1.88E-13	3.03E-13
bi210	5.85E-12	5.85E-12	6.13E-12	6.24E-12	6.44E-12	6.91E-12	8.98E-12	1.56E-11	2.80E-11	4.79E-11	7.73E-11
bi211	4.03E-03	4.04E-03	4.30E-03	4.57E-03	5.16E-03	6.27E-03	9.21E-03	1.36E-02	1.74E-02	2.07E-02	2.36E-02
bi212	3.17E+00	3.24E+00	3.55E+00	3.97E+00	4.85E+00	6.73E+00	1.18E+01	1.62E+01	1.74E+01	1.72E+01	1.65E+01
bi213	1.55E-05	1.55E-05	4.06E-06	3.57E-06	3.58E-06	3.59E-06	3.66E-06	3.79E-06	3.95E-06	4.14E-06	4.37E-06
bi214	7.86E-09	7.87E-09	8.15E-09	8.46E-09	9.13E-09	1.07E-08	1.71E-08	3.39E-08	5.90E-08	9.30E-08	1.37E-07
po210	5.54E-06	5.55E-06	6.19E-06	6.68E-06	7.30E-06	8.05E-06	1.05E-05	1.93E-05	3.45E-05	5.90E-05	9.53E-05
po211	1.60E-05	1.60E-05	1.70E-05	1.81E-05	2.04E-05	2.48E-05	3.65E-05	5.37E-05	6.88E-05	8.19E-05	9.33E-05
po212	1.62E+01	1.66E+01	1.82E+01	2.03E+01	2.48E+01	3.44E+01	6.03E+01	8.32E+01	8.89E+01	8.79E+01	8.47E+01
po213	2.04E-03	2.04E-03	5.35E-04	4.71E-04	4.72E-04	4.74E-04	4.83E-04	5.00E-04	5.21E-04	5.47E-04	5.76E-04
po214	3.88E-04	3.78E-04	8.85E-05	7.61E-05	8.14E-05	9.52E-05	1.52E-04	3.02E-04	5.25E-04	8.28E-04	1.22E-03
po215	5.70E-03	5.70E-03	6.07E-03	6.46E-03	7.29E-03	8.87E-03	1.30E-02	1.92E-02	2.46E-02	2.92E-02	3.33E-02
po216	1.27E+01	1.27E+01	1.42E+01	1.58E+01	1.94E+01	2.69E+01	4.71E+01	6.49E+01	6.94E+01	6.86E+01	6.61E+01
po218	3.33E-05	3.33E-05	3.45E-05	3.59E-05	3.87E-05	4.53E-05	7.24E-05	1.44E-04	2.50E-04	3.94E-04	5.79E-04
at217	1.32E-03	1.32E-03	3.47E-04	3.06E-04	3.06E-04	3.07E-04	3.13E-04	3.24E-04	3.38E-04	3.54E-04	3.74E-04
rn218	2.58E-04	2.50E-04	1.29E-05	5.90E-07	1.33E-09	6.90E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rn219	4.53E-03	4.53E-03	4.83E-03	5.13E-03	5.79E-03	7.05E-03	1.03E-02	1.53E-02	1.95E-02	2.32E-02	2.65E-02
rn220	1.00E+01	1.00E+01	1.12E+01	1.25E+01	1.53E+01	2.13E+01	3.73E+01	5.14E+01	5.50E+01	5.43E+01	5.24E+01
rn222	2.43E-05	2.43E-05	2.52E-05	2.62E-05	2.83E-05	3.31E-05	5.29E-05	1.05E-04	1.83E-04	2.88E-04	4.23E-04
fr221	9.66E-04	9.65E-04	2.53E-04	2.23E-04	2.23E-04	2.24E-04	2.28E-04	2.36E-04	2.46E-04	2.59E-04	2.73E-04
fr223	1.77E-09	1.77E-09	1.88E-09	2.00E-09	2.23E-09	2.67E-09	3.92E-09	5.77E-09	7.39E-09	8.79E-09	1.00E-08
ra222	1.99E-04	1.93E-04	9.95E-06	4.56E-07	1.03E-09	5.34E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ra223	2.62E-03	2.63E-03	2.80E-03	2.97E-03	3.36E-03	4.08E-03	5.99E-03	8.83E-03	1.13E-02	1.35E-02	1.53E-02
ra224	7.10E+00	7.09E+00	7.94E+00	8.87E+00	1.08E+01	1.50E+01	2.64E+01	3.63E+01	3.89E+01	3.84E+01	3.70E+01
ra226	1.42E-05	1.42E-05	1.48E-05	1.53E-05	1.65E-05	1.93E-05	3.09E-05	6.14E-05	1.07E-04	1.68E-04	2.47E-04
ac225	6.94E-04	6.93E-04	1.82E-04	1.60E-04	1.61E-04	1.61E-04	1.64E-04	1.70E-04	1.77E-04	1.86E-04	1.96E-04
ac227	1.99E-05	2.00E-05	2.12E-05	2.25E-05	2.51E-05	3.00E-05	4.41E-05	6.50E-05	8.32E-05	9.90E-05	1.13E-04
ac228	1.08E-16	1.08E-16	1.17E-16	1.26E-16	1.45E-16	1.86E-16	3.36E-16	6.44E-16	9.97E-16	1.37E-15	1.76E-15
th226	1.80E-04	1.74E-04	8.98E-06	4.12E-07	9.32E-10	4.82E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
th227	2.93E-03	2.93E-03	3.12E-03	3.31E-03	3.69E-03	4.50E-03	6.61E-03	9.74E-03	1.25E-02	1.48E-02	1.69E-02
th228	5.96E+00	5.96E+00	6.67E+00	7.45E+00	9.12E+00	1.27E+01	2.22E+01	3.06E+01	3.28E+01	3.24E+01	3.12E+01
th229	9.33E-05	9.33E-05	9.34E-05	9.35E-05	9.37E-05	9.42E-05	9.59E-05	9.93E-05	1.04E-04	1.09E-04	1.15E-04
th230	4.38E-03	4.38E-03	4.64E-03	4.92E-03	5.46E-03	6.55E-03	9.97E-03	1.61E-02	2.28E-02	3.00E-02	3.76E-02
th232	4.93E-09	4.94E-09	5.19E-09	5.45E-09	5.97E-09	7.00E-09	1.01E-08	1.53E-08	2.05E-08	2.56E-08	3.08E-08
pa231	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.46E-02	1.47E-02	1.48E-02	1.49E-02	1.51E-02	1.53E-02	1.55E-02
u230	1.42E-04	1.37E-04	7.07E-06	3.24E-07	7.33E-10	3.79E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u231	5.30E-07	4.50E-07	1.89E-13	4.45E-20	3.18E-33	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
u232	1.27E+01	1.27E+01	1.39E+01	1.52E+01	1.74E+01	2.10E+01	2.75E+01	3.09E+01	3.08E+01	2.97E+01	2.84E+01
u233	4.30E-03	4.30E-03	4.38E-03	4.47E-03	4.63E-03	4.99E-03	6.01E-03	7.66E-03	9.31E-03	1.10E-02	1.27E-02
u234	1.24E+02	1.24E+02	1.25E+02	1.26E+02	1.27E+02	1.29E+02	1.37E+02	1.50E+02	1.62E+02	1.74E+02	1.85E+02
u235	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00

u236	3.69E+01	3.69E+01	3.69E+01	3.69E+01	3.69E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01	3.70E+01
u238	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01	1.75E+01
np235	1.17E-04	1.17E-04	1.00E-04	8.51E-05	6.18E-05	3.26E-05	4.80E-06	1.97E-07	8.05E-09	3.30E-10	1.35E-11
np237	6.70E+01	6.71E+01	6.77E+01	6.77E+01	6.77E+01	6.78E+01	6.79E+01	6.82E+01	6.87E+01	6.93E+01	6.99E+01
pu236	7.34E+02	7.34E+02	6.93E+02	6.53E+02	5.79E+02	4.56E+02	2.23E+02	6.74E+01	2.04E+01	6.17E+00	1.87E+00
pu237	1.50E-02	1.47E-02	3.76E-03	9.09E-04	5.51E-05	2.03E-07	1.01E-14	6.84E-27	.00E+00	.00E+00	.00E+00
pu238	1.54E+06	1.54E+06	1.57E+06	1.59E+06	1.60E+06	1.60E+06	1.57E+06	1.51E+06	1.45E+06	1.39E+06	1.34E+06

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
pu239	4.73E+04	4.74E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04	4.77E+04
pu240	8.65E+04	8.65E+04	8.65E+04	8.66E+04	8.66E+04	8.68E+04	8.71E+04	8.76E+04	8.80E+04	8.83E+04	8.86E+04
pu241	4.92E+02	4.92E+02	4.87E+02	4.81E+02	4.69E+02	4.47E+02	3.87E+02	3.04E+02	2.39E+02	1.87E+02	1.47E+02
pu242	4.09E+02	4.09E+02	4.09E+02	4.09E+02	4.09E+02	4.09E+02	4.09E+02	4.09E+02	4.09E+02	4.09E+02	4.09E+02
pu244	1.12E-11	1.12E-11	1.51E-11	1.91E-11	2.70E-11	4.29E-11	9.05E-11	1.70E-10	2.49E-10	3.29E-10	4.08E-10
am239	5.57E-05	1.37E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am240	8.33E-05	6.01E-05	1.39E-17	1.03E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
am241	5.64E+04	5.65E+04	6.89E+04	8.16E+04	1.06E+05	1.54E+05	2.82E+05	4.58E+05	5.94E+05	6.99E+05	7.80E+05
am242m	1.88E+01	1.88E+01	1.87E+01	1.87E+01	1.87E+01	1.86E+01	1.83E+01	1.79E+01	1.74E+01	1.70E+01	1.66E+01
am243	8.59E+03	8.59E+03	8.59E+03	8.59E+03	8.59E+03	8.59E+03	8.59E+03	8.58E+03	8.58E+03	8.58E+03	8.57E+03
cm241	7.84E-04	7.67E-04	1.17E-04	1.66E-05	3.48E-07	1.55E-10	1.36E-20	.00E+00	.00E+00	.00E+00	.00E+00
cm242	2.38E+07	2.38E+07	1.63E+07	1.10E+07	5.06E+06	1.07E+06	1.58E+04	5.54E+03	5.40E+03	5.27E+03	5.15E+03
cm243	1.46E+04	1.46E+04	1.45E+04	1.44E+04	1.42E+04	1.39E+04	1.29E+04	1.14E+04	1.01E+04	8.97E+03	7.94E+03
cm244	2.09E+06	2.09E+06	2.08E+06	2.06E+06	2.02E+06	1.94E+06	1.73E+06	1.43E+06	1.18E+06	9.74E+05	8.05E+05
cm245	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02	1.78E+02
cm246	7.04E+01	7.04E+01	7.04E+01	7.04E+01	7.04E+01	7.04E+01	7.03E+01	7.03E+01	7.02E+01	7.02E+01	7.01E+01
cm247	3.85E-04	3.85E-04	3.85E-04	3.85E-04	3.85E-04	3.85E-04	3.85E-04	3.85E-04	3.85E-04	3.85E-04	3.85E-04
cm248	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.74E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03	2.75E-03
cm250	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10
bk249	3.88E-04	3.87E-04	3.19E-04	2.61E-04	1.76E-04	7.97E-05	7.43E-06	1.42E-07	2.72E-09	5.21E-11	9.99E-13
cf249	2.15E-02	2.17E-02	3.80E-02	5.18E-02	7.22E-02	9.51E-02	1.12E-01	1.12E-01	1.11E-01	1.10E-01	1.09E-01
cf250	4.84E-01	4.85E-01	4.79E-01	4.72E-01	4.60E-01	4.36E-01	3.72E-01	2.86E-01	2.19E-01	1.68E-01	1.29E-01
cf251	4.44E-03	4.44E-03	4.44E-03	4.44E-03	4.44E-03	4.43E-03	4.42E-03	4.41E-03	4.39E-03	4.37E-03	4.36E-03
cf252	1.59E+00	1.59E+00	1.49E+00	1.40E+00	1.23E+00	9.43E-01	4.29E-01	1.16E-01	3.12E-02	8.43E-03	2.27E-03
cf253	3.86E-04	3.71E-04	1.16E-05	3.18E-07	2.59E-10	1.74E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cf254	8.80E-08	8.70E-08	3.14E-08	1.09E-08	1.34E-09	2.04E-11	7.21E-17	5.90E-26	.00E+00	.00E+00	.00E+00
es253	1.46E-01	1.46E-01	2.65E-02	1.71E-03	4.66E-06	2.26E-11	1.75E-27	.00E+00	.00E+00	.00E+00	.00E+00
es254	5.10E-04	5.08E-04	4.06E-04	3.22E-04	2.03E-04	8.12E-05	5.17E-06	5.24E-08	5.31E-10	5.38E-12	5.45E-14
es255	6.12E-06	6.03E-06	1.24E-06	2.39E-07	9.30E-09	1.41E-11	4.91E-20	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.76E+07	2.76E+07	2.02E+07	1.49E+07	8.94E+06	4.93E+06	3.76E+06	3.56E+06	3.39E+06	3.23E+06	3.08E+06

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neutron source intensity as a function of time

0 BWR SNF Assembly - Fuel - decay
spontaneous fission neutron source, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
th230	1.12E-07	1.13E-07	1.19E-07	1.26E-07	1.40E-07	1.68E-07	2.56E-07	4.14E-07	5.85E-07	7.69E-07	9.65E-07
pa231	1.83E-06	1.83E-06	1.83E-06	1.83E-06	1.83E-06	1.84E-06	1.85E-06	1.87E-06	1.89E-06	1.92E-06	1.94E-06
u232	7.77E-04	7.78E-04	8.56E-04	9.31E-04	1.07E-03	1.29E-03	1.69E-03	1.90E-03	1.89E-03	1.83E-03	1.75E-03
u234	2.67E-01	2.67E-01	2.69E-01	2.70E-01	2.73E-01	2.79E-01	2.95E-01	3.22E-01	3.48E-01	3.73E-01	3.97E-01
u235	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02	1.24E-02

u236	5.55E+00	5.55E+00	5.55E+00	5.55E+00	5.55E+00	5.55E+00	5.55E+00	5.55E+00	5.55E+00	5.55E+00	5.55E+00
u237	3.46E-06	3.12E-06	3.53E-10	1.76E-11	1.72E-11	1.64E-11	1.42E-11	1.11E-11	8.74E-12	6.86E-12	5.39E-12
u238	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03	2.47E+03
u239	9.78E-07	3.29E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
np236	2.64E-07	2.64E-07	2.64E-07	2.64E-07	2.64E-07	2.64E-07	2.64E-07	2.64E-07	2.64E-07	2.64E-07	2.64E-07
np238	2.21E-05	1.59E-05	5.50E-12	5.50E-12	5.48E-12	5.46E-12	5.38E-12	5.24E-12	5.12E-12	4.99E-12	4.87E-12
np239	2.00E-02	1.50E-02	8.91E-08	8.90E-08	8.90E-08	8.90E-08	8.90E-08	8.90E-08	8.89E-08	8.89E-08	8.88E-08
pu236	4.97E+01	4.97E+01	4.69E+01	4.42E+01	3.92E+01	3.09E+01	1.51E+01	4.56E+00	1.38E+00	4.18E-01	1.27E-01
pu238	2.84E+05	2.84E+05	2.90E+05	2.93E+05	2.96E+05	2.96E+05	2.90E+05	2.79E+05	2.68E+05	2.57E+05	2.47E+05
pu239	2.53E+01	2.54E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01	2.56E+01
pu240	5.75E+05	5.75E+05	5.75E+05	5.76E+05	5.76E+05	5.77E+05	5.79E+05	5.82E+05	5.85E+05	5.87E+05	5.89E+05
pu241	1.77E+01	1.77E+01	1.75E+01	1.73E+01	1.69E+01	1.61E+01	1.39E+01	1.09E+01	8.59E+00	6.74E+00	5.30E+00
pu242	3.19E+05	3.19E+05	3.19E+05	3.19E+05	3.19E+05	3.19E+05	3.19E+05	3.19E+05	3.19E+05	3.19E+05	3.19E+05
pu243	2.31E-03	8.04E-05	1.66E-14	1.66E-14	1.66E-14	1.66E-14	1.66E-14	1.66E-14	1.66E-14	1.66E-14	1.66E-14
pu244	2.68E-06	2.69E-06	3.61E-06	4.57E-06	6.47E-06	1.03E-05	2.16E-05	4.06E-05	5.96E-05	7.86E-05	9.75E-05
am241	2.17E+01	2.18E+01	2.65E+01	3.14E+01	4.09E+01	5.91E+01	1.09E+02	1.76E+02	2.29E+02	2.69E+02	3.00E+02
am242m	8.92E+01	8.92E+01	8.91E+01	8.90E+01	8.88E+01	8.83E+01	8.70E+01	8.49E+01	8.29E+01	8.09E+01	7.89E+01
am242	4.61E+02	1.63E+02	9.68E-02	9.66E-02	9.64E-02	9.59E-02	9.45E-02	9.22E-02	9.00E-02	8.78E-02	8.57E-02
am243	3.95E+01	3.96E+01	3.96E+01	3.96E+01	3.96E+01	3.96E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01	3.95E+01
am244	5.74E-02	1.11E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cm242	1.19E+08	1.19E+08	8.14E+07	5.49E+07	2.53E+07	5.36E+06	7.89E+04	2.77E+04	2.70E+04	2.63E+04	2.57E+04
cm243	3.17E+02	3.17E+02	3.15E+02	3.13E+02	3.09E+02	3.02E+02	2.80E+02	2.48E+02	2.20E+02	1.95E+02	1.72E+02
cm244	2.73E+08	2.73E+08	2.71E+08	2.68E+08	2.63E+08	2.53E+08	2.26E+08	1.86E+08	1.54E+08	1.27E+08	1.05E+08
cm245	4.84E+01	4.84E+01	4.84E+01	4.84E+01	4.84E+01	4.84E+01	4.84E+01	4.83E+01	4.83E+01	4.83E+01	4.83E+01
cm246	2.54E+06	2.54E+06	2.54E+06	2.54E+06	2.54E+06	2.54E+06	2.53E+06	2.53E+06	2.53E+06	2.53E+06	2.53E+06
cm248	4.49E+04	4.49E+04	4.49E+04	4.49E+04	4.49E+04	4.49E+04	4.50E+04	4.50E+04	4.50E+04	4.50E+04	4.50E+04
cm250	6.02E-02	6.02E-02	6.02E-02	6.03E-02	6.03E-02	6.03E-02	6.03E-02	6.02E-02	6.02E-02	6.02E-02	6.02E-02
bk249	2.14E+00	2.13E+00	1.76E+00	1.44E+00	9.69E-01	4.39E-01	4.09E-02	7.84E-04	1.50E-05	2.87E-07	5.50E-09
cf249	1.31E-02	1.32E-02	2.31E-02	3.15E-02	4.39E-02	5.78E-02	6.80E-02	6.83E-02	6.77E-02	6.70E-02	6.64E-02
cf250	4.05E+04	4.06E+04	4.01E+04	3.96E+04	3.85E+04	3.65E+04	3.12E+04	2.39E+04	1.84E+04	1.41E+04	1.08E+04
cf252	5.57E+06	5.57E+06	5.23E+06	4.89E+06	4.29E+06	3.30E+06	1.50E+06	4.06E+05	1.09E+05	2.95E+04	7.96E+03
cf254	3.78E+03	3.74E+03	1.35E+03	4.67E+02	5.75E+01	8.76E-01	3.09E-06	2.53E-15	2.07E-24	.00E+00	.00E+00
es253	1.08E+00	1.09E+00	1.97E-01	1.27E-02	3.47E-05	1.68E-10	1.30E-26	.00E+00	.00E+00	.00E+00	.00E+00
es255	1.76E-02	1.74E-02	3.57E-03	6.89E-04	2.68E-05	4.06E-08	1.42E-16	1.12E-30	.00E+00	.00E+00	.00E+00
0 total	4.01E+08	4.01E+08	3.61E+08	3.32E+08	2.96E+08	2.66E+08	2.31E+08	1.91E+08	1.58E+08	1.31E+08	1.09E+08
0 total	4.29E+08	4.29E+08	3.81E+08	3.47E+08	3.05E+08	2.71E+08	2.35E+08	1.94E+08	1.61E+08	1.34E+08	1.12E+08

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alpha-n neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
alpha-n neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1 6.43E+00 - 2.00E+01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
2 3.00E+00 - 6.43E+00	1.166E+07	1.165E+07	8.287E+06	5.892E+06	3.200E+06	1.373E+06	8.476E+05	7.926E+05	7.468E+05	7.051E+05	6.671E+05
3 1.85E+00 - 3.00E+00	1.318E+07	1.317E+07	9.691E+06	7.214E+06	4.435E+06	2.560E+06	2.009E+06	1.907E+06	1.818E+06	1.736E+06	1.662E+06
4 1.40E+00 - 1.85E+00	1.899E+06	1.898E+06	1.468E+06	1.161E+06	8.183E+05	5.900E+05	5.194E+05	4.950E+05	4.731E+05	4.530E+05	4.346E+05
5 9.00E-01 - 1.40E+00	7.157E+05	7.155E+05	5.806E+05	4.846E+05	3.774E+05	3.075E+05	2.844E+05	2.718E+05	2.602E+05	2.497E+05	2.400E+05
6 4.00E-01 - 9.00E-01	1.392E+05	1.392E+05	1.211E+05	1.082E+05	9.396E+04	8.512E+04	8.167E+04	7.814E+04	7.488E+04	7.190E+04	6.915E+04
7 1.00E-01 - 4.00E-01	2.521E+04	2.522E+04	2.156E+04	1.896E+04	1.607E+04	1.424E+04	1.353E+04	1.289E+04	1.230E+04	1.176E+04	1.126E+04
8 1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9 3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10 5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11 1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12 3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13 1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00

14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		2.763E+07	2.760E+07	2.017E+07	1.488E+07	8.941E+06	4.931E+06	3.756E+06	3.558E+06	3.386E+06	3.228E+06	3.084E+06
1												

spontaneous fission neutron source spectrum as a function of time

0 BWR SNF Assembly - Fuel - decay
spontaneous fission neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	7.584E+06	7.586E+06	6.822E+06	6.261E+06	5.587E+06	5.002E+06	4.350E+06	3.588E+06	2.970E+06	2.464E+06	2.046E+06
2	3.00E+00 - 6.43E+00	8.404E+07	8.406E+07	7.568E+07	6.952E+07	6.212E+07	5.568E+07	4.844E+07	3.995E+07	3.308E+07	2.743E+07	2.279E+07
3	1.85E+00 - 3.00E+00	9.108E+07	9.110E+07	8.197E+07	7.527E+07	6.721E+07	6.021E+07	5.237E+07	4.319E+07	3.576E+07	2.966E+07	2.463E+07
4	1.40E+00 - 1.85E+00	5.229E+07	5.230E+07	4.712E+07	4.332E+07	3.874E+07	3.475E+07	3.023E+07	2.493E+07	2.064E+07	1.712E+07	1.422E+07
5	9.00E-01 - 1.40E+00	7.166E+07	7.168E+07	6.457E+07	5.935E+07	5.307E+07	4.759E+07	4.140E+07	3.415E+07	2.827E+07	2.345E+07	1.948E+07
6	4.00E-01 - 9.00E-01	7.899E+07	7.901E+07	7.110E+07	6.528E+07	5.830E+07	5.223E+07	4.543E+07	3.747E+07	3.102E+07	2.573E+07	2.137E+07
7	1.00E-01 - 4.00E-01	1.551E+07	1.551E+07	1.395E+07	1.280E+07	1.142E+07	1.023E+07	8.895E+06	7.336E+06	6.074E+06	5.038E+06	4.184E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		4.011E+08	4.013E+08	3.612E+08	3.318E+08	2.965E+08	2.657E+08	2.311E+08	1.906E+08	1.578E+08	1.309E+08	1.087E+08
1												

total (alpha-n plus spon. fission) neutron source spectrum as a function of time
(using reaction spectra for uranium dioxide)

0 BWR SNF Assembly - Fuel - decay
neutron spectra, neutrons/sec/basis
basis = per ONE BWR Fuel Assembly - Fuel Region

	boundaries, mev	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1	6.43E+00 - 2.00E+01	7.584E+06	7.586E+06	6.822E+06	6.261E+06	5.587E+06	5.002E+06	4.350E+06	3.588E+06	2.970E+06	2.464E+06	2.046E+06
2	3.00E+00 - 6.43E+00	9.570E+07	9.572E+07	8.397E+07	7.542E+07	6.532E+07	5.705E+07	4.928E+07	4.074E+07	3.382E+07	2.814E+07	2.345E+07
3	1.85E+00 - 3.00E+00	1.043E+08	1.043E+08	9.166E+07	8.248E+07	7.164E+07	6.277E+07	5.437E+07	4.510E+07	3.758E+07	3.140E+07	2.630E+07
4	1.40E+00 - 1.85E+00	5.419E+07	5.420E+07	4.859E+07	4.448E+07	3.956E+07	3.534E+07	3.075E+07	2.543E+07	2.112E+07	1.758E+07	1.466E+07
5	9.00E-01 - 1.40E+00	7.237E+07	7.239E+07	6.515E+07	5.983E+07	5.344E+07	4.790E+07	4.169E+07	3.442E+07	2.853E+07	2.370E+07	1.972E+07
6	4.00E-01 - 9.00E-01	7.913E+07	7.915E+07	7.122E+07	6.539E+07	5.840E+07	5.232E+07	4.551E+07	3.755E+07	3.110E+07	2.580E+07	2.144E+07
7	1.00E-01 - 4.00E-01	1.553E+07	1.554E+07	1.397E+07	1.282E+07	1.144E+07	1.024E+07	8.909E+06	7.349E+06	6.086E+06	5.050E+06	4.196E+06
8	1.70E-02 - 1.00E-01	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
9	3.00E-03 - 1.70E-02	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
10	5.50E-04 - 3.00E-03	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
11	1.00E-04 - 5.50E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
12	3.00E-05 - 1.00E-04	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
13	1.00E-05 - 3.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
14	3.05E-06 - 1.00E-05	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
15	1.77E-06 - 3.05E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
16	1.30E-06 - 1.77E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
17	1.13E-06 - 1.30E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
18	1.00E-06 - 1.13E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
19	8.00E-07 - 1.00E-06	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
20	4.00E-07 - 8.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
21	3.25E-07 - 4.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
22	2.25E-07 - 3.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
23	1.00E-07 - 2.25E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
24	5.00E-08 - 1.00E-07	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
25	3.00E-08 - 5.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
26	1.00E-08 - 3.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
27	1.00E-11 - 1.00E-08	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00	.000E+00
0		4.288E+08	4.289E+08	3.814E+08	3.467E+08	3.054E+08	2.706E+08	2.349E+08	1.942E+08	1.612E+08	1.341E+08	1.118E+08

1

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements
actinides
fission products

1 gamma source spectrum for decay step for BWR source term - fuel ds4 - discharge

0 1.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.5632E+16	1.9690E+15
5.0000E-02	to	1.0000E-01	2.3854E+16	1.7891E+15
1.0000E-01	to	2.0000E-01	4.8247E+16	7.2371E+15
2.0000E-01	to	3.0000E-01	3.2706E+16	8.1764E+15
3.0000E-01	to	4.0000E-01	1.0069E+16	3.5240E+15
4.0000E-01	to	6.0000E-01	2.2599E+16	1.1299E+16
6.0000E-01	to	8.0000E-01	4.0245E+16	2.8171E+16
8.0000E-01	to	1.0000E+00	7.9405E+15	7.1465E+15
1.0000E+00	to	1.3300E+00	4.0739E+15	4.7461E+15
1.3300E+00	to	1.6600E+00	8.9918E+15	1.3443E+16
1.6600E+00	to	2.0000E+00	5.2456E+14	9.5995E+14
2.0000E+00	to	2.5000E+00	4.9522E+14	1.1142E+15
2.5000E+00	to	3.0000E+00	2.6252E+14	7.2192E+14
3.0000E+00	to	4.0000E+00	2.2879E+12	8.0077E+12
4.0000E+00	to	5.0000E+00	1.4057E+10	6.3258E+10
5.0000E+00	to	6.5000E+00	7.8469E+07	4.5120E+08

	6.5000E+00 to	8.0000E+00	1.1361E+06	8.2369E+06
	8.0000E+00 to	1.0000E+01	2.4114E+05	2.1703E+06
0	totals		2.6564E+17	9.0306E+16

0
0 total energy from nuclides with spectrum data = 9.0183E+16
0 total energy from nuclides with no spectrum data = 1.2324E+14
1 gamma source spectrum for decay step for BWR source term - fuel ds4 - 0.25 year
0 90.00 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	6.9469E+15	2.0841E+14
	5.0000E-02 to	1.0000E-01	2.1745E+15	1.6309E+14
	1.0000E-01 to	2.0000E-01	2.4553E+15	3.6829E+14
	2.0000E-01 to	3.0000E-01	5.3151E+14	1.3288E+14
	3.0000E-01 to	4.0000E-01	4.0774E+14	1.4271E+14
	4.0000E-01 to	6.0000E-01	4.2200E+15	2.1100E+15
	6.0000E-01 to	8.0000E-01	1.1581E+16	8.1070E+15
	8.0000E-01 to	1.0000E+00	1.0349E+15	9.3142E+14
	1.0000E+00 to	1.3300E+00	3.0144E+14	3.5118E+14
	1.3300E+00 to	1.6600E+00	1.8288E+14	2.7340E+14
	1.6600E+00 to	2.0000E+00	1.4083E+13	2.5771E+13
	2.0000E+00 to	2.5000E+00	4.6723E+13	1.0513E+14
	2.5000E+00 to	3.0000E+00	2.9004E+12	7.9760E+12
	3.0000E+00 to	4.0000E+00	1.0700E+11	3.7451E+11
	4.0000E+00 to	5.0000E+00	1.2847E+07	5.7812E+07
	5.0000E+00 to	6.5000E+00	5.1539E+06	2.9635E+07
	6.5000E+00 to	8.0000E+00	1.0106E+06	7.3271E+06
	8.0000E+00 to	1.0000E+01	2.1452E+05	1.9307E+06
0	totals		2.9900E+16	1.2928E+16

0
0 total energy from nuclides with spectrum data = 1.2924E+16
0 total energy from nuclides with no spectrum data = 3.9089E+12
1 gamma source spectrum for decay step for BWR source term - fuel ds4 - 0.50 year
0 182.50 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	5.1393E+15	1.5418E+14
	5.0000E-02 to	1.0000E-01	1.6734E+15	1.2550E+14
	1.0000E-01 to	2.0000E-01	1.6262E+15	2.4394E+14
	2.0000E-01 to	3.0000E-01	4.0804E+14	1.0201E+14
	3.0000E-01 to	4.0000E-01	3.0808E+14	1.0783E+14
	4.0000E-01 to	6.0000E-01	2.7130E+15	1.3565E+15
	6.0000E-01 to	8.0000E-01	6.5803E+15	4.6062E+15
	8.0000E-01 to	1.0000E+00	9.0237E+14	8.1214E+14
	1.0000E+00 to	1.3300E+00	2.4957E+14	2.9075E+14
	1.3300E+00 to	1.6600E+00	1.0131E+14	1.5147E+14
	1.6600E+00 to	2.0000E+00	8.9351E+12	1.6351E+13
	2.0000E+00 to	2.5000E+00	3.3336E+13	7.5006E+13
	2.5000E+00 to	3.0000E+00	6.3050E+11	1.7339E+12
	3.0000E+00 to	4.0000E+00	7.5199E+10	2.6320E+11
	4.0000E+00 to	5.0000E+00	1.1692E+07	5.2616E+07
	5.0000E+00 to	6.5000E+00	4.6912E+06	2.6974E+07
	6.5000E+00 to	8.0000E+00	9.1999E+05	6.6699E+06
	8.0000E+00 to	1.0000E+01	1.9530E+05	1.7577E+06
0	totals		1.9745E+16	8.0439E+15

0
0 total energy from nuclides with spectrum data = 8.0423E+15
0 total energy from nuclides with no spectrum data = 1.6484E+12
1 gamma source spectrum for decay step for BWR source term - fuel ds4 - 1 year
0 365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.5170E+15	1.0551E+14
5.0000E-02	to	1.0000E-01	1.1497E+15	8.6228E+13
1.0000E-01	to	2.0000E-01	1.0740E+15	1.6110E+14
2.0000E-01	to	3.0000E-01	2.7925E+14	6.9813E+13
3.0000E-01	to	4.0000E-01	2.1100E+14	7.3850E+13
4.0000E-01	to	6.0000E-01	1.9558E+15	9.7792E+14
6.0000E-01	to	8.0000E-01	3.3907E+15	2.3735E+15
8.0000E-01	to	1.0000E+00	7.4809E+14	6.7328E+14
1.0000E+00	to	1.3300E+00	2.0690E+14	2.4104E+14
1.3300E+00	to	1.6600E+00	7.8509E+13	1.1737E+14
1.6600E+00	to	2.0000E+00	5.9591E+12	1.0905E+13
2.0000E+00	to	2.5000E+00	2.1620E+13	4.8644E+13
2.5000E+00	to	3.0000E+00	4.3651E+11	1.2004E+12
3.0000E+00	to	4.0000E+00	5.3398E+10	1.8689E+11
4.0000E+00	to	5.0000E+00	1.0319E+07	4.6434E+07
5.0000E+00	to	6.5000E+00	4.1406E+06	2.3809E+07
6.5000E+00	to	8.0000E+00	8.1213E+05	5.8880E+06
8.0000E+00	to	1.0000E+01	1.7242E+05	1.5517E+06
totals			1.2639E+16	4.9405E+15

total energy from nuclides with spectrum data = 4.9399E+15
total energy from nuclides with no spectrum data = 5.7275E+11
gamma source spectrum for decay step for BWR source term - fuel ds4 - 2 year
730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.9804E+15	5.9412E+13
5.0000E-02	to	1.0000E-01	6.2952E+14	4.7214E+13
1.0000E-01	to	2.0000E-01	5.7154E+14	8.5731E+13
2.0000E-01	to	3.0000E-01	1.5107E+14	3.7768E+13
3.0000E-01	to	4.0000E-01	1.1024E+14	3.8585E+13
4.0000E-01	to	6.0000E-01	1.2775E+15	6.3875E+14
6.0000E-01	to	8.0000E-01	2.3140E+15	1.6198E+15
8.0000E-01	to	1.0000E+00	5.2783E+14	4.7505E+14
1.0000E+00	to	1.3300E+00	1.5448E+14	1.7996E+14
1.3300E+00	to	1.6600E+00	5.0522E+13	7.5531E+13
1.6600E+00	to	2.0000E+00	2.8954E+12	5.2985E+12
2.0000E+00	to	2.5000E+00	9.1980E+12	2.0696E+13
2.5000E+00	to	3.0000E+00	2.1945E+11	6.0347E+11
3.0000E+00	to	4.0000E+00	2.7028E+10	9.4599E+10
4.0000E+00	to	5.0000E+00	9.1593E+06	4.1217E+07
5.0000E+00	to	6.5000E+00	3.6758E+06	2.1136E+07
6.5000E+00	to	8.0000E+00	7.2104E+05	5.2276E+06
8.0000E+00	to	1.0000E+01	1.5309E+05	1.3778E+06
totals			7.7795E+15	3.2845E+15

total energy from nuclides with spectrum data = 3.2844E+15
total energy from nuclides with no spectrum data = 9.2829E+10
gamma source spectrum for decay step for BWR source term - fuel ds4 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	7.8269E+14	2.3481E+13
5.0000E-02	to	1.0000E-01	2.2467E+14	1.6851E+13
1.0000E-01	to	2.0000E-01	1.8938E+14	2.8407E+13
2.0000E-01	to	3.0000E-01	5.1117E+13	1.2779E+13
3.0000E-01	to	4.0000E-01	3.2276E+13	1.1296E+13
4.0000E-01	to	6.0000E-01	4.1727E+14	2.0864E+14

	6.0000E-01 to	8.0000E-01	1.4235E+15	9.9644E+14
	8.0000E-01 to	1.0000E+00	2.0492E+14	1.8443E+14
	1.0000E+00 to	1.3300E+00	8.7309E+13	1.0171E+14
	1.3300E+00 to	1.6600E+00	1.8553E+13	2.7736E+13
	1.6600E+00 to	2.0000E+00	3.9476E+11	7.2240E+11
	2.0000E+00 to	2.5000E+00	7.4121E+11	1.6677E+12
	2.5000E+00 to	3.0000E+00	2.8364E+10	7.8000E+10
	3.0000E+00 to	4.0000E+00	3.5216E+09	1.2325E+10
	4.0000E+00 to	5.0000E+00	7.9556E+06	3.5800E+07
	5.0000E+00 to	6.5000E+00	3.1928E+06	1.8359E+07
	6.5000E+00 to	8.0000E+00	6.2630E+05	4.5407E+06
	8.0000E+00 to	1.0000E+01	1.3298E+05	1.1968E+06
0	totals		3.4328E+15	1.6143E+15

0
0 total energy from nuclides with spectrum data = 1.6142E+15
0 total energy from nuclides with no spectrum data = 1.6772E+10
1 gamma source spectrum for decay step for BWR source term - fuel ds4 - 10 year
0 3652.50 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	5.4450E+14	1.6335E+13
	5.0000E-02 to	1.0000E-01	1.5231E+14	1.1424E+13
	1.0000E-01 to	2.0000E-01	1.2075E+14	1.8112E+13
	2.0000E-01 to	3.0000E-01	3.3722E+13	8.4306E+12
	3.0000E-01 to	4.0000E-01	2.0537E+13	7.1878E+12
	4.0000E-01 to	6.0000E-01	8.8540E+13	4.4270E+13
	6.0000E-01 to	8.0000E-01	9.7429E+14	6.8200E+14
	8.0000E-01 to	1.0000E+00	5.5811E+13	5.0230E+13
	1.0000E+00 to	1.3300E+00	4.9506E+13	5.7675E+13
	1.3300E+00 to	1.6600E+00	5.9918E+12	8.9577E+12
	1.6600E+00 to	2.0000E+00	6.3652E+10	1.1648E+11
	2.0000E+00 to	2.5000E+00	1.5873E+10	3.5715E+10
	2.5000E+00 to	3.0000E+00	1.4079E+09	3.8717E+09
	3.0000E+00 to	4.0000E+00	1.3549E+08	4.7421E+08
	4.0000E+00 to	5.0000E+00	6.5697E+06	2.9563E+07
	5.0000E+00 to	6.5000E+00	2.6365E+06	1.5160E+07
	6.5000E+00 to	8.0000E+00	5.1716E+05	3.7494E+06
	8.0000E+00 to	1.0000E+01	1.0980E+05	9.8820E+05
0	totals		2.0460E+15	9.0478E+14

0
0 total energy from nuclides with spectrum data = 9.0478E+14
0 total energy from nuclides with no spectrum data = 5.1489E+09
1 gamma source spectrum for decay step for BWR source term - fuel ds4 - 15 year
0 5478.75 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	4.6167E+14	1.3850E+13
	5.0000E-02 to	1.0000E-01	1.3073E+14	9.8050E+12
	1.0000E-01 to	2.0000E-01	9.7916E+13	1.4687E+13
	2.0000E-01 to	3.0000E-01	2.8314E+13	7.0785E+12
	3.0000E-01 to	4.0000E-01	1.7752E+13	6.2132E+12
	4.0000E-01 to	6.0000E-01	2.8845E+13	1.4422E+13
	6.0000E-01 to	8.0000E-01	8.1174E+14	5.6822E+14
	8.0000E-01 to	1.0000E+00	2.2872E+13	2.0585E+13
	1.0000E+00 to	1.3300E+00	3.1472E+13	3.6665E+13
	1.3300E+00 to	1.6600E+00	2.8055E+12	4.1943E+12
	1.6600E+00 to	2.0000E+00	4.6826E+10	8.5691E+10
	2.0000E+00 to	2.5000E+00	2.6172E+09	5.8888E+09
	2.5000E+00 to	3.0000E+00	5.4823E+08	1.5076E+09
	3.0000E+00 to	4.0000E+00	1.9972E+07	6.9902E+07

	4.0000E+00 to	5.0000E+00	5.4424E+06	2.4491E+07
	5.0000E+00 to	6.5000E+00	2.1840E+06	1.2558E+07
	6.5000E+00 to	8.0000E+00	4.2838E+05	3.1058E+06
	8.0000E+00 to	1.0000E+01	9.0949E+04	8.1854E+05
0	totals		1.6342E+15	6.9582E+14

0
0 total energy from nuclides with spectrum data = 6.9581E+14
0 total energy from nuclides with no spectrum data = 1.6788E+09
1 gamma source spectrum for decay step for BWR source term - fuel ds4 - 20 year
0 7305.00 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	4.0078E+14	1.2023E+13
	5.0000E-02 to	1.0000E-01	1.1532E+14	8.6487E+12
	1.0000E-01 to	2.0000E-01	8.1763E+13	1.2264E+13
	2.0000E-01 to	3.0000E-01	2.4239E+13	6.0597E+12
	3.0000E-01 to	4.0000E-01	1.5597E+13	5.4589E+12
	4.0000E-01 to	6.0000E-01	1.5595E+13	7.7975E+12
	6.0000E-01 to	8.0000E-01	7.1038E+14	4.9727E+14
	8.0000E-01 to	1.0000E+00	1.2980E+13	1.1682E+13
	1.0000E+00 to	1.3300E+00	2.0667E+13	2.4077E+13
	1.3300E+00 to	1.6600E+00	1.6137E+12	2.4125E+12
	1.6600E+00 to	2.0000E+00	4.0626E+10	7.4345E+10
	2.0000E+00 to	2.5000E+00	2.0422E+09	4.5949E+09
	2.5000E+00 to	3.0000E+00	5.1011E+08	1.4028E+09
	3.0000E+00 to	4.0000E+00	1.3506E+07	4.7272E+07
	4.0000E+00 to	5.0000E+00	4.5156E+06	2.0320E+07
	5.0000E+00 to	6.5000E+00	1.8120E+06	1.0419E+07
	6.5000E+00 to	8.0000E+00	3.5540E+05	2.5767E+06
	8.0000E+00 to	1.0000E+01	7.5452E+04	6.7907E+05
0	totals		1.3990E+15	5.8777E+14

0
0 total energy from nuclides with spectrum data = 5.8777E+14
0 total energy from nuclides with no spectrum data = 6.2976E+08
1 gamma source spectrum for decay step for BWR source term - fuel ds4 - 25 year
0 9131.25 day time of the requested nuclides

0	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	3.5094E+14	1.0528E+13
	5.0000E-02 to	1.0000E-01	1.0282E+14	7.7115E+12
	1.0000E-01 to	2.0000E-01	6.9319E+13	1.0398E+13
	2.0000E-01 to	3.0000E-01	2.0919E+13	5.2297E+12
	3.0000E-01 to	4.0000E-01	1.3740E+13	4.8091E+12
	4.0000E-01 to	6.0000E-01	1.1451E+13	5.7256E+12
	6.0000E-01 to	8.0000E-01	6.2893E+14	4.4025E+14
	8.0000E-01 to	1.0000E+00	8.5778E+12	7.7200E+12
	1.0000E+00 to	1.3300E+00	1.3786E+13	1.6060E+13
	1.3300E+00 to	1.6600E+00	1.0245E+12	1.5316E+12
	1.6600E+00 to	2.0000E+00	3.5579E+10	6.5109E+10
	2.0000E+00 to	2.5000E+00	1.7930E+09	4.0342E+09
	2.5000E+00 to	3.0000E+00	4.8858E+08	1.3436E+09
	3.0000E+00 to	4.0000E+00	1.1120E+07	3.8918E+07
	4.0000E+00 to	5.0000E+00	3.7514E+06	1.6881E+07
	5.0000E+00 to	6.5000E+00	1.5052E+06	8.6551E+06
	6.5000E+00 to	8.0000E+00	2.9522E+05	2.1403E+06
	8.0000E+00 to	1.0000E+01	6.2673E+04	5.6406E+05
0	totals		1.2215E+15	5.1004E+14

0
0 total energy from nuclides with spectrum data = 5.1004E+14
0 total energy from nuclides with no spectrum data = 3.0752E+08

```
1
1  * normal termination of execution *
0                                        table of contents for material tables
0                                          case or subcase printed      page

                                                     1                   1
0ndset          33
           33           4           1          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     19 entries read
0   74* array     19 entries read
0   75$ array     19 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0           0
           21         100          19           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero           4
            0         689         129         879
0pow             3
   .000000E+00  .000000E+00  .000000E+00
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              3.7581E+00      1.9421E+02      1.9797E+02
 start of interval flux =        1.58779E+13
 n-gamma, fission and total mev/fission =              4.1325E+00      1.9431E+02      1.9844E+02
 start of interval flux =        1.59187E+13
 n-gamma, fission and total mev/fission =              4.2236E+00      1.9441E+02      1.9863E+02
 start of interval flux =        1.59696E+13
 n-gamma, fission and total mev/fission =              4.3139E+00      1.9451E+02      1.9882E+02
 start of interval flux =        1.60310E+13
 n-gamma, fission and total mev/fission =              4.4070E+00      1.9460E+02      1.9900E+02
 start of interval flux =        1.61016E+13
 n-gamma, fission and total mev/fission =              4.5027E+00      1.9469E+02      1.9919E+02
 start of interval flux =        1.61804E+13
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 n-gamma, fission and total mev/fission =              4.6007E+00       1.9477E+02       1.9937E+02
 start of interval flux =         1.62666E+13
 n-gamma, fission and total mev/fission =              4.7006E+00       1.9485E+02       1.9956E+02
 start of interval flux =         1.63595E+13
 n-gamma, fission and total mev/fission =              4.8021E+00       1.9494E+02       1.9974E+02
 start of interval flux =         1.64584E+13
 n-gamma, fission and total mev/fission =              4.9050E+00       1.9502E+02       1.9992E+02
 start of interval flux =         1.65631E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 9000 MWd/MTU
0ndset          33
            33           4           2          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
          7935          20           6          18        1697
0mmn           19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst         5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero          4
            21         689         129         879
0pow            3
  4.349999E+00 1.799989E+03 1.622187E+13
0 linp          9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              4.9780E+00       1.9507E+02       2.0005E+02
 start of interval flux =         1.65139E+13
 n-gamma, fission and total mev/fission =              5.0718E+00       1.9514E+02       2.0022E+02
 start of interval flux =         1.66374E+13
 n-gamma, fission and total mev/fission =              5.1724E+00       1.9522E+02       2.0039E+02
 start of interval flux =         1.67648E+13
 n-gamma, fission and total mev/fission =              5.2749E+00       1.9529E+02       2.0057E+02
 start of interval flux =         1.68965E+13
 n-gamma, fission and total mev/fission =              5.3785E+00       1.9536E+02       2.0074E+02
 start of interval flux =         1.70324E+13
 n-gamma, fission and total mev/fission =              5.4833E+00       1.9543E+02       2.0092E+02
 start of interval flux =         1.71722E+13
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 n-gamma, fission and total mev/fission =              5.5890E+00       1.9551E+02       2.0109E+02
 start of interval flux =         1.73158E+13
 n-gamma, fission and total mev/fission =              5.6957E+00       1.9558E+02       2.0127E+02
 start of interval flux =         1.74630E+13
 n-gamma, fission and total mev/fission =              5.8033E+00       1.9565E+02       2.0145E+02
 start of interval flux =         1.76137E+13
 n-gamma, fission and total mev/fission =              5.9116E+00       1.9572E+02       2.0163E+02
 start of interval flux =         1.77677E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 18000 MWd/MTU
0ndset          33
           33           4           3          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 3.599977E+03 1.720146E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              5.8180E+00       1.9575E+02       2.0157E+02
 start of interval flux =         1.78425E+13
 n-gamma, fission and total mev/fission =              5.9156E+00       1.9581E+02       2.0173E+02
 start of interval flux =         1.80312E+13
 n-gamma, fission and total mev/fission =              6.0266E+00       1.9588E+02       2.0190E+02
 start of interval flux =         1.82224E+13
 n-gamma, fission and total mev/fission =              6.1392E+00       1.9594E+02       2.0208E+02
 start of interval flux =         1.84164E+13
 n-gamma, fission and total mev/fission =              6.2528E+00       1.9600E+02       2.0226E+02
 start of interval flux =         1.86129E+13
 n-gamma, fission and total mev/fission =              6.3675E+00       1.9607E+02       2.0244E+02
 start of interval flux =         1.88120E+13
```

```
 n-gamma, fission and total mev/fission =              6.4830E+00       1.9613E+02       2.0262E+02
 start of interval flux =         1.90136E+13
 n-gamma, fission and total mev/fission =              6.5995E+00       1.9620E+02       2.0280E+02
 start of interval flux =         1.92176E+13
 n-gamma, fission and total mev/fission =              6.7169E+00       1.9626E+02       2.0298E+02
 start of interval flux =         1.94240E+13
 n-gamma, fission and total mev/fission =              6.8352E+00       1.9633E+02       2.0316E+02
 start of interval flux =         1.96327E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 27000 MWd/MTU
0ndset          33
            33           4           4          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935          20           6          18        1697
0mmn            19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21         689         129         879
0pow             3
  4.349999E+00 5.399966E+03 1.884016E+13
0 linp           9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              6.7684E+00       1.9638E+02       2.0315E+02
 start of interval flux =         1.97990E+13
 n-gamma, fission and total mev/fission =              6.8861E+00       1.9644E+02       2.0332E+02
 start of interval flux =         2.00429E+13
 n-gamma, fission and total mev/fission =              7.0118E+00       1.9650E+02       2.0351E+02
 start of interval flux =         2.02884E+13
 n-gamma, fission and total mev/fission =              7.1387E+00       1.9656E+02       2.0370E+02
 start of interval flux =         2.05353E+13
 n-gamma, fission and total mev/fission =              7.2664E+00       1.9662E+02       2.0389E+02
 start of interval flux =         2.07836E+13
 n-gamma, fission and total mev/fission =              7.3950E+00       1.9669E+02       2.0408E+02
 start of interval flux =         2.10332E+13
```

```
 n-gamma, fission and total mev/fission =              7.5243E+00       1.9675E+02       2.0428E+02
 start of interval flux =         2.12841E+13
 n-gamma, fission and total mev/fission =              7.6544E+00       1.9682E+02       2.0447E+02
 start of interval flux =         2.15362E+13
 n-gamma, fission and total mev/fission =              7.7851E+00       1.9688E+02       2.0467E+02
 start of interval flux =         2.17893E+13
 n-gamma, fission and total mev/fission =              7.9165E+00       1.9695E+02       2.0486E+02
 start of interval flux =         2.20436E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 36000 MWd/MTU
0ndset          33
            33           4           5          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935          20           6          18        1697
0mmn            19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21         689         129         879
0pow             3
  4.349999E+00 7.199954E+03 2.106112E+13
0 linp           9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              7.8538E+00       1.9700E+02       2.0486E+02
 start of interval flux =         2.22939E+13
 n-gamma, fission and total mev/fission =              7.9881E+00       1.9706E+02       2.0505E+02
 start of interval flux =         2.25901E+13
 n-gamma, fission and total mev/fission =              8.1299E+00       1.9713E+02       2.0526E+02
 start of interval flux =         2.28861E+13
 n-gamma, fission and total mev/fission =              8.2722E+00       1.9719E+02       2.0546E+02
 start of interval flux =         2.31814E+13
 n-gamma, fission and total mev/fission =              8.4149E+00       1.9725E+02       2.0567E+02
 start of interval flux =         2.34760E+13
 n-gamma, fission and total mev/fission =              8.5578E+00       1.9732E+02       2.0587E+02
 start of interval flux =         2.37697E+13
```

```
 n-gamma, fission and total mev/fission =              8.7009E+00       1.9738E+02       2.0608E+02
 start of interval flux =         2.40625E+13
 n-gamma, fission and total mev/fission =              8.8440E+00       1.9745E+02       2.0629E+02
 start of interval flux =         2.43542E+13
 n-gamma, fission and total mev/fission =              8.9872E+00       1.9751E+02       2.0650E+02
 start of interval flux =         2.46449E+13
 n-gamma, fission and total mev/fission =              9.1304E+00       1.9758E+02       2.0671E+02
 start of interval flux =         2.49343E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 45000 MWd/MTU
0ndset          33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 8.999942E+03 2.379376E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              9.2868E+00       1.9765E+02       2.0694E+02
 start of interval flux =         2.52490E+13
 n-gamma, fission and total mev/fission =              9.5275E+00       1.9776E+02       2.0729E+02
 start of interval flux =         2.57304E+13
 n-gamma, fission and total mev/fission =              9.7673E+00       1.9788E+02       2.0764E+02
 start of interval flux =         2.62075E+13
 n-gamma, fission and total mev/fission =              1.0006E+01       1.9799E+02       2.0799E+02
 start of interval flux =         2.66792E+13
 n-gamma, fission and total mev/fission =              1.0243E+01       1.9810E+02       2.0834E+02
 start of interval flux =         2.71449E+13
 n-gamma, fission and total mev/fission =              1.0482E+01       1.9821E+02       2.0869E+02
 start of interval flux =         2.76034E+13
```

```
 n-gamma, fission and total mev/fission =              1.0715E+01       1.9832E+02       2.0903E+02
 start of interval flux =         2.80550E+13
 n-gamma, fission and total mev/fission =              1.0946E+01       1.9842E+02       2.0937E+02
 start of interval flux =         2.84985E+13
 n-gamma, fission and total mev/fission =              1.1174E+01       1.9853E+02       2.0970E+02
 start of interval flux =         2.89330E+13
 n-gamma, fission and total mev/fission =              1.1398E+01       1.9863E+02       2.1003E+02
 start of interval flux =         2.93578E+13
0 case or subcase    1  BWR SNF Assembly - Fuel - deplete to 60000 MWd/MTU
0ndset           33
            33           4           5          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  87495
     used   107477 in size   150000
0jopt            12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
            0          10           0           0           1           1           0           0           0          10
           21         100           0           4           3           0           2           0           0
0tconst          5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 1.199992E+04 2.146748E+13
0 linp           9
            6           2           0          26           1       18418        1000        1697           5
0 case or subcase    1  BWR SNF Assembly - Fuel - decay
0   56$ array     20 entries read
0    5t
```

```
0*********************************************************************************
*                                                                               *
*                    scale4.2  bulletin  board                                  *
*                    --------  --------  -----                                  *
*                                                                               *
*      welcome to the configuration controlled version of scale4.2.             *
*      any problems should be reported to kay martin at 4-9213.                 *
*                                                                               *
*      updates that have been made from version 4.1 to 4.2 include:             *
*                                                                               *
*      nitawl:  parameter added to prevent exponent underflows for very         *
*      dilute resonance calculations on workstation.  (mrr 93-011)              *
*                                                                               *
*      nitawl:   corrected discrepancies in maximum fractional energy loss      *
*      of neutron in admixed moderator calculation and simpson rule             *
*      calculation of collision density as documented in "improved              *
*      calculation of flux shapes with the resonance shielding code             *
*      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
*      impact will vary, but is insignificant for hydrogen-moderated            *
*      systems. (mrr 93-030)                                                    *
*                                                                               *
*      sas4:  added option of axial source profile input for both radial        *
*      and axial dose calculations. also added option idr = 2 for               *
*      estimation to point detectors from collisions in both top and            *
*      bottom halves of geometry.  (mrr 92-016)                                 *
*                                                                               *
*      morse:  modifications made for compatibility with the new options in     *
*      sas4 (i.e., the axial source profile input option and                    *
*      the option idr = 2 for estimation to point detectors from collisions     *
*      in both top and bottom halves of geometry).  (mrr 92-016)                *
*                                                                               *
*      csas & keno-v.a:  error checking during input processing was added       *
*      so that these modules terminate with an error message if input           *
*      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
*                                                                               *
*      keno-v.a:  corrections made for applying differential albedo             *
*      boundary conditions to supergrouped problems where global unit           *
*      contains only an array specification.  effect on keff is very large      *
*      for this type of problem.  (mrr 93-033)                                  *
*                                                                               *
*      keno-v.a:  corrected an error introduced with modification on may 24,    *
*      1993 (mrr 93-033). this error affected problems with mirror or           *
*      periodic boundary conditions and could cause problem to loop, fail,      *
*      or run incorrectly.                                                      *
*                                                                               *
*      xsdrnpm:  corrected calculation of number of direct access data          *
*      blocks needed to weight the cross sections to prevent occasional         *
*      failure.  improved calculation of balance tables.  (mrr 93-021)          *
*                                                                               *
*      origen-s:  modified program to read combined binary libraries that       *
*      include multi-cycle cross sections.  add option to edit binary           *
*      library.  (mrr 93-026)                                                   *
*                                                                               *
*      sas2:  modified to produce combined binary libraries for origen-s.       *
*      (mrr 93-027)                                                             *
*                                                                               *
*      couple:  modified to allow combined binary libraries to be made by       *
*      sas2.  (mrr 93-031)                                                      *
*                                                                               *
*      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*       and expanded decay data and fission product yield libraries.  (mrr     *
*       92-088, 92-025, 92-026)                                                *
*                                                                              *
*       origen-s libraries:  the six standard origen-s card image libraries    *
*       have been replaced by two new libraries, end6dec and xsectpho.         *
*       end6dec contains the updated and expanded decay data library based     *
*       on endf/b-vi data.  xsectpho contains the basic cross section and      *
*       photon spectra data and updated fission product yield data based on    *
*       endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*       002, 003, 006, 008, 009)                                               *
*                                                                              *
*       std. comp. library:  in drr 92-033, the following nuclides were        *
*       changed to turn on resonance processing flag but should not have       *
*       been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*       feinconel.  flags for these nuclides have now been returned to off.    *
*       (drr 93-014)                                                           *
*                                                                              *
*       heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                              *
*       htas1:  updated for compatibility with heating7 and to interact        *
*       effectively with ocular.  fin effectiveness technique was added.       *
*       (mrr 93-036)                                                           *
*                                                                              *
*       ocular:  made compatible with heating7 and htas1 on mainframe and      *
*       workstation.  (mrr 93-037)                                             *
*                                                                              *
*       sas2:  corrected so that 'parm=skipshipdata' would work on             *
*       workstation.  (mrr 93-051)                                             *
*                                                                              *
*       aim:  ft47ft001 is no longer require for aim to execute on             *
*       workstation.  (mrr 93-052)                                             *
*                                                                              *
*       27group, 27burnup, and 218group - these libraries have been            *
*       updated to correct an error found in the chlorine cross-sections.      *
*       (drr93-022)                                                            *
*                                                                              *
*       bonami:  corrected so that a case with a number density of zero        *
*       for a nuclide that has bondarenko data will run without failing.       *
*       (mrr 93-060)                                                           *
*                                                                              *
*       csas:  corrected calculation of dancoff correction factor for          *
*       cylindrical cells.  note that previous calculations of small           *
*       cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*       values.  also corrected dancoff factor for multiregion slab            *
*       cell with vacuum boundary conditions to be set to zero.                *
*       (mrr 93-065)                                                           *
*                                                                              *
*       csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*       resonance materials that are not part of the unit cell in lattice-     *
*       cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*       check your nitawl output in any previous scale-4.2 calculations        *
*       for dancoff factors =-1.                                               *
*       (mrr 93-070)                                                           *
*                                                                              *
********************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
       0$$  a4 33 a8 26 e
       1$$  1
          1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     8000     140000
       240000    250000    260000
       280000    400000    500000
74**     89.4    10100.0     46.5  189764.1
          0.2       0.2      17.8
         193.8      12.7     672.9
         122.3     171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 60000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.2500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 60000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Bottom - decay
per ONE BWR Fuel Assembly - Bottom Region - ds4b
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - bot ds4 - discharge
  decay step for BWR source term - bot ds4 - 0.25 year
  decay step for BWR source term - bot ds4 - 0.50 year
  decay step for BWR source term - bot ds4 - 1 year
  decay step for BWR source term - bot ds4 - 2 year
  decay step for BWR source term - bot ds4 - 5 year
  decay step for BWR source term - bot ds4 - 10 year
  decay step for BWR source term - bot ds4 - 15 year
  decay step for BWR source term - bot ds4 - 20 year
  decay step for BWR source term - bot ds4 - 25 year
56$$ f0
   5t
```

```
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooooo  rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggggg   eeeeeeeeeeeee   nnn         nn  sssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    ggggggg   eeeeeeeee       nn    nn    nn  sssssssssssss
    oo         oo   rrrrrrrrrrrrr        ii         gg    ggggggg   eeeeeeeee       nn     nn   nn   sssssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooooo  rr          rr  iiiiiiiiiiii    gggggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
     ooooooooooo    rr          rr  iiiiiiiiiiii     gggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    ttttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooooo  ttttttttttttt    zzzzzzzzzzzzz
    ll             oo         oo        tt                   zz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    lllllllllllll  oooooooooooooo        tt          zzzzzzzzzzzzz
    lllllllllllll   ooooooooooo          tt          zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666                //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666               //  9999999999999  6666666666666
       1111       22         22              //    00       00  66                          //  99         99  66
         11                  22             //    00         00 66                          //  99         99  66
         11                  22            //     00         00 66                          //  99         99  66
         11                22             //      00         00 666666666666              //  9999999999999  666666666666
         11              22              //       00         00 6666666666666            //    999999999999  6666666666666
         11            22               //        00         00 66         66           //                99  66         66
         11          22                //         00         00 66         66          //                 99  66         66
         11        22                 //          00       00  66         66         //                  99  66         66
      11111111    2222222222222     //             000000000    6666666666666     //          9999999999999  6666666666666
      11111111    2222222222222    //               0000000      66666666666    //            999999999999    66666666666
0

         11             11                             11          0000000                          11       7777777777777
        111            111                            111         000000000                        111       777777777777
       1111           1111              :::          1111        00       00          :::        1111       77        77
         11             11              :::            11       00         00        :::          11                 77
         11             11              :::            11       00         00        :::          11                77
         11             11                             11       00         00                     11               77
         11             11                             11       00         00                     11               77
         11             11              :::            11       00         00        :::          11              77
         11             11              :::            11       00         00        :::          11              77
         11             11              :::            11        00       00          :::          11             77
      11111111       11111111                       11111111      000000000                   11111111          77
      11111111       11111111                       11111111       0000000                    11111111          77
1
0                                 sssssssssss    cccccccccc     aaaaaaaaa    ll            eeeeeeeeeeeee
                                 sssssssssssss  cccccccccccc   aaaaaaaaaaa   ll            eeeeeeeeeeeee
                                 ss         ss  cc         cc  aa         aa  ll            ee
                                 ss             cc             aa         aa  ll            ee
```

```
ss              cc              aa          aa   ll              ee
sssssssssss     cc              aaaaaaaaaaaa     ll              eeeeeeeee
 sssssssssss    cc              aaaaaaaaaaaa     ll              eeeeeeeee
          ss    cc              aa          aa   ll              ee
          ss    cc              aa          aa   ll              ee
ss        ss    cc          cc  aa          aa   ll              ee
sssssssssssss   ccccccccccccc   aa          aa   lllllllllllll   eeeeeeeeeeeee
 sssssssssss     ccccccccccc    aa          aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                  program verification information                *****
*****                                                                     *****
*****                 code system:    scale  version:    4.2           *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code            *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  11:10:17                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
```

```
1
1            * input echo * (with break between col. 1-72 and 73-80)
0       note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------         comment or title end
0.........................columns 1-72.............................               ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
   1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
   2t
 35$$ 0
   4t
 56$$ 10 10 a6 3 a10 0 a13 13 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1500000 e
```

```
   5t
BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     8000     140000
       240000    250000    260000
       280000    400000    500000
74**     89.4   10100.0      46.5  189764.1
          0.2       0.2      17.8
        193.8      12.7     672.9
        122.3     171.9       2.5
75$$  4r2 9r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Bottom Region - ds4b
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
```

```
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1500000 e
    5t
 BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Bottom Region - ds4b
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 60000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.2500000 e
    5t
 BWR SNF Assembly - Bottom - deplete to 60000 MWd/MTU
 per ONE BWR Fuel Assembly - Bottom Region - ds4b
 58** 10r4.35
 60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Bottom - decay
 per ONE BWR Fuel Assembly - Bottom Region - ds4b
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - bot ds4 - discharge
   decay step for BWR source term - bot ds4 - 0.25 year
   decay step for BWR source term - bot ds4 - 0.50 year
   decay step for BWR source term - bot ds4 - 1 year
   decay step for BWR source term - bot ds4 - 2 year
   decay step for BWR source term - bot ds4 - 5 year
   decay step for BWR source term - bot ds4 - 10 year
   decay step for BWR source term - bot ds4 - 15 year
   decay step for BWR source term - bot ds4 - 20 year
   decay step for BWR source term - bot ds4 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0     0$ array      12 entries read
0     1$ array       1 entries read
0     1t
0          dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0              short-lived split test fraction, qxn =    9.1188E-04
```

```
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
```

```
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
```

```
           pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
```

```
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *                photon libraries use an 18-energy-group structure             *
          *               the photon data are from the master photon data base,          *
          *                produced to include bremsstrahlung from uo2 matrix            *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
```

```
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
```

```
0                    7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  5 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *            prelim lwr origen-s binary working library--id = 1143           *
         *         made from modified card-image origen-s libraries of scale 4.2      *
         *      data from the light element, actinide, and fission product libraries  *
         *        decay data, including gamma and total energy, are from endf/b-vi    *
         *                                                                            *
         *      neutron flux spectrum factors and cross sections were produced from   *
         *     the "presas2" case updating all nuclides on the scale "burnup" library *
         *                                                                            *
         *                  fission product yields are from endf/b-v                  *
         *                                                                            *
         *              photon libraries use an 18-energy-group structure             *
         *             the photon data are from the master photon data base,          *
         *              produced to include bremsstrahlung from uo2 matrix            *
         *                                                                            *
         *        see information above this box (if present) for later updates       *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                 .other identification and sizes of library.
0                  data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0               7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
1
    BWR SNF Assembly - Bottom - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Bottom Regio
            initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
     h  1   3.35E-03  3.35E-03  3.35E-03  3.35E-03  3.35E-03  3.35E-03  3.35E-03  3.35E-03  3.35E-03  3.35E-03  3.35E-03
     h  2   4.99E-06  4.99E-06  4.99E-06  4.99E-06  4.99E-06  4.99E-06  4.99E-06  4.99E-06  4.99E-06  4.99E-06  4.99E-06
     h  3   1.04E-09  1.04E-09  1.03E-09  1.01E-09  9.83E-10  9.30E-10  7.85E-10  5.93E-10  4.48E-10  3.38E-10  2.55E-10
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he 3	4.06E-11	4.07E-11	5.49E-11	6.94E-11	9.74E-11	1.51E-10	2.95E-10	4.88E-10	6.33E-10	7.43E-10	8.26E-10
he 4	1.71E-03	1.71E-03	1.71E-03	1.71E-03	1.71E-03	1.71E-03	1.71E-03	1.71E-03	1.71E-03	1.71E-03	1.71E-03
li 6	2.52E-10	2.52E-10	2.52E-10	2.52E-10	2.52E-10	2.52E-10	2.52E-10	2.52E-10	2.52E-10	2.52E-10	2.52E-10
li 7	2.27E-13	2.27E-13	2.27E-13	2.27E-13	2.27E-13	2.27E-13	2.27E-13	2.27E-13	2.27E-13	2.27E-13	2.27E-13
be 9	3.26E-06	3.26E-06	3.26E-06	3.26E-06	3.26E-06	3.26E-06	3.26E-06	3.26E-06	3.26E-06	3.26E-06	3.26E-06
be 10	7.18E-08	7.18E-08	7.18E-08	7.18E-08	7.18E-08	7.18E-08	7.18E-08	7.18E-08	7.18E-08	7.18E-08	7.18E-08
b 10	9.85E-15	9.94E-15	1.75E-14	2.54E-14	4.10E-14	7.21E-14	1.65E-13	3.21E-13	4.77E-13	6.32E-13	7.88E-13
b 11	1.01E-13	1.01E-13	1.01E-13	1.01E-13	1.01E-13	1.01E-13	1.01E-13	1.01E-13	1.01E-13	1.01E-13	1.01E-13
c 12	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01	1.98E-01
c 13	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03	2.40E-03
c 14	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08	1.23E-08
n 14	4.97E-12	4.97E-12	5.34E-12	5.71E-12	6.46E-12	7.95E-12	1.24E-11	1.98E-11	2.73E-11	3.47E-11	4.21E-11
ne 20	5.06E-15	5.06E-15	5.06E-15	5.06E-15	5.06E-15	5.06E-15	5.06E-15	5.06E-15	5.06E-15	5.06E-15	5.06E-15
ne 22	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08	1.80E-08
na 23	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09	1.46E-09
na 24	5.00E-15	1.61E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	5.34E-12	5.34E-12	5.34E-12	5.34E-12	5.34E-12	5.34E-12	5.34E-12	5.34E-12	5.34E-12	5.34E-12	5.34E-12
mg 25	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04	1.61E-04
mg 26	7.38E-05	7.38E-05	7.38E-05	7.38E-05	7.38E-05	7.38E-05	7.38E-05	7.38E-05	7.38E-05	7.38E-05	7.38E-05
al 27	7.97E-07	7.97E-07	7.97E-07	7.97E-07	7.97E-07	7.97E-07	7.97E-07	7.97E-07	7.97E-07	7.97E-07	7.97E-07
si 28	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01	1.63E+01
si 29	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01	8.67E-01
si 30	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01	5.89E-01
si 31	2.26E-08	3.96E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	2.04E-11	2.04E-11	2.04E-11	2.04E-11	2.04E-11	2.03E-11	2.00E-11	1.96E-11	1.93E-11	1.89E-11	1.85E-11
p 31	2.86E-04	2.86E-04	2.86E-04	2.86E-04	2.86E-04	2.86E-04	2.86E-04	2.86E-04	2.86E-04	2.86E-04	2.86E-04
p 32	2.83E-09	2.69E-09	3.56E-11	4.01E-13	4.68E-15	4.60E-15	4.55E-15	4.46E-15	4.37E-15	4.28E-15	4.20E-15
p 33	7.89E-13	7.68E-13	6.73E-14	5.35E-15	3.61E-17	1.65E-21	1.58E-34	.00E+00	.00E+00	.00E+00	.00E+00
s 32	1.35E-07	1.36E-07	1.38E-07	1.38E-07	1.38E-07	1.38E-07	1.38E-07	1.38E-07	1.38E-07	1.38E-07	1.38E-07
s 33	4.83E-11	4.83E-11	4.90E-11	4.91E-11	4.91E-11	4.91E-11	4.91E-11	4.91E-11	4.91E-11	4.91E-11	4.91E-11
ca 44	2.78E-09	2.78E-09	2.78E-09	2.78E-09	2.78E-09	2.78E-09	2.78E-09	2.78E-09	2.78E-09	2.78E-09	2.78E-09
ca 45	9.38E-13	9.34E-13	6.41E-13	4.33E-13	2.00E-13	4.26E-14	4.12E-16	1.81E-19	7.97E-23	3.51E-26	1.54E-29
ca 46	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10	9.44E-10
ca 47	2.15E-14	1.84E-14	2.29E-20	1.66E-26	1.24E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	2.50E-12	2.51E-12	2.80E-12	3.01E-12	3.24E-12	3.40E-12	3.44E-12	3.44E-12	3.44E-12	3.44E-12	3.44E-12
sc 46	1.12E-14	1.11E-14	5.33E-15	2.48E-15	5.48E-16	2.67E-17	3.09E-21	8.53E-28	2.35E-34	6.48E-41	.00E+00
sc 47	5.68E-11	4.62E-11	5.15E-19	4.88E-26	1.71E-42	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	1.95E-10	1.33E-10	2.56E-25	1.30E-40	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	4.36E-14	4.37E-14	4.95E-14	5.23E-14	5.43E-14	5.48E-14	5.48E-14	5.48E-14	5.48E-14	5.48E-14	5.48E-14
ti 47	7.16E-05	7.16E-05	7.16E-05	7.16E-05	7.16E-05	7.16E-05	7.16E-05	7.16E-05	7.16E-05	7.16E-05	7.16E-05
ti 48	3.60E-07	3.60E-07	3.60E-07	3.60E-07	3.60E-07	3.60E-07	3.60E-07	3.60E-07	3.60E-07	3.60E-07	3.60E-07
ti 49	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04
ti 50	7.80E-04	7.80E-04	7.80E-04	7.80E-04	7.80E-04	7.80E-04	7.80E-04	7.80E-04	7.80E-04	7.80E-04	7.80E-04
v 50	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03	2.57E-03
v 51	4.21E-01	4.21E-01	4.29E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01
cr 50	7.67E+00	7.67E+00	7.67E+00	7.67E+00	7.67E+00	7.67E+00	7.67E+00	7.67E+00	7.67E+00	7.67E+00	7.67E+00
cr 51	8.50E-03	8.29E-03	8.95E-04	8.85E-05	9.15E-07	9.84E-11	1.23E-22	1.79E-42	.00E+00	.00E+00	.00E+00
cr 52	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02	1.62E+02
cr 53	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01	1.81E+01

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BWR SNF Assembly - Bottom - decay light elements page 2

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
cr 54	5.93E+00	5.93E+00	5.93E+00	5.93E+00	5.93E+00	5.93E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00	5.94E+00
mn 54	7.35E-03	7.33E-03	6.02E-03	4.90E-03	3.26E-03	1.45E-03	1.27E-04	2.21E-06	3.82E-08	6.63E-10	1.15E-11
mn 55	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.21E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01	1.22E+01
mn 56	6.32E-05	9.97E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01	3.74E+01
fe 55	1.49E-01	1.49E-01	1.40E-01	1.31E-01	1.16E-01	8.96E-02	4.18E-02	1.18E-02	3.30E-03	9.28E-04	2.61E-04

fe 56	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02	6.14E+02
fe 57	2.03E+01	2.03E+01	2.03E+01	2.03E+01	2.03E+01	2.03E+01	2.03E+01	2.03E+01	2.03E+01	2.03E+01	2.03E+01
fe 58	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00	2.25E+00
fe 59	3.74E-04	3.68E-04	9.20E-05	2.18E-05	1.26E-06	4.28E-09	1.66E-16	7.34E-29	3.25E-41	.00E+00	.00E+00
co 58m	2.74E-11	4.44E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	3.51E-03	3.47E-03	1.46E-03	5.89E-04	9.87E-05	2.78E-06	6.20E-11	1.10E-18	1.94E-26	3.43E-34	6.10E-42
co 59	5.96E-02	5.96E-02	5.99E-02	5.99E-02	5.99E-02	6.00E-02	6.00E-02	6.00E-02	6.01E-02	6.01E-02	6.02E-02
co 60	5.65E-03	5.65E-03	5.47E-03	5.29E-03	4.96E-03	4.35E-03	2.93E-03	1.52E-03	7.86E-04	4.07E-04	2.11E-04
co 61	5.90E-09	2.47E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	8.10E+01	8.10E+01	8.10E+01	8.10E+01	8.10E+01	8.10E+01	8.10E+01	8.10E+01	8.10E+01	8.10E+01	8.10E+01
ni 59	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00	1.01E+00
ni 60	3.26E+01	3.26E+01	3.26E+01	3.26E+01	3.26E+01	3.26E+01	3.26E+01	3.26E+01	3.26E+01	3.26E+01	3.26E+01
ni 61	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00	1.74E+00
ni 62	4.43E+00	4.43E+00	4.43E+00	4.43E+00	4.43E+00	4.43E+00	4.43E+00	4.43E+00	4.43E+00	4.43E+00	4.43E+00
ni 63	2.10E-01	2.10E-01	2.10E-01	2.09E-01	2.09E-01	2.07E-01	2.03E-01	1.96E-01	1.89E-01	1.83E-01	1.77E-01
ni 64	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00
ni 65	5.43E-07	7.38E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	7.41E-11	5.46E-11	9.19E-23	5.32E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	4.91E-03	4.91E-03	5.26E-03	5.63E-03	6.36E-03	7.79E-03	1.21E-02	1.90E-02	2.56E-02	3.21E-02	3.83E-02
cu 64	3.92E-08	1.06E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03	7.10E-03
cu 66	1.84E-10	8.52E-14	1.43E-25	8.29E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	1.18E-13	8.99E-14	3.59E-24	5.58E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05	1.43E-05
zn 65	7.50E-09	7.48E-09	5.80E-09	4.46E-09	2.65E-09	9.40E-10	4.17E-11	2.32E-13	1.29E-15	7.20E-18	4.01E-20
zn 66	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05	3.60E-05
zn 67	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08	4.39E-08
zn 68	6.17E-10	6.17E-10	6.17E-10	6.17E-10	6.17E-10	6.17E-10	6.17E-10	6.17E-10	6.17E-10	6.17E-10	6.17E-10
ga 69	1.12E-12	1.12E-12	1.12E-12	1.12E-12	1.12E-12	1.12E-12	1.12E-12	1.12E-12	1.12E-12	1.12E-12	1.12E-12
ge 70	6.44E-15	6.44E-15	6.44E-15	6.44E-15	6.44E-15	6.44E-15	6.44E-15	6.44E-15	6.44E-15	6.44E-15	6.44E-15
sr 87	4.19E-06	4.19E-06	4.19E-06	4.19E-06	4.19E-06	4.19E-06	4.19E-06	4.19E-06	4.19E-06	4.19E-06	4.19E-06
sr 88	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04	4.15E-04
sr 89	1.12E-06	1.10E-06	3.25E-07	9.15E-08	7.47E-09	4.99E-11	1.49E-17	1.99E-28	2.66E-39	.00E+00	.00E+00
sr 90	2.37E-08	2.37E-08	2.35E-08	2.34E-08	2.31E-08	2.25E-08	2.09E-08	1.85E-08	1.64E-08	1.45E-08	1.28E-08
sr 91	1.73E-09	3.01E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	3.05E-05	3.05E-05	3.13E-05	3.16E-05	3.16E-05	3.16E-05	3.16E-05	3.16E-05	3.16E-05	3.16E-05	3.16E-05
y 90	2.19E-06	1.69E-06	6.11E-12	6.07E-12	6.00E-12	5.85E-12	5.44E-12	4.81E-12	4.25E-12	3.76E-12	3.32E-12
y 91	3.33E-06	3.29E-06	1.15E-06	3.83E-07	4.40E-08	5.81E-10	1.34E-15	5.37E-25	2.15E-34	1.28E-43	.00E+00
y 92	7.35E-09	6.68E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	4.21E-12	8.20E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01	8.72E+01
zr 91	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01	1.91E+01
zr 92	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01	2.98E+01
zr 93	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02	6.45E-02
zr 94	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01	3.08E+01
zr 95	1.16E-03	1.15E-03	4.39E-04	1.61E-04	2.23E-05	4.27E-07	3.00E-12	7.76E-21	2.00E-29	5.18E-38	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 96	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00
zr 97	2.00E-05	7.47E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 92	6.31E-14	6.31E-14	6.31E-14	6.31E-14	6.31E-14	6.31E-14	6.31E-14	6.31E-14	6.31E-14	6.31E-14	6.31E-14
nb 93	9.46E-09	9.47E-09	1.04E-08	1.15E-08	1.39E-08	1.93E-08	4.15E-08	9.56E-08	1.68E-07	2.54E-07	3.52E-07
nb 93m	9.01E-08	9.02E-08	9.63E-08	1.03E-07	1.15E-07	1.39E-07	2.04E-07	2.96E-07	3.70E-07	4.30E-07	4.78E-07
nb 94	4.80E-11	4.80E-11	4.80E-11	4.80E-11	4.80E-11	4.79E-11	4.79E-11	4.79E-11	4.79E-11	4.79E-11	4.79E-11
nb 95	6.27E-04	6.27E-04	3.98E-04	1.73E-04	2.62E-05	5.29E-07	3.61E-12	9.34E-21	2.41E-29	6.92E-40	.00E+00
nb 95m	7.48E-07	7.43E-07	2.91E-07	1.07E-07	1.48E-08	2.83E-10	1.99E-15	5.14E-24	1.33E-32	.00E+00	.00E+00
nb 96	1.63E-08	7.99E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

nb 97	1.42E-06	5.33E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.87E-08	6.99E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	2.26E-15	2.27E-15	2.67E-15	3.08E-15	3.90E-15	5.54E-15	1.04E-14	1.86E-14	2.68E-14	3.50E-14	4.32E-14
mo 95	2.24E-02	2.24E-02	2.33E-02	2.38E-02	2.41E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02	2.42E-02
mo 96	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.98E-03	1.98E-03
mo 97	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02	4.03E-02
mo 98	5.96E-04	5.96E-04	5.96E-04	5.96E-04	5.96E-04	5.96E-04	5.96E-04	5.96E-04	5.96E-04	5.96E-04	5.96E-04
mo 99	1.23E-08	9.59E-09	1.70E-18	1.25E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10	1.62E-10
tc 98	1.69E-12	1.69E-12	1.69E-12	1.69E-12	1.69E-12	1.69E-12	1.69E-12	1.69E-12	1.69E-12	1.69E-12	1.69E-12
tc 99	2.33E-07	2.34E-07	2.35E-07	2.35E-07	2.35E-07	2.35E-07	2.35E-07	2.35E-07	2.35E-07	2.35E-07	2.35E-07
ru 99	1.18E-12	1.18E-12	1.37E-12	1.56E-12	1.95E-12	2.72E-12	5.04E-12	8.89E-12	1.28E-11	1.66E-11	2.05E-11
ru100	2.29E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08	2.29E-08
ru101	1.38E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10	1.38E-10
ru102	3.03E-12	3.03E-12	3.03E-12	3.03E-12	3.03E-12	3.03E-12	3.03E-12	3.03E-12	3.03E-12	3.03E-12	3.03E-12
cd111	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09
cd112	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08
cd113	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.63E-11	8.63E-11	8.63E-11	8.63E-11
cd113m	1.42E-10	1.42E-10	1.40E-10	1.39E-10	1.35E-10	1.29E-10	1.11E-10	8.70E-11	6.80E-11	5.32E-11	4.16E-11
cd114	5.35E-06	5.35E-06	5.60E-06	5.67E-06	5.69E-06	5.70E-06	5.70E-06	5.70E-06	5.70E-06	5.70E-06	5.70E-06
cd115	2.36E-10	1.73E-10	1.63E-22	5.18E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	5.17E-10	5.09E-10	1.28E-10	3.03E-11	1.77E-12	6.06E-15	2.43E-22	1.14E-34	.00E+00	.00E+00	.00E+00
cd116	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08
cd117	1.74E-12	2.18E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	1.03E-03	1.03E-03	1.07E-03	1.09E-03	1.12E-03	1.13E-03	1.13E-03	1.13E-03	1.13E-03	1.13E-03	1.13E-03
in113m	5.77E-08	5.74E-08	3.36E-08	1.92E-08	6.40E-09	7.09E-10	9.65E-13	1.61E-17	2.70E-22	4.51E-27	7.55E-32
in114	1.83E-10	1.15E-10	3.31E-11	9.07E-12	7.02E-13	4.22E-15	9.20E-22	7.26E-33	.00E+00	.00E+00	.00E+00
in114m	7.26E-06	7.15E-06	2.06E-06	5.64E-07	4.37E-08	2.63E-10	5.72E-17	4.51E-28	3.56E-39	.00E+00	.00E+00
in115	9.98E-09	9.99E-09	1.04E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08
in117	5.73E-12	1.40E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.23E-12	7.27E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02
sn113	9.61E-05	9.55E-05	5.59E-05	3.20E-05	1.06E-05	1.18E-06	1.61E-09	2.69E-14	4.49E-19	7.52E-24	1.26E-28
sn114	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02
sn115	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03
sn116	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01
sn117m	6.02E-05	5.72E-05	6.13E-07	5.49E-09	4.95E-13	4.07E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
sn119	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
sn119m	1.18E-03	1.17E-03	9.51E-04	7.64E-04	4.96E-04	2.09E-04	1.57E-05	2.08E-07	2.77E-09	3.69E-11	4.91E-13
sn120	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01
sn121	1.74E-06	9.42E-07	6.54E-10	6.52E-10	6.47E-10	6.39E-10	6.16E-10	5.78E-10	5.43E-10	5.10E-10	4.78E-10

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BWR SNF Assembly - Bottom - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sn121m	1.51E-05	1.51E-05	1.50E-05	1.50E-05	1.49E-05	1.47E-05	1.41E-05	1.33E-05	1.25E-05	1.17E-05	1.10E-05
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.89E-05	1.88E-05	1.16E-05	7.08E-06	2.66E-06	3.74E-07	1.05E-09	5.79E-14	3.21E-18	1.78E-22	9.87E-27
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	2.89E-07	2.69E-07	4.47E-10	5.78E-13	1.13E-18	4.46E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.94E-03	1.94E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03
sb122	9.26E-07	7.16E-07	8.57E-17	4.18E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.81E-04	1.81E-04	1.88E-04	1.93E-04	1.97E-04	1.99E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04
sb124	1.23E-06	1.21E-06	4.36E-07	1.50E-07	1.83E-08	2.73E-10	9.05E-16	6.67E-25	4.91E-34	3.48E-43	.00E+00
sb125	6.91E-04	6.91E-04	6.49E-04	6.09E-04	5.36E-04	4.16E-04	1.94E-04	5.46E-05	1.53E-05	4.31E-06	1.21E-06
sb126	1.06E-07	9.99E-08	6.89E-10	3.91E-12	1.42E-16	1.92E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	2.39E-04	2.39E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04

te123	2.26E-06	2.26E-06	2.54E-06	2.72E-06	2.88E-06	2.95E-06	2.96E-06	2.96E-06	2.96E-06	2.96E-06	2.96E-06
te123m	7.05E-07	7.01E-07	4.18E-07	2.45E-07	8.50E-08	1.02E-08	1.80E-11	4.58E-16	1.17E-20	2.97E-25	7.57E-30
te124	1.95E-05	1.95E-05	2.02E-05	2.05E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05
te125	7.17E-04	7.18E-04	7.59E-04	8.00E-04	8.74E-04	9.96E-04	1.22E-03	1.36E-03	1.40E-03	1.41E-03	1.42E-03
te125m	9.01E-06	9.01E-06	8.95E-06	8.56E-06	7.61E-06	5.91E-06	2.76E-06	7.75E-07	2.18E-07	6.12E-08	1.72E-08
te126	2.42E-05	2.42E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05
te127	1.19E-10	3.09E-11	7.37E-12	4.09E-12	1.28E-12	1.25E-13	1.18E-16	1.07E-21	9.67E-27	8.75E-32	7.89E-37
te127m	3.73E-09	3.71E-09	2.10E-09	1.17E-09	3.66E-10	3.58E-11	3.38E-14	3.05E-19	2.76E-24	2.50E-29	2.26E-34
te128	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10
te129m	4.60E-15	4.51E-15	7.19E-16	1.07E-16	2.46E-18	1.31E-21	2.00E-31	.00E+00	.00E+00	.00E+00	.00E+00
i127	1.36E-07	1.36E-07	1.38E-07	1.39E-07	1.39E-07	1.40E-07	1.40E-07	1.40E-07	1.40E-07	1.40E-07	1.40E-07
i129	6.03E-13	6.03E-13	6.07E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13
xe127	3.67E-15	3.60E-15	6.62E-16	1.14E-16	3.50E-18	3.34E-21	2.90E-30	.00E+00	.00E+00	.00E+00	.00E+00
xe128	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09
xe129	3.48E-11	3.48E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11
xe129m	7.55E-14	6.98E-14	6.76E-17	4.99E-20	3.23E-26	1.39E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12
xe131	5.36E-15	5.37E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15
total	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03	1.19E+03

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BWR SNF Assembly - Bottom - decay light elements page 5

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	1.01E-05	1.01E-05	9.92E-06	9.78E-06	9.51E-06	8.99E-06	7.59E-06	5.73E-06	4.33E-06	3.27E-06	2.47E-06
be 10	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09	1.61E-09
c 14	5.48E-08	5.48E-08	5.48E-08	5.48E-08	5.48E-08	5.48E-08	5.48E-08	5.48E-08	5.47E-08	5.47E-08	5.47E-08
na 24	4.45E-08	1.43E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	1.30E-12	5.85E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	3.19E+00	5.86E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	8.70E-01	1.53E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	1.33E-09	1.33E-09	1.33E-09	1.33E-09	1.32E-09	1.32E-09	1.30E-09	1.28E-09	1.25E-09	1.23E-09	1.20E-09
p 32	8.09E-04	7.71E-04	1.02E-05	1.15E-07	1.34E-09	1.32E-09	1.30E-09	1.28E-09	1.25E-09	1.23E-09	1.20E-09
p 33	1.23E-07	1.20E-07	1.05E-08	8.37E-10	5.64E-12	2.58E-16	2.47E-29	.00E+00	.00E+00	.00E+00	.00E+00
k 42	9.44E-15	2.46E-15	7.02E-21	6.98E-21	6.91E-21	6.76E-21	6.35E-21	5.71E-21	5.14E-21	4.63E-21	4.16E-21
ca 45	1.66E-08	1.66E-08	1.14E-08	7.68E-09	3.54E-09	7.55E-10	7.31E-12	3.21E-15	1.41E-18	6.22E-22	2.73E-25
ca 47	1.32E-08	1.13E-08	1.40E-14	1.02E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	3.81E-10	3.77E-10	1.81E-10	8.41E-11	1.86E-11	9.05E-13	1.05E-16	2.89E-23	7.96E-30	.00E+00	.00E+00
sc 47	4.72E-05	3.84E-05	4.28E-13	4.05E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	2.91E-04	1.99E-04	3.83E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	1.07E-05	2.82E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	7.86E+02	7.66E+02	8.27E+01	8.18E+00	8.46E-02	9.10E-06	1.13E-17	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	5.69E+01	5.68E+01	4.66E+01	3.80E+01	2.53E+01	1.12E+01	9.87E-01	1.71E-02	2.96E-04	5.14E-06	8.90E-08
mn 56	1.37E+03	2.17E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	3.55E+02	3.54E+02	3.33E+02	3.12E+02	2.75E+02	2.13E+02	9.97E+01	2.80E+01	7.87E+00	2.21E+00	6.21E-01
fe 59	1.86E+01	1.83E+01	4.58E+00	1.08E+00	6.29E-02	2.13E-04	8.24E-12	3.65E-24	.00E+00	.00E+00	.00E+00
co 58m	1.62E-04	2.63E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.11E+02	1.10E+02	4.62E+01	1.87E+01	3.14E+00	8.83E-02	1.97E-06	3.48E-14	6.16E-22	1.09E-29	.00E+00
co 60	6.40E+00	6.39E+00	6.19E+00	5.99E+00	5.61E+00	4.92E+00	3.31E+00	1.72E+00	8.89E-01	4.61E-01	2.39E-01
co 61	1.84E-01	7.68E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	8.14E-02	8.14E-02	8.14E-02	8.14E-02	8.14E-02	8.14E-02	8.14E-02	8.14E-02	8.14E-02	8.14E-02	8.14E-02
ni 63	1.19E+01	1.19E+01	1.19E+01	1.19E+01	1.18E+01	1.17E+01	1.15E+01	1.11E+01	1.07E+01	1.04E+01	1.00E+01
ni 65	1.04E+01	1.41E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	6.44E-05	4.75E-05	7.99E-17	4.63E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	1.51E-01	4.08E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	1.03E-01	4.76E-05	8.00E-17	4.63E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	8.91E-08	6.80E-08	2.72E-18	4.23E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	6.18E-05	6.16E-05	4.78E-05	3.68E-05	2.19E-05	7.75E-06	3.44E-07	1.91E-09	1.07E-11	5.93E-14	3.30E-16
zn 69	7.67E-09	1.65E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	5.15E-10	1.54E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ge 71	1.09E-13	1.02E-13	4.64E-16	1.71E-18	2.64E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.24E-02	3.20E-02	9.44E-03	2.66E-03	2.17E-04	1.45E-06	4.33E-13	5.78E-24	.00E+00	.00E+00	.00E+00
sr 90	3.34E-06	3.34E-06	3.32E-06	3.30E-06	3.26E-06	3.18E-06	2.95E-06	2.61E-06	2.31E-06	2.04E-06	1.80E-06
sr 91	6.26E-03	1.09E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.02E-06	2.97E-06	8.78E-07	2.47E-07	2.02E-08	1.35E-10	4.03E-17	5.38E-28	.00E+00	.00E+00	.00E+00
y 90	1.19E+00	9.20E-01	3.32E-06	3.30E-06	3.26E-06	3.18E-06	2.95E-06	2.61E-06	2.31E-06	2.04E-06	1.81E-06
y 90m	1.18E-07	6.39E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	8.17E-02	8.08E-02	2.81E-02	9.41E-03	1.08E-03	1.43E-05	3.28E-11	1.32E-20	5.29E-30	.00E+00	.00E+00
y 92	7.08E-02	6.44E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.40E-05	2.74E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04	1.62E-04
zr 95	2.50E+01	2.47E+01	9.42E+00	3.46E+00	4.78E-01	9.17E-03	6.45E-08	1.67E-16	4.30E-25	.00E+00	.00E+00
zr 97	3.82E+01	1.43E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 93m	2.15E-05	2.15E-05	2.30E-05	2.45E-05	2.74E-05	3.31E-05	4.87E-05	7.06E-05	8.83E-05	1.03E-04	1.14E-04
nb 94	8.99E-12	8.99E-12	8.99E-12	8.99E-12	8.99E-12	8.99E-12	8.99E-12	8.98E-12	8.98E-12	8.98E-12	8.98E-12
nb 95	2.47E+01	2.47E+01	1.57E+01	6.81E+00	1.03E+00	2.08E-02	1.42E-07	3.67E-16	9.48E-25	.00E+00	.00E+00

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BWR SNF Assembly - Bottom - decay light elements page 6

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Bottom Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 95m	2.85E-01	2.83E-01	1.11E-01	4.07E-02	5.63E-03	1.08E-04	7.59E-10	1.96E-18	5.06E-27	.00E+00	.00E+00
nb 96	2.28E-02	1.12E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	3.82E+01	1.43E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.62E+01	1.35E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	5.92E-03	4.60E-03	8.17E-13	6.00E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15	1.47E-15
tc 99	4.00E-09	4.00E-09	4.02E-09	4.02E-09	4.02E-09	4.02E-09	4.02E-09	4.02E-09	4.02E-09	4.02E-09	4.02E-09
ru103	2.47E-11	2.42E-11	5.03E-12	9.83E-13	3.90E-14	6.17E-17	2.45E-25	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	3.19E-08	3.19E-08	3.15E-08	3.11E-08	3.04E-08	2.89E-08	2.50E-08	1.95E-08	1.53E-08	1.19E-08	9.34E-09
cd115	1.20E-04	8.81E-05	8.31E-17	2.64E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.32E-05	1.30E-05	3.25E-06	7.73E-07	4.51E-08	1.54E-10	6.19E-18	2.92E-30	.00E+00	.00E+00	.00E+00
cd117	1.87E-05	2.35E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.61E-08	2.56E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	9.65E-01	9.60E-01	5.62E-01	3.22E-01	1.07E-01	1.19E-02	1.61E-05	2.70E-10	4.52E-15	7.55E-20	1.26E-24
in114	2.52E-01	1.58E-01	4.56E-02	1.25E-02	9.67E-04	5.82E-06	1.27E-12	9.99E-24	.00E+00	.00E+00	.00E+00
in114m	1.68E-01	1.66E-01	4.76E-02	1.30E-02	1.01E-03	6.08E-06	1.32E-12	1.04E-23	.00E+00	.00E+00	.00E+00
in116m	2.92E-05	2.89E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.10E-04	5.15E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.70E-05	1.00E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	9.65E-01	9.59E-01	5.61E-01	3.21E-01	1.07E-01	1.19E-02	1.61E-05	2.70E-10	4.51E-15	7.55E-20	1.26E-24
sn117m	4.94E+00	4.70E+00	5.03E-02	4.51E-04	4.06E-08	3.34E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	4.41E+00	4.40E+00	3.56E+00	2.86E+00	1.86E+00	7.83E-01	5.87E-02	7.81E-04	1.04E-05	1.38E-07	1.84E-09
sn121	1.67E+00	9.02E-01	6.26E-04	6.24E-04	6.20E-04	6.12E-04	5.89E-04	5.53E-04	5.20E-04	4.88E-04	4.58E-04
sn121m	8.09E-04	8.09E-04	8.06E-04	8.04E-04	7.99E-04	7.89E-04	7.60E-04	7.13E-04	6.70E-04	6.29E-04	5.90E-04
sn123	1.55E-01	1.54E-01	9.56E-02	5.82E-02	2.18E-02	3.08E-03	8.59E-06	4.76E-10	2.64E-14	1.46E-18	8.12E-23
sn123m	8.87E-04	1.36E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	3.13E-02	2.91E-02	4.84E-05	6.26E-08	1.23E-13	4.83E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.67E-01	2.84E-01	3.40E-11	1.66E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	2.15E-02	2.13E-02	7.63E-03	2.63E-03	3.21E-04	4.78E-06	1.58E-11	1.17E-20	8.60E-30	.00E+00	.00E+00
sb125	7.24E-01	7.24E-01	6.81E-01	6.38E-01	5.62E-01	4.36E-01	2.04E-01	5.72E-02	1.61E-02	4.52E-03	1.27E-03
sb126	8.83E-03	8.35E-03	5.76E-05	3.27E-07	1.19E-11	1.61E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	6.25E-03	6.22E-03	3.71E-03	2.17E-03	7.54E-04	9.09E-05	1.59E-07	4.06E-12	1.03E-16	2.64E-21	6.72E-26
te125m	1.62E-01	1.62E-01	1.61E-01	1.54E-01	1.37E-01	1.06E-01	4.97E-02	1.40E-02	3.92E-03	1.10E-03	3.10E-04
te127	3.15E-04	8.16E-05	1.95E-05	1.08E-05	3.38E-06	3.31E-07	3.12E-10	2.82E-15	2.55E-20	2.31E-25	2.08E-30
te127m	3.52E-05	3.50E-05	1.99E-05	1.10E-05	3.45E-06	3.38E-07	3.18E-10	2.88E-15	2.61E-20	2.36E-25	2.14E-30
te129	2.12E-09	8.70E-11	1.39E-11	2.06E-12	4.75E-14	2.53E-17	3.86E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	1.39E-10	1.36E-10	2.17E-11	3.21E-12	7.40E-14	3.95E-17	6.02E-27	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.74E-15	1.65E-15	1.44E-17	1.05E-19	6.24E-24	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	4.60E-11	1.21E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

i131	4.56E-15	4.19E-15	1.95E-18	6.71E-22	9.65E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	1.04E-10	1.02E-10	1.87E-11	3.21E-12	9.90E-14	9.44E-17	8.18E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	8.60E-09	7.95E-09	7.70E-12	5.68E-15	3.68E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.85E-12	1.75E-12	9.78E-15	4.47E-17	1.06E-21	6.16E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	2.10E-15	1.86E-15	1.50E-20	7.31E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.96E+03	1.43E+03	5.63E+02	4.11E+02	3.26E+02	2.43E+02	1.16E+02	4.10E+01	1.96E+01	1.31E+01	1.10E+01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Bottom - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

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emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	3.07E+13	4.96E+12	1.03E+12	4.20E+11	1.75E+11	7.22E+10	1.43E+10	5.74E+09	3.89E+09	2.97E+09	2.47E+09
3.00E-02	8.74E+12	4.36E+11	1.25E+11	8.31E+10	4.90E+10	2.60E+10	8.39E+09	2.63E+09	1.04E+09	4.96E+08	2.93E+08
5.50E-02	5.90E+12	1.53E+11	2.70E+10	1.16E+10	3.12E+09	1.34E+09	8.43E+08	4.28E+08	2.21E+08	1.16E+08	6.27E+07
8.50E-02	3.40E+12	8.28E+10	1.39E+10	5.82E+09	1.42E+09	5.11E+08	3.18E+08	1.60E+08	8.17E+07	4.20E+07	2.16E+07
1.20E-01	2.39E+12	5.54E+10	8.96E+09	3.76E+09	8.88E+08	2.91E+08	1.67E+08	7.69E+07	3.72E+07	1.85E+07	9.40E+06
1.70E-01	2.61E+12	1.99E+11	1.19E+10	5.20E+09	2.20E+09	1.30E+09	6.14E+08	1.85E+08	5.82E+07	1.96E+07	7.20E+06
3.00E-01	5.93E+12	3.04E+12	3.29E+11	3.59E+10	1.57E+09	5.09E+08	2.32E+08	6.96E+07	2.19E+07	7.34E+06	2.68E+06
6.50E-01	8.06E+13	1.22E+13	5.85E+12	3.29E+12	1.45E+12	5.50E+11	5.14E+10	2.10E+09	3.78E+08	1.03E+08	2.94E+07
1.13E+00	9.71E+11	5.63E+11	5.10E+11	4.93E+11	4.62E+11	4.05E+11	2.73E+11	1.41E+11	7.32E+10	3.79E+10	1.97E+10
1.58E+00	8.89E+12	4.74E+10	9.56E+09	3.86E+09	6.45E+08	1.81E+07	5.21E+02	7.78E+01	5.45E+01	4.07E+01	3.21E+01
2.00E+00	1.39E+13	2.38E+10	2.02E+07	8.64E+06	3.20E+06	2.17E+06	1.46E+06	7.54E+05	3.91E+05	2.02E+05	1.05E+05
2.40E+00	5.34E+11	8.45E+08	1.23E+05	4.67E+04	1.25E+04	6.90E+03	4.61E+03	2.39E+03	1.24E+03	6.40E+02	3.32E+02
2.80E+00	4.83E+11	7.63E+08	1.11E+04	3.84E+03	4.68E+02	6.98E+00	2.31E-05	4.03E-14	2.02E-14	1.80E-14	1.62E-14
3.25E+00	8.84E+10	1.40E+08	2.93E-15	2.90E-15	2.86E-15	2.78E-15	2.60E-15	2.34E-15	2.10E-15	1.89E-15	1.70E-15
3.75E+00	9.33E+05	6.45E+00	3.50E-18	3.47E-18	3.43E-18	3.35E-18	3.14E-18	2.83E-18	2.54E-18	2.29E-18	2.06E-18
4.25E+00	1.04E+06	4.43E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	9.00E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	2.70E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	1.65E+14	2.17E+13	7.92E+12	4.35E+12	2.15E+12	1.06E+12	3.49E+11	1.53E+11	7.89E+10	4.17E+10	2.25E+10
0 mev/sec	1.02E+14	9.69E+12	4.51E+12	2.72E+12	1.47E+12	8.15E+11	3.41E+11	1.61E+11	8.27E+10	4.28E+10	2.22E+10

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	7.05E+04	1.14E+04	2.38E+03	9.65E+02	4.02E+02	1.66E+02	3.29E+01	1.32E+01	8.94E+00	6.83E+00	5.67E+00
3.00E-02	6.02E+04	3.00E+03	8.63E+02	5.73E+02	3.38E+02	1.79E+02	5.79E+01	1.81E+01	7.15E+00	3.42E+00	2.02E+00
5.50E-02	7.46E+04	1.93E+03	3.42E+02	1.46E+02	3.95E+01	1.70E+01	1.07E+01	5.41E+00	2.80E+00	1.47E+00	7.92E-01
8.50E-02	6.63E+04	1.62E+03	2.71E+02	1.14E+02	2.77E+01	9.98E+00	6.21E+00	3.13E+00	1.60E+00	8.20E-01	4.23E-01
1.20E-01	6.59E+04	1.53E+03	2.47E+02	1.04E+02	2.45E+01	8.02E+00	4.60E+00	2.12E+00	1.03E+00	5.12E-01	2.59E-01
1.70E-01	1.02E+05	7.79E+03	4.65E+02	2.03E+02	8.60E+01	5.08E+01	2.40E+01	7.21E+00	2.27E+00	7.66E-01	2.81E-01
3.00E-01	4.09E+05	2.10E+05	2.27E+04	2.47E+03	1.08E+02	3.51E+01	1.60E+01	4.80E+00	1.51E+00	5.06E-01	1.85E-01
6.50E-01	1.20E+07	1.82E+06	8.74E+05	4.91E+05	2.17E+05	8.22E+04	7.69E+03	3.14E+02	5.65E+01	1.54E+01	4.39E+00
1.13E+00	2.51E+05	1.46E+05	1.32E+05	1.28E+05	1.19E+05	1.05E+05	7.06E+04	3.66E+04	1.89E+04	9.81E+03	5.08E+03
1.58E+00	3.22E+06	1.72E+04	3.46E+03	1.40E+03	2.33E+02	6.54E+00	1.89E-04	2.82E-05	1.97E-05	1.47E-05	1.16E-05
2.00E+00	6.41E+06	1.09E+04	9.29E+00	3.97E+00	1.47E+00	9.98E-01	6.69E-01	3.47E-01	1.80E-01	9.30E-02	4.82E-02
2.40E+00	2.95E+05	4.66E+02	6.81E-02	2.58E-02	6.88E-03	3.81E-03	2.54E-03	1.32E-03	6.82E-04	3.53E-04	1.83E-04
2.80E+00	3.11E+05	4.91E+02	7.17E-03	2.47E-03	3.01E-04	4.49E-06	1.49E-11	2.59E-20	1.30E-20	1.16E-20	1.04E-20
3.25E+00	6.61E+04	1.04E+02	2.19E-21	2.17E-21	2.14E-21	2.08E-21	1.94E-21	1.75E-21	1.57E-21	1.41E-21	1.27E-21
3.75E+00	8.04E-01	5.56E-06	3.01E-24	3.00E-24	2.96E-24	2.89E-24	2.71E-24	2.44E-24	2.19E-24	1.97E-24	1.78E-24
4.25E+00	1.02E+00	4.33E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	9.82E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	3.42E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	2.34E+07	2.23E+06	1.04E+06	6.25E+05	3.38E+05	1.87E+05	7.84E+04	3.69E+04	1.90E+04	9.84E+03	5.10E+03
0 gamma watts	1.64E+01	1.55E+00	7.23E-01	4.36E-01	2.35E-01	1.31E-01	5.47E-02	2.57E-02	1.33E-02	6.86E-03	3.55E-03

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photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Bottom - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean		time after discharge								
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.47E+17	3.24E+16	8.60E+15	6.41E+15	4.35E+15	2.42E+15	9.16E+14	6.40E+14	5.52E+14	4.84E+14	4.26E+14
3.00E-02	1.10E+17	2.54E+16	3.68E+15	2.68E+15	1.83E+15	1.02E+15	4.01E+14	2.84E+14	2.45E+14	2.16E+14	1.90E+14
5.50E-02	5.87E+16	8.98E+15	1.97E+15	1.51E+15	1.04E+15	5.83E+14	2.22E+14	1.50E+14	1.25E+14	1.06E+14	9.18E+13
8.50E-02	4.01E+16	7.65E+15	1.20E+15	9.28E+14	6.39E+14	3.50E+14	1.23E+14	7.93E+13	6.55E+13	5.60E+13	4.86E+13
1.20E-01	3.27E+16	7.07E+15	1.39E+15	1.11E+15	7.62E+14	4.05E+14	1.36E+14	8.44E+13	6.49E+13	5.17E+13	4.21E+13
1.70E-01	5.22E+16	8.36E+15	1.19E+15	6.55E+14	4.11E+14	2.19E+14	7.07E+13	4.68E+13	4.04E+13	3.55E+13	3.13E+13
3.00E-01	1.13E+17	1.75E+16	9.24E+14	7.01E+14	4.79E+14	2.55E+14	8.01E+13	5.19E+13	4.42E+13	3.83E+13	3.33E+13
6.50E-01	2.33E+17	6.56E+16	1.65E+16	1.01E+16	6.10E+15	4.17E+15	2.11E+15	1.18E+15	9.17E+14	7.88E+14	6.93E+14
1.13E+00	7.24E+16	5.42E+15	3.60E+14	2.88E+14	2.34E+14	1.70E+14	9.54E+13	5.61E+13	3.69E+13	2.49E+13	1.70E+13
1.58E+00	3.71E+16	8.74E+15	1.75E+14	9.60E+13	7.29E+13	4.52E+13	1.48E+13	4.17E+12	1.89E+12	1.14E+12	7.82E+11
2.00E+00	1.10E+16	6.98E+14	5.44E+13	3.81E+13	2.47E+13	1.05E+13	8.61E+11	3.41E+10	1.70E+10	1.46E+10	1.28E+10
2.40E+00	8.63E+15	4.28E+14	7.26E+12	3.17E+12	2.21E+12	1.10E+12	1.38E+11	4.45E+09	1.55E+08	1.31E+07	7.48E+06
2.80E+00	3.64E+15	6.81E+12	6.41E+11	5.03E+11	3.56E+11	1.78E+11	2.27E+10	7.44E+08	2.46E+07	8.13E+05	2.69E+04
3.25E+00	1.75E+15	2.45E+12	1.17E+11	8.22E+10	5.84E+10	2.95E+10	3.83E+09	1.27E+08	4.21E+06	1.40E+05	4.63E+03
3.75E+00	7.94E+14	1.20E+10	4.30E+07	3.62E+07	2.57E+07	1.30E+07	1.69E+06	5.60E+04	1.86E+03	6.16E+01	2.04E+00
4.25E+00	7.32E+14	1.60E+09	1.22E-05	1.23E-05	1.24E-05	1.26E-05	1.28E-05	1.30E-05	1.31E-05	1.31E-05	1.31E-05
4.75E+00	2.17E+14	1.19E+10	6.14E-06	6.17E-06	6.22E-06	6.30E-06	6.44E-06	6.53E-06	6.55E-06	6.56E-06	6.56E-06
5.50E+00	1.69E+14	7.60E+07	4.56E-06	4.58E-06	4.61E-06	4.67E-06	4.78E-06	4.84E-06	4.86E-06	4.87E-06	4.87E-06
0 total	1.02E+18	1.88E+17	3.60E+16	2.45E+16	1.59E+16	9.65E+15	4.17E+15	2.57E+15	2.09E+15	1.80E+15	1.57E+15
0 mev/sec	4.17E+17	7.47E+16	1.26E+16	7.90E+15	4.92E+15	3.27E+15	1.60E+15	8.99E+14	6.94E+14	5.87E+14	5.10E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean		time after discharge								
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.68E+08	7.45E+07	1.98E+07	1.47E+07	1.00E+07	5.56E+06	2.11E+06	1.47E+06	1.27E+06	1.11E+06	9.79E+05
3.00E-02	7.56E+08	1.75E+08	2.54E+07	1.85E+07	1.26E+07	7.05E+06	2.77E+06	1.96E+06	1.69E+06	1.49E+06	1.31E+06
5.50E-02	7.42E+08	1.14E+08	2.49E+07	1.90E+07	1.32E+07	7.38E+06	2.81E+06	1.90E+06	1.58E+06	1.35E+06	1.16E+06
8.50E-02	7.84E+08	1.49E+08	2.34E+07	1.81E+07	1.25E+07	6.83E+06	2.40E+06	1.55E+06	1.28E+06	1.09E+06	9.50E+05
1.20E-01	9.03E+08	1.95E+08	3.83E+07	3.05E+07	2.10E+07	1.12E+07	3.76E+06	2.33E+06	1.79E+06	1.43E+06	1.16E+06
1.70E-01	2.04E+09	3.27E+08	4.64E+07	2.56E+07	1.61E+07	8.56E+06	2.76E+06	1.83E+06	1.58E+06	1.39E+06	1.22E+06
3.00E-01	7.78E+09	1.21E+09	6.37E+07	4.84E+07	3.31E+07	1.76E+07	5.52E+06	3.58E+06	3.05E+06	2.64E+06	2.30E+06
6.50E-01	3.48E+10	9.80E+09	2.46E+09	1.51E+09	9.12E+08	6.23E+08	3.16E+08	1.76E+08	1.37E+08	1.18E+08	1.04E+08
1.13E+00	1.87E+10	1.40E+09	9.32E+07	7.45E+07	6.04E+07	4.40E+07	2.47E+07	1.45E+07	9.54E+06	6.44E+06	4.40E+06
1.58E+00	1.34E+10	3.16E+09	6.35E+07	3.48E+07	2.64E+07	1.64E+07	5.37E+06	1.51E+06	6.83E+05	4.14E+05	2.83E+05
2.00E+00	5.08E+09	3.21E+08	2.50E+07	1.75E+07	1.14E+07	4.83E+06	3.96E+05	1.57E+04	7.84E+03	6.73E+03	5.90E+03
2.40E+00	4.76E+09	2.36E+08	4.00E+06	1.75E+06	1.22E+06	6.07E+05	7.59E+04	2.46E+03	8.57E+01	7.23E+00	4.12E+00
2.80E+00	2.34E+09	4.38E+06	4.12E+05	3.24E+05	2.29E+05	1.15E+05	1.46E+04	4.79E+02	1.58E+01	5.23E-01	1.73E-02
3.25E+00	1.31E+09	1.83E+06	8.72E+04	6.14E+04	4.36E+04	2.21E+04	2.86E+03	9.48E+01	3.15E+00	1.04E-01	3.46E-03
3.75E+00	6.84E+08	1.04E+04	3.71E+01	3.12E+01	2.22E+01	1.12E+01	1.45E+00	4.82E-02	1.60E-03	5.31E-05	1.76E-06
4.25E+00	7.15E+08	1.56E+03	1.20E-11	1.20E-11	1.21E-11	1.23E-11	1.25E-11	1.27E-11	1.28E-11	1.28E-11	1.28E-11
4.75E+00	2.37E+08	1.30E+04	6.71E-12	6.74E-12	6.79E-12	6.88E-12	7.03E-12	7.13E-12	7.16E-12	7.16E-12	7.17E-12
5.50E+00	2.14E+08	9.60E+01	5.76E-12	5.79E-12	5.83E-12	5.91E-12	6.04E-12	6.12E-12	6.15E-12	6.15E-12	6.16E-12
0 total	9.59E+10	1.72E+10	2.89E+09	1.82E+09	1.13E+09	7.53E+08	3.68E+08	2.07E+08	1.59E+08	1.35E+08	1.17E+08
0 gamma watts	6.69E+04	1.20E+04	2.02E+03	1.27E+03	7.88E+02	5.25E+02	2.57E+02	1.44E+02	1.11E+02	9.42E+01	8.18E+01

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0 principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	time after discharge									
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	2.24E+15	1.74E+15	3.09E+05	2.27E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

rh106	3.19E+15	3.07E+15	2.60E+15	2.19E+15	1.56E+15	7.87E+14	1.02E+14	3.38E+12	1.12E+11	3.72E+09	1.23E+08
ba140	1.89E+15	1.79E+15	1.42E+13	9.32E+10	4.53E+06	1.09E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.51E+15	2.44E+15	2.05E+13	1.34E+11	6.53E+06	1.57E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.03E+15	4.00E+15	3.22E+15	2.58E+15	1.65E+15	6.79E+14	4.72E+13	5.56E+11	6.54E+09	7.70E+07	9.06E+05

0 principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.54E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.22E+15	3.42E+15	2.04E+07	5.81E-02	7.57E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.43E+15	4.27E+15	3.71E+10	1.81E+05	5.83E-06	6.55E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.58E+15	1.49E+15	1.19E+13	7.78E+10	3.78E+06	9.06E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.44E+15	1.41E+15	2.12E+14	2.95E+13	5.98E+11	2.48E+08	1.75E-02	2.13E-19	.00E+00	.00E+00	.00E+00
ce143	4.66E+15	2.84E+15	9.29E-05	5.22E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.33E+15	1.32E+15	1.07E+15	8.52E+14	5.46E+14	2.25E+14	1.56E+13	1.84E+11	2.16E+09	2.55E+07	3.00E+05
nd147	1.43E+15	1.34E+15	4.87E+12	1.42E+10	1.39E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec
mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.98E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.55E+14	7.26E+14	6.15E+14	5.17E+14	3.68E+14	1.86E+14	2.41E+13	8.00E+11	2.65E+10	8.80E+08	2.92E+07
te132	8.14E+14	6.58E+14	3.94E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.29E+14	5.14E+14	4.32E+12	2.83E+10	1.38E+06	3.30E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.33E+15	8.08E+14	2.64E-05	1.49E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.37E+14	9.30E+14	7.49E+14	5.98E+14	3.83E+14	1.58E+14	1.10E+13	1.29E+11	1.52E+09	1.79E+07	2.10E+05
sm153	1.62E+15	1.13E+15	1.45E+01	5.24E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec
mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.65E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.48E+14	4.31E+14	3.65E+14	3.07E+14	2.19E+14	1.11E+14	1.43E+13	4.75E+11	1.58E+10	5.23E+08	1.73E+07
xe133	3.13E+15	3.02E+15	2.62E+10	1.28E+05	4.12E-06	4.63E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.51E+14	5.47E+14	4.41E+14	3.52E+14	2.26E+14	9.28E+13	6.46E+12	7.60E+10	8.94E+08	1.05E+07	1.24E+05
nd147	8.87E+14	8.33E+14	3.03E+12	8.81E+09	8.61E+04	8.34E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec
mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.07E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.64E+15	3.09E+15	5.53E+05	4.06E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.05E+14	7.03E+14	5.66E+14	4.52E+14	2.90E+14	1.19E+14	8.29E+12	9.76E+10	1.15E+09	1.35E+07	1.59E+05
pr144	3.94E+14	3.92E+14	3.15E+14	2.52E+14	1.61E+14	6.64E+13	4.62E+12	5.44E+10	6.40E+08	7.53E+06	8.86E+04
sm153	7.73E+14	5.40E+14	6.88E+00	2.49E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.36E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.88E+14	6.12E+14	1.09E+05	7.98E-06	7.60E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.57E+15	2.18E+15	3.91E+05	2.87E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.71E+14	4.46E+14	3.54E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.85E+15	2.80E+15	4.20E+14	5.84E+13	1.18E+12	4.90E+08	3.47E-02	4.22E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.38E+15	9.87E+14	6.49E-04	8.20E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.52E+15	4.22E+15	2.01E+12	6.93E+08	9.97E+01	2.11E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.12E+15	3.33E+15	1.99E+07	5.66E-02	7.37E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.33E+15	1.73E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.87E+15	1.82E+15	1.53E+13	1.00E+11	4.87E+06	1.17E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.07E+15	1.87E+15	6.12E-05	3.44E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.56E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.65E+15	7.57E+15	2.89E+15	1.06E+15	1.47E+14	2.81E+12	1.98E+07	5.10E-02	1.32E-10	3.41E-19	8.42E-28
nb 95	7.97E+15	7.96E+15	4.99E+15	2.17E+15	3.28E+14	6.61E+12	4.51E+07	1.17E-01	3.01E-10	7.78E-19	.00E+00
ru103	5.59E+15	5.50E+15	1.14E+15	2.23E+14	8.85E+12	1.40E+10	5.55E+01	5.51E-13	5.44E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.07E+07	2.29E-01	2.98E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.31E+15	3.37E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.90E+15	4.90E+15	4.52E+15	4.15E+15	3.50E+15	2.50E+15	9.13E+14	1.70E+14	3.17E+13	5.90E+12	1.10E+12
la140	6.00E+15	5.83E+15	4.90E+13	3.21E+11	1.56E+07	3.74E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 9, photons/sec
mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.42E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.80E+15	1.47E+15	8.78E+06	2.49E-02	3.25E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	5.99E+15	4.77E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	5.52E+14	5.24E+14	4.82E+12	3.69E+10	2.44E+06	1.08E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.54E+14	6.35E+14	5.34E+12	3.50E+10	1.70E+06	4.08E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	8.82E+14	8.44E+14	1.45E+13	2.13E+11	5.07E+07	2.91E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 10, photons/sec
mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.74E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.79E+14	5.55E+14	3.32E+06	9.42E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.75E+15	7.53E+15	6.33E+13	4.15E+11	2.02E+07	4.84E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 11, photons/sec
mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.98E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.74E+14	1.43E+14	8.52E+05	2.42E-03	3.15E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.46E+14	3.55E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.15E+13	5.11E+13	4.11E+13	3.29E+13	2.11E+13	8.66E+12	6.03E+11	7.09E+09	8.35E+07	9.82E+05	1.16E+04
eu156	4.31E+14	4.12E+14	7.10E+12	1.04E+11	2.48E+07	1.42E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 12, photons/sec
mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.28E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.67E+14	3.57E+14	3.00E+12	1.97E+10	9.57E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	3.06E+13	2.93E+13	5.04E+11	7.39E+09	1.76E+06	1.01E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 13, photons/sec
mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.81E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.96E+11	6.70E+11	5.67E+11	4.77E+11	3.40E+11	1.72E+11	2.23E+10	7.38E+08	2.45E+07	8.12E+05	2.69E+04
ag112	1.28E+12	6.81E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.15E+12	5.00E+12	4.20E+10	2.76E+08	1.34E+04	3.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 14, photons/sec
mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.45E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.35E+12	2.28E+12	1.92E+10	1.26E+08	6.12E+03	1.47E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 15, photons/sec
mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.20E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.78E+12	8.62E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.70E+14	3.34E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.60E+09) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	5.16E+11	1.60E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.19E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	3.83E+12	1.19E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.60E+07) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.45E+10	7.60E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Bottom - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
1.00E-02	1.40E+17	7.32E+16	1.06E+14	7.95E+13	5.01E+13	3.04E+13	2.49E+13	2.44E+13	2.38E+13	2.33E+13	2.27E+13
3.00E-02	8.81E+15	1.52E+15	9.95E+10	9.34E+10	1.17E+11	1.63E+11	2.88E+11	4.59E+11	5.91E+11	6.92E+11	7.70E+11
5.50E-02	1.28E+16	4.16E+15	1.62E+12	1.54E+12	1.90E+12	2.67E+12	4.81E+12	7.75E+12	1.00E+13	1.18E+13	1.31E+13
8.50E-02	5.54E+16	8.04E+15	5.56E+11	3.51E+11	3.51E+11	3.50E+11	3.48E+11	3.44E+11	3.40E+11	3.37E+11	3.34E+11
1.20E-01	5.61E+16	4.09E+16	6.02E+11	4.61E+11	4.55E+11	4.48E+11	4.35E+11	4.17E+11	4.00E+11	3.85E+11	3.72E+11
1.70E-01	1.86E+15	3.07E+14	2.24E+10	8.57E+09	6.22E+09	4.63E+09	4.16E+09	4.09E+09	4.01E+09	3.95E+09	3.89E+09
3.00E-01	2.98E+16	2.15E+16	3.66E+11	2.51E+11	2.49E+11	2.46E+11	2.38E+11	2.25E+11	2.13E+11	2.03E+11	1.94E+11
6.50E-01	1.63E+15	5.69E+13	2.49E+09	2.05E+09	1.57E+09	1.31E+09	1.46E+09	1.66E+09	1.71E+09	1.68E+09	1.64E+09
1.13E+00	2.10E+15	1.35E+15	8.47E+08	7.99E+08	7.43E+08	7.01E+08	6.70E+08	6.35E+08	6.00E+08	5.69E+08	5.40E+08
1.58E+00	1.78E+08	1.72E+08	1.55E+08	1.43E+08	1.31E+08	1.24E+08	1.26E+08	1.25E+08	1.16E+08	1.05E+08	9.47E+07
2.00E+00	1.83E+06	1.10E+06	1.05E+06	1.09E+06	1.16E+06	1.31E+06	1.72E+06	2.08E+06	2.17E+06	2.16E+06	2.11E+06
2.40E+00	7.76E+07	7.76E+07	6.91E+07	6.29E+07	5.55E+07	4.93E+07	4.28E+07	3.54E+07	2.93E+07	2.43E+07	2.02E+07
2.80E+00	1.37E+08	1.39E+08	1.43E+08	1.51E+08	1.71E+08	2.21E+08	3.60E+08	4.83E+08	5.11E+08	5.02E+08	4.82E+08
3.25E+00	2.78E+07	2.78E+07	2.48E+07	2.25E+07	1.99E+07	1.77E+07	1.53E+07	1.27E+07	1.05E+07	8.71E+06	7.24E+06
3.75E+00	1.61E+07	1.61E+07	1.43E+07	1.31E+07	1.15E+07	1.02E+07	8.90E+06	7.35E+06	6.09E+06	5.05E+06	4.20E+06
4.25E+00	9.34E+06	9.34E+06	8.32E+06	7.57E+06	6.69E+06	5.94E+06	5.16E+06	4.26E+06	3.53E+06	2.93E+06	2.43E+06
4.75E+00	5.41E+06	5.41E+06	4.82E+06	4.39E+06	3.88E+06	3.44E+06	2.99E+06	2.47E+06	2.05E+06	1.70E+06	1.41E+06
5.50E+00	4.89E+06	4.90E+06	4.36E+06	3.97E+06	3.51E+06	3.12E+06	2.71E+06	2.23E+06	1.85E+06	1.54E+06	1.28E+06
0 total	3.09E+17	1.51E+17	1.10E+14	8.22E+13	5.32E+13	3.43E+13	3.10E+13	3.36E+13	3.54E+13	3.67E+13	3.75E+13
0 mev/sec	2.65E+16	1.47E+16	1.39E+12	1.05E+12	7.73E+11	6.16E+11	6.79E+11	8.34E+11	9.52E+11	1.04E+12	1.11E+12

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Bottom Regio

0

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
1.00E-02	3.22E+08	1.68E+08	2.44E+05	1.83E+05	1.15E+05	6.98E+04	5.72E+04	5.60E+04	5.48E+04	5.35E+04	5.22E+04
3.00E-02	6.08E+07	1.05E+07	6.87E+02	6.44E+02	8.09E+02	1.13E+03	1.99E+03	3.16E+03	4.07E+03	4.77E+03	5.31E+03
5.50E-02	1.62E+08	5.26E+07	2.05E+04	1.95E+04	2.41E+04	3.37E+04	6.08E+04	9.79E+04	1.27E+05	1.49E+05	1.66E+05
8.50E-02	1.08E+09	1.57E+08	1.09E+04	6.86E+03	6.85E+03	6.84E+03	6.79E+03	6.72E+03	6.65E+03	6.59E+03	6.53E+03
1.20E-01	1.55E+09	1.13E+09	1.66E+04	1.27E+04	1.26E+04	1.24E+04	1.20E+04	1.15E+04	1.10E+04	1.06E+04	1.03E+04
1.70E-01	7.27E+07	1.20E+07	8.76E+02	3.35E+02	2.43E+02	1.81E+02	1.63E+02	1.60E+02	1.57E+02	1.54E+02	1.52E+02
3.00E-01	2.05E+09	1.49E+09	2.53E+04	1.73E+04	1.72E+04	1.70E+04	1.64E+04	1.55E+04	1.47E+04	1.40E+04	1.34E+04
6.50E-01	2.44E+08	8.51E+06	3.72E+02	3.06E+02	2.34E+02	1.96E+02	2.18E+02	2.48E+02	2.55E+02	2.51E+02	2.45E+02
1.13E+00	5.44E+08	3.48E+08	2.19E+02	2.07E+02	1.92E+02	1.81E+02	1.73E+02	1.64E+02	1.55E+02	1.47E+02	1.40E+02
1.58E+00	6.44E+01	6.21E+01	5.59E+01	5.18E+01	4.73E+01	4.48E+01	4.57E+01	4.51E+01	4.19E+01	3.80E+01	3.43E+01
2.00E+00	8.41E-01	5.04E-01	4.85E-01	5.00E-01	5.33E-01	6.03E-01	7.91E-01	9.58E-01	1.00E+00	9.93E-01	9.69E-01

	2.40E+00	4.28E+01	4.28E+01	3.81E+01	3.47E+01	3.06E+01	2.72E+01	2.36E+01	1.95E+01	1.62E+01	1.34E+01	1.11E+01
	2.80E+00	8.82E+01	8.94E+01	9.17E+01	9.69E+01	1.10E+02	1.42E+02	2.32E+02	3.11E+02	3.29E+02	3.23E+02	3.10E+02
	3.25E+00	2.08E+01	2.08E+01	1.85E+01	1.68E+01	1.49E+01	1.32E+01	1.15E+01	9.47E+00	7.85E+00	6.51E+00	5.41E+00
	3.75E+00	1.39E+01	1.39E+01	1.24E+01	1.13E+01	9.94E+00	8.83E+00	7.67E+00	6.33E+00	5.25E+00	4.35E+00	3.62E+00
	4.25E+00	9.12E+00	9.12E+00	8.13E+00	7.40E+00	6.53E+00	5.80E+00	5.04E+00	4.16E+00	3.45E+00	2.86E+00	2.38E+00
	4.75E+00	5.91E+00	5.91E+00	5.26E+00	4.79E+00	4.23E+00	3.76E+00	3.27E+00	2.70E+00	2.23E+00	1.85E+00	1.54E+00
	5.50E+00	6.19E+00	6.19E+00	5.51E+00	5.02E+00	4.44E+00	3.94E+00	3.42E+00	2.83E+00	2.34E+00	1.94E+00	1.61E+00
0 total		6.09E+09	3.37E+09	3.20E+05	2.41E+05	1.78E+05	1.42E+05	1.56E+05	1.92E+05	2.19E+05	2.39E+05	2.54E+05
0 gamma watts		4.25E+03	2.35E+03	2.23E-01	1.68E-01	1.24E-01	9.88E-02	1.09E-01	1.34E-01	1.53E-01	1.67E-01	1.77E-01

1 page 14

1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - bot ds4 - discharge

0 1.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	7.0154E+11	2.1046E+10
5.0000E-02	to	1.0000E-01	1.6087E+11	1.2065E+10
1.0000E-01	to	2.0000E-01	2.7119E+11	4.0679E+10
2.0000E-01	to	3.0000E-01	4.5227E+10	1.1307E+10
3.0000E-01	to	4.0000E-01	2.5850E+12	9.0477E+11
4.0000E-01	to	6.0000E-01	1.3268E+12	6.6339E+11
6.0000E-01	to	8.0000E-01	3.0102E+12	2.1072E+12
8.0000E-01	to	1.0000E+00	5.7312E+12	5.1581E+12
1.0000E+00	to	1.3300E+00	4.0377E+11	4.7039E+11
1.3300E+00	to	1.6600E+00	1.1332E+11	1.6941E+11
1.6600E+00	to	2.0000E+00	5.0089E+10	9.1663E+10
2.0000E+00	to	2.5000E+00	1.0881E+10	2.4483E+10
2.5000E+00	to	3.0000E+00	1.5148E+09	4.1657E+09
3.0000E+00	to	4.0000E+00	1.3002E+08	4.5505E+08
4.0000E+00	to	5.0000E+00	4.2017E-03	1.8908E-02
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			1.4412E+13	9.6791E+12

0
0 total energy from nuclides with spectrum data = 9.6481E+12
0 total energy from nuclides with no spectrum data = 3.0989E+10

1 gamma source spectrum for decay step for BWR source term - bot ds4 - 0.25 year

0 90.00 day time of the requested nuclides

0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.7558E+11	5.2673E+09
5.0000E-02	to	1.0000E-01	2.7572E+10	2.0679E+09
1.0000E-01	to	2.0000E-01	2.0710E+10	3.1065E+09
2.0000E-01	to	3.0000E-01	6.3243E+09	1.5811E+09
3.0000E-01	to	4.0000E-01	2.7940E+11	9.7790E+10
4.0000E-01	to	6.0000E-01	5.4076E+11	2.7038E+11
6.0000E-01	to	8.0000E-01	1.0140E+12	7.0980E+11
8.0000E-01	to	1.0000E+00	3.1599E+12	2.8439E+12
1.0000E+00	to	1.3300E+00	3.6352E+11	4.2351E+11
1.3300E+00	to	1.6600E+00	1.0266E+11	1.5347E+11
1.6600E+00	to	2.0000E+00	8.2643E+09	1.5124E+10
2.0000E+00	to	2.5000E+00	1.8049E+07	4.0611E+07
2.5000E+00	to	3.0000E+00	1.5188E+04	4.1767E+04

	3.0000E+00 to	4.0000E+00	2.7376E-15	9.5815E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		5.6987E+12	4.5261E+12

0
0 total energy from nuclides with spectrum data = 4.5002E+12
0 total energy from nuclides with no spectrum data = 2.5892E+10
1 gamma source spectrum for decay step for BWR source term - bot ds4 - 0.50 year
0 182.50 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	1.0547E+11	3.1642E+09
	5.0000E-02 to	1.0000E-01	1.1690E+10	8.7679E+08
	1.0000E-01 to	2.0000E-01	8.9336E+09	1.3400E+09
	2.0000E-01 to	3.0000E-01	2.6733E+09	6.6832E+08
	3.0000E-01 to	4.0000E-01	2.9087E+10	1.0181E+10
	4.0000E-01 to	6.0000E-01	2.2566E+11	1.1283E+11
	6.0000E-01 to	8.0000E-01	4.1988E+11	2.9392E+11
	8.0000E-01 to	1.0000E+00	1.9427E+12	1.7485E+12
	1.0000E+00 to	1.3300E+00	3.5244E+11	4.1060E+11
	1.3300E+00 to	1.6600E+00	9.9528E+10	1.4879E+11
	1.6600E+00 to	2.0000E+00	3.3466E+09	6.1243E+09
	2.0000E+00 to	2.5000E+00	7.7494E+06	1.7436E+07
	2.5000E+00 to	3.0000E+00	7.6051E+03	2.0914E+04
	3.0000E+00 to	4.0000E+00	2.7215E-15	9.5253E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.2015E+12	2.7370E+12

0
0 total energy from nuclides with spectrum data = 2.7146E+12
0 total energy from nuclides with no spectrum data = 2.2332E+10
1 gamma source spectrum for decay step for BWR source term - bot ds4 - 1 year
0 365.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
0				
	1.0000E-02 to	5.0000E-02	5.6107E+10	1.6832E+09
	5.0000E-02 to	1.0000E-01	2.9746E+09	2.2309E+08
	1.0000E-01 to	2.0000E-01	3.2054E+09	4.8081E+08
	2.0000E-01 to	3.0000E-01	5.8370E+08	1.4592E+08
	3.0000E-01 to	4.0000E-01	9.4630E+08	3.3121E+08
	4.0000E-01 to	6.0000E-01	4.5767E+10	2.2883E+10
	6.0000E-01 to	8.0000E-01	6.6202E+10	4.6342E+10
	8.0000E-01 to	1.0000E+00	9.8451E+11	8.8606E+11
	1.0000E+00 to	1.3300E+00	3.3130E+11	3.8596E+11
	1.3300E+00 to	1.6600E+00	9.3556E+10	1.3987E+11
	1.6600E+00 to	2.0000E+00	5.6105E+08	1.0267E+09
	2.0000E+00 to	2.5000E+00	2.8797E+06	6.4794E+06
	2.5000E+00 to	3.0000E+00	3.9254E+03	1.0795E+04
	3.0000E+00 to	4.0000E+00	2.6912E-15	9.4192E-15
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.5857E+12	1.4850E+12

0
0 total energy from nuclides with spectrum data = 1.4670E+12

total energy from nuclides with no spectrum data = 1.7993E+10

gamma source spectrum for decay step for BWR source term - bot ds4 - 2 year

730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.9677E+10	8.9031E+08
5.0000E-02	to	1.0000E-01	1.1559E+09	8.6689E+07
1.0000E-01	to	2.0000E-01	1.7031E+09	2.5547E+08
2.0000E-01	to	3.0000E-01	1.1804E+08	2.9509E+07
3.0000E-01	to	4.0000E-01	3.5955E+08	1.2584E+08
4.0000E-01	to	6.0000E-01	8.5275E+09	4.2638E+09
6.0000E-01	to	8.0000E-01	5.1072E+09	3.5750E+09
8.0000E-01	to	1.0000E+00	3.9498E+11	3.5548E+11
1.0000E+00	to	1.3300E+00	2.9162E+11	3.3974E+11
1.3300E+00	to	1.6600E+00	8.2353E+10	1.2312E+11
1.6600E+00	to	2.0000E+00	1.5786E+07	2.8888E+07
2.0000E+00	to	2.5000E+00	1.9642E+06	4.4195E+06
2.5000E+00	to	3.0000E+00	3.0377E+03	8.3536E+03
3.0000E+00	to	4.0000E+00	2.6304E-15	9.2064E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			8.1562E+11	8.2760E+11

total energy from nuclides with spectrum data = 8.1431E+11

total energy from nuclides with no spectrum data = 1.3284E+10

gamma source spectrum for decay step for BWR source term - bot ds4 - 5 year

1826.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.0755E+10	3.2266E+08
5.0000E-02	to	1.0000E-01	7.1779E+08	5.3834E+07
1.0000E-01	to	2.0000E-01	8.2933E+08	1.2440E+08
2.0000E-01	to	3.0000E-01	4.7939E+07	1.1985E+07
3.0000E-01	to	4.0000E-01	1.6824E+08	5.8884E+07
4.0000E-01	to	6.0000E-01	3.5105E+09	1.7553E+09
6.0000E-01	to	8.0000E-01	1.8175E+09	1.2722E+09
8.0000E-01	to	1.0000E+00	3.4467E+10	3.1020E+10
1.0000E+00	to	1.3300E+00	1.9687E+11	2.2936E+11
1.3300E+00	to	1.6600E+00	5.5596E+10	8.3117E+10
1.6600E+00	to	2.0000E+00	3.5861E+02	6.5625E+02
2.0000E+00	to	2.5000E+00	1.3194E+06	2.9686E+06
2.5000E+00	to	3.0000E+00	2.0458E+03	5.6261E+03
3.0000E+00	to	4.0000E+00	2.4602E-15	8.6109E-15
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			3.0478E+11	3.4709E+11

total energy from nuclides with spectrum data = 3.4094E+11

total energy from nuclides with no spectrum data = 6.1540E+09

gamma source spectrum for decay step for BWR source term - bot ds4 - 10 year

3652.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.9205E+09	1.1762E+08
5.0000E-02	to	1.0000E-01	3.5908E+08	2.6931E+07
1.0000E-01	to	2.0000E-01	2.6965E+08	4.0447E+07

2.0000E-01 to	3.0000E-01	1.5272E+07	3.8180E+06
3.0000E-01 to	4.0000E-01	4.9428E+07	1.7300E+07
4.0000E-01 to	6.0000E-01	9.7945E+08	4.8973E+08
6.0000E-01 to	8.0000E-01	5.0705E+08	3.5494E+08
8.0000E-01 to	1.0000E+00	5.9744E+08	5.3770E+08
1.0000E+00 to	1.3300E+00	1.0126E+11	1.1797E+11
1.3300E+00 to	1.6600E+00	2.8597E+10	4.2753E+10
1.6600E+00 to	2.0000E+00	6.4367E+00	1.1779E+01
2.0000E+00 to	2.5000E+00	6.7865E+05	1.5270E+06
2.5000E+00 to	3.0000E+00	1.0523E+03	2.8939E+03
3.0000E+00 to	4.0000E+00	2.1966E-15	7.6882E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		1.3656E+11	1.6232E+11

total energy from nuclides with spectrum data = 1.6058E+11
total energy from nuclides with no spectrum data = 1.7355E+09
gamma source spectrum for decay step for BWR source term - bot ds4 - 15 year
5478.75 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.8295E+09	5.4884E+07
5.0000E-02 to	1.0000E-01	1.8266E+08	1.3699E+07
1.0000E-01 to	2.0000E-01	9.5148E+07	1.4272E+07
2.0000E-01 to	3.0000E-01	5.2526E+06	1.3132E+06
3.0000E-01 to	4.0000E-01	1.5109E+07	5.2880E+06
4.0000E-01 to	6.0000E-01	2.7395E+08	1.3698E+08
6.0000E-01 to	8.0000E-01	1.4181E+08	9.9267E+07
8.0000E-01 to	1.0000E+00	1.2553E+07	1.1298E+07
1.0000E+00 to	1.3300E+00	5.2210E+10	6.0825E+10
1.3300E+00 to	1.6600E+00	1.4744E+10	2.2042E+10
1.6600E+00 to	2.0000E+00	5.6638E+00	1.0365E+01
2.0000E+00 to	2.5000E+00	3.4990E+05	7.8727E+05
2.5000E+00 to	3.0000E+00	5.4255E+02	1.4920E+03
3.0000E+00 to	4.0000E+00	1.9674E-15	6.8860E-15
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		6.9510E+10	8.3205E+10

total energy from nuclides with spectrum data = 8.2711E+10
total energy from nuclides with no spectrum data = 4.9407E+08
gamma source spectrum for decay step for BWR source term - bot ds4 - 20 year
7305.00 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	1.0385E+09	3.1154E+07
5.0000E-02 to	1.0000E-01	9.3882E+07	7.0411E+06
1.0000E-01 to	2.0000E-01	3.6872E+07	5.5308E+06
2.0000E-01 to	3.0000E-01	1.9804E+06	4.9509E+05
3.0000E-01 to	4.0000E-01	4.9000E+06	1.7150E+06
4.0000E-01 to	6.0000E-01	7.6816E+07	3.8408E+07
6.0000E-01 to	8.0000E-01	3.9756E+07	2.7829E+07
8.0000E-01 to	1.0000E+00	1.3789E+06	1.2410E+06
1.0000E+00 to	1.3300E+00	2.6978E+10	3.1430E+10
1.3300E+00 to	1.6600E+00	7.6187E+09	1.1390E+10
1.6600E+00 to	2.0000E+00	4.9949E+00	9.1406E+00

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                        2.0000E+00 to       2.5000E+00        1.8080E+05        4.0681E+05
                        2.5000E+00 to       3.0000E+00        2.8035E+02        7.7097E+02
                        3.0000E+00 to       4.0000E+00        1.7661E-15        6.1814E-15
                        4.0000E+00 to       5.0000E+00         .0000E+00         .0000E+00
                        5.0000E+00 to       6.5000E+00         .0000E+00         .0000E+00
                        6.5000E+00 to       8.0000E+00         .0000E+00         .0000E+00
                        8.0000E+00 to       1.0000E+01         .0000E+00         .0000E+00
0                       totals                                 3.5891E+10        4.2934E+10
0
0                       total energy from nuclides with spectrum data    =   4.2788E+10
0                       total energy from nuclides with no spectrum data =   1.4528E+08
1                       gamma source spectrum for   decay step for BWR source term - bot ds4 - 25 year
0                                    9131.25  day time of the requested nuclides
0                            energy interval in mev       photons / second     mev / second
0
                        1.0000E-02 to       5.0000E-02        7.0384E+08        2.1115E+07
                        5.0000E-02 to       1.0000E-01        4.8615E+07        3.6461E+06
                        1.0000E-01 to       2.0000E-01        1.5630E+07        2.3445E+06
                        2.0000E-01 to       3.0000E-01        8.1939E+05        2.0485E+05
                        3.0000E-01 to       4.0000E-01        1.7200E+06        6.0201E+05
                        4.0000E-01 to       6.0000E-01        2.1578E+07        1.0789E+07
                        6.0000E-01 to       8.0000E-01        1.1164E+07        7.8146E+06
                        8.0000E-01 to       1.0000E+00        6.2515E+05        5.6264E+05
                        1.0000E+00 to       1.3300E+00        1.3959E+10        1.6262E+10
                        1.3300E+00 to       1.6600E+00        3.9420E+09        5.8932E+09
                        1.6600E+00 to       2.0000E+00        4.4107E+00        8.0715E+00
                        2.0000E+00 to       2.5000E+00        9.3548E+04        2.1048E+05
                        2.5000E+00 to       3.0000E+00        1.4506E+02        3.9890E+02
                        3.0000E+00 to       4.0000E+00        1.5875E-15        5.5562E-15
                        4.0000E+00 to       5.0000E+00         .0000E+00         .0000E+00
                        5.0000E+00 to       6.5000E+00         .0000E+00         .0000E+00
                        6.5000E+00 to       8.0000E+00         .0000E+00         .0000E+00
                        8.0000E+00 to       1.0000E+01         .0000E+00         .0000E+00
0                       totals                                 1.8705E+10        2.2202E+10
0
0                       total energy from nuclides with spectrum data    =   2.2155E+10
0                       total energy from nuclides with no spectrum data =   4.7279E+07
1
1  * normal termination of execution *
0                                    table of contents for material tables
0                                      case or subcase printed      page

                                                    1                 1
Ondset          33
             33             4             1            27             6             0             0             0             0             0
              0             0             0             0             0             2            -1          1698           690           130
            880          7935             0             5            99             7             9            93            18            18
             18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
```

```
0   66$ array      12 entries read
0   73$ array      13 entries read
0   74* array      13 entries read
0   75$ array      13 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0            0
            21          100           13            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero            4
             0          689          129          879
0pow              3
   .000000E+00  .000000E+00  .000000E+00
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              3.4750E+00   1.9421E+02   1.9769E+02
 start of interval flux =         1.59007E+13
 n-gamma, fission and total mev/fission =              3.8483E+00   1.9431E+02   1.9816E+02
 start of interval flux =         1.59416E+13
 n-gamma, fission and total mev/fission =              3.9383E+00   1.9441E+02   1.9835E+02
 start of interval flux =         1.59928E+13
 n-gamma, fission and total mev/fission =              4.0273E+00   1.9451E+02   1.9853E+02
 start of interval flux =         1.60545E+13
 n-gamma, fission and total mev/fission =              4.1190E+00   1.9460E+02   1.9872E+02
 start of interval flux =         1.61255E+13
 n-gamma, fission and total mev/fission =              4.2132E+00   1.9469E+02   1.9890E+02
 start of interval flux =         1.62047E+13
 n-gamma, fission and total mev/fission =              4.3095E+00   1.9477E+02   1.9908E+02
 start of interval flux =         1.62913E+13
 n-gamma, fission and total mev/fission =              4.4076E+00   1.9486E+02   1.9926E+02
 start of interval flux =         1.63846E+13
 n-gamma, fission and total mev/fission =              4.5072E+00   1.9494E+02   1.9944E+02
 start of interval flux =         1.64841E+13
 n-gamma, fission and total mev/fission =              4.6080E+00   1.9502E+02   1.9962E+02
 start of interval flux =         1.65893E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 9000 MWd/MTU
0ndset           33
            33            4            2           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
```

```
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935          20           6          18        1697
0mmn             19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21         689         129         879
0pow              3
  4.349999E+00 1.799989E+03 1.624619E+13
0 linp            9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =             4.6759E+00  1.9507E+02  1.9975E+02
 start of interval flux =        1.65408E+13
 n-gamma, fission and total mev/fission =             4.7673E+00  1.9515E+02  1.9991E+02
 start of interval flux =        1.66649E+13
 n-gamma, fission and total mev/fission =             4.8655E+00  1.9522E+02  2.0009E+02
 start of interval flux =        1.67930E+13
 n-gamma, fission and total mev/fission =             4.9653E+00  1.9529E+02  2.0026E+02
 start of interval flux =        1.69254E+13
 n-gamma, fission and total mev/fission =             5.0664E+00  1.9536E+02  2.0043E+02
 start of interval flux =        1.70620E+13
 n-gamma, fission and total mev/fission =             5.1684E+00  1.9544E+02  2.0060E+02
 start of interval flux =        1.72026E+13
 n-gamma, fission and total mev/fission =             5.2714E+00  1.9551E+02  2.0078E+02
 start of interval flux =        1.73470E+13
 n-gamma, fission and total mev/fission =             5.3752E+00  1.9558E+02  2.0095E+02
 start of interval flux =        1.74950E+13
 n-gamma, fission and total mev/fission =             5.4798E+00  1.9565E+02  2.0113E+02
 start of interval flux =        1.76465E+13
 n-gamma, fission and total mev/fission =             5.5852E+00  1.9572E+02  2.0130E+02
 start of interval flux =        1.78013E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 18000 MWd/MTU
0ndset           33
            33           4           3          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
```

```
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 3.599977E+03 1.723178E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =             5.4980E+00       1.9575E+02       2.0125E+02
 start of interval flux =         1.78762E+13
 n-gamma, fission and total mev/fission =             5.5921E+00       1.9581E+02       2.0141E+02
 start of interval flux =         1.80660E+13
 n-gamma, fission and total mev/fission =             5.6995E+00       1.9588E+02       2.0158E+02
 start of interval flux =         1.82583E+13
 n-gamma, fission and total mev/fission =             5.8085E+00       1.9594E+02       2.0175E+02
 start of interval flux =         1.84533E+13
 n-gamma, fission and total mev/fission =             5.9184E+00       1.9601E+02       2.0192E+02
 start of interval flux =         1.86510E+13
 n-gamma, fission and total mev/fission =             6.0293E+00       1.9607E+02       2.0210E+02
 start of interval flux =         1.88512E+13
 n-gamma, fission and total mev/fission =             6.1411E+00       1.9614E+02       2.0228E+02
 start of interval flux =         1.90540E+13
 n-gamma, fission and total mev/fission =             6.2538E+00       1.9620E+02       2.0245E+02
 start of interval flux =         1.92592E+13
 n-gamma, fission and total mev/fission =             6.3673E+00       1.9627E+02       2.0263E+02
 start of interval flux =         1.94668E+13
 n-gamma, fission and total mev/fission =             6.4816E+00       1.9633E+02       2.0281E+02
 start of interval flux =         1.96767E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 27000 MWd/MTU
0ndset           33
            33            4            4           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
```

```
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0powr             3
  4.349999E+00 5.399966E+03 1.887921E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              6.4185E+00      1.9638E+02      2.0280E+02
 start of interval flux =         1.98437E+13
 n-gamma, fission and total mev/fission =              6.5318E+00      1.9644E+02      2.0297E+02
 start of interval flux =         2.00890E+13
 n-gamma, fission and total mev/fission =              6.6530E+00      1.9650E+02      2.0315E+02
 start of interval flux =         2.03360E+13
 n-gamma, fission and total mev/fission =              6.7754E+00      1.9656E+02      2.0334E+02
 start of interval flux =         2.05844E+13
 n-gamma, fission and total mev/fission =              6.8985E+00      1.9663E+02      2.0353E+02
 start of interval flux =         2.08343E+13
 n-gamma, fission and total mev/fission =              7.0225E+00      1.9669E+02      2.0371E+02
 start of interval flux =         2.10854E+13
 n-gamma, fission and total mev/fission =              7.1472E+00      1.9676E+02      2.0390E+02
 start of interval flux =         2.13379E+13
 n-gamma, fission and total mev/fission =              7.2725E+00      1.9682E+02      2.0409E+02
 start of interval flux =         2.15915E+13
 n-gamma, fission and total mev/fission =              7.3986E+00      1.9689E+02      2.0428E+02
 start of interval flux =         2.18463E+13
 n-gamma, fission and total mev/fission =              7.5252E+00      1.9695E+02      2.0448E+02
 start of interval flux =         2.21022E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 36000 MWd/MTU
0ndset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
```

```
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 7.199954E+03 2.111307E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              7.4667E+00   1.9701E+02   2.0447E+02
 start of interval flux =         2.23534E+13
 n-gamma, fission and total mev/fission =              7.5956E+00   1.9707E+02   2.0466E+02
 start of interval flux =         2.26515E+13
 n-gamma, fission and total mev/fission =              7.7321E+00   1.9713E+02   2.0486E+02
 start of interval flux =         2.29495E+13
 n-gamma, fission and total mev/fission =              7.8691E+00   1.9719E+02   2.0506E+02
 start of interval flux =         2.32468E+13
 n-gamma, fission and total mev/fission =              8.0063E+00   1.9726E+02   2.0526E+02
 start of interval flux =         2.35433E+13
 n-gamma, fission and total mev/fission =              8.1439E+00   1.9732E+02   2.0547E+02
 start of interval flux =         2.38389E+13
 n-gamma, fission and total mev/fission =              8.2816E+00   1.9739E+02   2.0567E+02
 start of interval flux =         2.41336E+13
 n-gamma, fission and total mev/fission =              8.4193E+00   1.9745E+02   2.0587E+02
 start of interval flux =         2.44273E+13
 n-gamma, fission and total mev/fission =              8.5572E+00   1.9752E+02   2.0608E+02
 start of interval flux =         2.47199E+13
 n-gamma, fission and total mev/fission =              8.6950E+00   1.9759E+02   2.0628E+02
 start of interval flux =         2.50112E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 45000 MWd/MTU
0ndset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
```

```
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0            0            0            0            0            0            0            0            0            0
             0            0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935           20            6           18         1697
0mmn             19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21          689          129          879
0pow              3
  4.349999E+00 8.999942E+03 2.386250E+13
0 linp            9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =             8.8456E+00   1.9766E+02   2.0650E+02
 start of interval flux =         2.53279E+13
 n-gamma, fission and total mev/fission =             9.0773E+00   1.9777E+02   2.0685E+02
 start of interval flux =         2.58125E+13
 n-gamma, fission and total mev/fission =             9.3080E+00   1.9788E+02   2.0719E+02
 start of interval flux =         2.62927E+13
 n-gamma, fission and total mev/fission =             9.5377E+00   1.9800E+02   2.0753E+02
 start of interval flux =         2.67675E+13
 n-gamma, fission and total mev/fission =             9.7660E+00   1.9811E+02   2.0787E+02
 start of interval flux =         2.72362E+13
 n-gamma, fission and total mev/fission =             9.9964E+00   1.9822E+02   2.0821E+02
 start of interval flux =         2.76977E+13
 n-gamma, fission and total mev/fission =             1.0221E+01   1.9832E+02   2.0854E+02
 start of interval flux =         2.81521E+13
 n-gamma, fission and total mev/fission =             1.0443E+01   1.9843E+02   2.0887E+02
 start of interval flux =         2.85983E+13
 n-gamma, fission and total mev/fission =             1.0662E+01   1.9853E+02   2.0920E+02
 start of interval flux =         2.90355E+13
 n-gamma, fission and total mev/fission =             1.0878E+01   1.9863E+02   2.0951E+02
 start of interval flux =         2.94629E+13
0 case or subcase    1  BWR SNF Assembly - Bottom - deplete to 60000 MWd/MTU
0ndset           33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
```

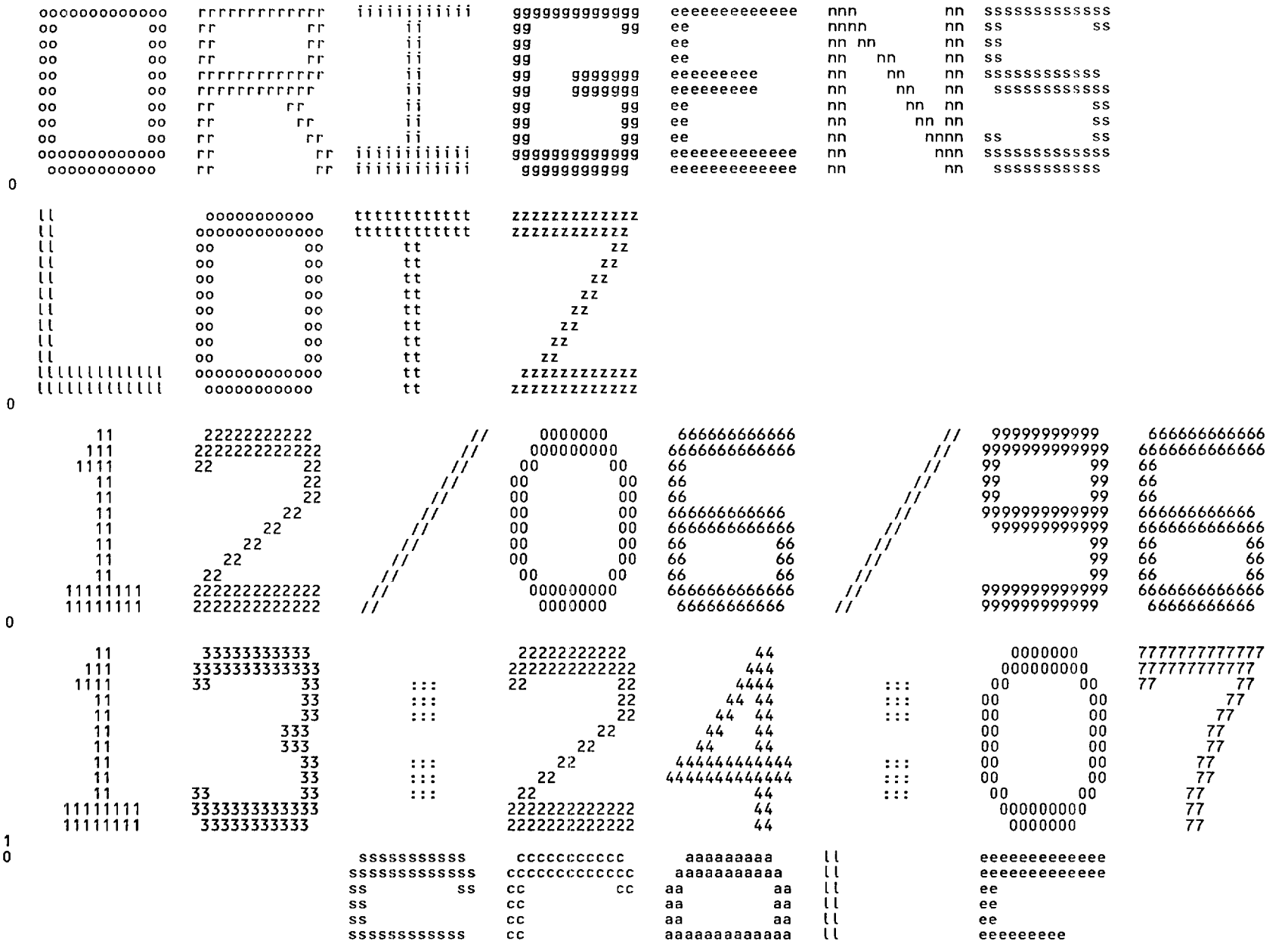
```
0   60* array      10 entries read
0   61* array       7 entries read
0   65$ array      63 entries read
0   81$ array       6 entries read
0   82$ array      10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt             12
              0             0             0             0             0             0             0             0             0             0
              0             0
0therm             4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non               5
           7935            20             6            18          1697
0mmn              19
              0            10             0             0             1             1             0             0             0            10
             21           100             0             4             3             0             2             0             0
0tconst            5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero             4
             21           689           129           879
0pow               3
  4.349999E+00 1.199992E+04 2.152286E+13
0 linp             9
              6             2             0            26             1         14808          1000          1697             5
0 case or subcase     1  BWR SNF Assembly - Bottom - decay
0   56$ array      20 entries read
0    5t
```

```
0*********************************************************************************
 *                                                                               *
 *                     scale4.2  bulletin  board                                 *
 *                     --------  --------  -----                                 *
 *                                                                               *
 *      welcome to the configuration controlled version of scale4.2.             *
 *      any problems should be reported to kay martin at 4-9213.                 *
 *                                                                               *
 *      updates that have been made from version 4.1 to 4.2 include:             *
 *                                                                               *
 *      nitawl:  parameter added to prevent exponent underflows for very         *
 *      dilute resonance calculations on workstation.  (mrr 93-011)              *
 *                                                                               *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss      *
 *      of neutron in admixed moderator calculation and simpson rule             *
 *      calculation of collision density as documented in "improved              *
 *      calculation of flux shapes with the resonance shielding code             *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.           *
 *      impact will vary, but is insignificant for hydrogen-moderated            *
 *      systems. (mrr 93-030)                                                    *
 *                                                                               *
 *      sas4:  added option of axial source profile input for both radial        *
 *      and axial dose calculations. also added option idr = 2 for               *
 *      estimation to point detectors from collisions in both top and            *
 *      bottom halves of geometry.  (mrr 92-016)                                 *
 *                                                                               *
 *      morse:  modifications made for compatibility with the new options in     *
 *      sas4 (i.e., the axial source profile input option and                    *
 *      the option idr = 2 for estimation to point detectors from collisions     *
 *      in both top and bottom halves of geometry).  (mrr 92-016)                *
 *                                                                               *
 *      csas & keno-v.a:  error checking during input processing was added       *
 *      so that these modules terminate with an error message if input           *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)            *
 *                                                                               *
 *      keno-v.a:  corrections made for applying differential albedo             *
 *      boundary conditions to supergrouped problems where global unit           *
 *      contains only an array specification.  effect on keff is very large      *
 *      for this type of problem.  (mrr 93-033)                                  *
 *                                                                               *
 *      keno-v.a:  corrected an error introduced with modification on may 24,    *
 *      1993 (mrr 93-033). this error affected problems with mirror or           *
 *      periodic boundary conditions and could cause problem to loop, fail,      *
 *      or run incorrectly.                                                      *
 *                                                                               *
 *      xsdrnpm:  corrected calculation of number of direct access data          *
 *      blocks needed to weight the cross sections to prevent occasional         *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)          *
 *                                                                               *
 *      origen-s:  modified program to read combined binary libraries that       *
 *      include multi-cycle cross sections.  add option to edit binary           *
 *      library.  (mrr 93-026)                                                   *
 *                                                                               *
 *      sas2:  modified to produce combined binary libraries for origen-s.       *
 *      (mrr 93-027)                                                             *
 *                                                                               *
 *      couple:  modified to allow combined binary libraries to be made by       *
 *      sas2.  (mrr 93-031)                                                      *
 *                                                                               *
 *      origen-s couple, sas2:  modified programs to accept the new updated      *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr     *
*      92-088, 92-025, 92-026)                                                *
*                                                                             *
*      origen-s libraries:  the six standard origen-s card image libraries    *
*      have been replaced by two new libraries, end6dec and xsectpho.         *
*      end6dec contains the updated and expanded decay data library based     *
*      on endf/b-vi data.  xsectpho contains the basic cross section and      *
*      photon spectra data and updated fission product yield data based on    *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,       *
*      002, 003, 006, 008, 009)                                               *
*                                                                             *
*      std. comp. library:  in drr 92-033, the following nuclides were        *
*      changed to turn on resonance processing flag but should not have       *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,           *
*      feinconel.  flags for these nuclides have now been returned to off.    *
*      (drr 93-014)                                                           *
*                                                                             *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)           *
*                                                                             *
*      htas1:  updated for compatibility with heating7 and to interact        *
*      effectively with ocular.  fin effectiveness technique was added.       *
*      (mrr 93-036)                                                           *
*                                                                             *
*      ocular:  made compatible with heating7 and htas1 on mainframe and      *
*      workstation.  (mrr 93-037)                                             *
*                                                                             *
*      sas2:  corrected so that 'parm=skipshipdata' would work on             *
*      workstation.  (mrr 93-051)                                             *
*                                                                             *
*      aim:  ft47ft001 is no longer require for aim to execute on             *
*      workstation.  (mrr 93-052)                                             *
*                                                                             *
*      27group, 27burnup, and 218group - these libraries have been            *
*      updated to correct an error found in the chlorine cross-sections.      *
*      (drr93-022)                                                            *
*                                                                             *
*      bonami:  corrected so that a case with a number density of zero        *
*      for a nuclide that has bondarenko data will run without failing.       *
*      (mrr 93-060)                                                           *
*                                                                             *
*      csas:  corrected calculation of dancoff correction factor for          *
*      cylindrical cells.  note that previous calculations of small           *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff           *
*      values.  also corrected dancoff factor for multiregion slab            *
*      cell with vacuum boundary conditions to be set to zero.                *
*      (mrr 93-065)                                                           *
*                                                                             *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for     *
*      resonance materials that are not part of the unit cell in lattice-     *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.     *
*      check your nitawl output in any previous scale-4.2 calculations        *
*      for dancoff factors =-1.                                               *
*      (mrr 93-070)                                                           *
*                                                                             *
*******************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-   module origens  will be called
      0$$  a4 33 a8 26 e
      1$$  1
         1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        80000    220000    240000    250000    260000
       270000    280000    400000    410000    500000
74**     89.4   10100.0      46.5  189764.1
          2.6       0.2       3.2       0.1       4.9
          0.1       4.5    2160.1       0.1      30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
```

```
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 45000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.1500000 e
         5t
      BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds4p
      58** 10r4.35
      60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
      66$$ 12r0 e
         6t
       BWR SNF Assembly deplete to 60000 MWd/MTU
      3$$  33 0 5 a33 0 e
         2t
      35$$ 0
         4t
      56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
      57** 0.0 0.0 1.0-5 0.2500000 e
         5t
      BWR SNF Assembly - Plenum - deplete to 60000 MWd/MTU
      per ONE BWR Fuel Assembly - Plenum Region - ds4p
      58** 10r4.35
      60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
      66$$ 12r0 e
         6t
       BWR SNF Assembly Decay
      3$$  33 0 5 a33 -88 e
         2t
      35$$ 0
         4t
      56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
         5t
      BWR SNF Assembly - Plenum - decay
      per ONE BWR Fuel Assembly - Plenum Region - ds4p
      60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
      61** f1-15
      65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
      81$$ 2 0 26 1 e
      82$$ f4
         6t
        decay step for BWR source term - plen ds4 - discharge
        decay step for BWR source term - plen ds4 - 0.25 year
        decay step for BWR source term - plen ds4 - 0.50 year
        decay step for BWR source term - plen ds4 - 1 year
        decay step for BWR source term - plen ds4 - 2 year
        decay step for BWR source term - plen ds4 - 5 year
        decay step for BWR source term - plen ds4 - 10 year
        decay step for BWR source term - plen ds4 - 15 year
        decay step for BWR source term - plen ds4 - 20 year
        decay step for BWR source term - plen ds4 - 25 year
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1   ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiii    ggggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
```


oooooooooooo rrrrrrrrrrrr iiiiiiiiiiii gggggggggggg eeeeeeeeeeee nnn nn ssssssssssss
oo oo rr rr ii gg gg ee nnnn nn ss ss
oo oo rr rr ii gg ee nn nn nn ss
oo oo rr rr ii gg ee nn nn nn ss
oo oo rrrrrrrrrrrr ii gg ggggggg eeeeeeeee nn nn nn sssssssssss
oo oo rrrrrrrrrrr ii gg ggggggg eeeeeeeee nn nn nn ssssssssssss
oo oo rr rr ii gg gg ee nn nn nn ss
oo oo rr rr ii gg gg ee nn nn nn ss
oo oo rr rr ii gg gg ee nn nnnn ss ss
oooooooooooo rr rr iiiiiiiiiiii gggggggggggg eeeeeeeeeeeee nn nnn sssssssssssss
oooooooooo rr rr iiiiiiiiiiii gggggggggg eeeeeeeeeeeee nn nn ssssssssss
0
ll oooooooooo ttttttttttttt zzzzzzzzzzzzzz
ll oooooooooooo ttttttttttttt zzzzzzzzzzzz
ll oo oo tt zz
ll oo oo tt zz
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ll oo oo tt zz
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ll oo oo tt zz
llllllllllll oooooooooooo tt zzzzzzzzzzzz
llllllllllll oooooooooo tt zzzzzzzzzzzz
0
11 22222222222 // 0000000 666666666666 // 99999999999 666666666666
111 2222222222222 // 000000000 6666666666666 // 9999999999999 6666666666666
1111 22 22 // 00 00 66 // 99 99 66
11 22 // 00 00 66 // 99 99 66
11 22 // 00 00 66 // 99 99 66
11 22 // 00 00 666666666666 // 9999999999999 666666666666
11 22 // 00 00 6666666666666 // 999999999999 6666666666666
11 22 // 00 00 66 66 // 99 66 66
11 22 // 00 00 66 66 // 99 66 66
11 22 // 00 00 66 66 // 99 66 66
11111111 2222222222222 // 000000000 6666666666666 // 9999999999999 6666666666666
11111111 2222222222222 // 0000000 66666666666 // 999999999999 66666666666
0
11 33333333333 22222222222 44 0000000 7777777777777
111 3333333333333 2222222222222 444 000000000 777777777777
1111 33 33 ::: 22 22 4444 ::: 00 00 77 77
11 33 ::: 22 44 44 ::: 00 00 77
11 33 ::: 22 44 44 ::: 00 00 77
11 333 22 44 44 00 00 77
11 333 22 44 44 00 00 77
11 33 ::: 22 444444444444 ::: 00 00 77
11 33 ::: 22 4444444444444 ::: 00 00 77
11 33 33 ::: 22 44 ::: 00 00 77
11111111 3333333333333 2222222222222 44 000000000 77
11111111 33333333333 2222222222222 44 0000000 77
1
0
ssssssssss ccccccccccc aaaaaaaaa ll eeeeeeeeeeeee
sssssssssssss ccccccccccccc aaaaaaaaaaa ll eeeeeeeeeeeee
ss ss cc cc aa aa ll ee
ss cc aa aa ll ee
ss cc aa aa ll ee
sssssssssssss cc aaaaaaaaaaaaa ll eeeeeeeee

```
                                 sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
                                           ss   cc              aa         aa   ll              ee
                                           ss   cc              aa         aa   ll              ee
                                ss         ss   cc         cc   aa         aa   ll              ee
                                sssssssssssss   cccccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
                                 sssssssssss     cccccccccccc    aa         aa   lllllllllllll   eeeeeeeeeeeee


                        ********************************************************************************
                        ********************************************************************************
                        ********************************************************************************
                        *****                                                                      *****
                        *****                 program verification information                      *****
                        *****                                                                      *****
                        *****                code system:    scale  version:    4.2                 *****
                        *****                                                                      *****
                        ********************************************************************************
                        ********************************************************************************
                        *****                                                                      *****
                        *****                                                                      *****
                        *****              program:  origns                                        *****
                        *****                                                                      *****
                        *****        creation date:  04/27/95                                      *****
                        *****                                                                      *****
                        *****              library:  /neutronics/scale/exe                         *****
                        *****                                                                      *****
                        *****                                                                      *****
                        *****    this is not a   scale  configuration controlled code              *****
                        *****                                                                      *****
                        *****              jobname:  lotz                                          *****
                        *****                                                                      *****
                        *****    date of execution:  12/06/96                                      *****
                        *****                                                                      *****
                        *****    time of execution:  13:24:07                                      *****
                        *****                                                                      *****
                        *****                                                                      *****
                        ********************************************************************************
                        ********************************************************************************
                        ********************************************************************************
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 0 a13 14 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1500000 e
    5t
 BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
```

```
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        80000    220000    240000    250000    260000
       270000    280000    400000    410000    500000
74**     89.4   10100.0      46.5  189764.1
          2.6       0.2       3.2       0.1       4.9
          0.1       4.5    2160.1       0.1      30.8
75$$  4r2 10r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Plenum Region - ds4p
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
```

```
 57** 0.0 0.0 1.0-5 0.1500000 e
    5t
 BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds4p
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 60000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.2500000 e
    5t
 BWR SNF Assembly - Plenum - deplete to 60000 MWd/MTU
 per ONE BWR Fuel Assembly - Plenum Region - ds4p
 58** 10r4.35
 60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Plenum - decay
 per ONE BWR Fuel Assembly - Plenum Region - ds4p
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - plen ds4 - discharge
   decay step for BWR source term - plen ds4 - 0.25 year
   decay step for BWR source term - plen ds4 - 0.50 year
   decay step for BWR source term - plen ds4 - 1 year
   decay step for BWR source term - plen ds4 - 2 year
   decay step for BWR source term - plen ds4 - 5 year
   decay step for BWR source term - plen ds4 - 10 year
   decay step for BWR source term - plen ds4 - 15 year
   decay step for BWR source term - plen ds4 - 20 year
   decay step for BWR source term - plen ds4 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
```

```
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                    .other identification and sizes of library.
0                     data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                   7/ 9/1993     date library was produced
0                        1697     total number of nuclides in library
                          689     number of light-element nuclides
                          129     number of actinide nuclides
                          879     number of fission product nuclides
0                        7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
```

```
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *     neutron flux spectrum factors and cross sections were produced from      *
          *    the "presas2" case updating all nuclides on the scale "burnup" library    *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
```

```
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *       neutron flux spectrum factors and cross sections were produced from  *
          *      the "presas2" case updating all nuclides on the scale "burnup" library*
          *                                                                            *
          *                   fission product yields are from endf/b-v                 *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *           prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *       data from the light element, actinide, and fission product libraries *
          *         decay data, including gamma and total energy, are from endf/b-vi   *
          *                                                                            *
          *       neutron flux spectrum factors and cross sections were produced from  *
          *      the "presas2" case updating all nuclides on the scale "burnup" library*
          *                                                                            *
          *                   fission product yields are from endf/b-v                 *
          *                                                                            *
```

```
          *              photon libraries use an 18-energy-group structure              *
          *             the photon data are from the master photon data base,           *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                    1697    total number of nuclides in library
                      689    number of light-element nuclides
                      129    number of actinide nuclides
                      879    number of fission product nuclides
0                    7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143           *
          *         made from modified card-image origen-s libraries of scale 4.2      *
          *      data from the light element, actinide, and fission product libraries  *
          *        decay data, including gamma and total energy, are from endf/b-vi    *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from   *
          *     the "presas2" case updating all nuclides on the scale "burnup" library *
          *                                                                            *
          *                    fission product yields are from endf/b-v                *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
```

```
0                  data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0       ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0       ********************************************************************************
0    3$ array     33 entries read
0    2t
```

```
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ******************************************************************************
          *                                                                            *
          *            prelim lwr origen-s binary working library--id = 1143            *
          *         made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries   *
          *        decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                            *
          *      neutron flux spectrum factors and cross sections were produced from    *
          *     the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                            *
          *                  fission product yields are from endf/b-v                  *
          *                                                                            *
          *              photon libraries use an 18-energy-group structure             *
          *             the photon data are from the master photon data base,          *
          *              produced to include bremsstrahlung from uo2 matrix            *
          *                                                                            *
          *        see information above this box (if present) for later updates       *
          *                                                                            *
          ******************************************************************************
          *                                                                            *
0         ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ******************************************************************************
1
     BWR SNF Assembly - Plenum - decay                                                    light elements        page    1
0                                          nuclide concentrations, grams
                                           basis =per ONE BWR Fuel Assembly - Plenum Regio
              initial    1.0 d    90.0 d   182.5 d   365.3 d   730.5 d  1826.3 d  3652.5 d  5478.8 d  7305.0 d  9131.3 d
      h  1   2.80E-04  2.80E-04  2.80E-04  2.80E-04  2.80E-04  2.80E-04  2.80E-04  2.80E-04  2.80E-04  2.80E-04  2.80E-04
      h  2   4.40E-07  4.40E-07  4.40E-07  4.40E-07  4.40E-07  4.40E-07  4.40E-07  4.40E-07  4.40E-07  4.40E-07  4.40E-07
      h  3   7.85E-11  7.85E-11  7.74E-11  7.63E-11  7.42E-11  7.01E-11  5.92E-11  4.47E-11  3.38E-11  2.55E-11  1.92E-11
     he  3   1.48E-12  1.49E-12  2.56E-12  3.66E-12  5.77E-12  9.83E-12  2.07E-11  3.52E-11  4.62E-11  5.45E-11  6.07E-11
     he  4   3.88E-04  3.88E-04  3.88E-04  3.88E-04  3.88E-04  3.88E-04  3.88E-04  3.88E-04  3.88E-04  3.88E-04  3.88E-04
     li  7   2.10E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15  2.10E-15
     be 10   3.78E-09  3.78E-09  3.78E-09  3.78E-09  3.78E-09  3.78E-09  3.78E-09  3.78E-09  3.78E-09  3.78E-09  3.78E-09
```

b 11	9.30E-14	9.30E-14	9.30E-14	9.30E-14	9.30E-14	9.30E-14	9.30E-14	9.30E-14	9.30E-14	9.30E-14	9.30E-14
c 12	9.98E-12	9.98E-12	9.98E-12	9.98E-12	9.98E-12	9.98E-12	9.98E-12	9.98E-12	9.98E-12	9.98E-12	9.98E-12
c 13	2.56E-04	2.56E-04	2.56E-04	2.56E-04	2.56E-04	2.56E-04	2.56E-04	2.56E-04	2.56E-04	2.56E-04	2.56E-04
c 14	6.75E-07	6.75E-07	6.75E-07	6.75E-07	6.75E-07	6.74E-07	6.74E-07	6.74E-07	6.73E-07	6.73E-07	6.73E-07
n 14	2.69E-10	2.70E-10	2.89E-10	3.10E-10	3.51E-10	4.33E-10	6.77E-10	1.09E-09	1.49E-09	1.90E-09	2.31E-09
n 15	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07	3.07E-07
o 16	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00	2.59E+00
o 17	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03	1.05E-03
o 18	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03	5.97E-03
f 19	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08	1.25E-08
ne 20	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13	3.20E-13
ar 40	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12	8.44E-12
k 41	2.79E-13	2.79E-13	2.79E-13	2.79E-13	2.79E-13	2.79E-13	2.79E-13	2.79E-13	2.79E-13	2.79E-13	2.79E-13
k 43	4.76E-15	2.26E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	5.68E-15	5.68E-15	5.68E-15	5.68E-15	5.68E-15	5.68E-15	5.68E-15	5.68E-15	5.68E-15	5.68E-15	5.68E-15
ca 43	1.44E-07	1.44E-07	1.44E-07	1.44E-07	1.44E-07	1.44E-07	1.44E-07	1.44E-07	1.44E-07	1.44E-07	1.44E-07
ca 44	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06	1.12E-06
ca 45	2.86E-09	2.85E-09	1.96E-09	1.32E-09	6.10E-10	1.30E-10	1.26E-12	5.54E-16	2.44E-19	1.07E-22	4.71E-26
ca 46	1.46E-07	1.46E-07	1.46E-07	1.46E-07	1.46E-07	1.46E-07	1.46E-07	1.46E-07	1.46E-07	1.46E-07	1.46E-07
ca 47	1.35E-12	1.16E-12	1.44E-18	1.05E-24	7.78E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	2.09E-08	2.09E-08	2.18E-08	2.24E-08	2.31E-08	2.36E-08	2.38E-08	2.38E-08	2.38E-08	2.38E-08	2.38E-08
sc 46	1.75E-07	1.73E-07	8.29E-08	3.86E-08	8.51E-09	4.15E-10	4.81E-14	1.33E-20	3.65E-27	1.01E-33	2.77E-40
sc 47	1.12E-08	9.11E-09	9.31E-17	3.36E-24	2.20E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.79E-10	3.96E-10	7.61E-25	3.86E-40	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ti 46	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02	1.58E-02
ti 47	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02	1.45E-02
ti 48	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01	1.44E-01
ti 49	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02	1.49E-02
ti 50	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02	1.10E-02
v 50	4.24E-05	4.24E-05	4.24E-05	4.24E-05	4.24E-05	4.24E-05	4.24E-05	4.24E-05	4.24E-05	4.24E-05	4.24E-05
v 51	6.95E-03	6.95E-03	7.08E-03	7.09E-03	7.09E-03	7.09E-03	7.09E-03	7.09E-03	7.09E-03	7.09E-03	7.09E-03
cr 50	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01	1.27E-01
cr 51	1.40E-04	1.37E-04	1.48E-05	1.46E-06	1.51E-08	1.62E-12	2.02E-24	.00E+00	.00E+00	.00E+00	.00E+00
cr 52	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00	2.67E+00
cr 53	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01	2.99E-01
cr 54	9.76E-02	9.76E-02	9.76E-02	9.76E-02	9.76E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02	9.77E-02
mn 54	5.35E-05	5.34E-05	4.38E-05	3.57E-05	2.38E-05	1.06E-05	9.27E-07	1.61E-08	2.79E-10	4.83E-12	8.37E-14
mn 55	9.49E-02	9.49E-02	9.49E-02	9.50E-02	9.51E-02	9.53E-02	9.56E-02	9.59E-02	9.59E-02	9.59E-02	9.59E-02
mn 56	4.97E-07	7.85E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01	2.73E-01
fe 55	1.09E-03	1.09E-03	1.02E-03	9.60E-04	8.46E-04	6.56E-04	3.06E-04	8.61E-05	2.42E-05	6.79E-06	1.91E-06
fe 56	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00	4.47E+00
fe 57	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01	1.48E-01
fe 58	1.87E-02	1.87E-02	1.88E-02	1.88E-02	1.88E-02	1.88E-02	1.88E-02	1.88E-02	1.88E-02	1.88E-02	1.88E-02
fe 59	3.20E-06	3.15E-06	7.88E-07	1.87E-07	1.08E-08	3.66E-11	1.42E-18	6.29E-31	2.48E-43	.00E+00	.00E+00

1

BWR SNF Assembly - Plenum - decay light elements page 2

0 nuclide concentrations, grams

basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
co 58m	3.78E-11	6.13E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.29E-04	1.28E-04	5.36E-05	2.17E-05	3.63E-06	1.02E-07	2.28E-12	4.04E-20	7.14E-28	1.26E-35	2.44E-43
co 59	8.22E-02	8.22E-02	8.22E-02	8.22E-02	8.22E-02	8.22E-02	8.22E-02	8.22E-02	8.22E-02	8.22E-02	8.22E-02
co 60	1.33E-02	1.33E-02	1.29E-02	1.24E-02	1.16E-02	1.02E-02	6.88E-03	3.56E-03	1.85E-03	9.57E-04	4.96E-04
co 61	8.91E-09	3.73E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00	2.98E+00
ni 59	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02	3.71E-02
ni 60	1.20E+00	1.20E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.21E+00	1.22E+00	1.22E+00	1.22E+00
ni 61	6.43E-02	6.43E-02	6.43E-02	6.43E-02	6.43E-02	6.43E-02	6.43E-02	6.43E-02	6.43E-02	6.43E-02	6.43E-02
ni 62	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01	1.63E-01

ni 63	7.73E-03	7.73E-03	7.72E-03	7.70E-03	7.68E-03	7.62E-03	7.47E-03	7.21E-03	6.97E-03	6.73E-03	6.50E-03
ni 64	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02	4.46E-02
ni 65	2.00E-08	2.71E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.73E-12	2.01E-12	3.38E-24	1.96E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.81E-04	1.81E-04	1.94E-04	2.07E-04	2.34E-04	2.87E-04	4.44E-04	6.98E-04	9.43E-04	1.18E-03	1.41E-03
cu 64	1.44E-09	3.89E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	2.61E-04	2.61E-04	2.61E-04	2.61E-04	2.61E-04	2.61E-04	2.61E-04	2.61E-04	2.61E-04	2.61E-04	2.61E-04
cu 66	6.78E-12	3.13E-15	5.27E-27	3.07E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	4.33E-15	3.31E-15	1.32E-25	2.06E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	5.27E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07	5.28E-07
zn 65	2.76E-10	2.75E-10	2.14E-10	1.64E-10	9.77E-11	3.46E-11	1.54E-12	8.55E-15	4.76E-17	2.65E-19	1.48E-21
zn 66	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06	1.33E-06
zn 67	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09	1.62E-09
zn 68	2.27E-11	2.27E-11	2.27E-11	2.27E-11	2.27E-11	2.27E-11	2.27E-11	2.27E-11	2.27E-11	2.27E-11	2.27E-11
ga 69	4.13E-14	4.13E-14	4.13E-14	4.13E-14	4.13E-14	4.13E-14	4.13E-14	4.13E-14	4.13E-14	4.13E-14	4.13E-14
sr 87	5.27E-05	5.27E-05	5.27E-05	5.27E-05	5.27E-05	5.27E-05	5.27E-05	5.27E-05	5.27E-05	5.27E-05	5.27E-05
sr 88	5.21E-03	5.21E-03	5.21E-03	5.21E-03	5.21E-03	5.21E-03	5.21E-03	5.21E-03	5.21E-03	5.21E-03	5.21E-03
sr 89	1.40E-05	1.38E-05	4.09E-06	1.15E-06	9.38E-08	6.27E-10	1.87E-16	2.50E-27	3.34E-38	.00E+00	.00E+00
sr 90	2.97E-07	2.97E-07	2.96E-07	2.94E-07	2.90E-07	2.83E-07	2.63E-07	2.32E-07	2.06E-07	1.82E-07	1.61E-07
sr 91	2.17E-08	3.79E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	3.84E-04	3.84E-04	3.94E-04	3.97E-04	3.98E-04	3.98E-04	3.98E-04	3.98E-04	3.98E-04	3.98E-04	3.98E-04
y 89m	4.80E-15	4.73E-15	1.40E-15	3.93E-16	3.21E-17	2.15E-19	6.41E-26	8.56E-37	.00E+00	.00E+00	.00E+00
y 90	2.76E-05	2.13E-05	7.68E-11	7.63E-11	7.54E-11	7.36E-11	6.83E-11	6.04E-11	5.34E-11	4.72E-11	4.18E-11
y 91	4.19E-05	4.14E-05	1.44E-05	4.82E-06	5.53E-07	7.30E-09	1.68E-14	6.75E-24	2.71E-33	1.15E-42	.00E+00
y 92	9.24E-08	8.40E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	5.29E-11	1.03E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03	1.10E+03
zr 91	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02	2.40E+02
zr 92	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02	3.74E+02
zr 93	8.11E-01	8.11E-01	8.11E-01	8.11E-01	8.11E-01	8.11E-01	8.10E-01	8.10E-01	8.10E-01	8.10E-01	8.10E-01
zr 94	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02	3.87E+02
zr 95	1.46E-02	1.44E-02	5.51E-03	2.02E-03	2.80E-04	5.36E-06	3.77E-11	9.75E-20	2.52E-28	6.51E-37	.00E+00
zr 96	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01	6.31E+01
zr 97	2.51E-04	9.38E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.16E-09	1.15E-09	1.15E-09	1.14E-09	1.14E-09
nb 92	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06	2.24E-06
nb 93	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02	9.83E-02
nb 93m	5.10E-05	5.10E-05	5.06E-05	5.01E-05	4.92E-05	4.75E-05	4.28E-05	3.62E-05	3.08E-05	2.65E-05	2.31E-05
nb 94	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03	1.62E-03
nb 95	7.89E-03	7.89E-03	5.01E-03	2.18E-03	3.30E-04	6.65E-06	4.54E-11	1.17E-19	3.03E-28	1.29E-36	.00E+00
nb 95m	9.40E-06	9.34E-06	3.66E-06	1.34E-06	1.86E-07	3.56E-09	2.50E-14	6.47E-23	1.67E-31	.00E+00	.00E+00
nb 96	2.05E-07	1.00E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 3

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 97	1.79E-05	6.70E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	2.35E-07	8.78E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	1.94E-07	1.94E-07	2.08E-07	2.22E-07	2.50E-07	3.05E-07	4.71E-07	7.47E-07	1.02E-06	1.30E-06	1.58E-06
mo 95	2.81E-01	2.81E-01	2.93E-01	3.00E-01	3.03E-01	3.04E-01	3.04E-01	3.04E-01	3.04E-01	3.04E-01	3.04E-01
mo 96	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02	2.49E-02
mo 97	5.06E-01	5.06E-01	5.06E-01	5.06E-01	5.06E-01	5.06E-01	5.06E-01	5.06E-01	5.06E-01	5.06E-01	5.06E-01
mo 98	7.50E-03	7.50E-03	7.50E-03	7.50E-03	7.50E-03	7.50E-03	7.50E-03	7.50E-03	7.50E-03	7.50E-03	7.50E-03
mo 99	1.55E-07	1.21E-07	2.14E-17	1.57E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09	2.04E-09
tc 98	2.13E-11	2.13E-11	2.13E-11	2.13E-11	2.13E-11	2.13E-11	2.13E-11	2.13E-11	2.13E-11	2.13E-11	2.13E-11
tc 99	2.93E-06	2.94E-06	2.95E-06	2.95E-06	2.95E-06	2.95E-06	2.95E-06	2.95E-06	2.95E-06	2.95E-06	2.95E-06
ru 99	1.48E-11	1.49E-11	1.72E-11	1.97E-11	2.45E-11	3.42E-11	6.33E-11	1.12E-10	1.60E-10	2.09E-10	2.57E-10
ru100	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07	2.88E-07

ru101	1.73E-09	1.73E-09	1.73E-09	1.73E-09	1.73E-09	1.73E-09	1.73E-09	1.73E-09	1.73E-09	1.73E-09	1.73E-09
ru102	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11	3.81E-11
ru103	9.60E-15	9.43E-15	1.96E-15	3.83E-16	1.52E-17	2.40E-20	9.53E-29	1.01E-42	.00E+00	.00E+00	.00E+00
cd111	5.17E-08	5.17E-08	5.17E-08	5.17E-08	5.17E-08	5.17E-08	5.17E-08	5.17E-08	5.17E-08	5.17E-08	5.17E-08
cd112	4.43E-07	4.43E-07	4.43E-07	4.43E-07	4.43E-07	4.43E-07	4.43E-07	4.43E-07	4.43E-07	4.43E-07	4.43E-07
cd113	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09	1.06E-09
cd113m	1.75E-09	1.75E-09	1.73E-09	1.71E-09	1.67E-09	1.59E-09	1.37E-09	1.07E-09	8.38E-10	6.55E-10	5.13E-10
cd114	6.59E-05	6.60E-05	6.90E-05	6.99E-05	7.02E-05	7.02E-05	7.02E-05	7.02E-05	7.02E-05	7.02E-05	7.02E-05
cd115	2.91E-09	2.13E-09	2.01E-21	6.39E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	6.38E-09	6.28E-09	1.57E-09	3.74E-10	2.18E-11	7.47E-14	3.00E-21	1.41E-33	.00E+00	.00E+00	.00E+00
cd116	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07	3.37E-07
cd117	2.14E-11	2.69E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	1.27E-02	1.27E-02	1.32E-02	1.35E-02	1.38E-02	1.39E-02	1.39E-02	1.39E-02	1.39E-02	1.39E-02	1.39E-02
in113m	7.11E-07	7.07E-07	4.13E-07	2.37E-07	7.88E-08	8.73E-09	1.19E-11	1.99E-16	3.33E-21	5.56E-26	9.30E-31
in114	2.25E-09	1.42E-09	4.08E-10	1.12E-10	8.65E-12	5.21E-14	1.13E-20	8.94E-32	.00E+00	.00E+00	.00E+00
in114m	8.94E-05	8.82E-05	2.54E-05	6.95E-06	5.38E-07	3.24E-09	7.05E-16	5.56E-27	4.39E-38	.00E+00	.00E+00
in115	1.23E-07	1.23E-07	1.28E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07	1.29E-07
in117	7.07E-11	1.73E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.52E-11	8.95E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01	2.75E-01
sn113	1.18E-03	1.18E-03	6.88E-04	3.94E-04	1.31E-04	1.45E-05	1.98E-08	3.31E-13	5.54E-18	9.26E-23	1.55E-27
sn114	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01	2.00E-01
sn115	9.78E-02	9.78E-02	9.78E-02	9.78E-02	9.78E-02	9.78E-02	9.78E-02	9.78E-02	9.78E-02	9.78E-02	9.78E-02
sn116	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00	4.36E+00
sn117	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00
sn117m	7.42E-04	7.05E-04	7.55E-06	6.77E-08	6.10E-12	5.02E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00	7.44E+00
sn119	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.69E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00	2.70E+00
sn119m	1.45E-02	1.45E-02	1.17E-02	9.42E-03	6.11E-03	2.58E-03	1.93E-04	2.57E-06	3.42E-08	4.55E-10	6.05E-12
sn120	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01	1.01E+01
sn121	2.15E-05	1.16E-05	8.05E-09	8.03E-09	7.98E-09	7.88E-09	7.59E-09	7.12E-09	6.69E-09	6.28E-09	5.90E-09
sn121m	1.85E-04	1.85E-04	1.85E-04	1.84E-04	1.83E-04	1.81E-04	1.74E-04	1.64E-04	1.54E-04	1.44E-04	1.35E-04
sn122	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00	1.45E+00
sn123	2.32E-04	2.31E-04	1.43E-04	8.72E-05	3.27E-05	4.61E-06	1.29E-08	7.14E-13	3.96E-17	2.19E-21	1.22E-25
sn124	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00	1.78E+00
sn125	3.56E-06	3.31E-06	5.51E-09	7.12E-12	1.40E-17	5.49E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	2.39E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02	2.40E-02
sb122	1.14E-05	8.82E-06	1.06E-15	5.15E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	2.23E-03	2.23E-03	2.32E-03	2.37E-03	2.43E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03	2.46E-03

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BWR SNF Assembly - Plenum - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sb124	1.51E-05	1.50E-05	5.37E-06	1.85E-06	2.26E-07	3.37E-09	1.12E-14	8.22E-24	6.05E-33	4.52E-42	.00E+00
sb125	8.52E-03	8.51E-03	8.00E-03	7.50E-03	6.61E-03	5.13E-03	2.39E-03	6.72E-04	1.89E-04	5.31E-05	1.49E-05
sb126	1.30E-06	1.23E-06	8.49E-09	4.81E-11	1.76E-15	2.37E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	2.94E-03	2.95E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03	2.96E-03
te123	2.78E-05	2.79E-05	3.13E-05	3.35E-05	3.55E-05	3.64E-05	3.65E-05	3.65E-05	3.65E-05	3.65E-05	3.65E-05
te123m	8.68E-06	8.63E-06	5.16E-06	3.02E-06	1.05E-06	1.26E-07	2.21E-10	5.64E-15	1.44E-19	3.66E-24	9.33E-29
te124	2.40E-04	2.40E-04	2.50E-04	2.53E-04	2.55E-04	2.55E-04	2.55E-04	2.55E-04	2.55E-04	2.55E-04	2.55E-04
te125	8.84E-03	8.84E-03	9.35E-03	9.86E-03	1.08E-02	1.23E-02	1.50E-02	1.68E-02	1.73E-02	1.74E-02	1.75E-02
te125m	1.11E-04	1.11E-04	1.10E-04	1.05E-04	9.37E-05	7.28E-05	3.40E-05	9.55E-06	2.68E-06	7.54E-07	2.12E-07
te126	2.98E-04	2.99E-04	3.00E-04	3.00E-04	3.00E-04	3.00E-04	3.00E-04	3.00E-04	3.00E-04	3.00E-04	3.00E-04
te127	1.47E-09	3.81E-10	9.08E-11	5.04E-11	1.58E-11	1.55E-12	1.46E-15	1.32E-20	1.19E-25	1.08E-30	9.76E-36
te127m	4.60E-08	4.57E-08	2.59E-08	1.44E-08	4.51E-09	4.42E-10	4.16E-13	3.76E-18	3.41E-23	3.08E-28	2.79E-33
te128	7.48E-09	7.48E-09	7.48E-09	7.48E-09	7.48E-09	7.48E-09	7.48E-09	7.48E-09	7.48E-09	7.48E-09	7.48E-09
te129m	5.67E-14	5.56E-14	8.86E-15	1.31E-15	3.03E-17	1.62E-20	2.46E-30	.00E+00	.00E+00	.00E+00	.00E+00
i127	1.68E-06	1.68E-06	1.70E-06	1.71E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06	1.72E-06
i129	7.43E-12	7.44E-12	7.48E-12	7.49E-12	7.49E-12	7.49E-12	7.49E-12	7.49E-12	7.49E-12	7.49E-12	7.49E-12

xe127	4.53E-14	4.44E-14	8.16E-15	1.40E-15	4.32E-17	4.12E-20	3.57E-29	.00E+00	.00E+00	.00E+00	.00E+00
xe128	8.59E-08	8.59E-08	8.59E-08	8.59E-08	8.59E-08	8.59E-08	8.59E-08	8.59E-08	8.59E-08	8.59E-08	8.59E-08
xe129	4.29E-10	4.29E-10	4.30E-10	4.30E-10	4.30E-10	4.30E-10	4.30E-10	4.30E-10	4.30E-10	4.30E-10	4.30E-10
xe129m	9.30E-13	8.61E-13	8.34E-16	6.15E-19	3.99E-25	1.71E-37	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	2.34E-11	2.34E-11	2.34E-11	2.34E-11	2.34E-11	2.34E-11	2.34E-11	2.34E-11	2.34E-11	2.34E-11	2.34E-11
xe131	6.61E-14	6.62E-14	6.64E-14	6.64E-14	6.64E-14	6.64E-14	6.64E-14	6.64E-14	6.64E-14	6.64E-14	6.64E-14
xe132	8.81E-15	8.81E-15	8.81E-15	8.81E-15	8.81E-15	8.81E-15	8.81E-15	8.81E-15	8.81E-15	8.81E-15	8.81E-15
total	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03	2.21E+03

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BWR SNF Assembly - Plenum - decay light elements page 5

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	7.59E-07	7.59E-07	7.48E-07	7.38E-07	7.17E-07	6.78E-07	5.73E-07	4.32E-07	3.26E-07	2.46E-07	1.86E-07
be 10	8.44E-11	8.44E-11	8.44E-11	8.44E-11	8.44E-11	8.44E-11	8.44E-11	8.44E-11	8.44E-11	8.44E-11	8.44E-11
c 14	3.01E-06	3.01E-06	3.01E-06	3.01E-06	3.01E-06	3.01E-06	3.01E-06	3.00E-06	3.00E-06	3.00E-06	3.00E-06
ar 41	1.27E-09	1.41E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	2.77E-11	7.21E-12	4.07E-18	4.04E-18	4.00E-18	3.92E-18	3.68E-18	3.31E-18	2.98E-18	2.68E-18	2.41E-18
k 43	1.56E-08	7.39E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	5.08E-05	5.06E-05	3.47E-05	2.35E-05	1.08E-05	2.31E-06	2.23E-08	9.82E-12	4.32E-15	1.90E-18	8.35E-22
ca 47	8.29E-07	7.11E-07	8.82E-13	6.41E-19	4.79E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	5.91E-03	5.86E-03	2.81E-03	1.31E-03	2.88E-04	1.41E-05	1.63E-09	4.49E-16	1.24E-22	3.41E-29	.00E+00
sc 47	9.31E-03	7.57E-03	7.73E-11	2.79E-18	1.83E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	8.66E-04	5.92E-04	1.14E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 49	9.54E-04	2.52E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	1.30E+01	1.26E+01	1.36E+00	1.35E-01	1.39E-03	1.50E-07	1.87E-19	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	4.15E-01	4.14E-01	3.40E-01	2.77E-01	1.84E-01	8.19E-02	7.19E-03	1.25E-04	2.16E-06	3.74E-08	6.48E-10
mn 56	1.08E+01	1.70E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	2.60E+00	2.59E+00	2.44E+00	2.29E+00	2.01E+00	1.56E+00	7.30E-01	2.05E-01	5.76E-02	1.62E-02	4.55E-03
fe 59	1.59E-01	1.57E-01	3.92E-02	9.28E-03	5.39E-04	1.82E-06	7.06E-14	3.13E-26	.00E+00	.00E+00	.00E+00
co 58m	2.24E-04	3.62E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	4.10E+00	4.06E+00	1.70E+00	6.89E-01	1.15E-01	3.25E-03	7.25E-08	1.28E-15	2.27E-23	4.11E-31	.00E+00
co 60	1.50E+01	1.50E+01	1.45E+01	1.41E+01	1.32E+01	1.15E+01	7.78E+00	4.03E+00	2.09E+00	1.08E+00	5.61E-01
co 61	2.78E-01	1.16E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	3.00E-03	3.00E-03	3.00E-03	3.00E-03	3.00E-03	2.99E-03	2.99E-03	2.99E-03	2.99E-03	2.99E-03	2.99E-03
ni 63	4.38E-01	4.38E-01	4.38E-01	4.37E-01	4.35E-01	4.32E-01	4.23E-01	4.09E-01	3.95E-01	3.82E-01	3.69E-01
ni 65	3.83E-01	5.20E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	2.37E-06	1.75E-06	2.94E-18	1.71E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	5.57E-03	1.50E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	3.79E-03	1.75E-06	2.95E-18	1.71E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	3.28E-09	2.50E-09	1.00E-19	1.55E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	2.27E-06	2.27E-06	1.76E-06	1.35E-06	8.05E-07	2.85E-07	1.27E-08	7.05E-11	3.92E-13	2.18E-15	1.22E-17
zn 69	2.82E-10	6.08E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.90E-11	5.66E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	4.00E-15	3.77E-15	1.71E-17	6.28E-20	9.71E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	4.07E-01	4.02E-01	1.19E-01	3.34E-02	2.72E-03	1.82E-05	5.44E-12	7.27E-23	.00E+00	.00E+00	.00E+00
sr 90	4.20E-05	4.20E-05	4.17E-05	4.15E-05	4.10E-05	4.00E-05	3.71E-05	3.28E-05	2.90E-05	2.57E-05	2.27E-05
sr 91	7.87E-02	1.37E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.79E-05	3.74E-05	1.10E-05	3.10E-06	2.53E-07	1.69E-09	5.06E-16	6.76E-27	.00E+00	.00E+00	.00E+00
y 90	1.50E+01	1.16E+01	4.17E-05	4.15E-05	4.10E-05	4.00E-05	3.71E-05	3.28E-05	2.90E-05	2.57E-05	2.27E-05
y 90m	1.48E-06	8.04E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	1.03E+00	1.02E+00	3.54E-01	1.18E-01	1.36E-02	1.79E-04	4.12E-10	1.66E-19	6.64E-29	.00E+00	.00E+00
y 92	8.90E-01	8.09E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.76E-04	3.44E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03	2.04E-03
zr 95	3.14E+02	3.10E+02	1.18E+02	4.35E+01	6.01E+00	1.15E-01	8.10E-07	2.09E-15	5.41E-24	2.28E-32	.00E+00
zr 97	4.80E+02	1.79E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	6.73E-09	6.73E-09	6.73E-09	6.73E-09	6.73E-09	6.72E-09	6.70E-09	6.66E-09	6.63E-09	6.60E-09	6.56E-09
nb 92	2.49E-10	2.49E-10	2.49E-10	2.49E-10	2.49E-10	2.49E-10	2.49E-10	2.49E-10	2.49E-10	2.49E-10	2.49E-10
nb 93m	1.22E-02	1.22E-02	1.21E-02	1.20E-02	1.17E-02	1.13E-02	1.02E-02	8.63E-03	7.35E-03	6.33E-03	5.50E-03

nb 94	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04	3.03E-04
nb 95	3.10E+02	3.10E+02	1.97E+02	8.56E+01	1.30E+01	2.62E-01	1.79E-06	4.61E-15	1.19E-23	4.56E-32	.00E+00
nb 95m	3.58E+00	3.56E+00	1.39E+00	5.12E-01	7.07E-02	1.36E-03	9.53E-09	2.46E-17	6.36E-26	.00E+00	.00E+00
nb 96	2.87E-01	1.41E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	4.80E+02	1.80E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Plenum - decay light elements page 6

0 nuclide radioactivity, curies

basis =per ONE BWR Fuel Assembly - Plenum Regio

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 97m	4.55E+02	1.70E+02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	7.45E-02	5.79E-02	1.03E-11	7.55E-22	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.85E-14	1.85E-14	1.85E-14	1.85E-14	1.85E-14	1.85E-14	1.85E-14	1.85E-14	1.85E-14	1.85E-14	1.85E-14
tc 99	5.02E-08	5.03E-08	5.05E-08	5.05E-08	5.05E-08	5.05E-08	5.05E-08	5.05E-08	5.05E-08	5.05E-08	5.05E-08
ru103	3.10E-10	3.05E-10	6.33E-11	1.24E-11	4.91E-13	7.77E-16	3.08E-24	.00E+00	.00E+00	.00E+00	.00E+00
rh105	1.44E-15	1.03E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	3.93E-07	3.93E-07	3.88E-07	3.84E-07	3.74E-07	3.56E-07	3.08E-07	2.41E-07	1.88E-07	1.47E-07	1.15E-07
cd115	1.48E-03	1.09E-03	1.02E-15	3.26E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.62E-04	1.60E-04	4.01E-05	9.52E-06	5.56E-07	1.90E-09	7.63E-17	3.59E-29	.00E+00	.00E+00	.00E+00
cd117	2.31E-04	2.89E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	4.45E-07	3.16E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	1.19E+01	1.18E+01	6.92E+00	3.96E+00	1.32E+00	1.46E-01	1.99E-04	3.33E-09	5.56E-14	9.31E-19	1.56E-23
in114	3.10E+00	1.95E+00	5.62E-01	1.54E-01	1.19E-02	7.17E-05	1.56E-11	1.23E-22	.00E+00	.00E+00	.00E+00
in114m	2.07E+00	2.04E+00	5.87E-01	1.61E-01	1.24E-02	7.49E-05	1.63E-11	1.29E-22	.00E+00	.00E+00	.00E+00
in116m	3.60E-04	3.56E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.59E-03	6.34E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	2.10E-04	1.24E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	1.19E+01	1.18E+01	6.91E+00	3.96E+00	1.32E+00	1.46E-01	1.99E-04	3.33E-09	5.56E-14	9.30E-19	1.56E-23
sn117m	6.09E+01	5.79E+01	6.20E-01	5.56E-03	5.01E-07	4.12E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	5.43E+01	5.42E+01	4.39E+01	3.53E+01	2.29E+01	9.65E+00	7.23E-01	9.62E-03	1.28E-04	1.70E-06	2.27E-08
sn121	2.06E+01	1.11E+01	7.71E-03	7.69E-03	7.64E-03	7.54E-03	7.26E-03	6.82E-03	6.40E-03	6.01E-03	5.64E-03
sn121m	9.97E-03	9.97E-03	9.94E-03	9.90E-03	9.84E-03	9.72E-03	9.36E-03	8.79E-03	8.25E-03	7.75E-03	7.27E-03
sn123	1.91E+00	1.90E+00	1.18E+00	7.17E-01	2.69E-01	3.79E-02	1.06E-04	5.87E-09	3.25E-13	1.80E-17	1.00E-21
sn123m	1.09E-02	1.67E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	3.86E-01	3.59E-01	5.97E-04	7.72E-07	1.52E-12	5.96E-24	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	4.52E+00	3.50E+00	4.19E-10	2.04E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	2.65E-01	2.62E-01	9.40E-02	3.24E-02	3.95E-03	5.89E-05	1.95E-10	1.44E-19	1.06E-28	.00E+00	.00E+00
sb125	8.92E+00	8.92E+00	8.39E+00	7.86E+00	6.93E+00	5.37E+00	2.51E+00	7.05E-01	1.98E-01	5.56E-02	1.56E-02
sb126	1.09E-01	1.03E-01	7.10E-04	4.03E-06	1.47E-10	1.98E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123	6.52E-15	6.53E-15	7.35E-15	7.85E-15	8.31E-15	8.53E-15	8.56E-15	8.56E-15	8.56E-15	8.56E-15	8.56E-15
te123m	7.71E-02	7.66E-02	4.58E-02	2.68E-02	9.29E-03	1.12E-03	1.96E-06	5.00E-11	1.28E-15	3.25E-20	8.28E-25
te125m	2.00E+00	2.00E+00	1.99E+00	1.90E+00	1.69E+00	1.31E+00	6.13E-01	1.72E-01	4.84E-02	1.36E-02	3.82E-03
te127	3.88E-03	1.01E-03	2.40E-04	1.33E-04	4.17E-05	4.08E-06	3.84E-09	3.48E-14	3.15E-19	2.85E-24	2.58E-29
te127m	4.34E-04	4.31E-04	2.45E-04	1.36E-04	4.25E-05	4.17E-06	3.93E-09	3.55E-14	3.21E-19	2.91E-24	2.63E-29
te129	2.61E-08	1.07E-09	1.71E-10	2.54E-11	5.85E-13	3.12E-16	4.76E-26	.00E+00	.00E+00	.00E+00	.00E+00
te129m	1.71E-09	1.67E-09	2.67E-10	3.96E-11	9.13E-13	4.87E-16	7.43E-26	.00E+00	.00E+00	.00E+00	.00E+00
i126	2.14E-14	2.03E-14	1.78E-16	1.29E-18	7.69E-23	2.74E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i129	1.31E-15	1.31E-15	1.32E-15	1.32E-15	1.32E-15	1.32E-15	1.32E-15	1.32E-15	1.32E-15	1.32E-15	1.32E-15
i130	5.67E-10	1.49E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	5.63E-14	5.16E-14	2.40E-17	8.27E-21	1.19E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	1.28E-09	1.25E-09	2.30E-10	3.96E-11	1.22E-12	1.16E-15	1.01E-24	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	1.06E-07	9.80E-08	9.50E-11	7.01E-14	4.54E-20	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	2.28E-11	2.15E-11	1.21E-13	5.51E-16	1.31E-20	7.53E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	2.59E-14	2.29E-14	1.85E-19	9.02E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133m	1.69E-15	1.23E-15	7.16E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	2.32E+03	1.37E+03	4.09E+02	2.02E+02	6.95E+01	3.07E+01	1.28E+01	5.56E+00	2.82E+00	1.57E+00	9.77E-01

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Plenum - decay

spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.46E+13	6.28E+12	6.39E+11	3.07E+11	1.12E+11	5.38E+10	2.33E+10	9.85E+09	4.67E+09	2.34E+09	1.22E+09
3.00E-02	6.80E+12	4.23E+12	1.12E+12	8.42E+11	5.51E+11	2.94E+11	8.57E+10	2.23E+10	6.70E+09	2.12E+09	7.21E+08
5.50E-02	2.84E+12	1.13E+12	6.07E+10	2.70E+10	8.61E+09	4.35E+09	2.44E+09	1.12E+09	5.43E+08	2.71E+08	1.38E+08
8.50E-02	1.55E+12	6.12E+11	2.33E+10	1.02E+10	3.18E+09	1.62E+09	9.40E+08	4.30E+08	2.07E+08	1.03E+08	5.21E+07
1.20E-01	1.06E+12	4.11E+11	1.25E+10	6.04E+09	2.53E+09	1.53E+09	7.86E+08	2.92E+08	1.19E+08	5.24E+07	2.46E+07
1.70E-01	2.93E+12	2.20E+12	5.38E+10	2.64E+10	2.02E+10	1.51E+10	7.05E+09	2.01E+09	5.79E+08	1.70E+08	5.19E+07
3.00E-01	2.43E+12	7.79E+11	3.28E+10	1.67E+10	9.05E+09	5.83E+09	2.67E+09	7.60E+08	2.19E+08	6.44E+07	1.96E+07
6.50E-01	6.63E+13	4.16E+13	1.39E+13	5.79E+12	9.89E+11	1.41E+11	5.67E+10	1.59E+10	4.48E+09	1.28E+09	3.80E+08
1.13E+00	2.45E+12	1.69E+12	1.20E+12	1.16E+12	1.08E+12	9.51E+11	6.41E+11	3.32E+11	1.72E+11	8.91E+10	4.62E+10
1.58E+00	4.86E+11	1.55E+11	2.35E+09	8.30E+08	1.08E+08	1.92E+06	7.58E+02	5.77E+02	4.77E+02	4.04E+02	3.48E+02
2.00E+00	1.69E+11	2.28E+10	2.22E+08	8.03E+07	1.48E+07	5.21E+06	3.42E+06	1.77E+06	9.17E+05	4.75E+05	2.46E+05
2.40E+00	4.30E+09	3.72E+07	1.44E+06	4.92E+05	7.59E+04	1.69E+04	1.08E+04	5.60E+03	2.90E+03	1.50E+03	7.79E+02
2.80E+00	3.83E+09	6.44E+06	1.37E+05	4.73E+04	5.77E+03	8.60E+01	2.85E-04	1.30E-11	1.15E-11	1.04E-11	9.35E-12
3.25E+00	6.99E+08	1.12E+06	1.66E-12	1.65E-12	1.64E-12	1.60E-12	1.50E-12	1.35E-12	1.22E-12	1.10E-12	9.87E-13
3.75E+00	1.26E+06	7.69E+01	2.01E-15	2.00E-15	1.98E-15	1.94E-15	1.82E-15	1.64E-15	1.47E-15	1.33E-15	1.19E-15
4.25E+00	4.54E+05	8.75E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.37E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	5.69E+05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	1.02E+14	5.91E+13	1.70E+13	8.18E+12	2.78E+12	1.47E+12	8.20E+11	3.85E+11	1.90E+11	9.55E+10	4.88E+10
mev/sec	4.90E+13	3.02E+13	1.04E+13	5.11E+12	1.89E+12	1.18E+12	7.63E+11	3.85E+11	1.97E+11	1.01E+11	5.22E+10

spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.36E+04	1.44E+04	1.47E+03	7.06E+02	2.58E+02	1.24E+02	5.36E+01	2.26E+01	1.07E+01	5.37E+00	2.81E+00
3.00E-02	4.69E+04	2.92E+04	7.74E+03	5.81E+03	3.80E+03	2.03E+03	5.91E+02	1.54E+02	4.62E+01	1.46E+01	4.97E+00
5.50E-02	3.59E+04	1.43E+04	7.67E+02	3.41E+02	1.09E+02	5.51E+01	3.08E+01	1.42E+01	6.86E+00	3.42E+00	1.74E+00
8.50E-02	3.03E+04	1.20E+04	4.56E+02	1.98E+02	6.21E+01	3.16E+01	1.84E+01	8.41E+00	4.05E+00	2.01E+00	1.02E+00
1.20E-01	2.91E+04	1.13E+04	3.46E+02	1.66E+02	6.98E+01	4.21E+01	2.17E+01	8.04E+00	3.27E+00	1.45E+00	6.79E-01
1.70E-01	1.14E+05	8.59E+04	2.10E+03	1.03E+03	7.88E+02	5.90E+02	2.75E+02	7.85E+01	2.26E+01	6.66E+00	2.03E+00
3.00E-01	1.68E+05	5.37E+04	2.26E+03	1.15E+03	6.24E+02	4.02E+02	1.84E+02	5.24E+01	1.51E+01	4.44E+00	1.35E+00
6.50E-01	9.91E+06	6.21E+06	2.07E+06	8.65E+05	1.48E+05	2.11E+04	8.48E+03	2.37E+03	6.70E+02	1.91E+02	5.68E+01
1.13E+00	6.33E+05	4.37E+05	3.10E+05	3.00E+05	2.81E+05	2.46E+05	1.66E+05	8.59E+04	4.45E+04	2.30E+04	1.19E+04
1.58E+00	1.76E+05	5.60E+04	8.51E+02	3.01E+02	3.90E+01	6.95E-01	2.75E-04	2.09E-04	1.73E-04	1.46E-04	1.26E-04
2.00E+00	7.77E+04	1.05E+04	1.02E+02	3.69E+01	6.81E+00	2.39E+00	1.57E+00	8.14E-01	4.22E-01	2.19E-01	1.13E-01
2.40E+00	2.37E+03	2.05E+01	7.92E-01	2.72E-01	4.19E-02	9.33E-03	5.97E-03	3.09E-03	1.60E-03	8.30E-04	4.30E-04
2.80E+00	2.47E+03	4.14E+00	8.84E-02	3.05E-02	3.71E-03	5.54E-05	1.84E-10	8.39E-18	7.43E-18	6.69E-18	6.02E-18
3.25E+00	5.22E+02	8.34E-01	1.24E-18	1.24E-18	1.22E-18	1.20E-18	1.12E-18	1.01E-18	9.11E-19	8.19E-19	7.38E-19
3.75E+00	1.08E+00	6.63E-05	1.73E-21	1.73E-21	1.71E-21	1.67E-21	1.57E-21	1.41E-21	1.27E-21	1.14E-21	1.03E-21
4.25E+00	4.44E-01	8.55E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	3.68E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	7.19E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	1.13E+07	6.93E+06	2.40E+06	1.17E+06	4.34E+05	2.70E+05	1.75E+05	8.86E+04	4.53E+04	2.33E+04	1.20E+04
gamma watts	7.85E+00	4.84E+00	1.67E+00	8.19E-01	3.03E-01	1.88E-01	1.22E-01	6.18E-02	3.16E-02	1.62E-02	8.37E-03

photon spectrum as a function of time for fission products

BWR SNF Assembly - Plenum - decay

spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	2.47E+17	3.24E+16	8.61E+15	6.41E+15	4.35E+15	2.42E+15	9.16E+14	6.40E+14	5.52E+14	4.84E+14	4.26E+14

3.00E-02	1.10E+17	2.54E+16	3.68E+15	2.68E+15	1.83E+15	1.02E+15	4.01E+14	2.84E+14	2.45E+14	2.16E+14	1.90E+14
5.50E-02	5.87E+16	8.98E+15	1.97E+15	1.51E+15	1.04E+15	5.84E+14	2.22E+14	1.50E+14	1.25E+14	1.06E+14	9.18E+13
8.50E-02	4.01E+16	7.65E+15	1.20E+15	9.28E+14	6.39E+14	3.50E+14	1.23E+14	7.93E+13	6.55E+13	5.60E+13	4.86E+13
1.20E-01	3.27E+16	7.08E+15	1.39E+15	1.11E+15	7.62E+14	4.05E+14	1.36E+14	8.44E+13	6.49E+13	5.17E+13	4.21E+13
1.70E-01	5.22E+16	8.36E+15	1.19E+15	6.55E+14	4.11E+14	2.19E+14	7.08E+13	4.68E+13	4.04E+13	3.55E+13	3.13E+13
3.00E-01	1.13E+17	1.75E+16	9.24E+14	7.01E+14	4.80E+14	2.55E+14	8.01E+13	5.19E+13	4.42E+13	3.83E+13	3.33E+13
6.50E-01	2.33E+17	6.56E+16	1.65E+16	1.01E+16	6.10E+15	4.17E+15	2.11E+15	1.18E+15	9.17E+14	7.88E+14	6.93E+14
1.13E+00	7.25E+16	5.42E+15	3.60E+14	2.88E+14	2.34E+14	1.70E+14	9.54E+13	5.61E+13	3.69E+13	2.49E+13	1.70E+13
1.58E+00	3.71E+16	8.74E+15	1.75E+14	9.60E+13	7.29E+13	4.52E+13	1.48E+13	4.17E+12	1.89E+12	1.14E+12	7.83E+11
2.00E+00	1.10E+16	6.98E+14	5.44E+13	3.81E+13	2.47E+13	1.05E+13	8.61E+11	3.41E+10	1.70E+10	1.46E+10	1.28E+10
2.40E+00	8.63E+15	4.28E+14	7.26E+12	3.17E+12	2.21E+12	1.10E+12	1.38E+11	4.45E+09	1.55E+08	1.31E+07	7.48E+06
2.80E+00	3.64E+15	6.81E+12	6.41E+11	5.03E+11	3.56E+11	1.78E+11	2.27E+10	7.44E+08	2.46E+07	8.13E+05	2.70E+04
3.25E+00	1.75E+15	2.45E+12	1.17E+11	8.22E+10	5.84E+10	2.95E+10	3.83E+09	1.27E+08	4.21E+06	1.40E+05	4.63E+03
3.75E+00	7.94E+14	1.20E+10	4.30E+07	3.62E+07	2.57E+07	1.30E+07	1.69E+06	5.60E+04	1.86E+03	6.16E+01	2.04E+00
4.25E+00	7.32E+14	1.60E+09	1.22E-05	1.23E-05	1.24E-05	1.26E-05	1.28E-05	1.30E-05	1.31E-05	1.31E-05	1.31E-05
4.75E+00	2.17E+14	1.19E+10	6.14E-06	6.17E-06	6.22E-06	6.30E-06	6.44E-06	6.53E-06	6.55E-06	6.56E-06	6.56E-06
5.50E+00	1.69E+14	7.60E+07	4.56E-06	4.58E-06	4.61E-06	4.67E-06	4.78E-06	4.84E-06	4.86E-06	4.87E-06	4.87E-06
total	1.02E+18	1.88E+17	3.60E+16	2.45E+16	1.59E+16	9.65E+15	4.17E+15	2.58E+15	2.09E+15	1.80E+15	1.57E+15
mev/sec	4.17E+17	7.47E+16	1.26E+16	7.90E+15	4.92E+15	3.27E+15	1.60E+15	8.99E+14	6.94E+14	5.88E+14	5.11E+14

spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean (mev)	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	5.68E+08	7.45E+07	1.98E+07	1.47E+07	1.00E+07	5.56E+06	2.11E+06	1.47E+06	1.27E+06	1.11E+06	9.79E+05
3.00E-02	7.56E+08	1.75E+08	2.54E+07	1.85E+07	1.26E+07	7.05E+06	2.77E+06	1.96E+06	1.69E+06	1.49E+06	1.31E+06
5.50E-02	7.42E+08	1.14E+08	2.49E+07	1.90E+07	1.32E+07	7.38E+06	2.81E+06	1.90E+06	1.58E+06	1.35E+06	1.16E+06
8.50E-02	7.84E+08	1.49E+08	2.34E+07	1.81E+07	1.25E+07	6.83E+06	2.40E+06	1.55E+06	1.28E+06	1.09E+06	9.50E+05
1.20E-01	9.03E+08	1.95E+08	3.83E+07	3.05E+07	2.10E+07	1.12E+07	3.76E+06	2.33E+06	1.79E+06	1.43E+06	1.16E+06
1.70E-01	2.04E+09	3.27E+08	4.64E+07	2.56E+07	1.61E+07	8.56E+06	2.76E+06	1.83E+06	1.58E+06	1.39E+06	1.22E+06
3.00E-01	7.78E+09	1.21E+09	6.37E+07	4.84E+07	3.31E+07	1.76E+07	5.52E+06	3.58E+06	3.05E+06	2.64E+06	2.30E+06
6.50E-01	3.48E+10	9.80E+09	2.46E+09	1.51E+09	9.12E+08	6.23E+08	3.16E+08	1.76E+08	1.37E+08	1.18E+08	1.04E+08
1.13E+00	1.87E+10	1.40E+09	9.32E+07	7.45E+07	6.04E+07	4.40E+07	2.47E+07	1.45E+07	9.54E+06	6.44E+06	4.40E+06
1.58E+00	1.34E+10	3.16E+09	6.35E+07	3.48E+07	2.64E+07	1.64E+07	5.38E+06	1.51E+06	6.83E+05	4.14E+05	2.83E+05
2.00E+00	5.08E+09	3.21E+08	2.50E+07	1.75E+07	1.14E+07	4.83E+06	3.96E+05	1.57E+04	7.84E+03	6.73E+03	5.90E+03
2.40E+00	4.76E+09	2.36E+08	4.00E+06	1.75E+06	1.22E+06	6.07E+05	7.59E+04	2.46E+03	8.57E+01	7.23E+00	4.12E+00
2.80E+00	2.34E+09	4.38E+06	4.13E+05	3.24E+05	2.29E+05	1.15E+05	1.46E+04	4.79E+02	1.58E+01	5.23E-01	1.73E-02
3.25E+00	1.31E+09	1.83E+06	8.72E+04	6.14E+04	4.36E+04	2.21E+04	2.86E+03	9.49E+01	3.15E+00	1.04E-01	3.46E-03
3.75E+00	6.84E+08	1.04E+04	3.71E+01	3.12E+01	2.22E+01	1.12E+01	1.45E+00	4.83E-02	1.60E-03	5.31E-05	1.76E-06
4.25E+00	7.15E+08	1.56E+03	1.20E-11	1.20E-11	1.21E-11	1.23E-11	1.25E-11	1.27E-11	1.28E-11	1.28E-11	1.28E-11
4.75E+00	2.37E+08	1.30E+04	6.71E-12	6.74E-12	6.79E-12	6.88E-12	7.03E-12	7.13E-12	7.16E-12	7.17E-12	7.17E-12
5.50E+00	2.14E+08	9.60E+01	5.76E-12	5.79E-12	5.83E-12	5.91E-12	6.04E-12	6.12E-12	6.15E-12	6.15E-12	6.16E-12
total	9.59E+10	1.72E+10	2.89E+09	1.82E+09	1.13E+09	7.53E+08	3.68E+08	2.07E+08	1.59E+08	1.35E+08	1.17E+08
gamma watts	6.69E+04	1.20E+04	2.02E+03	1.27E+03	7.88E+02	5.25E+02	2.57E+02	1.44E+02	1.11E+02	9.42E+01	8.18E+01

principal photon sources in group 1, photons/sec
mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	2.24E+15	1.74E+15	3.09E+05	2.27E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	3.19E+15	3.07E+15	2.60E+15	2.19E+15	1.56E+15	7.87E+14	1.02E+14	3.38E+12	1.12E+11	3.72E+09	1.23E+08
ba140	1.89E+15	1.79E+15	1.42E+13	9.32E+10	4.53E+06	1.09E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.51E+15	2.44E+15	2.05E+13	1.34E+11	6.53E+06	1.57E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.03E+15	4.00E+15	3.23E+15	2.58E+15	1.65E+15	6.79E+14	4.72E+13	5.56E+11	6.54E+09	7.70E+07	9.06E+05

principal photon sources in group 2, photons/sec
mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.54E+16) at 1.0 d

nuclide	time after discharge: initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
te132	4.22E+15	3.42E+15	2.04E+07	5.81E-02	7.57E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.43E+15	4.27E+15	3.71E+10	1.81E+05	5.83E-06	6.55E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

ba140	1.58E+15	1.49E+15	1.19E+13	7.78E+10	3.78E+06	9.06E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.44E+15	1.41E+15	2.12E+14	2.95E+13	5.98E+11	2.48E+08	1.75E-02	2.13E-19	.00E+00	.00E+00	.00E+00
ce143	4.66E+15	2.84E+15	9.29E-05	5.22E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.33E+15	1.33E+15	1.07E+15	8.52E+14	5.46E+14	2.25E+14	1.56E+13	1.84E+11	2.16E+09	2.55E+07	3.00E+05
nd147	1.43E+15	1.34E+15	4.87E+12	1.42E+10	1.39E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.98E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	7.55E+14	7.26E+14	6.15E+14	5.17E+14	3.68E+14	1.86E+14	2.41E+13	8.00E+11	2.65E+10	8.80E+08	2.92E+07
te132	8.14E+14	6.58E+14	3.94E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.29E+14	5.14E+14	4.32E+12	2.83E+10	1.38E+06	3.30E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.33E+15	8.08E+14	2.64E-05	1.49E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.37E+14	9.30E+14	7.49E+14	5.98E+14	3.84E+14	1.58E+14	1.10E+13	1.29E+11	1.52E+09	1.79E+07	2.10E+05
sm153	1.62E+15	1.13E+15	1.45E+01	5.24E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.65E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	4.49E+14	4.31E+14	3.65E+14	3.07E+14	2.19E+14	1.11E+14	1.43E+13	4.75E+11	1.58E+10	5.23E+08	1.74E+07
xe133	3.13E+15	3.02E+15	2.62E+10	1.28E+05	4.12E-06	4.63E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.51E+14	5.47E+14	4.41E+14	3.52E+14	2.26E+14	9.28E+13	6.46E+12	7.60E+10	8.94E+08	1.05E+07	1.24E+05
nd147	8.87E+14	8.34E+14	3.03E+12	8.81E+09	8.61E+04	8.34E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.08E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.64E+15	3.09E+15	5.53E+05	4.06E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.05E+14	7.03E+14	5.66E+14	4.52E+14	2.90E+14	1.19E+14	8.29E+12	9.76E+10	1.15E+09	1.35E+07	1.59E+05
pr144	3.95E+14	3.92E+14	3.15E+14	2.52E+14	1.62E+14	6.64E+13	4.62E+12	5.44E+10	6.40E+08	7.53E+06	8.86E+04
sm153	7.73E+14	5.40E+14	6.88E+00	2.49E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec

mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.36E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.88E+14	6.12E+14	1.09E+05	7.99E-06	7.60E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.57E+15	2.18E+15	3.91E+05	2.87E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.71E+14	4.46E+14	3.54E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.85E+15	2.80E+15	4.20E+14	5.84E+13	1.18E+12	4.90E+08	3.48E-02	4.22E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec

mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.38E+15	9.87E+14	6.50E-04	8.20E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.52E+15	4.22E+15	2.01E+12	6.93E+08	9.97E+01	2.11E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.12E+15	3.33E+15	1.99E+07	5.66E-02	7.37E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.33E+15	1.73E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.87E+15	1.82E+15	1.53E+13	1.00E+11	4.87E+06	1.17E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.07E+15	1.87E+15	6.12E-05	3.44E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec

mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.56E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.65E+15	7.57E+15	2.89E+15	1.06E+15	1.47E+14	2.81E+12	1.98E+07	5.10E-02	1.32E-10	3.41E-19	8.42E-28
nb 95	7.97E+15	7.96E+15	4.99E+15	2.17E+15	3.28E+14	6.61E+12	4.51E+07	1.17E-01	3.01E-10	7.78E-19	.00E+00
ru103	5.59E+15	5.50E+15	1.14E+15	2.23E+14	8.85E+12	1.40E+10	5.55E+01	5.51E-13	5.44E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.07E+07	2.29E-01	2.98E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.31E+15	3.37E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.91E+15	4.90E+15	4.52E+15	4.15E+15	3.51E+15	2.50E+15	9.14E+14	1.70E+14	3.17E+13	5.90E+12	1.10E+12

la140	6.00E+15	5.83E+15	4.90E+13	3.21E+11	1.56E+07	3.74E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 9, photons/sec

mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.42E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	1.80E+15	1.47E+15	8.78E+06	2.49E-02	3.25E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	5.99E+15	4.77E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	5.52E+14	5.24E+14	4.82E+12	3.69E+10	2.44E+06	1.08E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.54E+14	6.35E+14	5.34E+12	3.50E+10	1.70E+06	4.08E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	8.82E+14	8.44E+14	1.45E+13	2.13E+11	5.08E+07	2.92E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec

mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.74E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	6.79E+14	5.55E+14	3.32E+06	9.42E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.75E+15	7.53E+15	6.33E+13	4.15E+11	2.02E+07	4.84E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec

mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.98E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
i132	1.75E+14	1.43E+14	8.52E+05	2.42E-03	3.15E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.46E+14	3.55E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.15E+13	5.11E+13	4.12E+13	3.29E+13	2.11E+13	8.66E+12	6.03E+11	7.09E+09	8.35E+07	9.82E+05	1.16E+04
eu156	4.31E+14	4.12E+14	7.10E+12	1.04E+11	2.48E+07	1.43E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec

mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.28E+14) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	3.67E+14	3.57E+14	3.00E+12	1.97E+10	9.57E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	3.06E+13	2.93E+13	5.04E+11	7.39E+09	1.76E+06	1.01E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec

mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.81E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rh106	6.97E+11	6.70E+11	5.67E+11	4.78E+11	3.40E+11	1.72E+11	2.23E+10	7.38E+08	2.45E+07	8.12E+05	2.69E+04
ag112	1.28E+12	6.81E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.15E+12	5.00E+12	4.20E+10	2.76E+08	1.34E+04	3.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 14, photons/sec

mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.45E+12) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
la140	2.35E+12	2.28E+12	1.92E+10	1.26E+08	6.12E+03	1.47E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec

mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.20E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	2.78E+12	8.62E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.70E+14	3.34E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec

mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.60E+09) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	5.16E+11	1.60E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec

mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.19E+10) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
	time after discharge										
rb 88	3.83E+12	1.19E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.60E+07) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rb 88	2.45E+10	7.60E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

photon spectrum as a function of time for heavy metals and their daughters

BWR SNF Assembly - Plenum - decay
actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	1.40E+17	7.32E+16	1.06E+14	7.95E+13	5.01E+13	3.04E+13	2.49E+13	2.44E+13	2.38E+13	2.33E+13	2.27E+13
3.00E-02	8.81E+15	1.52E+15	9.95E+10	9.34E+10	1.17E+11	1.63E+11	2.88E+11	4.59E+11	5.91E+11	6.92E+11	7.71E+11
5.50E-02	1.28E+16	4.16E+15	1.62E+12	1.54E+12	1.90E+12	2.67E+12	4.81E+12	7.75E+12	1.00E+13	1.18E+13	1.31E+13
8.50E-02	5.54E+16	8.04E+15	5.57E+11	3.51E+11	3.51E+11	3.50E+11	3.48E+11	3.44E+11	3.41E+11	3.37E+11	3.34E+11
1.20E-01	5.61E+16	4.09E+16	6.02E+11	4.61E+11	4.55E+11	4.48E+11	4.35E+11	4.17E+11	4.00E+11	3.85E+11	3.72E+11
1.70E-01	1.86E+15	3.07E+14	2.24E+10	8.58E+09	6.22E+09	4.63E+09	4.16E+09	4.09E+09	4.01E+09	3.95E+09	3.89E+09
3.00E-01	2.98E+16	2.16E+16	3.66E+11	2.51E+11	2.49E+11	2.46E+11	2.38E+11	2.25E+11	2.13E+11	2.03E+11	1.94E+11
6.50E-01	1.63E+15	5.70E+13	2.49E+09	2.05E+09	1.57E+09	1.31E+09	1.46E+09	1.66E+09	1.71E+09	1.68E+09	1.64E+09
1.13E+00	2.10E+15	1.35E+15	8.47E+08	7.99E+08	7.43E+08	7.01E+08	6.70E+08	6.35E+08	6.00E+08	5.69E+08	5.41E+08
1.58E+00	1.78E+08	1.72E+08	1.55E+08	1.43E+08	1.31E+08	1.24E+08	1.26E+08	1.25E+08	1.16E+08	1.05E+08	9.47E+07
2.00E+00	1.83E+06	1.10E+06	1.05E+06	1.09E+06	1.16E+06	1.31E+06	1.72E+06	2.08E+06	2.17E+06	2.16E+06	2.11E+06
2.40E+00	7.76E+07	7.76E+07	6.91E+07	6.29E+07	5.55E+07	4.93E+07	4.28E+07	3.54E+07	2.93E+07	2.43E+07	2.02E+07
2.80E+00	1.37E+08	1.39E+08	1.43E+08	1.51E+08	1.71E+08	2.21E+08	3.61E+08	4.83E+08	5.11E+08	5.02E+08	4.82E+08
3.25E+00	2.78E+07	2.78E+07	2.48E+07	2.25E+07	1.99E+07	1.77E+07	1.54E+07	1.27E+07	1.05E+07	8.72E+06	7.24E+06
3.75E+00	1.61E+07	1.61E+07	1.44E+07	1.31E+07	1.15E+07	1.02E+07	8.90E+06	7.35E+06	6.09E+06	5.05E+06	4.20E+06
4.25E+00	9.34E+06	9.34E+06	8.32E+06	7.58E+06	6.69E+06	5.94E+06	5.16E+06	4.26E+06	3.53E+06	2.93E+06	2.43E+06
4.75E+00	5.41E+06	5.41E+06	4.82E+06	4.39E+06	3.88E+06	3.44E+06	2.99E+06	2.47E+06	2.05E+06	1.70E+06	1.41E+06
5.50E+00	4.90E+06	4.90E+06	4.36E+06	3.97E+06	3.51E+06	3.12E+06	2.71E+06	2.24E+06	1.85E+06	1.54E+06	1.28E+06
total	3.09E+17	1.51E+17	1.10E+14	8.22E+13	5.32E+13	3.43E+13	3.10E+13	3.36E+13	3.54E+13	3.67E+13	3.75E+13
mev/sec	2.65E+16	1.47E+16	1.39E+12	1.05E+12	7.73E+11	6.16E+11	6.79E+11	8.35E+11	9.52E+11	1.04E+12	1.11E+12

actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Plenum Regio

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	3.22E+08	1.68E+08	2.44E+05	1.83E+05	1.15E+05	6.98E+04	5.72E+04	5.60E+04	5.48E+04	5.35E+04	5.22E+04
3.00E-02	6.08E+07	1.05E+07	6.87E+02	6.44E+02	8.09E+02	1.13E+03	1.99E+03	3.16E+03	4.07E+03	4.78E+03	5.31E+03
5.50E-02	1.62E+08	5.26E+07	2.05E+04	1.95E+04	2.41E+04	3.37E+04	6.08E+04	9.80E+04	1.27E+05	1.49E+05	1.66E+05
8.50E-02	1.08E+09	1.57E+08	1.09E+04	6.86E+03	6.85E+03	6.84E+03	6.79E+03	6.72E+03	6.65E+03	6.59E+03	6.53E+03
1.20E-01	1.55E+09	1.13E+09	1.66E+04	1.27E+04	1.26E+04	1.24E+04	1.20E+04	1.15E+04	1.10E+04	1.06E+04	1.03E+04
1.70E-01	7.28E+07	1.20E+07	8.76E+02	3.35E+02	2.43E+02	1.81E+02	1.63E+02	1.60E+02	1.57E+02	1.54E+02	1.52E+02
3.00E-01	2.05E+09	1.49E+09	2.53E+04	1.73E+04	1.72E+04	1.70E+04	1.64E+04	1.55E+04	1.47E+04	1.40E+04	1.34E+04
6.50E-01	2.44E+08	8.51E+06	3.72E+02	3.06E+02	2.34E+02	1.96E+02	2.18E+02	2.48E+02	2.55E+02	2.51E+02	2.45E+02
1.13E+00	5.44E+08	3.48E+08	2.19E+02	2.07E+02	1.92E+02	1.81E+02	1.73E+02	1.64E+02	1.55E+02	1.47E+02	1.40E+02
1.58E+00	6.45E+01	6.22E+01	5.60E+01	5.18E+01	4.74E+01	4.48E+01	4.57E+01	4.52E+01	4.19E+01	3.80E+01	3.43E+01
2.00E+00	8.41E-01	5.04E-01	4.85E-01	5.00E-01	5.33E-01	6.03E-01	7.92E-01	9.58E-01	1.00E+00	9.93E-01	9.70E-01
2.40E+00	4.28E+01	4.28E+01	3.81E+01	3.47E+01	3.06E+01	2.72E+01	2.36E+01	1.95E+01	1.62E+01	1.34E+01	1.12E+01
2.80E+00	8.82E+01	8.95E+01	9.18E+01	9.70E+01	1.10E+02	1.42E+02	2.32E+02	3.11E+02	3.29E+02	3.23E+02	3.10E+02
3.25E+00	2.08E+01	2.08E+01	1.85E+01	1.68E+01	1.49E+01	1.32E+01	1.15E+01	9.47E+00	7.85E+00	6.51E+00	5.41E+00
3.75E+00	1.39E+01	1.39E+01	1.24E+01	1.13E+01	9.95E+00	8.84E+00	7.67E+00	6.34E+00	5.25E+00	4.36E+00	3.62E+00
4.25E+00	9.12E+00	9.13E+00	8.13E+00	7.40E+00	6.54E+00	5.81E+00	5.04E+00	4.16E+00	3.45E+00	2.86E+00	2.38E+00
4.75E+00	5.91E+00	5.91E+00	5.27E+00	4.80E+00	4.24E+00	3.76E+00	3.27E+00	2.70E+00	2.24E+00	1.85E+00	1.54E+00
5.50E+00	6.19E+00	6.19E+00	5.52E+00	5.02E+00	4.44E+00	3.94E+00	3.42E+00	2.83E+00	2.34E+00	1.94E+00	1.61E+00
total	6.09E+09	3.37E+09	3.20E+05	2.41E+05	1.78E+05	1.42E+05	1.56E+05	1.92E+05	2.19E+05	2.39E+05	2.55E+05
gamma watts	4.25E+03	2.35E+03	2.23E-01	1.68E-01	1.24E-01	9.88E-02	1.09E-01	1.34E-01	1.53E-01	1.67E-01	1.77E-01

1 * gamma sources determined *
0case applies the following photon data base
master photon library
in binary mode
0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - plen ds4 - discharge
0 1.00 day time of the requested nuclides

0 energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	6.2564E+12	1.8769E+11
5.0000E-02	to	1.0000E-01	1.1925E+12	8.9436E+10
1.0000E-01	to	2.0000E-01	2.8287E+12	4.2430E+11
2.0000E-01	to	3.0000E-01	4.0231E+11	1.0058E+11
3.0000E-01	to	4.0000E-01	3.8069E+11	1.3324E+11
4.0000E-01	to	6.0000E-01	8.6960E+11	4.3480E+11
6.0000E-01	to	8.0000E-01	3.7838E+13	2.6486E+13
8.0000E-01	to	1.0000E+00	2.4713E+11	2.2242E+11
1.0000E+00	to	1.3300E+00	1.2439E+12	1.4491E+12
1.3300E+00	to	1.6600E+00	3.4168E+11	5.1081E+11
1.6600E+00	to	2.0000E+00	1.1500E+11	2.1044E+11
2.0000E+00	to	2.5000E+00	7.8526E+08	1.7668E+09
2.5000E+00	to	3.0000E+00	1.2381E+07	3.4047E+07
3.0000E+00	to	4.0000E+00	1.0411E+06	3.6439E+06
4.0000E+00	to	5.0000E+00	8.3021E-20	3.7360E-19
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			5.1716E+13	3.0251E+13

0
0 total energy from nuclides with spectrum data = 3.0138E+13
0 total energy from nuclides with no spectrum data = 1.1259E+11
1 gamma source spectrum for decay step for BWR source term - plen ds4 - 0.25 year
0 90.00 day time of the requested nuclides

0 energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.2789E+12	3.8367E+10
5.0000E-02	to	1.0000E-01	5.2039E+10	3.9029E+09
1.0000E-01	to	2.0000E-01	7.0885E+10	1.0633E+10
2.0000E-01	to	3.0000E-01	2.2459E+10	5.6149E+09
3.0000E-01	to	4.0000E-01	1.2214E+10	4.2750E+09
4.0000E-01	to	6.0000E-01	1.6618E+11	8.3088E+10
6.0000E-01	to	8.0000E-01	1.2745E+13	8.9214E+12
8.0000E-01	to	1.0000E+00	6.9150E+10	6.2235E+10
1.0000E+00	to	1.3300E+00	8.5474E+11	9.9578E+11
1.3300E+00	to	1.6600E+00	2.4145E+11	3.6096E+11
1.6600E+00	to	2.0000E+00	1.8811E+09	3.4425E+09
2.0000E+00	to	2.5000E+00	1.9824E+08	4.4604E+08
2.5000E+00	to	3.0000E+00	1.4958E+05	4.1134E+05
3.0000E+00	to	4.0000E+00	1.5569E-12	5.4493E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			1.5515E+13	1.0490E+13

0
0 total energy from nuclides with spectrum data = 1.0424E+13
0 total energy from nuclides with no spectrum data = 6.5928E+10
1 gamma source spectrum for decay step for BWR source term - plen ds4 - 0.50 year

182.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	9.1307E+11	2.7392E+10
5.0000E-02	to	1.0000E-01	2.3046E+10	1.7285E+09
1.0000E-01	to	2.0000E-01	3.4490E+10	5.1735E+09
2.0000E-01	to	3.0000E-01	1.0435E+10	2.6088E+09
3.0000E-01	to	4.0000E-01	7.0115E+09	2.4540E+09
4.0000E-01	to	6.0000E-01	1.4331E+11	7.1657E+10
6.0000E-01	to	8.0000E-01	5.2690E+12	3.6883E+12
8.0000E-01	to	1.0000E+00	3.2856E+10	2.9571E+10
1.0000E+00	to	1.3300E+00	8.2736E+11	9.6387E+11
1.3300E+00	to	1.6600E+00	2.3365E+11	3.4930E+11
1.6600E+00	to	2.0000E+00	6.6705E+08	1.2207E+09
2.0000E+00	to	2.5000E+00	7.1882E+07	1.6173E+08
2.5000E+00	to	3.0000E+00	5.7145E+04	1.5715E+05
3.0000E+00	to	4.0000E+00	1.5502E-12	5.4257E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			7.4950E+12	5.1434E+12

total energy from nuclides with spectrum data = 5.1056E+12
total energy from nuclides with no spectrum data = 3.7825E+10

gamma source spectrum for decay step for BWR source term - plen ds4 - 1 year

365.25 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	5.7336E+11	1.7201E+10
5.0000E-02	to	1.0000E-01	7.3884E+09	5.5413E+08
1.0000E-01	to	2.0000E-01	2.4552E+10	3.6828E+09
2.0000E-01	to	3.0000E-01	3.2929E+09	8.2322E+08
3.0000E-01	to	4.0000E-01	5.4642E+09	1.9125E+09
4.0000E-01	to	6.0000E-01	1.1957E+11	5.9785E+10
6.0000E-01	to	8.0000E-01	8.2580E+11	5.7806E+11
8.0000E-01	to	1.0000E+00	1.0306E+10	9.2750E+09
1.0000E+00	to	1.3300E+00	7.7395E+11	9.0165E+11
1.3300E+00	to	1.6600E+00	2.1855E+11	3.2673E+11
1.6600E+00	to	2.0000E+00	8.6814E+07	1.5887E+08
2.0000E+00	to	2.5000E+00	1.3269E+07	2.9856E+07
2.5000E+00	to	3.0000E+00	1.3957E+04	3.8383E+04
3.0000E+00	to	4.0000E+00	1.5327E-12	5.3646E-12
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
totals			2.5623E+12	1.8999E+12

total energy from nuclides with spectrum data = 1.8872E+12
total energy from nuclides with no spectrum data = 1.2662E+10

gamma source spectrum for decay step for BWR source term - plen ds4 - 2 year

730.50 day time of the requested nuclides

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	3.0350E+11	9.1051E+09
5.0000E-02	to	1.0000E-01	3.7177E+09	2.7883E+08
1.0000E-01	to	2.0000E-01	1.7972E+10	2.6959E+09
2.0000E-01	to	3.0000E-01	1.2111E+09	3.0279E+08
3.0000E-01	to	4.0000E-01	4.1406E+09	1.4492E+09

4.0000E-01 to	6.0000E-01	9.1153E+10	4.5576E+10
6.0000E-01 to	8.0000E-01	6.2288E+10	4.3602E+10
8.0000E-01 to	1.0000E+00	2.9634E+09	2.6671E+09
1.0000E+00 to	1.3300E+00	6.7483E+11	7.8618E+11
1.3300E+00 to	1.6600E+00	1.9057E+11	2.8490E+11
1.6600E+00 to	2.0000E+00	1.5553E+06	2.8461E+06
2.0000E+00 to	2.5000E+00	4.6423E+06	1.0445E+07
2.5000E+00 to	3.0000E+00	7.1003E+03	1.9526E+04
3.0000E+00 to	4.0000E+00	1.4925E-12	5.2236E-12
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		1.3524E+12	1.1768E+12

total energy from nuclides with spectrum data = 1.1753E+12
total energy from nuclides with no spectrum data = 1.4878E+09
gamma source spectrum for decay step for BWR source term - plen ds4 - 5 year
1826.25 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	9.1068E+10	2.7320E+09
5.0000E-02 to	1.0000E-01	2.0753E+09	1.5564E+08
1.0000E-01 to	2.0000E-01	8.4446E+09	1.2667E+09
2.0000E-01 to	3.0000E-01	5.0112E+08	1.2528E+08
3.0000E-01 to	4.0000E-01	1.9325E+09	6.7639E+08
4.0000E-01 to	6.0000E-01	4.2484E+10	2.1242E+10
6.0000E-01 to	8.0000E-01	2.2007E+10	1.5405E+10
8.0000E-01 to	1.0000E+00	2.7766E+08	2.4990E+08
1.0000E+00 to	1.3300E+00	4.5425E+11	5.2920E+11
1.3300E+00 to	1.6600E+00	1.2828E+11	1.9178E+11
1.6600E+00 to	2.0000E+00	1.0648E+02	1.9486E+02
2.0000E+00 to	2.5000E+00	3.0443E+06	6.8496E+06
2.5000E+00 to	3.0000E+00	4.7204E+03	1.2981E+04
3.0000E+00 to	4.0000E+00	1.3992E-12	4.8972E-12
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
totals		7.5132E+11	7.6284E+11

total energy from nuclides with spectrum data = 7.6279E+11
total energy from nuclides with no spectrum data = 4.8934E+07
gamma source spectrum for decay step for BWR source term - plen ds4 - 10 year
3652.50 day time of the requested nuclides

energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	2.4847E+10	7.4540E+08
5.0000E-02 to	1.0000E-01	9.4829E+08	7.1122E+07
1.0000E-01 to	2.0000E-01	2.4616E+09	3.6924E+08
2.0000E-01 to	3.0000E-01	1.4518E+08	3.6296E+07
3.0000E-01 to	4.0000E-01	5.4876E+08	1.9207E+08
4.0000E-01 to	6.0000E-01	1.1936E+10	5.9682E+09
6.0000E-01 to	8.0000E-01	6.1912E+09	4.3339E+09
8.0000E-01 to	1.0000E+00	2.5617E+07	2.3055E+07
1.0000E+00 to	1.3300E+00	2.3532E+11	2.7415E+11
1.3300E+00 to	1.6600E+00	6.6454E+10	9.9349E+10
1.6600E+00 to	2.0000E+00	8.0041E+01	1.4647E+02
2.0000E+00 to	2.5000E+00	1.5771E+06	3.5484E+06
2.5000E+00 to	3.0000E+00	2.4454E+03	6.7248E+03

	3.0000E+00 to	4.0000E+00	1.2592E-12	4.4072E-12
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.4888E+11	3.8524E+11

0
0 total energy from nuclides with spectrum data = 3.8522E+11
0 total energy from nuclides with no spectrum data = 1.4591E+07
1 gamma source spectrum for decay step for BWR source term - plen ds4 - 15 year
0 5478.75 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	7.9283E+09	2.3785E+08
5.0000E-02 to	1.0000E-01	4.5767E+08	3.4326E+07
1.0000E-01 to	2.0000E-01	7.3781E+08	1.1067E+08
2.0000E-01 to	3.0000E-01	4.3110E+07	1.0777E+07
3.0000E-01 to	4.0000E-01	1.5720E+08	5.5021E+07
4.0000E-01 to	6.0000E-01	3.3538E+09	1.6769E+09
6.0000E-01 to	8.0000E-01	1.7476E+09	1.2234E+09
8.0000E-01 to	1.0000E+00	1.6363E+07	1.4727E+07
1.0000E+00 to	1.3300E+00	1.2191E+11	1.4202E+11
1.3300E+00 to	1.6600E+00	3.4427E+10	5.1468E+10
1.6600E+00 to	2.0000E+00	7.0767E+01	1.2950E+02
2.0000E+00 to	2.5000E+00	8.1700E+05	1.8382E+06
2.5000E+00 to	3.0000E+00	1.2668E+03	3.4838E+03
3.0000E+00 to	4.0000E+00	1.1333E-12	3.9664E-12
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		1.7078E+11	1.9686E+11

0
0 total energy from nuclides with spectrum data = 1.9685E+11
0 total energy from nuclides with no spectrum data = 5.4037E+06
1 gamma source spectrum for decay step for BWR source term - plen ds4 - 20 year
0 7305.00 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	2.7454E+09	8.2363E+07
5.0000E-02 to	1.0000E-01	2.2778E+08	1.7084E+07
1.0000E-01 to	2.0000E-01	2.3128E+08	3.4692E+07
2.0000E-01 to	3.0000E-01	1.3325E+07	3.3312E+06
3.0000E-01 to	4.0000E-01	4.5741E+07	1.6009E+07
4.0000E-01 to	6.0000E-01	9.4241E+08	4.7121E+08
6.0000E-01 to	8.0000E-01	4.9915E+08	3.4941E+08
8.0000E-01 to	1.0000E+00	1.3671E+07	1.2303E+07
1.0000E+00 to	1.3300E+00	6.3155E+10	7.3576E+10
1.3300E+00 to	1.6600E+00	1.7835E+10	2.6663E+10
1.6600E+00 to	2.0000E+00	6.2569E+01	1.1450E+02
2.0000E+00 to	2.5000E+00	4.2325E+05	9.5232E+05
2.5000E+00 to	3.0000E+00	6.5629E+02	1.8048E+03
3.0000E+00 to	4.0000E+00	1.0199E-12	3.5697E-12
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		8.5709E+10	1.0123E+11

0
0 total energy from nuclides with spectrum data = 1.0122E+11

```
0                       total energy from nuclides with no spectrum data =   2.7571E+06
1                       gamma source spectrum for   decay step for BWR source term - plen ds4 - 25 year
0                                          9131.25  day time of the requested nuclides
0                            energy interval in mev       photons / second     mev / second
0
                        1.0000E-02 to       5.0000E-02        1.0488E+09        3.1464E+07
                        5.0000E-02 to       1.0000E-01        1.1547E+08        8.6604E+06
                        1.0000E-01 to       2.0000E-01        7.7449E+07        1.1617E+07
                        2.0000E-01 to       3.0000E-01        4.3824E+06        1.0956E+06
                        3.0000E-01 to       4.0000E-01        1.3673E+07        4.7854E+06
                        4.0000E-01 to       6.0000E-01        2.6484E+08        1.3242E+08
                        6.0000E-01 to       8.0000E-01        1.4836E+08        1.0385E+08
                        8.0000E-01 to       1.0000E+00        1.2311E+07        1.1080E+07
                        1.0000E+00 to       1.3300E+00        3.2718E+10        3.8117E+10
                        1.3300E+00 to       1.6600E+00        9.2396E+09        1.3813E+10
                        1.6600E+00 to       2.0000E+00        5.5322E+01        1.0124E+02
                        2.0000E+00 to       2.5000E+00        2.1927E+05        4.9336E+05
                        2.5000E+00 to       3.0000E+00        3.4000E+02        9.3500E+02
                        3.0000E+00 to       4.0000E+00        9.1793E-13        3.2127E-12
                        4.0000E+00 to       5.0000E+00         .0000E+00         .0000E+00
                        5.0000E+00 to       6.5000E+00         .0000E+00         .0000E+00
                        6.5000E+00 to       8.0000E+00         .0000E+00         .0000E+00
                        8.0000E+00 to       1.0000E+01         .0000E+00         .0000E+00
0                       totals                                4.3643E+10        5.2235E+10
0
0                       total energy from nuclides with spectrum data    =   5.2233E+10
0                       total energy from nuclides with no spectrum data =   1.9523E+06
1
1  * normal termination of execution *
0                                       table of contents for material tables
0                                         case or subcase printed      page

                                                     1                  1
0ndset          33
          33          4          1         27          6          0          0          0          0          0
           0          0          0          0          0          2         -1       1698        690        130
         880       7935          0          5         99          7          9         93         18         18
          18          0          0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     14 entries read
0   74* array     14 entries read
0   75$ array     14 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
           0          0          0          0          0          0          0          0          0          0
           0          0
```

```
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935           20            6           18         1697
0mmn            19
           10           10            0            0            1            3            0            0            0            0
           21          100           14            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero           4
            0          689          129          879
0pow             3
   .000000E+00  .000000E+00  .000000E+00
0 linp           9
           6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              3.4634E+00   1.9421E+02   1.9768E+02
 start of interval flux =          1.59016E+13
 n-gamma, fission and total mev/fission =              3.8366E+00   1.9431E+02   1.9815E+02
 start of interval flux =          1.59426E+13
 n-gamma, fission and total mev/fission =              3.9266E+00   1.9441E+02   1.9834E+02
 start of interval flux =          1.59937E+13
 n-gamma, fission and total mev/fission =              4.0155E+00   1.9451E+02   1.9852E+02
 start of interval flux =          1.60555E+13
 n-gamma, fission and total mev/fission =              4.1071E+00   1.9460E+02   1.9871E+02
 start of interval flux =          1.61265E+13
 n-gamma, fission and total mev/fission =              4.2012E+00   1.9469E+02   1.9889E+02
 start of interval flux =          1.62057E+13
 n-gamma, fission and total mev/fission =              4.2975E+00   1.9477E+02   1.9907E+02
 start of interval flux =          1.62923E+13
 n-gamma, fission and total mev/fission =              4.3955E+00   1.9486E+02   1.9925E+02
 start of interval flux =          1.63856E+13
 n-gamma, fission and total mev/fission =              4.4950E+00   1.9494E+02   1.9943E+02
 start of interval flux =          1.64852E+13
 n-gamma, fission and total mev/fission =              4.5958E+00   1.9502E+02   1.9961E+02
 start of interval flux =          1.65903E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 9000 MWd/MTU
0ndset          33
           33            4            2           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
           0            0            0            0            0            0            0            0            0            0
           0            0
```

```
Otherm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
Onon             5
          7935           20            6           18         1697
Ommn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
Otconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
Omzero           4
            21          689          129          879
Opow             3
  4.349999E+00 1.799989E+03 1.624719E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              4.6634E+00       1.9507E+02       1.9974E+02
 start of interval flux =         1.65420E+13
 n-gamma, fission and total mev/fission =              4.7547E+00       1.9515E+02       1.9990E+02
 start of interval flux =         1.66661E+13
 n-gamma, fission and total mev/fission =              4.8528E+00       1.9522E+02       2.0007E+02
 start of interval flux =         1.67942E+13
 n-gamma, fission and total mev/fission =              4.9526E+00       1.9529E+02       2.0025E+02
 start of interval flux =         1.69266E+13
 n-gamma, fission and total mev/fission =              5.0535E+00       1.9536E+02       2.0042E+02
 start of interval flux =         1.70633E+13
 n-gamma, fission and total mev/fission =              5.1554E+00       1.9544E+02       2.0059E+02
 start of interval flux =         1.72039E+13
 n-gamma, fission and total mev/fission =              5.2582E+00       1.9551E+02       2.0077E+02
 start of interval flux =         1.73483E+13
 n-gamma, fission and total mev/fission =              5.3619E+00       1.9558E+02       2.0094E+02
 start of interval flux =         1.74963E+13
 n-gamma, fission and total mev/fission =              5.4664E+00       1.9565E+02       2.0111E+02
 start of interval flux =         1.76478E+13
 n-gamma, fission and total mev/fission =              5.5717E+00       1.9572E+02       2.0129E+02
 start of interval flux =         1.78027E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 18000 MWd/MTU
Ondset          33
            33            4            3           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
```

```
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935            20             6            18          1697
0mmn             19
            10            10             0             0             1             3             0             0             0            10
            21           100             0             4             3             0             2             1             0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21           689           129           879
0pow              3
  4.349999E+00 3.599977E+03 1.723304E+13
0 linp            9
             6             0            51            26             2          3000          1000          1697             5
 n-gamma, fission and total mev/fission =              5.4841E+00       1.9575E+02       2.0124E+02
 start of interval flux =         1.78777E+13
 n-gamma, fission and total mev/fission =              5.5780E+00       1.9582E+02       2.0139E+02
 start of interval flux =         1.80675E+13
 n-gamma, fission and total mev/fission =              5.6853E+00       1.9588E+02       2.0156E+02
 start of interval flux =         1.82599E+13
 n-gamma, fission and total mev/fission =              5.7941E+00       1.9594E+02       2.0174E+02
 start of interval flux =         1.84550E+13
 n-gamma, fission and total mev/fission =              5.9038E+00       1.9601E+02       2.0191E+02
 start of interval flux =         1.86527E+13
 n-gamma, fission and total mev/fission =              6.0146E+00       1.9607E+02       2.0209E+02
 start of interval flux =         1.88529E+13
 n-gamma, fission and total mev/fission =              6.1262E+00       1.9614E+02       2.0226E+02
 start of interval flux =         1.90557E+13
 n-gamma, fission and total mev/fission =              6.2387E+00       1.9620E+02       2.0244E+02
 start of interval flux =         1.92610E+13
 n-gamma, fission and total mev/fission =              6.3520E+00       1.9627E+02       2.0262E+02
 start of interval flux =         1.94687E+13
 n-gamma, fission and total mev/fission =              6.4662E+00       1.9633E+02       2.0280E+02
 start of interval flux =         1.96787E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 27000 MWd/MTU
0ndset           33
            33             4             4            27             6             0             0             0             0             0
             0             0             0             0             0             2            -1          1698           690           130
           880          7935             0             5            99             7             9            93            18            18
            18             0             0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0             0             0             0             0             0             0             0             0             0
             0             0
```

```
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 5.399966E+03 1.888091E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              6.4027E+00       1.9638E+02       2.0278E+02
 start of interval flux =         1.98457E+13
 n-gamma, fission and total mev/fission =              6.5157E+00       1.9644E+02       2.0296E+02
 start of interval flux =         2.00911E+13
 n-gamma, fission and total mev/fission =              6.6367E+00       1.9650E+02       2.0314E+02
 start of interval flux =         2.03381E+13
 n-gamma, fission and total mev/fission =              6.7589E+00       1.9656E+02       2.0332E+02
 start of interval flux =         2.05866E+13
 n-gamma, fission and total mev/fission =              6.8818E+00       1.9663E+02       2.0351E+02
 start of interval flux =         2.08365E+13
 n-gamma, fission and total mev/fission =              7.0055E+00       1.9669E+02       2.0370E+02
 start of interval flux =         2.10878E+13
 n-gamma, fission and total mev/fission =              7.1300E+00       1.9676E+02       2.0389E+02
 start of interval flux =         2.13403E+13
 n-gamma, fission and total mev/fission =              7.2552E+00       1.9682E+02       2.0408E+02
 start of interval flux =         2.15940E+13
 n-gamma, fission and total mev/fission =              7.3810E+00       1.9689E+02       2.0427E+02
 start of interval flux =         2.18489E+13
 n-gamma, fission and total mev/fission =              7.5075E+00       1.9695E+02       2.0446E+02
 start of interval flux =         2.21048E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 36000 MWd/MTU
0ndset          33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
```

```
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 7.199954E+03 2.111540E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              7.4484E+00       1.9701E+02       2.0446E+02
 start of interval flux =         2.23562E+13
 n-gamma, fission and total mev/fission =              7.5771E+00       1.9707E+02       2.0465E+02
 start of interval flux =         2.26543E+13
 n-gamma, fission and total mev/fission =              7.7133E+00       1.9713E+02       2.0484E+02
 start of interval flux =         2.29524E+13
 n-gamma, fission and total mev/fission =              7.8500E+00       1.9719E+02       2.0504E+02
 start of interval flux =         2.32498E+13
 n-gamma, fission and total mev/fission =              7.9870E+00       1.9726E+02       2.0524E+02
 start of interval flux =         2.35464E+13
 n-gamma, fission and total mev/fission =              8.1243E+00       1.9732E+02       2.0545E+02
 start of interval flux =         2.38421E+13
 n-gamma, fission and total mev/fission =              8.2617E+00       1.9739E+02       2.0565E+02
 start of interval flux =         2.41369E+13
 n-gamma, fission and total mev/fission =              8.3993E+00       1.9745E+02       2.0585E+02
 start of interval flux =         2.44307E+13
 n-gamma, fission and total mev/fission =              8.5368E+00       1.9752E+02       2.0606E+02
 start of interval flux =         2.47234E+13
 n-gamma, fission and total mev/fission =              8.6744E+00       1.9759E+02       2.0626E+02
 start of interval flux =         2.50148E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 45000 MWd/MTU
0ndset          33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
             0            0
```

```
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
          7935           20            6           18         1697
0mmn            19
            10           10            0            0            1            3            0            0            0           10
            21          100            0            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
            21          689          129          879
0pow             3
  4.349999E+00 8.999942E+03 2.386569E+13
0 linp           9
             6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =              8.8247E+00       1.9766E+02       2.0648E+02
 start of interval flux =         2.53316E+13
 n-gamma, fission and total mev/fission =              9.0559E+00       1.9777E+02       2.0683E+02
 start of interval flux =         2.58164E+13
 n-gamma, fission and total mev/fission =              9.2863E+00       1.9788E+02       2.0717E+02
 start of interval flux =         2.62967E+13
 n-gamma, fission and total mev/fission =              9.5155E+00       1.9800E+02       2.0751E+02
 start of interval flux =         2.67716E+13
 n-gamma, fission and total mev/fission =              9.7434E+00       1.9811E+02       2.0785E+02
 start of interval flux =         2.72405E+13
 n-gamma, fission and total mev/fission =              9.9733E+00       1.9822E+02       2.0819E+02
 start of interval flux =         2.77021E+13
 n-gamma, fission and total mev/fission =              1.0197E+01       1.9832E+02       2.0852E+02
 start of interval flux =         2.81566E+13
 n-gamma, fission and total mev/fission =              1.0419E+01       1.9843E+02       2.0885E+02
 start of interval flux =         2.86030E+13
 n-gamma, fission and total mev/fission =              1.0638E+01       1.9853E+02       2.0917E+02
 start of interval flux =         2.90403E+13
 n-gamma, fission and total mev/fission =              1.0854E+01       1.9863E+02       2.0949E+02
 start of interval flux =         2.94678E+13
0 case or subcase    1  BWR SNF Assembly - Plenum - deplete to 60000 MWd/MTU
0ndset          33
            33            4            5           27            6            0            0            0            0            0
             0            0            0            0            0            2           -1         1698          690          130
           880         7935            0            5           99            7            9           93           18           18
            18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt           12
             0            0            0            0            0            0            0            0            0            0
```

```
            0            0
Otherm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
Onon              5
         7935           20            6           18         1697
Ommn             19
            0           10            0            0            1            1            0            0            0           10
           21          100            0            4            3            0            2            0            0
Otconst           5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
Omzero            4
           21          689          129          879
Opow              3
  4.349999E+00 1.199992E+04 2.152537E+13
0 linp            9
            6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Plenum - decay
0   56$ array     20 entries read
0    5t
```

```
0********************************************************************************
 *                                                                              *
 *                    scale4.2  bulletin  board                                 *
 *                    --------  --------  -----                                 *
 *                                                                              *
 *      welcome to the configuration controlled version of scale4.2.            *
 *      any problems should be reported to kay martin at 4-9213.                *
 *                                                                              *
 *      updates that have been made from version 4.1 to 4.2 include:            *
 *                                                                              *
 *      nitawl:  parameter added to prevent exponent underflows for very        *
 *      dilute resonance calculations on workstation.  (mrr 93-011)             *
 *                                                                              *
 *      nitawl:   corrected discrepancies in maximum fractional energy loss     *
 *      of neutron in admixed moderator calculation and simpson rule            *
 *      calculation of collision density as documented in "improved             *
 *      calculation of flux shapes with the resonance shielding code            *
 *      nitawl", by j. oppe, ecn-i--93-003.  affects all calculations.          *
 *      impact will vary, but is insignificant for hydrogen-moderated           *
 *      systems. (mrr 93-030)                                                   *
 *                                                                              *
 *      sas4:  added option of axial source profile input for both radial       *
 *      and axial dose calculations. also added option idr = 2 for              *
 *      estimation to point detectors from collisions in both top and           *
 *      bottom halves of geometry.  (mrr 92-016)                                *
 *                                                                              *
 *      morse:  modifications made for compatibility with the new options in    *
 *      sas4 (i.e., the axial source profile input option and                   *
 *      the option idr = 2 for estimation to point detectors from collisions    *
 *      in both top and bottom halves of geometry).  (mrr 92-016)               *
 *                                                                              *
 *      csas & keno-v.a:  error checking during input processing was added      *
 *      so that these modules terminate with an error message if input          *
 *      errors are encountered.  (mrr 93-013, 93-014, 93-015, 93-018)           *
 *                                                                              *
 *      keno-v.a:  corrections made for applying differential albedo            *
 *      boundary conditions to supergrouped problems where global unit          *
 *      contains only an array specification.  effect on keff is very large     *
 *      for this type of problem.  (mrr 93-033)                                 *
 *                                                                              *
 *      keno-v.a:  corrected an error introduced with modification on may 24,   *
 *      1993 (mrr 93-033). this error affected problems with mirror or          *
 *      periodic boundary conditions and could cause problem to loop, fail,     *
 *      or run incorrectly.                                                     *
 *                                                                              *
 *      xsdrnpm:  corrected calculation of number of direct access data         *
 *      blocks needed to weight the cross sections to prevent occasional        *
 *      failure.  improved calculation of balance tables.  (mrr 93-021)         *
 *                                                                              *
 *      origen-s:  modified program to read combined binary libraries that      *
 *      include multi-cycle cross sections.  add option to edit binary          *
 *      library.  (mrr 93-026)                                                  *
 *                                                                              *
 *      sas2:  modified to produce combined binary libraries for origen-s.      *
 *      (mrr 93-027)                                                            *
 *                                                                              *
 *      couple:  modified to allow combined binary libraries to be made by      *
 *      sas2.  (mrr 93-031)                                                     *
 *                                                                              *
 *      origen-s couple, sas2:  modified programs to accept the new updated     *
```

```
*      and expanded decay data and fission product yield libraries.  (mrr      *
*      92-088, 92-025, 92-026)                                                 *
*                                                                              *
*      origen-s libraries:  the six standard origen-s card image libraries     *
*      have been replaced by two new libraries, end6dec and xsectpho.          *
*      end6dec contains the updated and expanded decay data library based      *
*      on endf/b-vi data.  xsectpho contains the basic cross section and       *
*      photon spectra data and updated fission product yield data based on     *
*      endf/b-v data.  (drr 92-006, 007, 008, 009, 010, and drr 93-001,        *
*      002, 003, 006, 008, 009)                                                *
*                                                                              *
*      std. comp. library:  in drr 92-033, the following nuclides were         *
*      changed to turn on resonance processing flag but should not have        *
*      been changed:  niss, fess, mnss, crss, niinconel, crinconel,            *
*      feinconel.  flags for these nuclides have now been returned to off.     *
*      (drr 93-014)                                                            *
*                                                                              *
*      heating7:  replaced heating6 with version 7.2.  (mrr 93-038)            *
*                                                                              *
*      htas1:  updated for compatibility with heating7 and to interact         *
*      effectively with ocular.  fin effectiveness technique was added.        *
*      (mrr 93-036)                                                            *
*                                                                              *
*      ocular:  made compatible with heating7 and htas1 on mainframe and       *
*      workstation.  (mrr 93-037)                                              *
*                                                                              *
*      sas2:  corrected so that 'parm=skipshipdata' would work on              *
*      workstation.  (mrr 93-051)                                              *
*                                                                              *
*      aim:  ft47ft001 is no longer require for aim to execute on              *
*      workstation.  (mrr 93-052)                                              *
*                                                                              *
*      27group, 27burnup, and 218group - these libraries have been             *
*      updated to correct an error found in the chlorine cross-sections.       *
*      (drr93-022)                                                             *
*                                                                              *
*      bonami:  corrected so that a case with a number density of zero         *
*      for a nuclide that has bondarenko data will run without failing.        *
*      (mrr 93-060)                                                            *
*                                                                              *
*      csas:  corrected calculation of dancoff correction factor for           *
*      cylindrical cells.  note that previous calculations of small            *
*      cylindrical cells (o.d. < 0.3 cm) gave non-conservative keff            *
*      values.  also corrected dancoff factor for multiregion slab             *
*      cell with vacuum boundary conditions to be set to zero.                 *
*      (mrr 93-065)                                                            *
*                                                                              *
*      csas, sas1, sas2, sas3, sas4:  error in miplib was corrected.  for      *
*      resonance materials that are not part of the unit cell in lattice-      *
*      cell or multiregion problems, the dancoff factor defaulted  to -1.      *
*      check your nitawl output in any previous scale-4.2 calculations         *
*      for dancoff factors =-1.                                                *
*      (mrr 93-070)                                                            *
*                                                                              *
********************************************************************************
1          primary module access and input record ( scale driver - 10/01/86 - 14:00 )
-    module origens  will be called
       0$$  a4 33 a8 26 e
       1$$  1
          1t
```

```
 BWR SNF Assembly deplete to 9000 MWd/MTU
3$$  33 0 1 a16 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360    922380
        60000     80000    130000    140000
       220000    240000    250000    260000
       270000    280000    290000    400000
       410000    500000
74**     89.4    10100.0      46.5  189764.1
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
```

```
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 45000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 60000 MWd/MTU
3$$  33 0 5 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.2500000 e
   5t
BWR SNF Assembly - Top - deplete to 60000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
66$$ 12r0 e
   6t
 BWR SNF Assembly Decay
3$$  33 0 5 a33 -88 e
   2t
35$$ 0
   4t
56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
   5t
BWR SNF Assembly - Top - decay
per ONE BWR Fuel Assembly - Top Region - ds4t
60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
61** f1-15
65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
81$$ 2 0 26 1 e
82$$ f4
   6t
  decay step for BWR source term - top ds4 - discharge
  decay step for BWR source term - top ds4 - 0.25 year
  decay step for BWR source term - top ds4 - 0.50 year
  decay step for BWR source term - top ds4 - 1 year
  decay step for BWR source term - top ds4 - 2 year
  decay step for BWR source term - top ds4 - 5 year
  decay step for BWR source term - top ds4 - 10 year
  decay step for BWR source term - top ds4 - 15 year
  decay step for BWR source term - top ds4 - 20 year
  decay step for BWR source term - top ds4 - 25 year
```

```
      56$$ f0
         5t
0   module origens  is finished. completion code     0. cpu time used    19.00 (seconds).
1    ooooooooooo    rrrrrrrrrrrr    iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
    oooooooooooo   rrrrrrrrrrrrr   iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nnn         nn  ssssssssssss
    oo         oo   rr         rr        ii         gg         gg   ee              nnnn        nn  ss         ss
    oo         oo   rr         rr        ii         gg              ee              nn nn       nn  ss
    oo         oo   rr         rr        ii         gg              ee              nn   nn     nn  ss
    oo         oo   rrrrrrrrrrrrr        ii         gg    gggggg    eeeeeeeee       nn    nn    nn  sssssssssss
    oo         oo   rrrrrrrrrrrr         ii         gg    gggggg    eeeeeeeee       nn     nn   nn   sssssssssss
    oo         oo   rr       rr          ii         gg         gg   ee              nn      nn  nn             ss
    oo         oo   rr        rr         ii         gg         gg   ee              nn       nn nn             ss
    oo         oo   rr         rr        ii         gg         gg   ee              nn        nnnn  ss         ss
    oooooooooooo   rr          rr  iiiiiiiiiiii    gggggggggggg   eeeeeeeeeeeee   nn         nnn  sssssssssssss
     ooooooooooo   rr          rr  iiiiiiiiiiii     gggggggggg    eeeeeeeeeeeee   nn          nn   sssssssssss
0

    ll              ooooooooooo    tttttttttttt    zzzzzzzzzzzzz
    ll             oooooooooooo   tttttttttttt    zzzzzzzzzzzz
    ll             oo         oo        tt                  zz
    ll             oo         oo        tt                 zz
    ll             oo         oo        tt                zz
    ll             oo         oo        tt               zz
    ll             oo         oo        tt              zz
    ll             oo         oo        tt             zz
    ll             oo         oo        tt            zz
    ll             oo         oo        tt           zz
    llllllllllll   oooooooooooo        tt          zzzzzzzzzzzz
    llllllllllll    ooooooooooo        tt         zzzzzzzzzzzzz
0

         11        22222222222                //     0000000      666666666666              //   99999999999    666666666666
        111       2222222222222               //    000000000    6666666666666             //   9999999999999  6666666666666
       1111       22         22              //    00        00   66                       //   99         99  66
         11                  22             //    00         00   66                      //    99         99  66
         11                  22            //     00         00   66                     //     99         99  66
         11                22             //      00         00   666666666666          //      9999999999999  666666666666
         11              22              //       00         00   6666666666666        //       999999999999  6666666666666
         11            22               //        00         00   66         66       //                  99  66         66
         11          22                //         00         00   66         66      //                   99  66         66
         11        22                 //          00        00   66         66     //                    99  66         66
      11111111    2222222222222     //             000000000    6666666666666    //           9999999999999  6666666666666
      11111111    2222222222222    //               0000000      66666666666    //            999999999999    66666666666
0

         11        33333333333                    5555555555555   5555555555555                  33333333333    88888888888
        111       3333333333333                   5555555555555   5555555555555                 3333333333333  8888888888888
       1111       33         33        :::        55              55                   :::      33         33  88         88
         11                  33        :::        55              55                   :::                 33  88         88
         11                  33        :::        55              55                   :::                 33  88         88
         11                333                    555555555555    555555555555                          333    88888888888
         11                333                    5555555555555   5555555555555                         333    88888888888
         11                  33        :::                  55              55       :::                 33  88         88
         11                  33        :::                  55              55       :::                 33  88         88
         11        33        33        :::        55        55   55        55       :::      33         33  88         88
      11111111    3333333333333                   5555555555555   5555555555555                 3333333333333  8888888888888
      11111111     33333333333                     55555555555     55555555555                   33333333333    88888888888
1
0                                 sssssssssss     cccccccccc      aaaaaaaaa     ll              eeeeeeeeeeeee
                                 ssssssssssss   cccccccccccc    aaaaaaaaaaa    ll              eeeeeeeeeeeee
```

```
ss         ss   cc         cc   aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
ss              cc              aa         aa   ll              ee
sssssssssssss   cc              aaaaaaaaaaaaa   ll              eeeeeeeee
 sssssssssssss  cc              aaaaaaaaaaaaa   ll              eeeeeeeee
            ss   cc              aa         aa   ll              ee
            ss   cc              aa         aa   ll              ee
ss         ss   cc         cc   aa         aa   ll              ee
sssssssssssss   cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
 ssssssssssss    cccccccccccc   aa         aa   lllllllllllll   eeeeeeeeeeeee
```

```
*******************************************************************************
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                 program verification information                     *****
*****                                                                     *****
*****                code system:    scale  version:    4.2                *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*****                                                                     *****
*****                                                                     *****
*****              program:  origns                                       *****
*****                                                                     *****
*****        creation date:  04/27/95                                     *****
*****                                                                     *****
*****              library:  /neutronics/scale/exe                        *****
*****                                                                     *****
*****                                                                     *****
*****    this is not a   scale  configuration controlled code             *****
*****                                                                     *****
*****              jobname:  lotz                                         *****
*****                                                                     *****
*****    date of execution:  12/06/96                                     *****
*****                                                                     *****
*****    time of execution:  13:55:38                                     *****
*****                                                                     *****
*****                                                                     *****
*******************************************************************************
*******************************************************************************
*******************************************************************************
1
1            * input echo * (with break between col. 1-72 and 73-80)
0        note:  only comments are permitted after column 72.
0--------------------only this is used as input data.--------------------          comment or title end
0..............................columns 1-72..............................                ..73-80.

 0$$  a4 33 a8 26 e
 1$$  1
    1t
  BWR SNF Assembly deplete to 9000 MWd/MTU
 3$$  33 0 1 a16 2 a33 0 e
    2t
 35$$ 0
    4t
```

```
56$$ 10 10 a6 3 a10 0 a13 18 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
73$$   922340    922350    922360     922380
        60000     80000    130000     140000
       220000    240000    250000     260000
       270000    280000    290000     400000
       410000    500000
74**     89.4    10100.0      46.5  189764.1
          0.1       0.2       0.4       4.4
          1.2      53.7       3.4     163.8
          0.5      64.8       0.2     176.3
          0.5       2.5
75$$  4r2 14r4
   6t
 BWR SNF Assembly deplete to 18000 MWd/MTU
3$$  33 0 2 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 27000 MWd/MTU
3$$  33 0 3 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
66$$ 12r0 e
   6t
 BWR SNF Assembly deplete to 36000 MWd/MTU
3$$  33 0 4 a33 0 e
   2t
35$$ 0
   4t
56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
57** 0.0 0.0 1.0-5 0.1500000 e
   5t
BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
per ONE BWR Fuel Assembly - Top Region - ds4t
58** 10r4.35
60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
```

```
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 45000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.1500000 e
    5t
 BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds4t
 58** 10r4.35
 60** 41.0 82.0 123.0 164.0 205.0 246.0 287.0 328.0 369.0 413.793103
 66$$ 12r0 e
    6t
  BWR SNF Assembly deplete to 60000 MWd/MTU
 3$$  33 0 5 a33 0 e
    2t
 35$$ 0
    4t
 56$$ 10 10 a6 3 a10 10 a13 0 4 3 0 2 1 e
 57** 0.0 0.0 1.0-5 0.2500000 e
    5t
 BWR SNF Assembly - Top - deplete to 60000 MWd/MTU
 per ONE BWR Fuel Assembly - Top Region - ds4t
 58** 10r4.35
 60** 69. 138. 207.0 276.0 345.0 414.0 483.0 552.0 621.0 689.655172
 66$$ 12r0 e
    6t
  BWR SNF Assembly Decay
 3$$  33 0 5 a33 -88 e
    2t
 35$$ 0
    4t
 56$$  0 10 a6 1 a10 10 a13 0 4 3 0 2 e
    5t
 BWR SNF Assembly - Top - decay
 per ONE BWR Fuel Assembly - Top Region - ds4t
 60** 1 90 182.50 365.25 730.5 1826.25 3652.5 5478.75 7305.0 9131.25
 61** f1-15
 65$$ 3z 1 2z 1 a25 0 2z 0 a46 0 2z 0 e
 81$$ 2 0 26 1 e
 82$$ f4
    6t
   decay step for BWR source term - top ds4 - discharge
   decay step for BWR source term - top ds4 - 0.25 year
   decay step for BWR source term - top ds4 - 0.50 year
   decay step for BWR source term - top ds4 - 1 year
   decay step for BWR source term - top ds4 - 2 year
   decay step for BWR source term - top ds4 - 5 year
   decay step for BWR source term - top ds4 - 10 year
   decay step for BWR source term - top ds4 - 15 year
   decay step for BWR source term - top ds4 - 20 year
   decay step for BWR source term - top ds4 - 25 year
 56$$ f0
    5t
0when job "fails", make sure no fido input.....................................is out here!

0    0$ array     12 entries read
```

```
0    1$ array      1 entries read
0    1t
0         dbl. prec. machine word applied has, at least, a 16 significant figure accuracy.
0             short-lived split test fraction, qxn =    9.1188E-04
0             half-norm of matrix used, axn =    7.0000E+00
0             4-place-accuracy-retention ratio, ratio4 =    6.4516E-13
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  1 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                  fission product yields are from endf/b-v                    *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993     date library was produced
0                       1697     total number of nuclides in library
                         689     number of light-element nuclides
                         129     number of actinide nuclides
                         879     number of fission product nuclides
0                       7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...
```

```
          cross-section data taken from position number  2 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                   fission product yields are from endf/b-v                   *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  3 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
```

```
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *               photon libraries use an 18-energy-group structure              *
          *              the photon data are from the master photon data base,           *
          *               produced to include bremsstrahlung from uo2 matrix             *
          *                                                                              *
          *         see information above this box (if present) for later updates        *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                    .other identification and sizes of library.
0                     data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                   7/ 9/1993     date library was produced
0                        1697     total number of nuclides in library
                          689     number of light-element nuclides
                          129     number of actinide nuclides
                          879     number of fission product nuclides
0                        7935     number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  4 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
```

```
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                  .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                 7/ 9/1993    date library was produced
0                     1697    total number of nuclides in library
                       689    number of light-element nuclides
                       129    number of actinide nuclides
                       879    number of fission product nuclides
0                     7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *          made from modified card-image origen-s libraries of scale 4.2       *
          *      data from the light element, actinide, and fission product libraries    *
          *        decay data, including gamma and total energy, are from endf/b-vi      *
          *                                                                              *
          *      neutron flux spectrum factors and cross sections were produced from     *
          *     the "presas2" case updating all nuclides on the scale "burnup" library   *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
```

```
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
0                       1697    total number of nuclides in library
                         689    number of light-element nuclides
                         129    number of actinide nuclides
                         879    number of fission product nuclides
0                       7935    number of nonzero off-diagonal matrix elements
0         ********************************************************************************
0     3$ array     33 entries read
0     2t
1library information...

          cross-section data taken from position number  5 of library on unit 33.

          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          pass   1
          pass   0
          *scale-system control module sas2 library*
          used a time-dependent neutron spectrum, for each of the above passes
            pass 0 applies start-up fuel densiities
            pass n applies mid time densities of nth library interval
          first library updated was...
          ********************************************************************************
          *                                                                              *
          *            prelim lwr origen-s binary working library--id = 1143             *
          *         made from modified card-image origen-s libraries of scale 4.2        *
          *       data from the light element, actinide, and fission product libraries   *
          *         decay data, including gamma and total energy, are from endf/b-vi     *
          *                                                                              *
          *       neutron flux spectrum factors and cross sections were produced from    *
          *      the "presas2" case updating all nuclides on the scale "burnup" library  *
          *                                                                              *
          *                    fission product yields are from endf/b-v                  *
          *                                                                              *
          *              photon libraries use an 18-energy-group structure               *
          *             the photon data are from the master photon data base,            *
          *              produced to include bremsstrahlung from uo2 matrix              *
          *                                                                              *
          *        see information above this box (if present) for later updates         *
          *                                                                              *
          ********************************************************************************
          *                                                                              *
0         ********************************************************************************
0                   .other identification and sizes of library.
0                    data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                  7/ 9/1993    date library was produced
```

```
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
0    3$ array     33 entries read
0    2t
1library information...

         cross-section data taken from position number  5 of library on unit 33.

         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         pass   1
         pass   0
         *scale-system control module sas2 library*
         used a time-dependent neutron spectrum, for each of the above passes
           pass 0 applies start-up fuel densiities
           pass n applies mid time densities of nth library interval
         first library updated was...
         ******************************************************************************
         *                                                                            *
         *            prelim lwr origen-s binary working library--id = 1143            *
         *         made from modified card-image origen-s libraries of scale 4.2       *
         *      data from the light element, actinide, and fission product libraries   *
         *        decay data, including gamma and total energy, are from endf/b-vi     *
         *                                                                            *
         *      neutron flux spectrum factors and cross sections were produced from    *
         *     the "presas2" case updating all nuclides on the scale "burnup" library  *
         *                                                                            *
         *                  fission product yields are from endf/b-v                  *
         *                                                                            *
         *              photon libraries use an 18-energy-group structure             *
         *             the photon data are from the master photon data base,          *
         *              produced to include bremsstrahlung from uo2 matrix            *
         *                                                                            *
         *        see information above this box (if present) for later updates       *
         *                                                                            *
         ******************************************************************************
         *                                                                            *
0        ******************************************************************************
0                  .other identification and sizes of library.
0                   data set name:  /neutronics/scale/datalib/origen/binrylib/B4
0                7/ 9/1993    date library was produced
0                      1697    total number of nuclides in library
                        689    number of light-element nuclides
                        129    number of actinide nuclides
                        879    number of fission product nuclides
0                      7935    number of nonzero off-diagonal matrix elements
0        ******************************************************************************
1
    BWR SNF Assembly - Top - decay                                                    light elements        page    1
0                                        nuclide concentrations, grams
                                         basis =per ONE BWR Fuel Assembly - Top Region -
```

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 1	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03	1.51E-03
h 2	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06	2.26E-06
h 3	7.77E-10	7.77E-10	7.66E-10	7.55E-10	7.34E-10	6.94E-10	5.87E-10	4.43E-10	3.34E-10	2.52E-10	1.91E-10
he 3	1.91E-11	1.92E-11	2.97E-11	4.06E-11	6.15E-11	1.02E-10	2.09E-10	3.53E-10	4.62E-10	5.44E-10	6.05E-10
he 4	7.79E-04	7.79E-04	7.79E-04	7.79E-04	7.79E-04	7.79E-04	7.79E-04	7.79E-04	7.79E-04	7.79E-04	7.79E-04
li 6	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10	1.26E-10
li 7	1.14E-13	1.14E-13	1.14E-13	1.14E-13	1.14E-13	1.14E-13	1.14E-13	1.14E-13	1.14E-13	1.14E-13	1.14E-13
be 9	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06	1.63E-06
be 10	3.62E-08	3.62E-08	3.62E-08	3.62E-08	3.62E-08	3.62E-08	3.62E-08	3.62E-08	3.62E-08	3.62E-08	3.62E-08
b 10	4.96E-15	5.01E-15	8.83E-15	1.28E-14	2.07E-14	3.63E-14	8.34E-14	1.62E-13	2.40E-13	3.19E-13	3.97E-13
b 11	5.78E-14	5.78E-14	5.78E-14	5.78E-14	5.78E-14	5.78E-14	5.78E-14	5.78E-14	5.78E-14	5.78E-14	5.78E-14
c 12	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02	9.88E-02
c 13	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03	1.22E-03
c 14	5.80E-08	5.80E-08	5.80E-08	5.80E-08	5.80E-08	5.80E-08	5.80E-08	5.80E-08	5.79E-08	5.79E-08	5.79E-08
n 14	2.32E-11	2.32E-11	2.49E-11	2.67E-11	3.02E-11	3.72E-11	5.83E-11	9.34E-11	1.28E-10	1.63E-10	1.98E-10
n 15	2.36E-08	2.36E-08	2.36E-08	2.36E-08	2.36E-08	2.36E-08	2.36E-08	2.36E-08	2.36E-08	2.36E-08	2.36E-08
o 16	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01	1.99E-01
o 17	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05	8.08E-05
o 18	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04	4.59E-04
f 19	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10	9.61E-10
ne 20	2.59E-14	2.59E-14	2.59E-14	2.59E-14	2.59E-14	2.59E-14	2.59E-14	2.59E-14	2.59E-14	2.59E-14	2.59E-14
ne 21	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11	4.33E-11
ne 22	4.45E-09	4.45E-09	4.45E-09	4.45E-09	4.45E-09	4.45E-09	4.45E-09	4.45E-09	4.45E-09	4.45E-09	4.45E-09
na 23	3.63E-10	3.63E-10	3.63E-10	3.63E-10	3.63E-10	3.63E-10	3.63E-10	3.63E-10	3.63E-10	3.63E-10	3.63E-10
na 24	1.89E-09	6.09E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 24	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06	4.42E-06
mg 25	3.98E-05	3.98E-05	3.98E-05	3.98E-05	3.98E-05	3.98E-05	3.98E-05	3.98E-05	3.98E-05	3.98E-05	3.98E-05
mg 26	1.84E-05	1.84E-05	1.84E-05	1.84E-05	1.84E-05	1.84E-05	1.84E-05	1.84E-05	1.84E-05	1.84E-05	1.84E-05
al 27	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01	4.00E-01
si 28	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00	4.04E+00
si 29	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01	2.14E-01
si 30	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01	1.46E-01
si 31	5.58E-09	9.79E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	5.06E-12	5.06E-12	5.05E-12	5.05E-12	5.04E-12	5.02E-12	4.96E-12	4.86E-12	4.76E-12	4.66E-12	4.57E-12
p 31	7.06E-05	7.06E-05	7.06E-05	7.06E-05	7.06E-05	7.06E-05	7.06E-05	7.06E-05	7.06E-05	7.06E-05	7.06E-05
p 32	6.99E-10	6.66E-10	8.80E-12	9.93E-14	1.16E-15	1.14E-15	1.12E-15	1.10E-15	1.08E-15	1.06E-15	1.04E-15
p 33	1.95E-13	1.90E-13	1.66E-14	1.32E-15	8.92E-18	4.08E-22	3.90E-35	.00E+00	.00E+00	.00E+00	.00E+00
s 32	3.35E-08	3.35E-08	3.42E-08	3.42E-08	3.42E-08	3.42E-08	3.42E-08	3.42E-08	3.42E-08	3.42E-08	3.42E-08
s 33	1.19E-11	1.20E-11	1.21E-11	1.21E-11	1.21E-11	1.21E-11	1.21E-11	1.21E-11	1.21E-11	1.21E-11	1.21E-11
ar 40	5.07E-11	5.07E-11	5.07E-11	5.07E-11	5.07E-11	5.07E-11	5.07E-11	5.07E-11	5.07E-11	5.07E-11	5.07E-11
k 41	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.68E-12	1.68E-12
k 43	2.86E-14	1.36E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 42	3.41E-14	3.41E-14	3.41E-14	3.41E-14	3.41E-14	3.41E-14	3.41E-14	3.41E-14	3.41E-14	3.41E-14	3.41E-14
ca 43	8.65E-07	8.65E-07	8.65E-07	8.65E-07	8.65E-07	8.65E-07	8.65E-07	8.65E-07	8.65E-07	8.65E-07	8.65E-07
ca 44	6.72E-06	6.72E-06	6.72E-06	6.72E-06	6.72E-06	6.72E-06	6.72E-06	6.72E-06	6.72E-06	6.72E-06	6.72E-06
ca 45	1.72E-08	1.71E-08	1.17E-08	7.94E-09	3.66E-09	7.81E-10	7.56E-12	3.32E-15	1.46E-18	6.43E-22	2.83E-25
ca 46	8.77E-07	8.77E-07	8.77E-07	8.77E-07	8.77E-07	8.77E-07	8.77E-07	8.77E-07	8.77E-07	8.77E-07	8.77E-07
ca 47	8.12E-12	6.97E-12	8.64E-18	6.28E-24	4.67E-36	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 45	1.25E-07	1.25E-07	1.31E-07	1.35E-07	1.39E-07	1.42E-07	1.43E-07	1.43E-07	1.43E-07	1.43E-07	1.43E-07
sc 46	1.05E-06	1.04E-06	4.97E-07	2.31E-07	5.11E-08	2.49E-09	2.89E-13	7.95E-20	2.19E-26	6.04E-33	1.66E-39
sc 47	6.72E-08	5.47E-08	5.59E-16	2.02E-23	1.31E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	3.51E-09	2.40E-09	4.61E-24	2.34E-39	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 2

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
ti 46	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02	9.48E-02
ti 47	8.72E-02	8.72E-02	8.72E-02	8.72E-02	8.72E-02	8.72E-02	8.72E-02	8.72E-02	8.72E-02	8.72E-02	8.72E-02

ti 48	8.64E-01	8.64E-01	8.64E-01	8.64E-01	8.64E-01	8.64E-01	8.64E-01	8.64E-01	8.64E-01	8.64E-01	8.64E-01
ti 49	8.92E-02	8.92E-02	8.92E-02	8.92E-02	8.92E-02	8.92E-02	8.92E-02	8.92E-02	8.92E-02	8.92E-02	8.92E-02
ti 50	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02	6.59E-02
v 50	7.11E-04	7.11E-04	7.11E-04	7.11E-04	7.11E-04	7.11E-04	7.11E-04	7.11E-04	7.11E-04	7.11E-04	7.11E-04
v 51	1.17E-01	1.17E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01	1.19E-01
cr 50	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00	2.13E+00
cr 51	2.36E-03	2.30E-03	2.48E-04	2.45E-05	2.53E-07	2.73E-11	3.40E-23	5.00E-43	.00E+00	.00E+00	.00E+00
cr 52	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01	4.48E+01
cr 53	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00	5.02E+00
cr 54	1.64E+00	1.64E+00	1.64E+00	1.64E+00	1.64E+00	1.64E+00	1.64E+00	1.64E+00	1.64E+00	1.64E+00	1.64E+00
mn 54	1.79E-03	1.78E-03	1.46E-03	1.19E-03	7.95E-04	3.53E-04	3.10E-05	5.37E-07	9.31E-09	1.61E-10	2.80E-12
mn 55	3.22E+00	3.22E+00	3.22E+00	3.23E+00	3.23E+00	3.24E+00	3.25E+00	3.26E+00	3.26E+00	3.26E+00	3.26E+00
mn 56	1.69E-05	2.67E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 54	9.11E+00	9.11E+00	9.11E+00	9.11E+00	9.11E+00	9.11E+00	9.11E+00	9.11E+00	9.11E+00	9.11E+00	9.11E+00
fe 55	3.63E-02	3.63E-02	3.41E-02	3.20E-02	2.82E-02	2.19E-02	1.02E-02	2.87E-03	8.05E-04	2.26E-04	6.36E-05
fe 56	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02	1.49E+02
fe 57	4.95E+00	4.95E+00	4.95E+00	4.95E+00	4.95E+00	4.95E+00	4.95E+00	4.95E+00	4.95E+00	4.95E+00	4.95E+00
fe 58	5.69E-01	5.69E-01	5.70E-01	5.71E-01	5.71E-01	5.71E-01	5.71E-01	5.71E-01	5.71E-01	5.71E-01	5.71E-01
fe 59	9.52E-05	9.37E-05	2.34E-05	5.55E-06	3.22E-07	1.09E-09	4.22E-17	1.87E-29	8.27E-42	.00E+00	.00E+00
co 58m	1.98E-10	3.21E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	1.86E-03	1.84E-03	7.71E-04	3.12E-04	5.23E-05	1.47E-06	3.29E-11	5.81E-19	1.03E-26	1.82E-34	3.25E-42
co 59	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01	4.30E-01
co 60	6.82E-02	6.82E-02	6.61E-02	6.39E-02	5.98E-02	5.25E-02	3.54E-02	1.83E-02	9.49E-03	4.92E-03	2.55E-03
co 61	4.65E-08	1.95E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 58	4.29E+01	4.29E+01	4.29E+01	4.29E+01	4.29E+01	4.29E+01	4.29E+01	4.29E+01	4.29E+01	4.29E+01	4.29E+01
ni 59	5.34E-01	5.34E-01	5.34E-01	5.34E-01	5.34E-01	5.34E-01	5.34E-01	5.34E-01	5.34E-01	5.34E-01	5.34E-01
ni 60	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01	1.73E+01
ni 61	9.24E-01	9.24E-01	9.24E-01	9.24E-01	9.24E-01	9.24E-01	9.24E-01	9.24E-01	9.24E-01	9.24E-01	9.24E-01
ni 62	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00	2.35E+00
ni 63	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.11E-01	1.10E-01	1.08E-01	1.04E-01	1.00E-01	9.69E-02	9.36E-02
ni 64	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01	6.44E-01
ni 65	2.89E-07	3.92E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	3.94E-11	2.90E-11	4.88E-23	2.83E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 63	1.37E-01	1.37E-01	1.37E-01	1.37E-01	1.38E-01	1.38E-01	1.41E-01	1.44E-01	1.48E-01	1.51E-01	1.55E-01
cu 64	1.09E-06	2.95E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 65	6.61E-02	6.61E-02	6.61E-02	6.61E-02	6.61E-02	6.61E-02	6.61E-02	6.61E-02	6.61E-02	6.61E-02	6.61E-02
cu 66	1.72E-09	4.53E-14	7.61E-26	4.41E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	1.10E-12	8.37E-13	3.34E-23	5.20E-34	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 64	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03	1.06E-03
zn 65	6.91E-07	6.89E-07	5.35E-07	4.11E-07	2.45E-07	8.66E-08	3.84E-09	2.14E-11	1.19E-13	6.63E-16	3.69E-18
zn 66	6.55E-04	6.55E-04	6.55E-04	6.55E-04	6.55E-04	6.55E-04	6.55E-04	6.55E-04	6.55E-04	6.55E-04	6.55E-04
zn 67	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06	1.18E-06
zn 68	2.22E-08	2.22E-08	2.22E-08	2.22E-08	2.22E-08	2.22E-08	2.22E-08	2.22E-08	2.22E-08	2.22E-08	2.22E-08
zn 69m	5.61E-15	1.67E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 70	1.43E-15	1.43E-15	1.43E-15	1.43E-15	1.43E-15	1.43E-15	1.43E-15	1.43E-15	1.43E-15	1.43E-15	1.43E-15
ga 69	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11	5.04E-11
ge 70	3.48E-13	3.48E-13	3.48E-13	3.48E-13	3.48E-13	3.48E-13	3.48E-13	3.48E-13	3.48E-13	3.48E-13	3.48E-13
sr 87	4.30E-06	4.30E-06	4.30E-06	4.30E-06	4.30E-06	4.30E-06	4.30E-06	4.30E-06	4.30E-06	4.30E-06	4.30E-06
sr 88	4.25E-04	4.25E-04	4.25E-04	4.25E-04	4.25E-04	4.25E-04	4.25E-04	4.25E-04	4.25E-04	4.25E-04	4.25E-04
sr 89	1.15E-06	1.13E-06	3.34E-07	9.38E-08	7.66E-09	5.12E-11	1.53E-17	2.04E-28	2.73E-39	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 3

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nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
sr 90	2.43E-08	2.43E-08	2.41E-08	2.40E-08	2.37E-08	2.31E-08	2.15E-08	1.90E-08	1.68E-08	1.48E-08	1.31E-08
sr 91	1.77E-09	3.09E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89	3.14E-05	3.15E-05	3.23E-05	3.25E-05	3.26E-05	3.26E-05	3.26E-05	3.26E-05	3.26E-05	3.26E-05	3.26E-05
y 90	2.25E-06	1.74E-06	6.27E-12	6.23E-12	6.15E-12	6.01E-12	5.58E-12	4.93E-12	4.36E-12	3.85E-12	3.41E-12
y 91	3.42E-06	3.38E-06	1.18E-06	3.93E-07	4.51E-08	5.96E-10	1.37E-15	5.51E-25	2.21E-34	1.28E-43	.00E+00

y 92	7.54E-09	6.86E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	4.31E-12	8.41E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 90	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01	8.94E+01
zr 91	1.95E+01	1.95E+01	1.95E+01	1.95E+01	1.95E+01	1.95E+01	1.95E+01	1.95E+01	1.95E+01	1.95E+01	1.95E+01
zr 92	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01	3.05E+01
zr 93	6.62E-02	6.62E-02	6.62E-02	6.62E-02	6.62E-02	6.62E-02	6.62E-02	6.62E-02	6.62E-02	6.62E-02	6.62E-02
zr 94	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01	3.16E+01
zr 95	1.19E-03	1.18E-03	4.50E-04	1.65E-04	2.28E-05	4.38E-07	3.08E-12	7.96E-21	2.06E-29	5.31E-38	.00E+00
zr 96	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00	5.15E+00
zr 97	2.05E-05	7.66E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 91	5.82E-09	5.82E-09	5.82E-09	5.82E-09	5.82E-09	5.81E-09	5.79E-09	5.77E-09	5.74E-09	5.71E-09	5.68E-09
nb 92	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05	1.12E-05
nb 93	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01	4.91E-01
nb 93m	2.50E-04	2.50E-04	2.47E-04	2.44E-04	2.39E-04	2.29E-04	2.01E-04	1.63E-04	1.31E-04	1.06E-04	8.57E-05
nb 94	8.09E-03	8.09E-03	8.09E-03	8.09E-03	8.09E-03	8.09E-03	8.09E-03	8.09E-03	8.09E-03	8.09E-03	8.08E-03
nb 95	6.79E-04	6.78E-04	4.14E-04	1.78E-04	2.69E-05	5.43E-07	3.71E-12	9.58E-21	2.47E-29	7.10E-40	.00E+00
nb 95m	7.67E-07	7.63E-07	2.98E-07	1.10E-07	1.52E-08	2.90E-10	2.04E-15	5.28E-24	1.36E-32	.00E+00	.00E+00
nb 96	1.76E-08	8.64E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	1.46E-06	5.47E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	1.92E-08	7.17E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 94	9.71E-07	9.72E-07	1.04E-06	1.11E-06	1.25E-06	1.52E-06	2.35E-06	3.73E-06	5.11E-06	6.50E-06	7.88E-06
mo 95	2.36E-02	2.36E-02	2.46E-02	2.51E-02	2.54E-02	2.55E-02	2.55E-02	2.55E-02	2.55E-02	2.55E-02	2.55E-02
mo 96	2.07E-03	2.07E-03	2.07E-03	2.07E-03	2.07E-03	2.07E-03	2.07E-03	2.07E-03	2.07E-03	2.07E-03	2.07E-03
mo 97	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02	4.13E-02
mo 98	6.12E-04	6.12E-04	6.12E-04	6.12E-04	6.12E-04	6.12E-04	6.12E-04	6.12E-04	6.12E-04	6.12E-04	6.12E-04
mo 99	1.27E-08	9.84E-09	1.75E-18	1.28E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo100	1.67E-10	1.67E-10	1.67E-10	1.67E-10	1.67E-10	1.67E-10	1.67E-10	1.67E-10	1.67E-10	1.67E-10	1.67E-10
tc 98	1.74E-12	1.74E-12	1.74E-12	1.74E-12	1.74E-12	1.74E-12	1.74E-12	1.74E-12	1.74E-12	1.74E-12	1.74E-12
tc 99	2.40E-07	2.40E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07	2.41E-07
ru 99	1.21E-12	1.21E-12	1.41E-12	1.61E-12	2.00E-12	2.79E-12	5.17E-12	9.12E-12	1.31E-11	1.70E-11	2.10E-11
ru100	2.35E-08	2.35E-08	2.35E-08	2.35E-08	2.35E-08	2.35E-08	2.35E-08	2.35E-08	2.35E-08	2.35E-08	2.35E-08
ru101	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10	1.41E-10
ru102	3.11E-12	3.11E-12	3.11E-12	3.11E-12	3.11E-12	3.11E-12	3.11E-12	3.11E-12	3.11E-12	3.11E-12	3.11E-12
cd111	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09	4.19E-09
cd112	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08	3.60E-08
cd113	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.62E-11	8.63E-11	8.63E-11	8.63E-11	8.63E-11
cd113m	1.42E-10	1.42E-10	1.40E-10	1.39E-10	1.35E-10	1.29E-10	1.11E-10	8.70E-11	6.80E-11	5.32E-11	4.16E-11
cd114	5.35E-06	5.36E-06	5.60E-06	5.67E-06	5.69E-06	5.70E-06	5.70E-06	5.70E-06	5.70E-06	5.70E-06	5.70E-06
cd115	2.36E-10	1.73E-10	1.63E-22	5.18E-35	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	5.18E-10	5.10E-10	1.28E-10	3.03E-11	1.77E-12	6.06E-15	2.43E-22	1.14E-34	.00E+00	.00E+00	.00E+00
cd116	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08	2.74E-08
cd117	1.74E-12	2.18E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113	1.03E-03	1.03E-03	1.07E-03	1.09E-03	1.12E-03	1.13E-03	1.13E-03	1.13E-03	1.13E-03	1.13E-03	1.13E-03
in113m	5.77E-08	5.74E-08	3.36E-08	1.92E-08	6.40E-09	7.09E-10	9.65E-13	1.61E-17	2.70E-22	4.51E-27	7.55E-32
in114	1.83E-10	1.15E-10	3.31E-11	9.07E-12	7.02E-13	4.23E-15	9.21E-22	7.26E-33	.00E+00	.00E+00	.00E+00
in114m	7.26E-06	7.16E-06	2.06E-06	5.64E-07	4.37E-08	2.63E-10	5.72E-17	4.51E-28	3.56E-39	.00E+00	.00E+00
in115	9.98E-09	9.99E-09	1.04E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08	1.05E-08

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BWR SNF Assembly - Top - decay light elements page 4

0 nuclide concentrations, grams
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
in117	5.74E-12	1.40E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.23E-12	7.27E-15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn112	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02	2.23E-02
sn113	9.61E-05	9.55E-05	5.59E-05	3.20E-05	1.06E-05	1.18E-06	1.61E-09	2.69E-14	4.49E-19	7.52E-24	1.26E-28
sn114	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02	1.62E-02
sn115	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03	7.94E-03
sn116	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01	3.54E-01
sn117	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01	1.91E-01

sn117m	6.02E-05	5.72E-05	6.13E-07	5.49E-09	4.95E-13	4.07E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn118	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01	6.04E-01
sn119	2.18E-01	2.18E-01	2.18E-01	2.18E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01	2.19E-01
sn119m	1.18E-03	1.17E-03	9.52E-04	7.65E-04	4.96E-04	2.09E-04	1.57E-05	2.08E-07	2.77E-09	3.69E-11	4.91E-13
sn120	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01	8.19E-01
sn121	1.74E-06	9.42E-07	6.54E-10	6.52E-10	6.47E-10	6.39E-10	6.16E-10	5.78E-10	5.43E-10	5.10E-10	4.79E-10
sn121m	1.51E-05	1.51E-05	1.50E-05	1.50E-05	1.49E-05	1.47E-05	1.41E-05	1.33E-05	1.25E-05	1.17E-05	1.10E-05
sn122	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01	1.18E-01
sn123	1.89E-05	1.88E-05	1.16E-05	7.08E-06	2.66E-06	3.74E-07	1.05E-09	5.79E-14	3.21E-18	1.78E-22	9.87E-27
sn124	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01	1.45E-01
sn125	2.89E-07	2.69E-07	4.47E-10	5.78E-13	1.13E-18	4.46E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb121	1.94E-03	1.94E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03	1.95E-03
sb122	9.26E-07	7.16E-07	8.57E-17	4.18E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb123	1.81E-04	1.81E-04	1.88E-04	1.93E-04	1.97E-04	1.99E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04	2.00E-04
sb124	1.23E-06	1.21E-06	4.36E-07	1.50E-07	1.83E-08	2.73E-10	9.05E-16	6.67E-25	4.91E-34	3.48E-43	.00E+00
sb125	6.91E-04	6.91E-04	6.50E-04	6.09E-04	5.36E-04	4.16E-04	1.94E-04	5.46E-05	1.53E-05	4.31E-06	1.21E-06
sb126	1.06E-07	9.99E-08	6.89E-10	3.91E-12	1.43E-16	1.92E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te122	2.39E-04	2.39E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04	2.40E-04
te123	2.26E-06	2.26E-06	2.54E-06	2.72E-06	2.88E-06	2.95E-06	2.96E-06	2.96E-06	2.96E-06	2.96E-06	2.96E-06
te123m	7.05E-07	7.01E-07	4.19E-07	2.45E-07	8.50E-08	1.02E-08	1.80E-11	4.58E-16	1.17E-20	2.97E-25	7.58E-30
te124	1.95E-05	1.95E-05	2.03E-05	2.05E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05	2.07E-05
te125	7.17E-04	7.18E-04	7.59E-04	8.00E-04	8.74E-04	9.96E-04	1.22E-03	1.36E-03	1.40E-03	1.41E-03	1.42E-03
te125m	9.01E-06	9.02E-06	8.95E-06	8.56E-06	7.61E-06	5.91E-06	2.76E-06	7.75E-07	2.18E-07	6.12E-08	1.72E-08
te126	2.42E-05	2.42E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05	2.43E-05
te127	1.19E-10	3.09E-11	7.37E-12	4.09E-12	1.28E-12	1.26E-13	1.18E-16	1.07E-21	9.68E-27	8.76E-32	7.89E-37
te127m	3.73E-09	3.71E-09	2.11E-09	1.17E-09	3.66E-10	3.59E-11	3.38E-14	3.06E-19	2.76E-24	2.50E-29	2.26E-34
te128	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10	6.07E-10
te129m	4.60E-15	4.51E-15	7.19E-16	1.07E-16	2.46E-18	1.31E-21	2.00E-31	.00E+00	.00E+00	.00E+00	.00E+00
i127	1.36E-07	1.36E-07	1.38E-07	1.39E-07	1.39E-07	1.40E-07	1.40E-07	1.40E-07	1.40E-07	1.40E-07	1.40E-07
i129	6.03E-13	6.04E-13	6.07E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13	6.08E-13
xe127	3.67E-15	3.60E-15	6.62E-16	1.14E-16	3.50E-18	3.34E-21	2.90E-30	.00E+00	.00E+00	.00E+00	.00E+00
xe128	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09	6.97E-09
xe129	3.48E-11	3.48E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11	3.49E-11
xe129m	7.55E-14	6.99E-14	6.77E-17	4.99E-20	3.24E-26	1.39E-38	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe130	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12	1.90E-12
xe131	5.37E-15	5.37E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15	5.39E-15
total	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02	4.72E+02

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BWR SNF Assembly - Top - decay light elements page 5

0 nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
h 3	7.51E-06	7.51E-06	7.41E-06	7.30E-06	7.10E-06	6.71E-06	5.67E-06	4.28E-06	3.23E-06	2.44E-06	1.84E-06
be 10	8.09E-10	8.09E-10	8.09E-10	8.09E-10	8.09E-10	8.09E-10	8.09E-10	8.09E-10	8.09E-10	8.09E-10	8.09E-10
c 14	2.59E-07	2.59E-07	2.59E-07	2.59E-07	2.59E-07	2.59E-07	2.59E-07	2.58E-07	2.58E-07	2.58E-07	2.58E-07
na 24	1.69E-02	5.43E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mg 28	3.74E-11	1.69E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
al 28	2.11E+00	1.69E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 31	2.15E-01	3.78E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
si 32	3.28E-10	3.28E-10	3.28E-10	3.28E-10	3.27E-10	3.26E-10	3.22E-10	3.15E-10	3.09E-10	3.03E-10	2.97E-10
p 32	2.00E-04	1.91E-04	2.52E-06	2.84E-08	3.31E-10	3.26E-10	3.22E-10	3.16E-10	3.09E-10	3.03E-10	2.97E-10
p 33	3.05E-08	2.97E-08	2.60E-09	2.07E-10	1.39E-12	6.38E-17	6.09E-30	.00E+00	.00E+00	.00E+00	.00E+00
ar 41	7.59E-09	8.43E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
k 42	1.66E-10	4.33E-11	2.44E-17	2.43E-17	2.40E-17	2.35E-17	2.21E-17	1.99E-17	1.79E-17	1.61E-17	1.45E-17
k 43	9.35E-08	4.43E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ca 45	3.05E-04	3.03E-04	2.08E-04	1.41E-04	6.49E-05	1.38E-05	1.34E-07	5.89E-11	2.59E-14	1.14E-17	5.01E-21
ca 47	4.98E-06	4.27E-06	5.30E-12	3.85E-18	2.85E-30	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 46	3.55E-02	3.52E-02	1.69E-02	7.84E-03	1.73E-03	8.44E-05	9.78E-09	2.69E-15	7.43E-22	2.05E-28	.00E+00
sc 47	5.59E-02	4.54E-02	4.64E-10	1.67E-17	1.09E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sc 48	5.25E-03	3.58E-03	6.90E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

sc 49	5.73E-03	1.51E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cr 51	2.18E+02	2.12E+02	2.29E+01	2.27E+00	2.34E-02	2.52E-06	3.14E-18	.00E+00	.00E+00	.00E+00	.00E+00
mn 54	1.39E+01	1.38E+01	1.14E+01	9.24E+00	6.16E+00	2.74E+00	2.40E-01	4.16E-03	7.22E-05	1.25E-06	2.17E-08
mn 56	3.67E+02	5.79E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
fe 55	8.65E+01	8.64E+01	8.12E+01	7.62E+01	6.71E+01	5.20E+01	2.43E+01	6.83E+00	1.92E+00	5.39E-01	1.51E-01
fe 59	4.73E+00	4.66E+00	1.17E+00	2.76E-01	1.60E-02	5.42E-05	2.10E-12	9.30E-25	.00E+00	.00E+00	.00E+00
co 58m	1.17E-03	1.90E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
co 58	5.90E+01	5.85E+01	2.45E+01	9.92E+00	1.66E+00	4.68E-02	1.04E-06	1.85E-14	3.26E-22	5.77E-30	.00E+00
co 60	7.72E+01	7.72E+01	7.47E+01	7.23E+01	6.77E+01	5.93E+01	4.00E+01	2.07E+01	1.07E+01	5.56E+00	2.88E+00
co 61	1.45E+00	6.06E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 59	4.31E-02	4.31E-02	4.31E-02	4.31E-02	4.31E-02	4.31E-02	4.31E-02	4.31E-02	4.31E-02	4.31E-02	4.31E-02
ni 63	6.31E+00	6.31E+00	6.30E+00	6.29E+00	6.27E+00	6.23E+00	6.10E+00	5.89E+00	5.69E+00	5.50E+00	5.31E+00
ni 65	5.52E+00	7.50E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ni 66	3.43E-05	2.53E-05	4.25E-17	2.46E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 64	4.22E+00	1.14E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 66	9.59E-01	2.53E-05	4.25E-17	2.46E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cu 67	8.29E-07	6.34E-07	2.53E-17	3.93E-28	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 65	5.69E-03	5.68E-03	4.41E-03	3.39E-03	2.02E-03	7.14E-04	3.17E-05	1.76E-07	9.82E-10	5.47E-12	3.04E-14
zn 69	2.75E-07	5.93E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zn 69m	1.85E-08	5.53E-09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ga 72	7.01E-14	2.15E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ge 71	5.92E-12	5.57E-12	2.53E-14	9.28E-17	1.43E-21	3.42E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sr 89	3.33E-02	3.28E-02	9.68E-03	2.72E-03	2.22E-04	1.49E-06	4.44E-13	5.93E-24	.00E+00	.00E+00	.00E+00
sr 90	3.43E-06	3.43E-06	3.41E-06	3.38E-06	3.34E-06	3.26E-06	3.03E-06	2.68E-06	2.37E-06	2.09E-06	1.85E-06
sr 91	6.42E-03	1.12E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 89m	3.09E-06	3.05E-06	9.00E-07	2.53E-07	2.07E-08	1.38E-10	4.13E-17	5.52E-28	.00E+00	.00E+00	.00E+00
y 90	1.22E+00	9.44E-01	3.41E-06	3.39E-06	3.34E-06	3.26E-06	3.03E-06	2.68E-06	2.37E-06	2.09E-06	1.85E-06
y 90m	1.21E-07	6.59E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 91	8.38E-02	8.29E-02	2.89E-02	9.65E-03	1.11E-03	1.46E-05	3.37E-11	1.35E-20	5.43E-30	.00E+00	.00E+00
y 92	7.26E-02	6.60E-04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
y 93	1.44E-05	2.81E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
zr 93	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04	1.66E-04
zr 95	2.56E+01	2.53E+01	9.66E+00	3.55E+00	4.91E-01	9.40E-03	6.61E-08	1.71E-16	4.41E-25	.00E+00	.00E+00
zr 97	3.92E+01	1.46E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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BWR SNF Assembly - Top - decay light elements page 6

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nuclide radioactivity, curies
basis =per ONE BWR Fuel Assembly - Top Region -

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
nb 91	3.37E-08	3.37E-08	3.37E-08	3.36E-08	3.36E-08	3.36E-08	3.35E-08	3.33E-08	3.32E-08	3.30E-08	3.28E-08
nb 92	1.25E-09	1.25E-09	1.25E-09	1.25E-09	1.25E-09	1.25E-09	1.25E-09	1.25E-09	1.25E-09	1.25E-09	1.25E-09
nb 93m	5.95E-02	5.95E-02	5.89E-02	5.82E-02	5.70E-02	5.46E-02	4.80E-02	3.88E-02	3.13E-02	2.53E-02	2.04E-02
nb 94	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03	1.52E-03
nb 95	2.67E+01	2.67E+01	1.63E+01	7.02E+00	1.06E+00	2.14E-02	1.46E-07	3.77E-16	9.73E-25	.00E+00	.00E+00
nb 95m	2.92E-01	2.91E-01	1.14E-01	4.17E-02	5.77E-03	1.11E-04	7.78E-10	2.01E-18	5.19E-27	.00E+00	.00E+00
nb 96	2.46E-02	1.21E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97	3.92E+01	1.47E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
nb 97m	3.72E+01	1.39E+01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
mo 99	6.08E-03	4.72E-03	8.39E-13	6.16E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 98	1.51E-15	1.51E-15	1.51E-15	1.51E-15	1.51E-15	1.51E-15	1.51E-15	1.51E-15	1.51E-15	1.51E-15	1.51E-15
tc 99	4.10E-09	4.10E-09	4.12E-09	4.12E-09	4.12E-09	4.12E-09	4.12E-09	4.12E-09	4.12E-09	4.12E-09	4.12E-09
ru103	2.53E-11	2.49E-11	5.17E-12	1.01E-12	4.00E-14	6.34E-17	2.51E-25	.00E+00	.00E+00	.00E+00	.00E+00
cd113m	3.19E-08	3.19E-08	3.15E-08	3.11E-08	3.04E-08	2.89E-08	2.50E-08	1.95E-08	1.53E-08	1.19E-08	9.34E-09
cd115	1.20E-04	8.81E-05	8.32E-17	2.64E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd115m	1.32E-05	1.30E-05	3.25E-06	7.73E-07	4.51E-08	1.54E-10	6.20E-18	2.92E-30	.00E+00	.00E+00	.00E+00
cd117	1.87E-05	2.35E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cd117m	3.62E-08	2.56E-10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in113m	9.65E-01	9.60E-01	5.62E-01	3.22E-01	1.07E-01	1.19E-02	1.61E-05	2.70E-10	4.52E-15	7.55E-20	1.26E-24
in114	2.52E-01	1.58E-01	4.56E-02	1.25E-02	9.67E-04	5.82E-06	1.27E-12	1.00E-23	.00E+00	.00E+00	.00E+00
in114m	1.68E-01	1.66E-01	4.76E-02	1.31E-02	1.01E-03	6.08E-06	1.32E-12	1.04E-23	.00E+00	.00E+00	.00E+00

in116m	2.92E-05	2.89E-13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117	2.11E-04	5.15E-08	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
in117m	1.70E-05	1.00E-07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn113	9.65E-01	9.59E-01	5.61E-01	3.22E-01	1.07E-01	1.19E-02	1.61E-05	2.70E-10	4.51E-15	7.55E-20	1.26E-24
sn117m	4.94E+00	4.70E+00	5.03E-02	4.51E-04	4.06E-08	3.34E-16	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn119m	4.41E+00	4.40E+00	3.56E+00	2.86E+00	1.86E+00	7.84E-01	5.87E-02	7.81E-04	1.04E-05	1.38E-07	1.84E-09
sn121	1.67E+00	9.02E-01	6.26E-04	6.24E-04	6.20E-04	6.12E-04	5.89E-04	5.53E-04	5.20E-04	4.88E-04	4.58E-04
sn121m	8.09E-04	8.09E-04	8.06E-04	8.04E-04	7.99E-04	7.89E-04	7.60E-04	7.13E-04	6.70E-04	6.29E-04	5.90E-04
sn123	1.55E-01	1.54E-01	9.56E-02	5.82E-02	2.18E-02	3.08E-03	8.59E-06	4.76E-10	2.64E-14	1.46E-18	8.12E-23
sn123m	8.87E-04	1.36E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sn125	3.13E-02	2.91E-02	4.84E-05	6.26E-08	1.23E-13	4.83E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb122	3.67E-01	2.84E-01	3.40E-11	1.66E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
sb124	2.15E-02	2.13E-02	7.63E-03	2.63E-03	3.21E-04	4.78E-06	1.58E-11	1.17E-20	8.60E-30	.00E+00	.00E+00
sb125	7.24E-01	7.24E-01	6.81E-01	6.38E-01	5.62E-01	4.36E-01	2.04E-01	5.72E-02	1.61E-02	4.52E-03	1.27E-03
sb126	8.84E-03	8.36E-03	5.76E-05	3.27E-07	1.19E-11	1.61E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te123m	6.25E-03	6.22E-03	3.71E-03	2.17E-03	7.54E-04	9.09E-05	1.59E-07	4.06E-12	1.04E-16	2.64E-21	6.72E-26
te125m	1.62E-01	1.62E-01	1.61E-01	1.54E-01	1.37E-01	1.07E-01	4.97E-02	1.40E-02	3.93E-03	1.10E-03	3.10E-04
te127	3.15E-04	8.16E-05	1.95E-05	1.08E-05	3.38E-06	3.31E-07	3.12E-10	2.82E-15	2.55E-20	2.31E-25	2.08E-30
te127m	3.52E-05	3.50E-05	1.99E-05	1.10E-05	3.45E-06	3.38E-07	3.19E-10	2.88E-15	2.61E-20	2.36E-25	2.14E-30
te129	2.12E-09	8.71E-11	1.39E-11	2.06E-12	4.75E-14	2.54E-17	3.86E-27	.00E+00	.00E+00	.00E+00	.00E+00
te129m	1.39E-10	1.36E-10	2.17E-11	3.21E-12	7.41E-14	3.96E-17	6.03E-27	.00E+00	.00E+00	.00E+00	.00E+00
i126	1.74E-15	1.65E-15	1.44E-17	1.05E-19	6.24E-24	2.28E-32	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i130	4.60E-11	1.21E-11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.57E-15	4.19E-15	1.95E-18	6.71E-22	9.66E-29	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe127	1.04E-10	1.02E-10	1.87E-11	3.21E-12	9.90E-14	9.44E-17	8.19E-26	.00E+00	.00E+00	.00E+00	.00E+00
xe129m	8.60E-09	7.96E-09	7.71E-12	5.69E-15	3.69E-21	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe131m	1.85E-12	1.75E-12	9.79E-15	4.47E-17	1.06E-21	6.16E-31	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	2.10E-15	1.86E-15	1.50E-20	7.32E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
total	1.12E+03	5.71E+02	2.54E+02	1.92E+02	1.53E+02	1.22E+02	7.10E+01	3.36E+01	1.84E+01	1.17E+01	8.41E+00

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photon spectrum as a function of time for light elements, cladding and structural materials

0 BWR SNF Assembly - Top - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.02E+13	2.11E+12	5.49E+11	3.00E+11	1.82E+11	1.31E+11	7.93E+10	4.09E+10	2.18E+10	1.18E+10	6.68E+09
3.00E-02	2.83E+12	4.24E+11	1.42E+11	1.08E+11	7.74E+10	5.16E+10	2.57E+10	1.15E+10	5.63E+09	2.84E+09	1.48E+09
5.50E-02	1.92E+12	1.40E+11	3.32E+10	2.34E+10	1.73E+10	1.43E+10	9.58E+09	4.95E+09	2.56E+09	1.33E+09	6.90E+08
8.50E-02	1.03E+12	7.29E+10	1.45E+10	9.62E+09	6.66E+09	5.41E+09	3.62E+09	1.87E+09	9.69E+08	5.02E+08	2.60E+08
1.20E-01	7.19E+11	4.73E+10	7.86E+09	4.83E+09	3.03E+09	2.37E+09	1.57E+09	8.06E+08	4.15E+08	2.14E+08	1.11E+08
1.70E-01	8.91E+11	1.91E+11	9.40E+09	4.81E+09	2.93E+09	2.14E+09	1.18E+09	4.79E+08	2.11E+08	9.86E+07	4.82E+07
3.00E-01	1.78E+12	8.92E+11	9.51E+10	1.20E+10	1.46E+09	8.11E+08	4.40E+08	1.77E+08	7.76E+07	3.62E+07	1.77E+07
6.50E-01	2.72E+13	7.34E+12	3.02E+12	1.45E+12	4.64E+11	1.44E+11	1.63E+10	1.70E+09	5.41E+08	2.58E+08	1.75E+08
1.13E+00	6.58E+12	6.39E+12	6.15E+12	5.95E+12	5.57E+12	4.89E+12	3.29E+12	1.71E+12	8.84E+11	4.58E+11	2.37E+11
1.58E+00	2.49E+12	2.81E+10	5.14E+09	2.07E+09	3.45E+08	9.62E+06	1.17E+03	5.13E+02	2.80E+02	1.58E+02	9.32E+01
2.00E+00	3.73E+12	7.76E+09	5.03E+07	3.78E+07	3.05E+07	2.61E+07	1.76E+07	9.10E+06	4.71E+06	2.44E+06	1.27E+06
2.40E+00	1.43E+11	2.28E+08	2.19E+05	1.39E+05	9.87E+04	8.25E+04	5.56E+04	2.88E+04	1.49E+04	7.73E+03	4.00E+03
2.80E+00	1.30E+11	4.01E+08	1.11E+04	3.84E+03	4.68E+02	6.98E+00	2.31E-05	7.70E-11	6.93E-11	6.24E-11	5.61E-11
3.25E+00	2.36E+10	3.73E+07	9.98E-12	9.93E-12	9.82E-12	9.62E-12	9.03E-12	8.13E-12	7.31E-12	6.58E-12	5.92E-12
3.75E+00	8.07E+05	1.28E+05	1.21E-14	1.20E-14	1.19E-14	1.16E-14	1.09E-14	9.83E-15	8.85E-15	7.96E-15	7.16E-15
4.25E+00	6.09E+05	1.68E+03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
4.75E+00	4.82E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
5.50E+00	4.38E+04	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0 total	5.97E+13	1.77E+13	1.00E+13	7.87E+12	6.33E+12	5.24E+12	3.43E+12	1.77E+12	9.16E+11	4.75E+11	2.47E+11
0 mev/sec	3.84E+13	1.24E+13	8.94E+12	7.66E+12	6.58E+12	5.60E+12	3.72E+12	1.92E+12	9.95E+11	5.16E+11	2.67E+11

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

	emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
						time after discharge						
	1.00E-02	2.35E+04	4.86E+03	1.26E+03	6.90E+02	4.19E+02	3.01E+02	1.82E+02	9.40E+01	5.00E+01	2.72E+01	1.53E+01
	3.00E-02	1.95E+04	2.92E+03	9.80E+02	7.48E+02	5.34E+02	3.56E+02	1.77E+02	7.96E+01	3.88E+01	1.96E+01	1.02E+01
	5.50E-02	2.43E+04	1.77E+03	4.19E+02	2.96E+02	2.18E+02	1.81E+02	1.21E+02	6.26E+01	3.24E+01	1.68E+01	8.73E+00
	8.50E-02	2.01E+04	1.42E+03	2.83E+02	1.88E+02	1.30E+02	1.06E+02	7.08E+01	3.66E+01	1.89E+01	9.81E+00	5.08E+00
	1.20E-01	1.98E+04	1.30E+03	2.17E+02	1.33E+02	8.35E+01	6.54E+01	4.34E+01	2.22E+01	1.14E+01	5.91E+00	3.06E+00
	1.70E-01	3.48E+04	7.47E+03	3.67E+02	1.88E+02	1.14E+02	8.35E+01	4.62E+01	1.87E+01	8.23E+00	3.86E+00	1.88E+00
	3.00E-01	1.23E+05	6.15E+04	6.56E+03	8.29E+02	1.01E+02	5.59E+01	3.03E+01	1.22E+01	5.35E+00	2.50E+00	1.22E+00
	6.50E-01	4.06E+06	1.10E+06	4.51E+05	2.17E+05	6.93E+04	2.15E+04	2.43E+03	2.54E+02	8.08E+01	3.86E+01	2.62E+01
	1.13E+00	1.70E+06	1.65E+06	1.59E+06	1.54E+06	1.44E+06	1.26E+06	8.52E+05	4.41E+05	2.29E+05	1.18E+05	6.13E+04
	1.58E+00	9.02E+05	1.02E+04	1.86E+03	7.50E+02	1.25E+02	3.48E+00	4.24E-04	1.86E-04	1.01E-04	5.72E-05	3.37E-05
	2.00E+00	1.71E+06	3.57E+03	2.31E+01	1.74E+01	1.40E+01	1.20E+01	8.08E+00	4.18E+00	2.17E+00	1.12E+00	5.82E-01
	2.40E+00	7.88E+04	1.26E+02	1.21E-01	7.66E-02	5.45E-02	4.55E-02	3.07E-02	1.59E-02	8.23E-03	4.26E-03	2.21E-03
	2.80E+00	8.35E+04	2.58E+02	7.17E-03	2.47E-03	3.02E-04	4.50E-06	1.49E-11	4.96E-17	4.46E-17	4.01E-17	3.61E-17
	3.25E+00	1.77E+04	2.79E+01	7.46E-18	7.42E-18	7.34E-18	7.19E-18	6.75E-18	6.07E-18	5.46E-18	4.92E-18	4.43E-18
	3.75E+00	6.96E-01	1.11E-01	1.04E-20	1.04E-20	1.02E-20	1.00E-20	9.41E-21	8.47E-21	7.63E-21	6.86E-21	6.18E-21
	4.25E+00	5.95E-01	1.64E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	4.75E+00	5.26E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
	5.50E+00	5.54E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
0	total	8.82E+06	2.85E+06	2.05E+06	1.76E+06	1.51E+06	1.29E+06	8.55E+05	4.42E+05	2.29E+05	1.19E+05	6.14E+04
0	gamma watts	6.15E+00	1.98E+00	1.43E+00	1.23E+00	1.05E+00	8.97E-01	5.96E-01	3.08E-01	1.60E-01	8.27E-02	4.28E-02

photon spectrum as a function of time for fission products

0 BWR SNF Assembly - Top - decay
0 spectrum of photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -

	emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
						time after discharge						
	1.00E-02	2.47E+17	3.24E+16	8.61E+15	6.41E+15	4.35E+15	2.42E+15	9.16E+14	6.40E+14	5.52E+14	4.84E+14	4.26E+14
	3.00E-02	1.10E+17	2.54E+16	3.68E+15	2.68E+15	1.83E+15	1.02E+15	4.01E+14	2.84E+14	2.45E+14	2.16E+14	1.90E+14
	5.50E-02	5.87E+16	8.98E+15	1.97E+15	1.51E+15	1.04E+15	5.84E+14	2.22E+14	1.50E+14	1.25E+14	1.06E+14	9.18E+13
	8.50E-02	4.01E+16	7.65E+15	1.20E+15	9.28E+14	6.39E+14	3.50E+14	1.23E+14	7.93E+13	6.55E+13	5.60E+13	4.86E+13
	1.20E-01	3.27E+16	7.08E+15	1.39E+15	1.11E+15	7.62E+14	4.05E+14	1.36E+14	8.44E+13	6.49E+13	5.17E+13	4.21E+13
	1.70E-01	5.22E+16	8.36E+15	1.19E+15	6.55E+14	4.11E+14	2.19E+14	7.08E+13	4.68E+13	4.04E+13	3.55E+13	3.13E+13
	3.00E-01	1.13E+17	1.75E+16	9.24E+14	7.01E+14	4.80E+14	2.55E+14	8.01E+13	5.19E+13	4.42E+13	3.83E+13	3.33E+13
	6.50E-01	2.33E+17	6.56E+16	1.65E+16	1.01E+16	6.10E+15	4.17E+15	2.11E+15	1.18E+15	9.17E+14	7.88E+14	6.93E+14
	1.13E+00	7.25E+16	5.42E+15	3.60E+14	2.88E+14	2.34E+14	1.70E+14	9.54E+13	5.61E+13	3.69E+13	2.49E+13	1.70E+13
	1.58E+00	3.71E+16	8.74E+15	1.75E+14	9.60E+13	7.29E+13	4.52E+13	1.48E+13	4.17E+12	1.89E+12	1.14E+12	7.83E+11
	2.00E+00	1.10E+16	6.98E+14	5.44E+13	3.81E+13	2.47E+13	1.05E+13	8.61E+11	3.41E+10	1.70E+10	1.46E+10	1.28E+10
	2.40E+00	8.63E+15	4.28E+14	7.26E+12	3.17E+12	2.21E+12	1.10E+12	1.38E+11	4.45E+09	1.55E+08	1.31E+07	7.48E+06
	2.80E+00	3.64E+15	6.81E+12	6.41E+11	5.03E+11	3.56E+11	1.78E+11	2.27E+10	7.44E+08	2.46E+07	8.13E+05	2.70E+04
	3.25E+00	1.75E+15	2.45E+12	1.17E+11	8.22E+10	5.84E+10	2.95E+10	3.83E+09	1.27E+08	4.21E+06	1.40E+05	4.63E+03
	3.75E+00	7.94E+14	1.20E+10	4.30E+07	3.62E+07	2.57E+07	1.30E+07	1.69E+06	5.60E+04	1.86E+03	6.16E+01	2.04E+00
	4.25E+00	7.32E+14	1.60E+09	1.22E-05	1.23E-05	1.24E-05	1.26E-05	1.28E-05	1.30E-05	1.31E-05	1.31E-05	1.31E-05
	4.75E+00	2.17E+14	1.19E+10	6.14E-06	6.17E-06	6.22E-06	6.30E-06	6.44E-06	6.53E-06	6.55E-06	6.56E-06	6.56E-06
	5.50E+00	1.69E+14	7.60E+07	4.56E-06	4.58E-06	4.61E-06	4.67E-06	4.78E-06	4.84E-06	4.86E-06	4.87E-06	4.87E-06
0	total	1.02E+18	1.88E+17	3.60E+16	2.45E+16	1.59E+16	9.65E+15	4.17E+15	2.58E+15	2.09E+15	1.80E+15	1.57E+15
0	mev/sec	4.17E+17	7.47E+16	1.26E+16	7.90E+15	4.92E+15	3.27E+15	1.60E+15	8.99E+14	6.94E+14	5.88E+14	5.11E+14

0 spectrum of energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

emean (mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
1.00E-02	5.68E+08	7.45E+07	1.98E+07	1.47E+07	1.00E+07	5.56E+06	2.11E+06	1.47E+06	1.27E+06	1.11E+06	9.79E+05
3.00E-02	7.56E+08	1.75E+08	2.54E+07	1.85E+07	1.26E+07	7.05E+06	2.77E+06	1.96E+06	1.69E+06	1.49E+06	1.31E+06
5.50E-02	7.42E+08	1.14E+08	2.49E+07	1.90E+07	1.32E+07	7.38E+06	2.81E+06	1.90E+06	1.58E+06	1.35E+06	1.16E+06

	8.50E-02	7.84E+08	1.49E+08	2.34E+07	1.81E+07	1.25E+07	6.83E+06	2.40E+06	1.55E+06	1.28E+06	1.09E+06	9.50E+05
	1.20E-01	9.03E+08	1.95E+08	3.83E+07	3.05E+07	2.10E+07	1.12E+07	3.76E+06	2.33E+06	1.79E+06	1.43E+06	1.16E+06
	1.70E-01	2.04E+09	3.27E+08	4.64E+07	2.56E+07	1.61E+07	8.56E+06	2.76E+06	1.83E+06	1.58E+06	1.39E+06	1.22E+06
	3.00E-01	7.78E+09	1.21E+09	6.37E+07	4.84E+07	3.31E+07	1.76E+07	5.52E+06	3.58E+06	3.05E+06	2.64E+06	2.30E+06
	6.50E-01	3.48E+10	9.80E+09	2.46E+09	1.51E+09	9.12E+08	6.23E+08	3.16E+08	1.76E+08	1.37E+08	1.18E+08	1.04E+08
	1.13E+00	1.87E+10	1.40E+09	9.32E+07	7.45E+07	6.04E+07	4.40E+07	2.47E+07	1.45E+07	9.54E+06	6.44E+06	4.40E+06
	1.58E+00	1.34E+10	3.16E+09	6.35E+07	3.48E+07	2.64E+07	1.64E+07	5.38E+06	1.51E+06	6.83E+05	4.14E+05	2.83E+05
	2.00E+00	5.08E+09	3.21E+08	2.50E+07	1.75E+07	1.14E+07	4.83E+06	3.96E+05	1.57E+04	7.84E+03	6.73E+03	5.90E+03
	2.40E+00	4.76E+09	2.36E+08	4.00E+06	1.75E+06	1.22E+06	6.07E+05	7.59E+04	2.46E+03	8.57E+01	7.23E+00	4.12E+00
	2.80E+00	2.34E+09	4.38E+06	4.13E+05	3.24E+05	2.29E+05	1.15E+05	1.46E+04	4.79E+02	1.58E+01	5.23E-01	1.74E-02
	3.25E+00	1.31E+09	1.83E+06	8.72E+04	6.14E+04	4.36E+04	2.21E+04	2.86E+03	9.49E+01	3.15E+00	1.04E-01	3.46E-03
	3.75E+00	6.84E+08	1.04E+04	3.71E+01	3.12E+01	2.22E+01	1.12E+01	1.45E+00	4.83E-02	1.60E-03	5.31E-05	1.76E-06
	4.25E+00	7.15E+08	1.56E+03	1.20E-11	1.20E-11	1.21E-11	1.23E-11	1.25E-11	1.27E-11	1.28E-11	1.28E-11	1.28E-11
	4.75E+00	2.37E+08	1.30E+04	6.71E-12	6.74E-12	6.79E-12	6.88E-12	7.03E-12	7.13E-12	7.16E-12	7.17E-12	7.17E-12
	5.50E+00	2.14E+08	9.60E+01	5.76E-12	5.79E-12	5.83E-12	5.91E-12	6.04E-12	6.12E-12	6.15E-12	6.15E-12	6.16E-12
0	total	9.59E+10	1.72E+10	2.89E+09	1.82E+09	1.13E+09	7.53E+08	3.68E+08	2.07E+08	1.59E+08	1.35E+08	1.17E+08
0	gamma watts	6.69E+04	1.20E+04	2.02E+03	1.27E+03	7.88E+02	5.25E+02	2.57E+02	1.44E+02	1.11E+02	9.42E+01	8.18E+01

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0 principal photon sources in group 1, photons/sec

mean energy = .0100 mev. nuclides exceeding 5.0E-02 of total group release rate (3.24E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
mo 99	2.24E+15	1.74E+15	3.09E+05	2.27E-05	2.16E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
rh106	3.19E+15	3.07E+15	2.60E+15	2.19E+15	1.56E+15	7.87E+14	1.02E+14	3.38E+12	1.12E+11	3.72E+09	1.23E+08
ba140	1.89E+15	1.79E+15	1.42E+13	9.32E+10	4.53E+06	1.09E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	2.51E+15	2.44E+15	2.05E+13	1.34E+11	6.53E+06	1.57E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	4.03E+15	4.00E+15	3.23E+15	2.58E+15	1.65E+15	6.79E+14	4.72E+13	5.56E+11	6.54E+09	7.70E+07	9.06E+05

0 principal photon sources in group 2, photons/sec

mean energy = .0300 mev. nuclides exceeding 5.0E-02 of total group release rate (2.54E+16) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
te132	4.22E+15	3.42E+15	2.04E+07	5.81E-02	7.57E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe133	4.43E+15	4.27E+15	3.71E+10	1.81E+05	5.83E-06	6.55E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	1.58E+15	1.49E+15	1.19E+13	7.78E+10	3.78E+06	9.06E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	1.44E+15	1.41E+15	2.12E+14	2.95E+13	5.98E+11	2.48E+08	1.75E-02	2.13E-19	.00E+00	.00E+00	.00E+00
ce143	4.66E+15	2.84E+15	9.29E-05	5.22E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	1.33E+15	1.33E+15	1.07E+15	8.52E+14	5.46E+14	2.25E+14	1.56E+13	1.84E+11	2.16E+09	2.55E+07	3.00E+05
nd147	1.43E+15	1.34E+15	4.87E+12	1.42E+10	1.39E+05	1.34E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 3, photons/sec

mean energy = .0550 mev. nuclides exceeding 5.0E-02 of total group release rate (8.98E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rh106	7.55E+14	7.26E+14	6.15E+14	5.17E+14	3.68E+14	1.86E+14	2.41E+13	8.00E+11	2.65E+10	8.80E+08	2.92E+07
te132	8.14E+14	6.58E+14	3.94E+06	1.12E-02	1.46E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.29E+14	5.14E+14	4.32E+12	2.83E+10	1.38E+06	3.30E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	1.33E+15	8.08E+14	2.64E-05	1.49E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	9.37E+14	9.30E+14	7.49E+14	5.98E+14	3.84E+14	1.58E+14	1.10E+13	1.29E+11	1.52E+09	1.79E+07	2.10E+05
sm153	1.62E+15	1.13E+15	1.45E+01	5.24E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 4, photons/sec

mean energy = .0850 mev. nuclides exceeding 5.0E-02 of total group release rate (7.65E+15) at 1.0 d

nuclide	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
					time after discharge						
rh106	4.49E+14	4.31E+14	3.65E+14	3.07E+14	2.19E+14	1.11E+14	1.43E+13	4.75E+11	1.58E+10	5.23E+08	1.74E+07
xe133	3.13E+15	3.02E+15	2.62E+10	1.28E+05	4.12E-06	4.63E-27	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.51E+14	5.47E+14	4.41E+14	3.52E+14	2.26E+14	9.28E+13	6.46E+12	7.60E+10	8.94E+08	1.05E+07	1.24E+05
nd147	8.87E+14	8.34E+14	3.03E+12	8.81E+09	8.61E+04	8.34E-06	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

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0 principal photon sources in group 5, photons/sec

mean energy = .1200 mev. nuclides exceeding 5.0E-02 of total group release rate (7.08E+15) at 1.0 d

nuclide	time after discharge

	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
tc 99m	3.64E+15	3.09E+15	5.53E+05	4.06E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce144	7.05E+14	7.03E+14	5.66E+14	4.52E+14	2.90E+14	1.19E+14	8.29E+12	9.76E+10	1.15E+09	1.35E+07	1.59E+05
pr144	3.95E+14	3.92E+14	3.15E+14	2.52E+14	1.62E+14	6.64E+13	4.62E+12	5.44E+10	6.40E+08	7.53E+06	8.86E+04
sm153	7.73E+14	5.40E+14	6.88E+00	2.49E-14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 6, photons/sec
mean energy = .1700 mev. nuclides exceeding 5.0E-02 of total group release rate (8.36E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
mo 99	7.88E+14	6.12E+14	1.09E+05	7.99E-06	7.60E-26	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
tc 99m	2.57E+15	2.18E+15	3.91E+05	2.87E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ba140	4.71E+14	4.46E+14	3.54E+12	2.32E+10	1.13E+06	2.70E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce141	2.85E+15	2.80E+15	4.20E+14	5.84E+13	1.18E+12	4.90E+08	3.48E-02	4.22E-19	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 7, photons/sec
mean energy = .3000 mev. nuclides exceeding 5.0E-02 of total group release rate (1.75E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh105	1.38E+15	9.87E+14	6.50E-04	8.20E-23	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i131	4.52E+15	4.22E+15	2.01E+12	6.93E+08	9.97E+01	2.11E-12	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
te132	4.12E+15	3.33E+15	1.99E+07	5.66E-02	7.37E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
xe135	2.33E+15	1.73E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	1.87E+15	1.82E+15	1.53E+13	1.00E+11	4.87E+06	1.17E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
ce143	3.07E+15	1.87E+15	6.12E-05	3.44E-25	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 8, photons/sec
mean energy = .6500 mev. nuclides exceeding 5.0E-02 of total group release rate (6.56E+16) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
zr 95	7.65E+15	7.57E+15	2.89E+15	1.06E+15	1.47E+14	2.81E+12	1.98E+07	5.10E-02	1.32E-10	3.41E-19	8.42E-28
nb 95	7.97E+15	7.96E+15	4.99E+15	2.17E+15	3.28E+14	6.61E+12	4.51E+07	1.17E-01	3.01E-10	7.78E-19	.00E+00
ru103	5.59E+15	5.50E+15	1.14E+15	2.23E+14	8.85E+12	1.40E+10	5.55E+01	5.51E-13	5.44E-27	.00E+00	.00E+00
i132	1.65E+16	1.35E+16	8.07E+07	2.29E-01	2.98E-18	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i133	7.31E+15	3.37E+15	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs134	4.91E+15	4.90E+15	4.52E+15	4.15E+15	3.51E+15	2.50E+15	9.14E+14	1.70E+14	3.17E+13	5.90E+12	1.10E+12
la140	6.00E+15	5.83E+15	4.90E+13	3.21E+11	1.56E+07	3.74E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1 page 11

0 principal photon sources in group 9, photons/sec
mean energy = 1.1250 mev. nuclides exceeding 5.0E-02 of total group release rate (5.42E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.80E+15	1.47E+15	8.78E+06	2.49E-02	3.25E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	5.99E+15	4.77E+14	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
cs136	5.52E+14	5.24E+14	4.82E+12	3.69E+10	2.44E+06	1.08E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	6.54E+14	6.35E+14	5.34E+12	3.50E+10	1.70E+06	4.08E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	8.82E+14	8.44E+14	1.45E+13	2.13E+11	5.08E+07	2.92E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 10, photons/sec
mean energy = 1.5750 mev. nuclides exceeding 5.0E-02 of total group release rate (8.74E+15) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	6.79E+14	5.55E+14	3.32E+06	9.42E-03	1.23E-19	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	7.75E+15	7.53E+15	6.33E+13	4.15E+11	2.02E+07	4.84E-02	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 11, photons/sec
mean energy = 2.0000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.98E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
i132	1.75E+14	1.43E+14	8.52E+05	2.42E-03	3.15E-20	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
i135	4.46E+14	3.55E+13	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
pr144	5.15E+13	5.11E+13	4.12E+13	3.29E+13	2.11E+13	8.66E+12	6.03E+11	7.09E+09	8.35E+07	9.82E+05	1.16E+04
eu156	4.31E+14	4.12E+14	7.10E+12	1.04E+11	2.48E+07	1.43E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 12, photons/sec
mean energy = 2.4000 mev. nuclides exceeding 5.0E-02 of total group release rate (4.28E+14) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	3.67E+14	3.57E+14	3.00E+12	1.97E+10	9.57E+05	2.29E-03	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
eu156	3.06E+13	2.93E+13	5.04E+11	7.39E+09	1.76E+06	1.01E-01	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 13, photons/sec
mean energy = 2.8000 mev. nuclides exceeding 5.0E-02 of total group release rate (6.81E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rh106	6.97E+11	6.70E+11	5.67E+11	4.78E+11	3.40E+11	1.72E+11	2.23E+10	7.38E+08	2.45E+07	8.12E+05	2.69E+04
ag112	1.28E+12	6.81E+11	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la140	5.15E+12	5.00E+12	4.20E+10	2.76E+08	1.34E+04	3.21E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

0 principal photon sources in group 14, photons/sec
mean energy = 3.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (2.45E+12) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
la140	2.35E+12	2.28E+12	1.92E+10	1.26E+08	6.12E+03	1.47E-05	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 15, photons/sec
mean energy = 3.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.20E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.78E+12	8.62E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00
la142	1.70E+14	3.34E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 16, photons/sec
mean energy = 4.2500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.60E+09) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	5.16E+11	1.60E+09	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 17, photons/sec
mean energy = 4.7500 mev. nuclides exceeding 5.0E-02 of total group release rate (1.19E+10) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	3.83E+12	1.19E+10	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

0 principal photon sources in group 18, photons/sec
mean energy = 5.5000 mev. nuclides exceeding 5.0E-02 of total group release rate (7.60E+07) at 1.0 d

nuclide	time after discharge										
	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
rb 88	2.45E+10	7.60E+07	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00	.00E+00

1

photon spectrum as a function of time for heavy metals and their daughters

0 BWR SNF Assembly - Top - decay
0 actinide photon release rates, photons/sec
basis = per ONE BWR Fuel Assembly - Top Region -
0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	1.40E+17	7.32E+16	1.06E+14	7.95E+13	5.01E+13	3.04E+13	2.49E+13	2.44E+13	2.38E+13	2.33E+13	2.27E+13
3.00E-02	8.81E+15	1.52E+15	9.95E+10	9.34E+10	1.17E+11	1.63E+11	2.88E+11	4.59E+11	5.91E+11	6.92E+11	7.71E+11
5.50E-02	1.28E+16	4.16E+15	1.62E+12	1.54E+12	1.90E+12	2.67E+12	4.81E+12	7.75E+12	1.00E+13	1.18E+13	1.31E+13
8.50E-02	5.54E+16	8.04E+15	5.57E+11	3.51E+11	3.51E+11	3.50E+11	3.48E+11	3.44E+11	3.41E+11	3.37E+11	3.34E+11
1.20E-01	5.61E+16	4.09E+16	6.02E+11	4.61E+11	4.55E+11	4.48E+11	4.35E+11	4.17E+11	4.00E+11	3.85E+11	3.72E+11
1.70E-01	1.86E+15	3.07E+14	2.24E+10	8.58E+09	6.22E+09	4.63E+09	4.17E+09	4.09E+09	4.01E+09	3.95E+09	3.89E+09
3.00E-01	2.98E+16	2.16E+16	3.66E+11	2.51E+11	2.49E+11	2.46E+11	2.38E+11	2.25E+11	2.13E+11	2.03E+11	1.94E+11
6.50E-01	1.63E+15	5.70E+13	2.49E+09	2.05E+09	1.57E+09	1.31E+09	1.46E+09	1.66E+09	1.71E+09	1.68E+09	1.64E+09
1.13E+00	2.10E+15	1.35E+15	8.47E+08	7.99E+08	7.43E+08	7.01E+08	6.70E+08	6.35E+08	6.00E+08	5.69E+08	5.41E+08
1.58E+00	1.78E+08	1.72E+08	1.55E+08	1.43E+08	1.31E+08	1.24E+08	1.26E+08	1.25E+08	1.16E+08	1.05E+08	9.47E+07
2.00E+00	1.83E+06	1.10E+06	1.05E+06	1.09E+06	1.16E+06	1.31E+06	1.72E+06	2.08E+06	2.17E+06	2.16E+06	2.11E+06
2.40E+00	7.76E+07	7.76E+07	6.91E+07	6.29E+07	5.55E+07	4.93E+07	4.28E+07	3.54E+07	2.93E+07	2.43E+07	2.02E+07
2.80E+00	1.37E+08	1.39E+08	1.43E+08	1.51E+08	1.71E+08	2.21E+08	3.61E+08	4.83E+08	5.11E+08	5.02E+08	4.82E+08

	3.25E+00	2.78E+07	2.78E+07	2.48E+07	2.25E+07	1.99E+07	1.77E+07	1.54E+07	1.27E+07	1.05E+07	8.72E+06	7.24E+06
	3.75E+00	1.61E+07	1.61E+07	1.44E+07	1.31E+07	1.15E+07	1.02E+07	8.90E+06	7.35E+06	6.09E+06	5.05E+06	4.20E+06
	4.25E+00	9.34E+06	9.34E+06	8.32E+06	7.58E+06	6.69E+06	5.94E+06	5.16E+06	4.26E+06	3.53E+06	2.93E+06	2.43E+06
	4.75E+00	5.41E+06	5.41E+06	4.82E+06	4.39E+06	3.88E+06	3.44E+06	2.99E+06	2.47E+06	2.05E+06	1.70E+06	1.41E+06
	5.50E+00	4.90E+06	4.90E+06	4.36E+06	3.97E+06	3.51E+06	3.12E+06	2.71E+06	2.24E+06	1.85E+06	1.54E+06	1.28E+06
0	total	3.09E+17	1.51E+17	1.10E+14	8.22E+13	5.32E+13	3.43E+13	3.10E+13	3.36E+13	3.54E+13	3.67E+13	3.75E+13
0	mev/sec	2.65E+16	1.47E+16	1.39E+12	1.05E+12	7.73E+11	6.16E+11	6.79E+11	8.35E+11	9.52E+11	1.04E+12	1.11E+12

0 actinide energy release rates, mev/watt-sec
basis = per ONE BWR Fuel Assembly - Top Region -

0

emean	time after discharge										
(mev)	initial	1.0 d	90.0 d	182.5 d	365.3 d	730.5 d	1826.3 d	3652.5 d	5478.8 d	7305.0 d	9131.3 d
1.00E-02	3.22E+08	1.68E+08	2.44E+05	1.83E+05	1.15E+05	6.98E+04	5.72E+04	5.60E+04	5.48E+04	5.35E+04	5.22E+04
3.00E-02	6.08E+07	1.05E+07	6.87E+02	6.44E+02	8.09E+02	1.13E+03	1.99E+03	3.16E+03	4.07E+03	4.78E+03	5.31E+03
5.50E-02	1.62E+08	5.26E+07	2.05E+04	1.95E+04	2.41E+04	3.37E+04	6.08E+04	9.80E+04	1.27E+05	1.49E+05	1.66E+05
8.50E-02	1.08E+09	1.57E+08	1.09E+04	6.86E+03	6.85E+03	6.84E+03	6.79E+03	6.72E+03	6.65E+03	6.59E+03	6.53E+03
1.20E-01	1.55E+09	1.13E+09	1.66E+04	1.27E+04	1.26E+04	1.24E+04	1.20E+04	1.15E+04	1.10E+04	1.06E+04	1.03E+04
1.70E-01	7.28E+07	1.20E+07	8.76E+02	3.35E+02	2.43E+02	1.81E+02	1.63E+02	1.60E+02	1.57E+02	1.54E+02	1.52E+02
3.00E-01	2.05E+09	1.49E+09	2.53E+04	1.73E+04	1.72E+04	1.70E+04	1.64E+04	1.55E+04	1.47E+04	1.40E+04	1.34E+04
6.50E-01	2.44E+08	8.51E+06	3.72E+02	3.06E+02	2.34E+02	1.96E+02	2.18E+02	2.48E+02	2.55E+02	2.51E+02	2.45E+02
1.13E+00	5.44E+08	3.48E+08	2.19E+02	2.07E+02	1.92E+02	1.81E+02	1.73E+02	1.64E+02	1.55E+02	1.47E+02	1.40E+02
1.58E+00	6.45E+01	6.22E+01	5.60E+01	5.18E+01	4.74E+01	4.48E+01	4.57E+01	4.52E+01	4.19E+01	3.80E+01	3.43E+01
2.00E+00	8.41E-01	5.04E-01	4.85E-01	5.00E-01	5.33E-01	6.03E-01	7.92E-01	9.58E-01	1.00E+00	9.93E-01	9.70E-01
2.40E+00	4.28E+01	4.28E+01	3.81E+01	3.47E+01	3.06E+01	2.72E+01	2.36E+01	1.95E+01	1.62E+01	1.34E+01	1.12E+01
2.80E+00	8.82E+01	8.95E+01	9.18E+01	9.70E+01	1.10E+02	1.42E+02	2.32E+02	3.11E+02	3.29E+02	3.23E+02	3.10E+02
3.25E+00	2.08E+01	2.08E+01	1.85E+01	1.68E+01	1.49E+01	1.32E+01	1.15E+01	9.47E+00	7.85E+00	6.51E+00	5.41E+00
3.75E+00	1.39E+01	1.39E+01	1.24E+01	1.13E+01	9.95E+00	8.84E+00	7.67E+00	6.34E+00	5.25E+00	4.36E+00	3.62E+00
4.25E+00	9.12E+00	9.13E+00	8.13E+00	7.40E+00	6.54E+00	5.81E+00	5.04E+00	4.16E+00	3.45E+00	2.86E+00	2.38E+00
4.75E+00	5.91E+00	5.91E+00	5.27E+00	4.80E+00	4.24E+00	3.76E+00	3.27E+00	2.70E+00	2.24E+00	1.85E+00	1.54E+00
5.50E+00	6.19E+00	6.19E+00	5.52E+00	5.02E+00	4.44E+00	3.94E+00	3.42E+00	2.83E+00	2.34E+00	1.94E+00	1.61E+00
0 total	6.09E+09	3.37E+09	3.20E+05	2.41E+05	1.78E+05	1.42E+05	1.56E+05	1.92E+05	2.19E+05	2.39E+05	2.55E+05
0 gamma watts	4.25E+03	2.35E+03	2.23E-01	1.68E-01	1.24E-01	9.88E-02	1.09E-01	1.34E-01	1.53E-01	1.67E-01	1.77E-01

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1 * gamma sources determined *

0case applies the following photon data base
master photon library
in binary mode

0 the sources include photons of nuclides for...

light elements

1 gamma source spectrum for decay step for BWR source term - top ds4 - discharge

0 1.00 day time of the requested nuclides

0 energy interval in mev		photons / second	mev / second
1.0000E-02 to	5.0000E-02	6.7621E+11	2.0286E+10
5.0000E-02 to	1.0000E-01	1.4322E+11	1.0741E+10
1.0000E-01 to	2.0000E-01	2.5484E+11	3.8226E+10
2.0000E-01 to	3.0000E-01	3.9323E+10	9.8308E+09
3.0000E-01 to	4.0000E-01	7.3688E+11	2.5791E+11
4.0000E-01 to	6.0000E-01	7.4853E+11	3.7427E+11
6.0000E-01 to	8.0000E-01	3.1349E+12	2.1944E+12
8.0000E-01 to	1.0000E+00	2.4578E+12	2.2121E+12
1.0000E+00 to	1.3300E+00	4.5406E+12	5.2898E+12
1.3300E+00 to	1.6600E+00	1.2814E+12	1.9157E+12
1.6600E+00 to	2.0000E+00	2.5302E+10	4.6302E+10
2.0000E+00 to	2.5000E+00	2.9728E+09	6.6888E+09
2.5000E+00 to	3.0000E+00	6.0502E+08	1.6638E+09
3.0000E+00 to	4.0000E+00	3.4814E+07	1.2185E+08
4.0000E+00 to	5.0000E+00	1.5898E+03	7.1541E+03
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00

	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		1.4043E+13	1.2378E+13

0
0 total energy from nuclides with spectrum data = 1.2364E+13
0 total energy from nuclides with no spectrum data = 1.4459E+10
1 gamma source spectrum for decay step for BWR source term - top ds4 - 0.25 year
0 90.00 day time of the requested nuclides
0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	2.1114E+11	6.3341E+09
5.0000E-02	to	1.0000E-01	3.0367E+10	2.2775E+09
1.0000E-01	to	2.0000E-01	1.6908E+10	2.5363E+09
2.0000E-01	to	3.0000E-01	4.3550E+09	1.0887E+09
3.0000E-01	to	4.0000E-01	7.8467E+10	2.7463E+10
4.0000E-01	to	6.0000E-01	2.9083E+11	1.4541E+11
6.0000E-01	to	8.0000E-01	1.0444E+12	7.3106E+11
8.0000E-01	to	1.0000E+00	1.2091E+12	1.0882E+12
1.0000E+00	to	1.3300E+00	4.3676E+12	5.0883E+12
1.3300E+00	to	1.6600E+00	1.2332E+12	1.8437E+12
1.6600E+00	to	2.0000E+00	4.4193E+09	8.0874E+09
2.0000E+00	to	2.5000E+00	4.4812E+07	1.0083E+08
2.5000E+00	to	3.0000E+00	5.6742E+04	1.5604E+05
3.0000E+00	to	4.0000E+00	9.2902E-12	3.2516E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			8.4909E+12	8.9445E+12

0
0 total energy from nuclides with spectrum data = 8.9342E+12
0 total energy from nuclides with no spectrum data = 1.0353E+10
1 gamma source spectrum for decay step for BWR source term - top ds4 - 0.50 year
0 182.50 day time of the requested nuclides
0

energy interval in mev			photons / second	mev / second
1.0000E-02	to	5.0000E-02	1.5878E+11	4.7635E+09
5.0000E-02	to	1.0000E-01	2.0668E+10	1.5501E+09
1.0000E-01	to	2.0000E-01	9.2866E+09	1.3930E+09
2.0000E-01	to	3.0000E-01	1.9670E+09	4.9175E+08
3.0000E-01	to	4.0000E-01	8.9032E+09	3.1161E+09
4.0000E-01	to	6.0000E-01	1.2387E+11	6.1936E+10
6.0000E-01	to	8.0000E-01	4.2892E+11	3.0025E+11
8.0000E-01	to	1.0000E+00	6.4927E+11	5.8434E+11
1.0000E+00	to	1.3300E+00	4.2236E+12	4.9205E+12
1.3300E+00	to	1.6600E+00	1.1926E+12	1.7830E+12
1.6600E+00	to	2.0000E+00	1.7814E+09	3.2599E+09
2.0000E+00	to	2.5000E+00	3.3653E+07	7.5720E+07
2.5000E+00	to	3.0000E+00	4.7802E+04	1.3146E+05
3.0000E+00	to	4.0000E+00	9.2394E-12	3.2338E-11
4.0000E+00	to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00	to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00	to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00	to	1.0000E+01	.0000E+00	.0000E+00
0 totals			6.8197E+12	7.6646E+12

0
0 total energy from nuclides with spectrum data = 7.6569E+12
0 total energy from nuclides with no spectrum data = 7.7607E+09
1 gamma source spectrum for decay step for BWR source term - top ds4 - 1 year
0 365.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	1.1569E+11	3.4707E+09
	5.0000E-02 to	1.0000E-01	1.4680E+10	1.1010E+09
	1.0000E-01 to	2.0000E-01	5.7076E+09	8.5614E+08
	2.0000E-01 to	3.0000E-01	5.8491E+08	1.4623E+08
	3.0000E-01 to	4.0000E-01	8.3353E+08	2.9174E+08
	4.0000E-01 to	6.0000E-01	2.8478E+10	1.4239E+10
	6.0000E-01 to	8.0000E-01	6.7094E+10	4.6966E+10
	8.0000E-01 to	1.0000E+00	2.6730E+11	2.4057E+11
	1.0000E+00 to	1.3300E+00	3.9534E+12	4.6057E+12
	1.3300E+00 to	1.6600E+00	1.1164E+12	1.6690E+12
	1.6600E+00 to	2.0000E+00	2.9645E+08	5.4250E+08
	2.0000E+00 to	2.5000E+00	2.7146E+07	6.1079E+07
	2.5000E+00 to	3.0000E+00	4.1559E+04	1.1429E+05
	3.0000E+00 to	4.0000E+00	9.1404E-12	3.1991E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
	totals		5.5705E+12	6.5830E+12

total energy from nuclides with spectrum data = 6.5779E+12
total energy from nuclides with no spectrum data = 5.1592E+09

gamma source spectrum for decay step for BWR source term - top ds4 - 2 year
730.50 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	8.3655E+10	2.5096E+09
	5.0000E-02 to	1.0000E-01	1.2004E+10	9.0034E+08
	1.0000E-01 to	2.0000E-01	4.2906E+09	6.4358E+08
	2.0000E-01 to	3.0000E-01	2.4269E+08	6.0672E+07
	3.0000E-01 to	4.0000E-01	5.2245E+08	1.8286E+08
	4.0000E-01 to	6.0000E-01	7.9358E+09	3.9679E+09
	6.0000E-01 to	8.0000E-01	5.1193E+09	3.5835E+09
	8.0000E-01 to	1.0000E+00	9.5745E+10	8.6170E+10
	1.0000E+00 to	1.3300E+00	3.4654E+12	4.0372E+12
	1.3300E+00 to	1.6600E+00	9.7863E+11	1.4631E+12
	1.6600E+00 to	2.0000E+00	8.2732E+06	1.5140E+07
	2.0000E+00 to	2.5000E+00	2.3234E+07	5.2277E+07
	2.5000E+00 to	3.0000E+00	3.6019E+04	9.9052E+04
	3.0000E+00 to	4.0000E+00	8.9481E-12	3.1318E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
	totals		4.6536E+12	5.5984E+12

total energy from nuclides with spectrum data = 5.5950E+12
total energy from nuclides with no spectrum data = 3.3269E+09

gamma source spectrum for decay step for BWR source term - top ds4 - 5 year
1826.25 day time of the requested nuclides

	energy interval in mev		photons / second	mev / second
	1.0000E-02 to	5.0000E-02	4.7239E+10	1.4172E+09
	5.0000E-02 to	1.0000E-01	8.0402E+09	6.0301E+08
	1.0000E-01 to	2.0000E-01	2.5848E+09	3.8772E+08
	2.0000E-01 to	3.0000E-01	1.3501E+08	3.3752E+07
	3.0000E-01 to	4.0000E-01	2.8063E+08	9.8221E+07
	4.0000E-01 to	6.0000E-01	3.4574E+09	1.7287E+09

	6.0000E-01 to	8.0000E-01	1.8450E+09	1.2915E+09
	8.0000E-01 to	1.0000E+00	8.4035E+09	7.5632E+09
	1.0000E+00 to	1.3300E+00	2.3351E+12	2.7203E+12
	1.3300E+00 to	1.6600E+00	6.5942E+11	9.8583E+11
	1.6600E+00 to	2.0000E+00	1.9043E+02	3.4849E+02
	2.0000E+00 to	2.5000E+00	1.5649E+07	3.5210E+07
	2.5000E+00 to	3.0000E+00	2.4265E+04	6.6730E+04
	3.0000E+00 to	4.0000E+00	8.3983E-12	2.9394E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		3.0665E+12	3.7193E+12

0
0 total energy from nuclides with spectrum data = 3.7178E+12
0 total energy from nuclides with no spectrum data = 1.5033E+09
1 gamma source spectrum for decay step for BWR source term - top ds4 - 10 year
0 3652.50 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	2.2803E+10	6.8408E+08
5.0000E-02 to	1.0000E-01	4.1547E+09	3.1160E+08
1.0000E-01 to	2.0000E-01	1.1836E+09	1.7755E+08
2.0000E-01 to	3.0000E-01	6.0654E+07	1.5164E+07
3.0000E-01 to	4.0000E-01	1.0863E+08	3.8021E+07
4.0000E-01 to	6.0000E-01	9.7310E+08	4.8655E+08
6.0000E-01 to	8.0000E-01	5.5942E+08	3.9160E+08
8.0000E-01 to	1.0000E+00	2.5104E+08	2.2594E+08
1.0000E+00 to	1.3300E+00	1.2095E+12	1.4090E+12
1.3300E+00 to	1.6600E+00	3.4155E+11	5.1062E+11
1.6600E+00 to	2.0000E+00	6.5343E+00	1.1958E+01
2.0000E+00 to	2.5000E+00	8.1056E+06	1.8238E+07
2.5000E+00 to	3.0000E+00	1.2569E+04	3.4563E+04
3.0000E+00 to	4.0000E+00	7.5570E-12	2.6450E-11
4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0 totals		1.5811E+12	1.9220E+12

0
0 total energy from nuclides with spectrum data = 1.9216E+12
0 total energy from nuclides with no spectrum data = 4.2579E+08
1 gamma source spectrum for decay step for BWR source term - top ds4 - 15 year
0 5478.75 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

1.0000E-02 to	5.0000E-02	1.1548E+10	3.4644E+08
5.0000E-02 to	1.0000E-01	2.1499E+09	1.6124E+08
1.0000E-01 to	2.0000E-01	5.6962E+08	8.5443E+07
2.0000E-01 to	3.0000E-01	2.8828E+07	7.2070E+06
3.0000E-01 to	4.0000E-01	4.5958E+07	1.6085E+07
4.0000E-01 to	6.0000E-01	2.7435E+08	1.3718E+08
6.0000E-01 to	8.0000E-01	1.9797E+08	1.3858E+08
8.0000E-01 to	1.0000E+00	8.4665E+07	7.6198E+07
1.0000E+00 to	1.3300E+00	6.2651E+11	7.2989E+11
1.3300E+00 to	1.6600E+00	1.7693E+11	2.6451E+11
1.6600E+00 to	2.0000E+00	5.7767E+00	1.0571E+01
2.0000E+00 to	2.5000E+00	4.1987E+06	9.4471E+06
2.5000E+00 to	3.0000E+00	6.5106E+03	1.7904E+04
3.0000E+00 to	4.0000E+00	6.8006E-12	2.3802E-11

	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		8.1834E+11	9.9537E+11

0
0 total energy from nuclides with spectrum data = 9.9525E+11
0 total energy from nuclides with no spectrum data = 1.2310E+08
1 gamma source spectrum for decay step for BWR source term - top ds4 - 20 year
0 7305.00 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

	1.0000E-02 to	5.0000E-02	6.0007E+09	1.8002E+08
	5.0000E-02 to	1.0000E-01	1.1134E+09	8.3503E+07
	1.0000E-01 to	2.0000E-01	2.8294E+08	4.2441E+07
	2.0000E-01 to	3.0000E-01	1.4217E+07	3.5543E+06
	3.0000E-01 to	4.0000E-01	2.0912E+07	7.3192E+06
	4.0000E-01 to	6.0000E-01	7.7585E+07	3.8792E+07
	6.0000E-01 to	8.0000E-01	9.6257E+07	6.7380E+07
	8.0000E-01 to	1.0000E+00	6.8767E+07	6.1891E+07
	1.0000E+00 to	1.3300E+00	3.2455E+11	3.7810E+11
	1.3300E+00 to	1.6600E+00	9.1654E+10	1.3702E+11
	1.6600E+00 to	2.0000E+00	5.1073E+00	9.3463E+00
	2.0000E+00 to	2.5000E+00	2.1751E+06	4.8939E+06
	2.5000E+00 to	3.0000E+00	3.3727E+03	9.2749E+03
	3.0000E+00 to	4.0000E+00	6.1202E-12	2.1421E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		4.2388E+11	5.1562E+11

0
0 total energy from nuclides with spectrum data = 5.1558E+11
0 total energy from nuclides with no spectrum data = 3.8051E+07
1 gamma source spectrum for decay step for BWR source term - top ds4 - 25 year
0 9131.25 day time of the requested nuclides
0 energy interval in mev photons / second mev / second
0

	1.0000E-02 to	5.0000E-02	3.1997E+09	9.5991E+07
	5.0000E-02 to	1.0000E-01	5.7700E+08	4.3275E+07
	1.0000E-01 to	2.0000E-01	1.4325E+08	2.1487E+07
	2.0000E-01 to	3.0000E-01	7.1752E+06	1.7938E+06
	3.0000E-01 to	4.0000E-01	1.0022E+07	3.5077E+06
	4.0000E-01 to	6.0000E-01	2.2060E+07	1.1030E+07
	6.0000E-01 to	8.0000E-01	6.7590E+07	4.7313E+07
	8.0000E-01 to	1.0000E+00	6.1746E+07	5.5572E+07
	1.0000E+00 to	1.3300E+00	1.6813E+11	1.9588E+11
	1.3300E+00 to	1.6600E+00	4.7481E+10	7.0984E+10
	1.6600E+00 to	2.0000E+00	4.5155E+00	8.2634E+00
	2.0000E+00 to	2.5000E+00	1.1268E+06	2.5353E+06
	2.5000E+00 to	3.0000E+00	1.7472E+03	4.8048E+03
	3.0000E+00 to	4.0000E+00	5.5080E-12	1.9278E-11
	4.0000E+00 to	5.0000E+00	.0000E+00	.0000E+00
	5.0000E+00 to	6.5000E+00	.0000E+00	.0000E+00
	6.5000E+00 to	8.0000E+00	.0000E+00	.0000E+00
	8.0000E+00 to	1.0000E+01	.0000E+00	.0000E+00
0	totals		2.1970E+11	2.6714E+11

0
0 total energy from nuclides with spectrum data = 2.6713E+11
0 total energy from nuclides with no spectrum data = 1.4150E+07

```
1
1  * normal termination of execution *
0                                        table of contents for material tables
0                                          case or subcase printed      page

                                                     1                   1
0ndset          33
           33            4            1           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0   73$ array     18 entries read
0   74* array     18 entries read
0   75$ array     18 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0            0            0            0            0            0            0            0            0            0
            0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935           20            6           18         1697
0mmn            19
           10           10            0            0            1            3            0            0            0            0
           21          100           18            4            3            0            2            1            0
0tconst          5
  8.640000E+04  .000000E+00  .000000E+00  .000000E+00 1.000000E-05
0mzero           4
            0          689          129          879
0pow             3
   .000000E+00  .000000E+00  .000000E+00
0 linp           9
            6            0           51           26            2         3000         1000         1697            5
 n-gamma, fission and total mev/fission =                3.4627E+00       1.9421E+02       1.9768E+02
 start of interval flux =          1.59016E+13
 n-gamma, fission and total mev/fission =                3.8360E+00       1.9431E+02       1.9815E+02
 start of interval flux =          1.59426E+13
 n-gamma, fission and total mev/fission =                3.9259E+00       1.9441E+02       1.9834E+02
 start of interval flux =          1.59938E+13
 n-gamma, fission and total mev/fission =                4.0149E+00       1.9451E+02       1.9852E+02
 start of interval flux =          1.60555E+13
 n-gamma, fission and total mev/fission =                4.1065E+00       1.9460E+02       1.9870E+02
 start of interval flux =          1.61265E+13
 n-gamma, fission and total mev/fission =                4.2006E+00       1.9469E+02       1.9889E+02
 start of interval flux =          1.62057E+13
```

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 n-gamma, fission and total mev/fission =              4.2968E+00       1.9477E+02       1.9907E+02
 start of interval flux =         1.62923E+13
 n-gamma, fission and total mev/fission =              4.3948E+00       1.9486E+02       1.9925E+02
 start of interval flux =         1.63857E+13
 n-gamma, fission and total mev/fission =              4.4943E+00       1.9494E+02       1.9943E+02
 start of interval flux =         1.64852E+13
 n-gamma, fission and total mev/fission =              4.5951E+00       1.9502E+02       1.9961E+02
 start of interval flux =         1.65904E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 9000 MWd/MTU
0ndset          33
           33           4           2          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 1.799989E+03 1.624725E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              4.6628E+00       1.9507E+02       1.9973E+02
 start of interval flux =         1.65420E+13
 n-gamma, fission and total mev/fission =              4.7541E+00       1.9515E+02       1.9990E+02
 start of interval flux =         1.66661E+13
 n-gamma, fission and total mev/fission =              4.8521E+00       1.9522E+02       2.0007E+02
 start of interval flux =         1.67942E+13
 n-gamma, fission and total mev/fission =              4.9519E+00       1.9529E+02       2.0024E+02
 start of interval flux =         1.69267E+13
 n-gamma, fission and total mev/fission =              5.0528E+00       1.9536E+02       2.0042E+02
 start of interval flux =         1.70633E+13
 n-gamma, fission and total mev/fission =              5.1547E+00       1.9544E+02       2.0059E+02
 start of interval flux =         1.72040E+13
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```
 n-gamma, fission and total mev/fission =              5.2576E+00       1.9551E+02       2.0076E+02
 start of interval flux =         1.73484E+13
 n-gamma, fission and total mev/fission =              5.3612E+00       1.9558E+02       2.0094E+02
 start of interval flux =         1.74964E+13
 n-gamma, fission and total mev/fission =              5.4657E+00       1.9565E+02       2.0111E+02
 start of interval flux =         1.76479E+13
 n-gamma, fission and total mev/fission =              5.5710E+00       1.9572E+02       2.0129E+02
 start of interval flux =         1.78028E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 18000 MWd/MTU
0ndset          33
           33           4           3          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 3.599977E+03 1.723310E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              5.4836E+00       1.9575E+02       2.0124E+02
 start of interval flux =         1.78777E+13
 n-gamma, fission and total mev/fission =              5.5775E+00       1.9582E+02       2.0139E+02
 start of interval flux =         1.80675E+13
 n-gamma, fission and total mev/fission =              5.6848E+00       1.9588E+02       2.0156E+02
 start of interval flux =         1.82599E+13
 n-gamma, fission and total mev/fission =              5.7936E+00       1.9594E+02       2.0174E+02
 start of interval flux =         1.84550E+13
 n-gamma, fission and total mev/fission =              5.9034E+00       1.9601E+02       2.0191E+02
 start of interval flux =         1.86527E+13
 n-gamma, fission and total mev/fission =              6.0141E+00       1.9607E+02       2.0208E+02
 start of interval flux =         1.88530E+13
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 n-gamma, fission and total mev/fission =              6.1257E+00       1.9614E+02       2.0226E+02
 start of interval flux =         1.90558E+13
 n-gamma, fission and total mev/fission =              6.2382E+00       1.9620E+02       2.0244E+02
 start of interval flux =         1.92610E+13
 n-gamma, fission and total mev/fission =              6.3515E+00       1.9627E+02       2.0262E+02
 start of interval flux =         1.94687E+13
 n-gamma, fission and total mev/fission =              6.4657E+00       1.9633E+02       2.0280E+02
 start of interval flux =         1.96787E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 27000 MWd/MTU
0ndset          33
            33           4           4          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non            5
          7935          20           6          18        1697
0mmn           19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst         5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero          4
            21         689         129         879
0pow            3
  4.349999E+00 5.399966E+03 1.888097E+13
0 linp          9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              6.4023E+00       1.9638E+02       2.0278E+02
 start of interval flux =         1.98457E+13
 n-gamma, fission and total mev/fission =              6.5154E+00       1.9644E+02       2.0296E+02
 start of interval flux =         2.00911E+13
 n-gamma, fission and total mev/fission =              6.6364E+00       1.9650E+02       2.0314E+02
 start of interval flux =         2.03382E+13
 n-gamma, fission and total mev/fission =              6.7585E+00       1.9656E+02       2.0332E+02
 start of interval flux =         2.05867E+13
 n-gamma, fission and total mev/fission =              6.8815E+00       1.9663E+02       2.0351E+02
 start of interval flux =         2.08366E+13
 n-gamma, fission and total mev/fission =              7.0052E+00       1.9669E+02       2.0370E+02
 start of interval flux =         2.10878E+13
```

```
 n-gamma, fission and total mev/fission =              7.1297E+00       1.9676E+02       2.0389E+02
 start of interval flux =         2.13404E+13
 n-gamma, fission and total mev/fission =              7.2549E+00       1.9682E+02       2.0408E+02
 start of interval flux =         2.15941E+13
 n-gamma, fission and total mev/fission =              7.3807E+00       1.9689E+02       2.0427E+02
 start of interval flux =         2.18490E+13
 n-gamma, fission and total mev/fission =              7.5071E+00       1.9695E+02       2.0446E+02
 start of interval flux =         2.21049E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 36000 MWd/MTU
0ndset          33
           33           4           5          27           6           0           0           0           0           0
            0           0           0           0           0           2          -1        1698         690         130
          880        7935           0           5          99           7           9          93          18          18
           18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt           12
            0           0           0           0           0           0           0           0           0           0
            0           0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935          20           6          18        1697
0mmn            19
           10          10           0           0           1           3           0           0           0          10
           21         100           0           4           3           0           2           1           0
0tconst          5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero           4
           21         689         129         879
0pow             3
  4.349999E+00 7.199954E+03 2.111546E+13
0 linp           9
            6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              7.4483E+00       1.9701E+02       2.0446E+02
 start of interval flux =         2.23562E+13
 n-gamma, fission and total mev/fission =              7.5770E+00       1.9707E+02       2.0465E+02
 start of interval flux =         2.26544E+13
 n-gamma, fission and total mev/fission =              7.7132E+00       1.9713E+02       2.0484E+02
 start of interval flux =         2.29525E+13
 n-gamma, fission and total mev/fission =              7.8499E+00       1.9719E+02       2.0504E+02
 start of interval flux =         2.32498E+13
 n-gamma, fission and total mev/fission =              7.9869E+00       1.9726E+02       2.0524E+02
 start of interval flux =         2.35464E+13
 n-gamma, fission and total mev/fission =              8.1242E+00       1.9732E+02       2.0545E+02
 start of interval flux =         2.38422E+13
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```
 n-gamma, fission and total mev/fission =              8.2616E+00       1.9739E+02       2.0565E+02
 start of interval flux =         2.41370E+13
 n-gamma, fission and total mev/fission =              8.3992E+00       1.9745E+02       2.0585E+02
 start of interval flux =         2.44308E+13
 n-gamma, fission and total mev/fission =              8.5367E+00       1.9752E+02       2.0606E+02
 start of interval flux =         2.47234E+13
 n-gamma, fission and total mev/fission =              8.6743E+00       1.9759E+02       2.0626E+02
 start of interval flux =         2.50148E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 45000 MWd/MTU
0ndset           33
            33           4           5          27           6           0           0           0           0           0
             0           0           0           0           0           2          -1        1698         690         130
           880        7935           0           5          99           7           9          93          18          18
            18           0           0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0   57* array      5 entries read
0    5t
     l90  102464
     l116  66229
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81119
0   58* array     10 entries read
0   60* array     10 entries read
0   66$ array     12 entries read
0    6t
     l140  71971
     used   107088 in size   150000
0jopt            12
             0           0           0           0           0           0           0           0           0           0
             0           0
0therm            4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non              5
          7935          20           6          18        1697
0mmn             19
            10          10           0           0           1           3           0           0           0          10
            21         100           0           4           3           0           2           1           0
0tconst           5
  8.640000E+04  .000000E+00 2.800000E+01  .000000E+00 1.000000E-05
0mzero            4
            21         689         129         879
0pow              3
  4.349999E+00 8.999942E+03 2.386573E+13
0 linp            9
             6           0          51          26           2        3000        1000        1697           5
 n-gamma, fission and total mev/fission =              8.8246E+00       1.9766E+02       2.0648E+02
 start of interval flux =         2.53317E+13
 n-gamma, fission and total mev/fission =              9.0559E+00       1.9777E+02       2.0683E+02
 start of interval flux =         2.58164E+13
 n-gamma, fission and total mev/fission =              9.2862E+00       1.9788E+02       2.0717E+02
 start of interval flux =         2.62967E+13
 n-gamma, fission and total mev/fission =              9.5155E+00       1.9800E+02       2.0751E+02
 start of interval flux =         2.67717E+13
 n-gamma, fission and total mev/fission =              9.7433E+00       1.9811E+02       2.0785E+02
 start of interval flux =         2.72405E+13
 n-gamma, fission and total mev/fission =              9.9733E+00       1.9822E+02       2.0819E+02
 start of interval flux =         2.77021E+13
```

```
 n-gamma, fission and total mev/fission =              1.0197E+01       1.9832E+02       2.0852E+02
 start of interval flux =         2.81567E+13
 n-gamma, fission and total mev/fission =              1.0419E+01       1.9843E+02       2.0885E+02
 start of interval flux =         2.86030E+13
 n-gamma, fission and total mev/fission =              1.0638E+01       1.9853E+02       2.0917E+02
 start of interval flux =         2.90403E+13
 n-gamma, fission and total mev/fission =              1.0854E+01       1.9863E+02       2.0949E+02
 start of interval flux =         2.94678E+13
0 case or subcase    1  BWR SNF Assembly - Top - deplete to 60000 MWd/MTU
0ndset           33
           33            4            5           27            6            0            0            0            0            0
            0            0            0            0            0            2           -1         1698          690          130
          880         7935            0            5           99            7            9           93           18           18
           18            0            0
0   35$ array      1 entries read
0    4t
0   56$ array     20 entries read
0    5t
     l90  102462
     l116  66217
     l32   33663 nudata (library) storage size
     l44   33734
     l103  81117
0   60* array     10 entries read
0   61* array      7 entries read
0   65$ array     63 entries read
0   81$ array      6 entries read
0   82$ array     10 entries read
0    6t
     l140  83885
     used   107477 in size   150000
0jopt            12
            0            0            0            0            0            0            0            0            0            0
            0            0
0therm           4
  4.454389E-01 4.020185E-01 3.005387E+00 1.000000E-25
0non             5
         7935           20            6           18         1697
0mmn            19
            0           10            0            0            1            1            0            0            0           10
           21          100            0            4            3            0            2            0            0
0tconst          5
  8.640000E+04  .000000E+00 2.900000E+01  .000000E+00 5.000000E-02
0mzero           4
           21          689          129          879
0pow             3
  4.349999E+00 1.199992E+04 2.152542E+13
0 linp           9
            6            2            0           26            1        14808         1000         1697            5
0 case or subcase    1  BWR SNF Assembly - Top - decay
0   56$ array     20 entries read
0    5t
```

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 - 5 Year Cooling
(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	2.8594E+05	2.5515E+04	3.2314E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	1.8582E+06	2.7339E+05	2.1000E+01
7	0.100	0.400	3.00E-01	7.7350E+06	2.5783E+07	25	Part 7	0.18316	0.29721	0.11405	2.9406E+06	7.0629E+05	3.3232E+01
6	0.400	0.900	5.00E-01	3.9510E+07	7.9020E+07	24	Part 7	0.29721	0.36883	0.07162	1.8466E+06	6.1496E+05	2.0868E+01
5	0.900	1.400	5.00E-01	3.6190E+07	7.2380E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	8.5374E+06	3.6997E+06	9.6481E+01
4	1.400	1.850	4.50E-01	2.6680E+07	5.9289E+07	22	Part 6	0.49787	0.60810	0.11023	8.7104E+06	4.8167E+06	9.8436E+01
3	1.850	3.000	1.15E+00	4.7130E+07	4.0983E+07	21	Part 6	0.60810	0.74274	0.13464	1.0639E+07	7.1860E+06	1.2023E+02
2	3.000	6.430	3.43E+00	4.2770E+07	1.2469E+07	20	Part 6	0.74274	0.82085	0.07811	6.1723E+06	4.8254E+06	6.9753E+01
1	6.430	20.000	1.36E+01	3.7770E+06	2.7833E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	1.3681E+07	1.2473E+07	1.5460E+02
			Sum:	2.0379E+08		18	Part 5	1.00260	1.35340	0.35080	2.5391E+07	2.9910E+07	2.8694E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	1.8373E+07	2.7618E+07	2.0763E+02
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	1.4569E+07	2.6031E+07	1.6465E+02
						15	Part 3	1.92050	2.23130	0.31080	1.2737E+07	2.6442E+07	1.4395E+02
						14	Part 3	2.23130	2.34570	0.11440	4.6884E+06	1.0729E+07	5.2984E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	8.0326E+05	1.8921E+06	9.0776E+00
						12	Part 3	2.36530	2.46600	0.10070	4.1269E+06	9.9693E+06	4.6639E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	1.0627E+07	2.7583E+07	1.2009E+02
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	1.1406E+07	3.2720E+07	1.2890E+02
C9	6.430	6.800	3.70E-01	1.0593E+06	2.8629E+06	9	Part 2	3.01190	3.67880	0.66690	8.3158E+06	2.7819E+07	9.3977E+01
C8	6.800	7.200	4.00E-01	7.3621E+05	1.8405E+06	8	Part 2	3.67880	4.96590	1.28710	1.6049E+07	6.9371E+07	1.8137E+02
C7	7.200	7.600	4.00E-01	5.5607E+05	1.3902E+06	7	Part 2	4.96590	6.06530	1.09940	1.3709E+07	7.5613E+07	1.5492E+02
C6	7.600	8.000	4.00E-01	4.4838E+05	1.1210E+06	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	6.6325E+06	4.4682E+07	7.4954E+01
C5	8.000	8.800	8.00E-01	5.0321E+05	6.2901E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	1.0969E+06	8.7835E+06	1.2396E+01
C4	8.800	9.600	8.00E-01	1.4685E+05	1.8356E+05	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	3.4553E+05	3.2146E+06	3.9048E+00
C3	9.600	10.400	8.00E-01	1.5468E+05	1.9335E+05	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	2.2383E+05	2.4861E+06	2.5295E+00
C2	10.400	11.200	8.00E-01	1.0182E+05	1.2727E+05	2	Part C1	12.21400	14.19100	1.97700	2.5816E+04	3.4084E+05	2.9175E-01
C1	11.200	12.800	1.60E+00	7.0488E+04	4.4055E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.7770E+06						Sum:	2.0379E+08	4.5983E+08	2.3031E+03

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 - 10 Year Cooling

(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	2.3614E+05	2.1072E+04	2.6687E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	1.5346E+06	2.2578E+05	1.7343E+01
7	0.100	0.400	3.00E-01	6.3880E+06	2.1293E+07	25	Part 7	0.18316	0.29721	0.11405	2.4285E+06	5.8329E+05	2.7445E+01
6	0.400	0.900	5.00E-01	3.2630E+07	6.5260E+07	24	Part 7	0.29721	0.36883	0.07162	1.5250E+06	5.0787E+05	1.7234E+01
5	0.900	1.400	5.00E-01	2.9910E+07	5.9820E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	7.0507E+06	3.0554E+06	7.9680E+01
4	1.400	1.850	4.50E-01	2.2090E+07	4.9089E+07	22	Part 6	0.49787	0.60810	0.11023	7.1936E+06	3.9780E+06	8.1295E+01
3	1.850	3.000	1.15E+00	3.9130E+07	3.4026E+07	21	Part 6	0.60810	0.74274	0.13464	8.7866E+06	5.9346E+06	9.9297E+01
2	3.000	6.430	3.43E+00	3.5390E+07	1.0318E+07	20	Part 6	0.74274	0.82085	0.07811	5.0975E+06	3.9852E+06	5.7606E+01
1	6.430	20.000	1.36E+01	3.1190E+06	2.2985E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	1.1303E+07	1.0305E+07	1.2773E+02
			Sum:	1.6866E+08		18	Part 5	1.00260	1.35340	0.35080	2.0985E+07	2.4720E+07	2.3715E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	1.5207E+07	2.2859E+07	1.7186E+02
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	1.2069E+07	2.1565E+07	1.3640E+02
						15	Part 3	1.92050	2.23130	0.31080	1.0575E+07	2.1953E+07	1.1951E+02
						14	Part 3	2.23130	2.34570	0.11440	3.8926E+06	8.9082E+06	4.3990E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	6.6691E+05	1.5709E+06	7.5368E+00
						12	Part 3	2.36530	2.46600	0.10070	3.4264E+06	8.2770E+06	3.8722E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	8.8230E+06	2.2901E+07	9.9708E+01
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	9.4697E+06	2.7165E+07	1.0702E+02
C9	6.430	6.800	3.70E-01	8.7474E+05	2.3642E+06	9	Part 2	3.01190	3.67880	0.66690	6.8809E+06	2.3019E+07	7.7761E+01
C8	6.800	7.200	4.00E-01	6.0795E+05	1.5199E+06	8	Part 2	3.67880	4.96590	1.28710	1.3280E+07	5.7401E+07	1.5008E+02
C7	7.200	7.600	4.00E-01	4.5920E+05	1.1480E+06	7	Part 2	4.96590	6.06530	1.09940	1.1343E+07	6.2566E+07	1.2819E+02
C6	7.600	8.000	4.00E-01	3.7027E+05	9.2568E+05	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	5.4846E+06	3.6948E+07	6.1982E+01
C5	8.000	8.800	8.00E-01	4.1554E+05	5.1943E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	9.0580E+05	7.2533E+06	1.0236E+01
C4	8.800	9.600	8.00E-01	1.2127E+05	1.5158E+05	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	2.8533E+05	2.6546E+06	3.2245E+00
C3	9.600	10.400	8.00E-01	1.2774E+05	1.5967E+05	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	1.8484E+05	2.0530E+06	2.0888E+00
C2	10.400	11.200	8.00E-01	8.4079E+04	1.0510E+05	2	Part C1	12.21400	14.19100	1.97700	2.1319E+04	2.8146E+05	2.4092E-01
C1	11.200	12.800	1.60E+00	5.8208E+04	3.6380E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.1190E+06						Sum:	1.6866E+08	3.8069E+08	1.9060E+03

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 - 5 Year Cooling
(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	1.3777E+05	1.2294E+04	1.5570E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	8.9535E+05	1.3173E+05	1.0118E+01
7	0.100	0.400	3.00E-01	3.7270E+06	1.2423E+07	25	Part 7	0.18316	0.29721	0.11405	1.4169E+06	3.4031E+05	1.6012E+01
6	0.400	0.900	5.00E-01	1.9040E+07	3.8080E+07	24	Part 7	0.29721	0.36883	0.07162	8.8976E+05	2.9631E+05	1.0055E+01
5	0.900	1.400	5.00E-01	1.7480E+07	3.4960E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	4.1141E+06	1.7829E+06	4.6494E+01
4	1.400	1.850	4.50E-01	1.2940E+07	2.8756E+07	22	Part 6	0.49787	0.60810	0.11023	4.1976E+06	2.3212E+06	4.7437E+01
3	1.850	3.000	1.15E+00	2.3050E+07	2.0043E+07	21	Part 6	0.60810	0.74274	0.13464	5.1271E+06	3.4629E+06	5.7941E+01
2	3.000	6.430	3.43E+00	2.0720E+07	6.0408E+06	20	Part 6	0.74274	0.82085	0.07811	2.9744E+06	2.3254E+06	3.3614E+01
1	6.430	20.000	1.36E+01	1.8190E+06	1.3405E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	6.6009E+06	6.0182E+06	7.4597E+01
			Sum:	9.8776E+07		18	Part 5	1.00260	1.35340	0.35080	1.2264E+07	1.4447E+07	1.3860E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	8.9043E+06	1.3385E+07	1.0063E+02
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	7.0779E+06	1.2646E+07	7.9987E+01
						15	Part 3	1.92050	2.23130	0.31080	6.2295E+06	1.2932E+07	7.0400E+01
						14	Part 3	2.23130	2.34570	0.11440	2.2930E+06	5.2475E+06	2.5913E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	3.9285E+05	9.2536E+05	4.4396E+00
						12	Part 3	2.36530	2.46600	0.10070	2.0184E+06	4.8757E+06	2.2810E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	5.1973E+06	1.3490E+07	5.8734E+01
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	5.5778E+06	1.6001E+07	6.3035E+01
C9	6.430	6.800	3.70E-01	5.1015E+05	1.3788E+06	9	Part 2	3.01190	3.67880	0.66690	4.0286E+06	1.3477E+07	4.5527E+01
C8	6.800	7.200	4.00E-01	3.5456E+05	8.8640E+05	8	Part 2	3.67880	4.96590	1.28710	7.7751E+06	3.3607E+07	8.7867E+01
C7	7.200	7.600	4.00E-01	2.6781E+05	6.6951E+05	7	Part 2	4.96590	6.06530	1.09940	6.6413E+06	3.6631E+07	7.5053E+01
C6	7.600	8.000	4.00E-01	2.1594E+05	5.3985E+05	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	3.2072E+06	2.1606E+07	3.6244E+01
C5	8.000	8.800	8.00E-01	2.4234E+05	3.0293E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	5.2826E+05	4.2301E+06	5.9699E+00
C4	8.800	9.600	8.00E-01	7.0723E+04	8.8404E+04	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	1.6641E+05	1.5482E+06	1.8806E+00
C3	9.600	10.400	8.00E-01	7.4495E+04	9.3119E+04	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	1.0780E+05	1.1973E+06	1.2182E+00
C2	10.400	11.200	8.00E-01	4.9035E+04	6.1293E+04	2	Part C1	12.21400	14.19100	1.97700	1.2433E+04	1.6415E+05	1.4051E-01
C1	11.200	12.800	1.60E+00	3.3947E+04	2.1217E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.8190E+06						Sum:	9.8776E+07	2.2310E+08	1.1163E+03

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 - 10 Year Cooling

(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	1.1404E+05	1.0176E+04	1.2888E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	7.4112E+05	1.0904E+05	8.3754E+00
7	0.100	0.400	3.00E-01	3.0850E+06	1.0283E+07	25	Part 7	0.18316	0.29721	0.11405	1.1728E+06	2.8169E+05	1.3254E+01
6	0.400	0.900	5.00E-01	1.5760E+07	3.1520E+07	24	Part 7	0.29721	0.36883	0.07162	7.3649E+05	2.4527E+05	8.3231E+00
5	0.900	1.400	5.00E-01	1.4490E+07	2.8980E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	3.4054E+06	1.4757E+06	3.8484E+01
4	1.400	1.850	4.50E-01	1.0760E+07	2.3911E+07	22	Part 6	0.49787	0.60810	0.11023	3.4744E+06	1.9213E+06	3.9265E+01
3	1.850	3.000	1.15E+00	1.9260E+07	1.6748E+07	21	Part 6	0.60810	0.74274	0.13464	4.2439E+06	2.8664E+06	4.7960E+01
2	3.000	6.430	3.43E+00	1.7220E+07	5.0204E+06	20	Part 6	0.74274	0.82085	0.07811	2.4620E+06	1.9248E+06	2.7823E+01
1	6.430	20.000	1.36E+01	1.5050E+06	1.1091E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	5.4682E+06	4.9855E+06	6.1796E+01
			Sum:	8.2080E+07		18	Part 5	1.00260	1.35340	0.35080	1.0166E+07	1.1976E+07	1.1489E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	7.4000E+06	1.1124E+07	8.3627E+01
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	5.8912E+06	1.0526E+07	6.6577E+01
						15	Part 3	1.92050	2.23130	0.31080	5.2052E+06	1.0806E+07	5.8824E+01
						14	Part 3	2.23130	2.34570	0.11440	1.9160E+06	4.3847E+06	2.1652E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	3.2826E+05	7.7321E+05	3.7096E+00
						12	Part 3	2.36530	2.46600	0.10070	1.6865E+06	4.0740E+06	1.9059E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	4.3427E+06	1.1272E+07	4.9077E+01
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	4.6604E+06	1.3369E+07	5.2667E+01
C9	6.430	6.800	3.70E-01	4.2209E+05	1.1408E+06	9	Part 2	3.01190	3.67880	0.66690	3.3481E+06	1.1201E+07	3.7837E+01
C8	6.800	7.200	4.00E-01	2.9335E+05	7.3339E+05	8	Part 2	3.67880	4.96590	1.28710	6.4618E+06	2.7930E+07	7.3024E+01
C7	7.200	7.600	4.00E-01	2.2158E+05	5.5394E+05	7	Part 2	4.96590	6.06530	1.09940	5.5194E+06	3.0443E+07	6.2375E+01
C6	7.600	8.000	4.00E-01	1.7867E+05	4.4666E+05	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	2.6617E+06	1.7931E+07	3.0080E+01
C5	8.000	8.800	8.00E-01	2.0051E+05	2.5064E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	4.3707E+05	3.4999E+06	4.9394E+00
C4	8.800	9.600	8.00E-01	5.8515E+04	7.3143E+04	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	1.3768E+05	1.2809E+06	1.5559E+00
C3	9.600	10.400	8.00E-01	6.1636E+04	7.7044E+04	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	8.9188E+04	9.9061E+05	1.0079E+00
C2	10.400	11.200	8.00E-01	4.0570E+04	5.0713E+04	2	Part C1	12.21400	14.19100	1.97700	1.0287E+04	1.3581E+05	1.1625E-01
C1	11.200	12.800	1.60E+00	2.8087E+04	1.7554E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.5050E+06						Sum:	8.2080E+07	1.8554E+08	9.2759E+02

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 - 5 Year Cooling

(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	2.1759E+05	1.9416E+04	2.4589E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	1.4140E+06	2.0804E+05	1.5980E+01
7	0.100	0.400	3.00E-01	5.8860E+06	1.9620E+07	25	Part 7	0.18316	0.29721	0.11405	2.2377E+06	5.3745E+05	2.5288E+01
6	0.400	0.900	5.00E-01	3.0070E+07	6.0140E+07	24	Part 7	0.29721	0.36883	0.07162	1.4052E+06	4.6795E+05	1.5880E+01
5	0.900	1.400	5.00E-01	2.7570E+07	5.5140E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	6.4975E+06	2.8157E+06	7.3428E+01
4	1.400	1.850	4.50E-01	2.0370E+07	4.5267E+07	22	Part 6	0.49787	0.60810	0.11023	6.6292E+06	3.6659E+06	7.4917E+01
3	1.850	3.000	1.15E+00	3.6120E+07	3.1409E+07	21	Part 6	0.60810	0.74274	0.13464	8.0972E+06	5.4690E+06	9.1507E+01
2	3.000	6.430	3.43E+00	3.2630E+07	9.5131E+06	20	Part 6	0.74274	0.82085	0.07811	4.6975E+06	3.6725E+06	5.3087E+01
1	6.430	20.000	1.36E+01	2.8730E+06	2.1172E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	1.0417E+07	9.4978E+06	1.1773E+02
			Sum:	1.5552E+08		18	Part 5	1.00260	1.35340	0.35080	1.9343E+07	2.2786E+07	2.1860E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	1.4022E+07	2.1078E+07	1.5846E+02
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	1.1132E+07	1.9890E+07	1.2580E+02
						15	Part 3	1.92050	2.23130	0.31080	9.7618E+06	2.0265E+07	1.1032E+02
						14	Part 3	2.23130	2.34570	0.11440	3.5932E+06	8.2229E+06	4.0606E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	6.1561E+05	1.4501E+06	6.9570E+00
						12	Part 3	2.36530	2.46600	0.10070	3.1629E+06	7.6404E+06	3.5743E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	8.1443E+06	2.1140E+07	9.2038E+01
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	8.7412E+06	2.5075E+07	9.8784E+01
C9	6.430	6.800	3.70E-01	8.0575E+05	2.1777E+06	9	Part 2	3.01190	3.67880	0.66690	6.3443E+06	2.1224E+07	7.1697E+01
C8	6.800	7.200	4.00E-01	5.6000E+05	1.4000E+06	8	Part 2	3.67880	4.96590	1.28710	1.2244E+07	5.2924E+07	1.3837E+02
C7	7.200	7.600	4.00E-01	4.2298E+05	1.0575E+06	7	Part 2	4.96590	6.06530	1.09940	1.0459E+07	5.7686E+07	1.1819E+02
C6	7.600	8.000	4.00E-01	3.4107E+05	8.5267E+05	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	5.0554E+06	3.4057E+07	5.7131E+01
C5	8.000	8.800	8.00E-01	3.8277E+05	4.7846E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	8.3436E+05	6.6813E+06	9.4291E+00
C4	8.800	9.600	8.00E-01	1.1170E+05	1.3963E+05	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	2.6283E+05	2.4452E+06	2.9702E+00
C3	9.600	10.400	8.00E-01	1.1766E+05	1.4708E+05	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	1.7026E+05	1.8911E+06	1.9241E+00
C2	10.400	11.200	8.00E-01	7.7447E+04	9.6809E+04	2	Part C1	12.21400	14.19100	1.97700	1.9637E+04	2.5926E+05	2.2192E-01
C1	11.200	12.800	1.60E+00	5.3617E+04	3.3511E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	2.8730E+06						Sum:	1.5552E+08	3.5107E+08	1.7575E+03

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 - 10 Year Cooling

(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	1.7988E+05	1.6051E+04	2.0328E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	1.1690E+06	1.7199E+05	1.3211E+01
7	0.100	0.400	3.00E-01	4.8660E+06	1.6220E+07	25	Part 7	0.18316	0.29721	0.11405	1.8499E+06	4.4432E+05	2.0906E+01
6	0.400	0.900	5.00E-01	2.4860E+07	4.9720E+07	24	Part 7	0.29721	0.36883	0.07162	1.1617E+06	3.8686E+05	1.3128E+01
5	0.900	1.400	5.00E-01	2.2820E+07	4.5640E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	5.3717E+06	2.3278E+06	6.0705E+01
4	1.400	1.850	4.50E-01	1.6890E+07	3.7533E+07	22	Part 6	0.49787	0.60810	0.11023	5.4806E+06	3.0307E+06	6.1937E+01
3	1.850	3.000	1.15E+00	3.0070E+07	2.6148E+07	21	Part 6	0.60810	0.74274	0.13464	6.6943E+06	4.5215E+06	7.5652E+01
2	3.000	6.430	3.43E+00	2.7050E+07	7.8863E+06	20	Part 6	0.74274	0.82085	0.07811	3.8836E+06	3.0362E+06	4.3889E+01
1	6.430	20.000	1.36E+01	2.3750E+06	1.7502E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	8.6180E+06	7.8572E+06	9.7392E+01
			Sum:	1.2893E+08		18	Part 5	1.00260	1.35340	0.35080	1.6011E+07	1.8860E+07	1.8093E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	1.1623E+07	1.7471E+07	1.3135E+02
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	9.2375E+06	1.6505E+07	1.0439E+02
						15	Part 3	1.92050	2.23130	0.31080	8.1267E+06	1.6870E+07	9.1840E+01
						14	Part 3	2.23130	2.34570	0.11440	2.9913E+06	6.8456E+06	3.3805E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	5.1250E+05	1.2072E+06	5.7917E+00
						12	Part 3	2.36530	2.46600	0.10070	2.6331E+06	6.3606E+06	2.9757E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	6.7801E+06	1.7599E+07	7.6622E+01
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	7.2767E+06	2.0874E+07	8.2233E+01
C9	6.430	6.800	3.70E-01	6.6608E+05	1.8002E+06	9	Part 2	3.01190	3.67880	0.66690	5.2594E+06	1.7594E+07	5.9436E+01
C8	6.800	7.200	4.00E-01	4.6293E+05	1.1573E+06	8	Part 2	3.67880	4.96590	1.28710	1.0150E+07	4.3874E+07	1.1471E+02
C7	7.200	7.600	4.00E-01	3.4966E+05	8.7416E+05	7	Part 2	4.96590	6.06530	1.09940	8.6702E+06	4.7821E+07	9.7982E+01
C6	7.600	8.000	4.00E-01	2.8195E+05	7.0487E+05	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	4.1871E+06	2.8208E+07	4.7319E+01
C5	8.000	8.800	8.00E-01	3.1642E+05	3.9553E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	6.8973E+05	5.5231E+06	7.7947E+00
C4	8.800	9.600	8.00E-01	9.2341E+04	1.1543E+05	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	2.1727E+05	2.0214E+06	2.4554E+00
C3	9.600	10.400	8.00E-01	9.7265E+04	1.2158E+05	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	1.4075E+05	1.5633E+06	1.5906E+00
C2	10.400	11.200	8.00E-01	6.4023E+04	8.0029E+04	2	Part C1	12.21400	14.19100	1.97700	1.6233E+04	2.1432E+05	1.8345E-01
C1	11.200	12.800	1.60E+00	4.4323E+04	2.7702E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	2.3750E+06						Sum:	1.2893E+08	2.9121E+08	1.4570E+03

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 - 5 Year Cooling
(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	3.2934E+05	2.9388E+04	3.7218E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	2.1402E+06	3.1488E+05	2.4187E+01
7	0.100	0.400	3.00E-01	8.9090E+06	2.9697E+07	25	Part 7	0.18316	0.29721	0.11405	3.3869E+06	8.1348E+05	3.8275E+01
6	0.400	0.900	5.00E-01	4.5510E+07	9.1020E+07	24	Part 7	0.29721	0.36883	0.07162	2.1269E+06	7.0829E+05	2.4036E+01
5	0.900	1.400	5.00E-01	4.1690E+07	8.3380E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	9.8338E+06	4.2615E+06	1.1113E+02
4	1.400	1.850	4.50E-01	3.0750E+07	6.8333E+07	22	Part 6	0.49787	0.60810	0.11023	1.0033E+07	5.5482E+06	1.1338E+02
3	1.850	3.000	1.15E+00	5.4370E+07	4.7278E+07	21	Part 6	0.60810	0.74274	0.13464	1.2255E+07	8.2772E+06	1.3849E+02
2	3.000	6.430	3.43E+00	4.9280E+07	1.4367E+07	20	Part 6	0.74274	0.82085	0.07811	7.1096E+06	5.5582E+06	8.0345E+01
1	6.430	20.000	1.36E+01	4.3500E+06	3.2056E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	1.5759E+07	1.4368E+07	1.7809E+02
			Sum:	2.3486E+08		18	Part 5	1.00260	1.35340	0.35080	2.9250E+07	3.4456E+07	3.3055E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	2.1174E+07	3.1829E+07	2.3929E+02
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	1.6795E+07	3.0008E+07	1.8980E+02
						15	Part 3	1.92050	2.23130	0.31080	1.4694E+07	3.0503E+07	1.6606E+02
						14	Part 3	2.23130	2.34570	0.11440	5.4086E+06	1.2378E+07	6.1123E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	9.2665E+05	2.1827E+06	1.0472E+01
						12	Part 3	2.36530	2.46600	0.10070	4.7609E+06	1.1501E+07	5.3803E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	1.2259E+07	3.1821E+07	1.3854E+02
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	1.3158E+07	3.7746E+07	1.4870E+02
C9	6.430	6.800	3.70E-01	1.2200E+06	3.2973E+06	9	Part 2	3.01190	3.67880	0.66690	9.5816E+06	3.2054E+07	1.0828E+02
C8	6.800	7.200	4.00E-01	8.4790E+05	2.1198E+06	8	Part 2	3.67880	4.96590	1.28710	1.8492E+07	7.9930E+07	2.0898E+02
C7	7.200	7.600	4.00E-01	6.4044E+05	1.6011E+06	7	Part 2	4.96590	6.06530	1.09940	1.5795E+07	8.7121E+07	1.7850E+02
C6	7.600	8.000	4.00E-01	5.1641E+05	1.2910E+06	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	7.6410E+06	5.1476E+07	8.6351E+01
C5	8.000	8.800	8.00E-01	5.7955E+05	7.2444E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	1.2633E+06	1.0116E+07	1.4277E+01
C4	8.800	9.600	8.00E-01	1.6913E+05	2.1141E+05	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	3.9795E+05	3.7023E+06	4.4972E+00
C3	9.600	10.400	8.00E-01	1.7815E+05	2.2269E+05	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	2.5779E+05	2.8632E+06	2.9132E+00
C2	10.400	11.200	8.00E-01	1.1726E+05	1.4658E+05	2	Part C1	12.21400	14.19100	1.97700	2.9733E+04	3.9255E+05	3.3601E-01
C1	11.200	12.800	1.60E+00	8.1182E+04	5.0739E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	4.3500E+06						Sum:	2.3486E+08	5.2996E+08	2.6541E+03

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling the ORIGENS Neutron Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 - 10 Year Cooling
(Using the reference 5.18 Cm-244 spontaneous fission distribution for the ORIGENS group 1)

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301000E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	neutron/s	MEV/s	neutron/s cc
10 to 27	1.00E-11	0.003	3.00E-03	0.0000E+00	0.0000E+00	28 to 47	Part 8 + (9 to 27)	1.0000E-11	6.7379E-02	6.7379E-02	0.0000E+00	0.0000E+00	0.0000E+00
9	0.003	0.017	1.40E-02	0.0000E+00	0.0000E+00	27	Part 8 + Part 7	6.7379E-02	0.11109	0.04371	2.7167E+05	2.4242E+04	3.0701E+00
8	0.017	0.100	8.30E-02	0.0000E+00	0.0000E+00	26	Part 7	0.11109	0.18316	0.07207	1.7655E+06	2.5975E+05	1.9952E+01
7	0.100	0.400	3.00E-01	7.3490E+06	2.4497E+07	25	Part 7	0.18316	0.29721	0.11405	2.7938E+06	6.7104E+05	3.1573E+01
6	0.400	0.900	5.00E-01	3.7550E+07	7.5100E+07	24	Part 7	0.29721	0.36883	0.07162	1.7545E+06	5.8427E+05	1.9827E+01
5	0.900	1.400	5.00E-01	3.4420E+07	6.8840E+07	23	Part 7 + Part 6	0.36883	0.49787	0.12904	8.1136E+06	3.5160E+06	9.1692E+01
4	1.400	1.850	4.50E-01	2.5430E+07	5.6511E+07	22	Part 6	0.49787	0.60810	0.11023	8.2783E+06	4.5778E+06	9.3553E+01
3	1.850	3.000	1.15E+00	4.5100E+07	3.9217E+07	21	Part 6	0.60810	0.74274	0.13464	1.0111E+07	6.8295E+06	1.1427E+02
2	3.000	6.430	3.43E+00	4.0740E+07	1.1878E+07	20	Part 6	0.74274	0.82085	0.07811	5.8661E+06	4.5861E+06	6.6292E+01
1	6.430	20.000	1.36E+01	3.5880E+06	2.6441E+05	19	Part 6 + Part 5	0.82085	1.00260	0.18175	1.3007E+07	1.1859E+07	1.4699E+02
			Sum:	1.9418E+08		18	Part 5	1.00260	1.35340	0.35080	2.4149E+07	2.8448E+07	2.7291E+02
						17	Part 5 + Part 4	1.35340	1.65300	0.29960	1.7505E+07	2.6314E+07	1.9783E+02
						16	Part 4 + Part 3	1.65300	1.92050	0.26750	1.3898E+07	2.4831E+07	1.5706E+02
						15	Part 3	1.92050	2.23130	0.31080	1.2189E+07	2.5303E+07	1.3775E+02
						14	Part 3	2.23130	2.34570	0.11440	4.4865E+06	1.0267E+07	5.0702E+01
Convert ORIGENS Group 1 Data to Cm244 Spont. Fission Spectrum						13	Part 3	2.34570	2.36530	0.01960	7.6866E+05	1.8106E+06	8.6866E+00
						12	Part 3	2.36530	2.46600	0.10070	3.9492E+06	9.5399E+06	4.4630E+01
Cm244 Sp.	Lower	Upper	Delta E	SO	SO/dE	11	Part 3	2.46600	2.72530	0.25930	1.0169E+07	2.6395E+07	1.1492E+02
Fiss. Grps	E (MeV)	E (MeV)	E (MeV)	neutron/s	neutron/s-MeV	10	Part 3 + Part 2	2.72530	3.01190	0.28660	1.0914E+07	3.1309E+07	1.2334E+02
C9	6.430	6.800	3.70E-01	1.0063E+06	2.7197E+06	9	Part 2	3.01190	3.67880	0.66690	7.9211E+06	2.6499E+07	8.9517E+01
C8	6.800	7.200	4.00E-01	6.9937E+05	1.7484E+06	8	Part 2	3.67880	4.96590	1.28710	1.5288E+07	6.6078E+07	1.7277E+02
C7	7.200	7.600	4.00E-01	5.2825E+05	1.3206E+06	7	Part 2	4.96590	6.06530	1.09940	1.3058E+07	7.2024E+07	1.4757E+02
C6	7.600	8.000	4.00E-01	4.2595E+05	1.0649E+06	6	Part 2+C9+C8+Part C7	6.06530	7.40820	1.34290	6.3123E+06	4.2525E+07	7.1336E+01
C5	8.000	8.800	8.00E-01	4.7803E+05	5.9753E+05	5	Part C7+C6+Part C5	7.40820	8.60710	1.19890	1.0420E+06	8.3440E+06	1.1776E+01
C4	8.800	9.600	8.00E-01	1.3950E+05	1.7438E+05	4	Part C5+C4+Part C3	8.60710	10.00000	1.39290	3.2824E+05	3.0538E+06	3.7094E+00
C3	9.600	10.400	8.00E-01	1.4694E+05	1.8368E+05	3	Part C3+C2+Part C1	10.00000	12.21400	2.21400	2.1263E+05	2.3617E+06	2.4029E+00
C2	10.400	11.200	8.00E-01	9.6722E+04	1.2090E+05	2	Part C1	12.21400	14.19100	1.97700	2.4525E+04	3.2378E+05	2.7715E-01
C1	11.200	12.800	1.60E+00	6.6961E+04	4.1851E+04	1	None	14.19100	17.33200	3.14100	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.5880E+06						Sum:	1.9418E+08	4.3833E+08	2.1944E+03

Cm244 Sp.	Ref. 5.18	Normalized
Fiss. Grps	Spec. Data	Spec. Data
C9	0.00541	0.2804562
C8	0.00376	0.1949196
C7	0.00284	0.1472265
C6	0.00229	0.1187144
C5	0.00257	0.1332297
C4	0.00075	0.0388802
C3	0.00079	0.0409539
C2	0.00052	0.026957
C1	0.00036	0.0186625
Sum:	0.01929	1.000E+00

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Bottom End Fitting - 5 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	1.0864E+10	2.7160E+11	20	18 (1/4)	0.01	0.02	0.01	2.7160E+09	4.0740E+07	6.6338E+05
17	0.05	0.10	0.05	7.0723E+08	1.4145E+10	19	18 (1/4)	0.02	0.03	0.01	2.7160E+09	6.7900E+07	6.6338E+05
16	0.10	0.20	0.10	8.4384E+08	8.4384E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	5.5734E+09	2.5081E+08	1.3613E+06
15	0.20	0.30	0.10	4.8835E+07	4.8835E+08	17	17 (.8)	0.06	0.10	0.04	5.6578E+08	4.5263E+07	1.3819E+05
14	0.30	0.40	0.10	1.7215E+08	1.7215E+09	16	16	0.10	0.20	0.10	8.4384E+08	1.2658E+08	2.0611E+05
13	0.40	0.60	0.20	3.6017E+09	1.8009E+10	15	14+15	0.20	0.40	0.20	2.2099E+08	6.6296E+07	5.3976E+04
12	0.60	0.80	0.20	1.8647E+09	9.3235E+09	14	13	0.40	0.60	0.20	3.6017E+09	1.8009E+09	8.7972E+05
11	0.80	1.00	0.20	3.6242E+10	1.8121E+11	13	12 (1/2)	0.60	0.70	0.10	9.3235E+08	6.0603E+08	2.2773E+05
10	1.00	1.33	0.33	1.9347E+11	5.8627E+11	12	12 (1/2)	0.70	0.80	0.10	9.3235E+08	6.9926E+08	2.2773E+05
9	1.33	1.66	0.33	5.4635E+10	1.6556E+11	11	11	0.80	1.00	0.20	3.6242E+10	3.2618E+10	8.8521E+06
8	1.66	2.00	0.34	3.6540E+02	1.0747E+03	10	10	1.00	1.50	0.50	2.2162E+11	2.7702E+11	5.4130E+07
7	2.00	2.50	0.50	1.2966E+06	2.5932E+06	9	8+9	1.50	2.00	0.50	2.6490E+10	4.6357E+10	6.4701E+06
6	2.50	3.00	0.50	2.0105E+03	4.0210E+03	8	6+7	2.00	3.00	1.00	1.2986E+06	3.2465E+06	3.1719E+02
5	3.00	4.00	1.00	2.1888E-15	2.1888E-15	7	5	3.00	4.00	1.00	2.1888E-15	7.6608E-15	5.3461E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.0245E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.0245E+11	3.5970E+11	7.3874E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Bottom End Fitting - 10 Year

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	3.9044E+09	9.7610E+10	20	18 (1/4)	0.01	0.02	0.01	9.7610E+08	1.4642E+07	2.3841E+05
17	0.05	0.10	0.05	3.5332E+08	7.0664E+09	19	18 (1/4)	0.02	0.03	0.01	9.7610E+08	2.4403E+07	2.3841E+05
16	0.10	0.20	0.10	2.7301E+08	2.7301E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.0229E+09	9.1029E+07	4.9408E+05
15	0.20	0.30	0.10	1.5487E+07	1.5487E+08	17	17 (.8)	0.06	0.10	0.04	2.8266E+08	2.2612E+07	6.9039E+04
14	0.30	0.40	0.10	5.0473E+07	5.0473E+08	16	16	0.10	0.20	0.10	2.7301E+08	4.0952E+07	6.6683E+04
13	0.40	0.60	0.20	1.0048E+09	5.0240E+09	15	14+15	0.20	0.40	0.20	6.5960E+07	1.9788E+07	1.6111E+04
12	0.60	0.80	0.20	5.2019E+08	2.6010E+09	14	13	0.40	0.60	0.20	1.0048E+09	5.0240E+08	2.4542E+05
11	0.80	1.00	0.20	6.2787E+08	3.1394E+09	13	12 (1/2)	0.60	0.70	0.10	2.6010E+08	1.6906E+08	6.3528E+04
10	1.00	1.33	0.33	9.9505E+10	3.0153E+11	12	12 (1/2)	0.70	0.80	0.10	2.6010E+08	1.9507E+08	6.3528E+04
9	1.33	1.66	0.33	2.8100E+10	8.5152E+10	11	11	0.80	1.00	0.20	6.2787E+08	5.6508E+08	1.5336E+05
8	1.66	2.00	0.34	5.8066E+00	1.7078E+01	10	10	1.00	1.50	0.50	1.1398E+11	1.4248E+11	2.7840E+07
7	2.00	2.50	0.50	6.6686E+05	1.3337E+06	9	8+9	1.50	2.00	0.50	1.3624E+10	2.3842E+10	3.3277E+06
6	2.50	3.00	0.50	1.0340E+03	2.0680E+03	8	6+7	2.00	3.00	1.00	6.6789E+05	1.6697E+06	1.6313E+02
5	3.00	4.00	1.00	1.9545E-15	1.9545E-15	7	5	3.00	4.00	1.00	1.9545E-15	6.8408E-15	4.7739E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.3436E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.3436E+11	1.6797E+11	3.2816E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Bottom End Fitting - 5 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	8.5549E+09	2.1387E+11	20	18 (1/4)	0.01	0.02	0.01	2.1387E+09	3.2081E+07	5.2238E+05
17	0.05	0.10	0.05	4.7499E+08	9.4998E+09	19	18 (1/4)	0.02	0.03	0.01	2.1387E+09	5.3468E+07	5.2238E+05
16	0.10	0.20	0.10	6.8160E+08	6.8160E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	4.3724E+09	1.9676E+08	1.0680E+06
15	0.20	0.30	0.10	3.9685E+07	3.9685E+08	17	17 (.8)	0.06	0.10	0.04	3.7999E+08	3.0399E+07	9.2813E+04
14	0.30	0.40	0.10	1.4310E+08	1.4310E+09	16	16	0.10	0.20	0.10	6.8160E+08	1.0224E+08	1.6648E+05
13	0.40	0.60	0.20	3.0334E+09	1.5167E+10	15	14+15	0.20	0.40	0.20	1.8279E+08	5.4836E+07	4.4645E+04
12	0.60	0.80	0.20	1.5705E+09	7.8525E+09	14	13	0.40	0.60	0.20	3.0334E+09	1.5167E+09	7.4091E+05
11	0.80	1.00	0.20	3.0897E+10	1.5449E+11	13	12 (1/2)	0.60	0.70	0.10	7.8525E+08	5.1041E+08	1.9180E+05
10	1.00	1.33	0.33	1.2771E+11	3.8700E+11	12	12 (1/2)	0.70	0.80	0.10	7.8525E+08	5.8894E+08	1.9180E+05
9	1.33	1.66	0.33	3.6065E+10	1.0929E+11	11	11	0.80	1.00	0.20	3.0897E+10	2.7807E+10	7.5466E+06
8	1.66	2.00	0.34	3.3903E+02	9.9715E+02	10	10	1.00	1.50	0.50	1.4629E+11	1.8286E+11	3.5731E+07
7	2.00	2.50	0.50	8.5587E+05	1.7117E+06	9	8+9	1.50	2.00	0.50	1.7486E+10	3.0601E+10	4.2710E+06
6	2.50	3.00	0.50	1.3271E+03	2.6542E+03	8	6+7	2.00	3.00	1.00	8.5720E+05	2.1430E+06	2.0937E+02
5	3.00	4.00	1.00	1.0844E-15	1.0844E-15	7	5	3.00	4.00	1.00	1.0844E-15	3.7954E-15	2.6486E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	2.0917E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.0917E+11	2.4436E+11	5.1090E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Bottom End Fitting - 10 Year

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	2.9751E+09	7.4378E+10	20	18 (1/4)	0.01	0.02	0.01	7.4378E+08	1.1157E+07	1.8167E+05
17	0.05	0.10	0.05	2.3520E+08	4.7040E+09	19	18 (1/4)	0.02	0.03	0.01	7.4378E+08	1.8594E+07	1.8167E+05
16	0.10	0.20	0.10	2.1468E+08	2.1468E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.5346E+09	6.9057E+07	3.7482E+05
15	0.20	0.30	0.10	1.2284E+07	1.2284E+08	17	17 (.8)	0.06	0.10	0.04	1.8816E+08	1.5053E+07	4.5958E+04
14	0.30	0.40	0.10	4.1479E+07	4.1479E+08	16	16	0.10	0.20	0.10	2.1468E+08	3.2202E+07	5.2436E+04
13	0.40	0.60	0.20	8.4512E+08	4.2256E+09	15	14+15	0.20	0.40	0.20	5.3763E+07	1.6129E+07	1.3132E+04
12	0.60	0.80	0.20	4.3752E+08	2.1876E+09	14	13	0.40	0.60	0.20	8.4512E+08	4.2256E+08	2.0642E+05
11	0.80	1.00	0.20	5.3373E+08	2.6687E+09	13	12 (1/2)	0.60	0.70	0.10	2.1876E+08	1.4219E+08	5.3432E+04
10	1.00	1.33	0.33	6.5597E+10	1.9878E+11	12	12 (1/2)	0.70	0.80	0.10	2.1876E+08	1.6407E+08	5.3432E+04
9	1.33	1.66	0.33	1.8525E+10	5.6136E+10	11	11	0.80	1.00	0.20	5.3373E+08	4.8036E+08	1.3036E+05
8	1.66	2.00	0.34	4.0635E+00	1.1951E+01	10	10	1.00	1.50	0.50	7.5140E+10	9.3925E+10	1.8353E+07
7	2.00	2.50	0.50	4.3962E+05	8.7924E+05	9	8+9	1.50	2.00	0.50	8.9818E+09	1.5718E+10	2.1938E+06
6	2.50	3.00	0.50	6.8167E+02	1.3633E+03	8	6+7	2.00	3.00	1.00	4.4030E+05	1.1008E+06	1.0754E+02
5	3.00	4.00	1.00	9.6746E-16	9.6746E-16	7	5	3.00	4.00	1.00	9.6746E-16	3.3861E-15	2.3630E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	8.9418E+10		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	8.9418E+10	1.1102E+11	2.1840E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Bottom End Fitting - 5 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	9.6091E+09	2.4023E+11	20	18 (1/4)	0.01	0.02	0.01	2.4023E+09	3.6034E+07	5.8676E+05
17	0.05	0.10	0.05	5.8731E+08	1.1746E+10	19	18 (1/4)	0.02	0.03	0.01	2.4023E+09	6.0057E+07	5.8676E+05
16	0.10	0.20	0.10	7.5334E+08	7.5334E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	4.9220E+09	2.2149E+08	1.2022E+06
15	0.20	0.30	0.10	4.3707E+07	4.3707E+08	17	17 (.8)	0.06	0.10	0.04	4.6985E+08	3.7588E+07	1.1476E+05
14	0.30	0.40	0.10	1.5554E+08	1.5554E+09	16	16	0.10	0.20	0.10	7.5334E+08	1.1300E+08	1.8400E+05
13	0.40	0.60	0.20	3.2723E+09	1.6362E+10	15	14+15	0.20	0.40	0.20	1.9925E+08	5.9774E+07	4.8666E+04
12	0.60	0.80	0.20	1.6941E+09	8.4705E+09	14	13	0.40	0.60	0.20	3.2723E+09	1.6362E+09	7.9926E+05
11	0.80	1.00	0.20	3.2683E+10	1.6342E+11	13	12 (1/2)	0.60	0.70	0.10	8.4705E+08	5.5058E+08	2.0689E+05
10	1.00	1.33	0.33	1.5964E+11	4.8376E+11	12	12 (1/2)	0.70	0.80	0.10	8.4705E+08	6.3529E+08	2.0689E+05
9	1.33	1.66	0.33	4.5082E+10	1.3661E+11	11	11	0.80	1.00	0.20	3.2683E+10	2.9415E+10	7.9828E+06
8	1.66	2.00	0.34	3.4927E+02	1.0273E+03	10	10	1.00	1.50	0.50	1.8286E+11	2.2858E+11	4.4665E+07
7	2.00	2.50	0.50	1.0699E+06	2.1398E+06	9	8+9	1.50	2.00	0.50	2.1858E+10	3.8251E+10	5.3388E+06
6	2.50	3.00	0.50	1.6589E+03	3.3178E+03	8	6+7	2.00	3.00	1.00	1.0716E+06	2.6789E+06	2.6173E+02
5	3.00	4.00	1.00	1.6566E-15	1.6566E-15	7	5	3.00	4.00	1.00	1.6566E-15	5.7981E-15	4.0462E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	2.5352E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.5352E+11	2.9960E+11	6.1923E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Bottom End Fitting - 10 Year

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	3.4233E+09	8.5583E+10	20	18 (1/4)	0.01	0.02	0.01	8.5583E+08	1.2837E+07	2.0904E+05
17	0.05	0.10	0.05	2.9244E+08	5.8488E+09	19	18 (1/4)	0.02	0.03	0.01	8.5583E+08	2.1396E+07	2.0904E+05
16	0.10	0.20	0.10	2.4104E+08	2.4104E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.7701E+09	7.9656E+07	4.3236E+05
15	0.20	0.30	0.10	1.3722E+07	1.3722E+08	17	17 (.8)	0.06	0.10	0.04	2.3395E+08	1.8716E+07	5.7143E+04
14	0.30	0.40	0.10	4.5382E+07	4.5382E+08	16	16	0.10	0.20	0.10	2.4104E+08	3.6156E+07	5.8874E+04
13	0.40	0.60	0.20	9.1234E+08	4.5617E+09	15	14+15	0.20	0.40	0.20	5.9104E+07	1.7731E+07	1.4436E+04
12	0.60	0.80	0.20	4.7232E+08	2.3616E+09	14	13	0.40	0.60	0.20	9.1234E+08	4.5617E+08	2.2284E+05
11	0.80	1.00	0.20	5.6554E+08	2.8277E+09	13	12 (1/2)	0.60	0.70	0.10	2.3616E+08	1.5350E+08	5.7682E+04
10	1.00	1.33	0.33	8.2057E+10	2.4866E+11	12	12 (1/2)	0.70	0.80	0.10	2.3616E+08	1.7712E+08	5.7682E+04
9	1.33	1.66	0.33	2.3173E+10	7.0221E+10	11	11	0.80	1.00	0.20	5.6554E+08	5.0899E+08	1.3813E+05
8	1.66	2.00	0.34	5.1534E+00	1.5157E+01	10	10	1.00	1.50	0.50	9.3995E+10	1.1749E+11	2.2958E+07
7	2.00	2.50	0.50	5.4992E+05	1.0998E+06	9	8+9	1.50	2.00	0.50	1.1235E+10	1.9662E+10	2.7442E+06
6	2.50	3.00	0.50	8.5272E+02	1.7054E+03	8	6+7	2.00	3.00	1.00	5.5077E+05	1.3769E+06	1.3453E+02
5	3.00	4.00	1.00	1.4787E-15	1.4787E-15	7	5	3.00	4.00	1.00	1.4787E-15	5.1755E-15	3.6117E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.1120E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.1120E+11	1.3864E+11	2.7160E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Bottom End Fitting - 5 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	1.0755E+10	2.6888E+11	20	18 (1/4)	0.01	0.02	0.01	2.6888E+09	4.0331E+07	6.5673E+05
17	0.05	0.10	0.05	7.1779E+08	1.4356E+10	19	18 (1/4)	0.02	0.03	0.01	2.6888E+09	6.7219E+07	6.5673E+05
16	0.10	0.20	0.10	8.2933E+08	8.2933E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	5.5211E+09	2.4845E+08	1.3485E+06
15	0.20	0.30	0.10	4.7939E+07	4.7939E+08	17	17 (.8)	0.06	0.10	0.04	5.7423E+08	4.5939E+07	1.4026E+05
14	0.30	0.40	0.10	1.6824E+08	1.6824E+09	16	16	0.10	0.20	0.10	8.2933E+08	1.2440E+08	2.0256E+05
13	0.40	0.60	0.20	3.5105E+09	1.7553E+10	15	14+15	0.20	0.40	0.20	2.1618E+08	6.4854E+07	5.2802E+04
12	0.60	0.80	0.20	1.8175E+09	9.0875E+09	14	13	0.40	0.60	0.20	3.5105E+09	1.7553E+09	8.5744E+05
11	0.80	1.00	0.20	3.4467E+10	1.7234E+11	13	12 (1/2)	0.60	0.70	0.10	9.0875E+08	5.9069E+08	2.2196E+05
10	1.00	1.33	0.33	1.9687E+11	5.9658E+11	12	12 (1/2)	0.70	0.80	0.10	9.0875E+08	6.8156E+08	2.2196E+05
9	1.33	1.66	0.33	5.5596E+10	1.6847E+11	11	11	0.80	1.00	0.20	3.4467E+10	3.1020E+10	8.4186E+06
8	1.66	2.00	0.34	3.5861E+02	1.0547E+03	10	10	1.00	1.50	0.50	2.2551E+11	2.8189E+11	5.5081E+07
7	2.00	2.50	0.50	1.3194E+06	2.6388E+06	9	8+9	1.50	2.00	0.50	2.6956E+10	4.7172E+10	6.5839E+06
6	2.50	3.00	0.50	2.0458E+03	4.0916E+03	8	6+7	2.00	3.00	1.00	1.3214E+06	3.3036E+06	3.2276E+02
5	3.00	4.00	1.00	2.4602E-15	2.4602E-15	7	5	3.00	4.00	1.00	2.4602E-15	8.6107E-15	6.0090E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.0478E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.0478E+11	3.6370E+11	7.4443E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Bottom End Fitting - 10 Year

	1	2	3	4	5			6	7	8	9	10	11
												NF =	2.4425E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	3.9205E+09	9.8013E+10	20	18 (1/4)	0.01	0.02	0.01	9.8013E+08	1.4702E+07	2.3940E+05
17	0.05	0.10	0.05	3.5908E+08	7.1816E+09	19	18 (1/4)	0.02	0.03	0.01	9.8013E+08	2.4503E+07	2.3940E+05
16	0.10	0.20	0.10	2.6965E+08	2.6965E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.0321E+09	9.1443E+07	4.9633E+05
15	0.20	0.30	0.10	1.5272E+07	1.5272E+08	17	17 (.8)	0.06	0.10	0.04	2.8726E+08	2.2981E+07	7.0164E+04
14	0.30	0.40	0.10	4.9428E+07	4.9428E+08	16	16	0.10	0.20	0.10	2.6965E+08	4.0448E+07	6.5862E+04
13	0.40	0.60	0.20	9.7945E+08	4.8973E+09	15	14+15	0.20	0.40	0.20	6.4700E+07	1.9410E+07	1.5803E+04
12	0.60	0.80	0.20	5.0705E+08	2.5353E+09	14	13	0.40	0.60	0.20	9.7945E+08	4.8973E+08	2.3923E+05
11	0.80	1.00	0.20	5.9744E+08	2.9872E+09	13	12 (1/2)	0.60	0.70	0.10	2.5353E+08	1.6479E+08	6.1923E+04
10	1.00	1.33	0.33	1.0126E+11	3.0685E+11	12	12 (1/2)	0.70	0.80	0.10	2.5353E+08	1.9014E+08	6.1923E+04
9	1.33	1.66	0.33	2.8597E+10	8.6658E+10	11	11	0.80	1.00	0.20	5.9744E+08	5.3770E+08	1.4592E+05
8	1.66	2.00	0.34	6.4367E+00	1.8931E+01	10	10	1.00	1.50	0.50	1.1599E+11	1.4499E+11	2.8331E+07
7	2.00	2.50	0.50	6.7865E+05	1.3573E+06	9	8+9	1.50	2.00	0.50	1.3865E+10	2.4264E+10	3.3866E+06
6	2.50	3.00	0.50	1.0523E+03	2.1046E+03	8	6+7	2.00	3.00	1.00	6.7970E+05	1.6993E+06	1.6602E+02
5	3.00	4.00	1.00	2.1966E-15	2.1966E-15	7	5	3.00	4.00	1.00	2.1966E-15	7.6881E-15	5.3652E-19
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.3656E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.3656E+11	1.7085E+11	3.3354E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Active Fuel region - 5 Year Cc

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	6.5566E+14	1.6392E+16	20	18 (1/4)	0.01	0.02	0.01	1.6392E+14	2.4587E+12	1.8524E+09
17	0.05	0.10	0.05	1.8842E+14	3.7684E+15	19	18 (1/4)	0.02	0.03	0.01	1.6392E+14	4.0979E+12	1.8524E+09
16	0.10	0.20	0.10	1.5976E+14	1.5976E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	3.6551E+14	1.6448E+13	4.1307E+09
15	0.20	0.30	0.10	4.3032E+13	4.3032E+14	17	17 (.8)	0.06	0.10	0.04	1.5074E+14	1.2059E+13	1.7035E+09
14	0.30	0.40	0.10	2.7431E+13	2.7431E+14	16	16	0.10	0.20	0.10	1.5976E+14	2.3964E+13	1.8054E+09
13	0.40	0.60	0.20	3.4758E+14	1.7379E+15	15	14+15	0.20	0.40	0.20	7.0463E+13	2.1139E+13	7.9630E+08
12	0.60	0.80	0.20	1.1773E+15	5.8865E+15	14	13	0.40	0.60	0.20	3.4758E+14	1.7379E+14	3.9280E+09
11	0.80	1.00	0.20	1.6747E+14	8.3735E+14	13	12 (1/2)	0.60	0.70	0.10	5.8865E+14	3.8262E+14	6.6523E+09
10	1.00	1.33	0.33	7.4728E+13	2.2645E+14	12	12 (1/2)	0.70	0.80	0.10	5.8865E+14	4.4149E+14	6.6523E+09
9	1.33	1.66	0.33	1.5903E+13	4.8191E+13	11	11	0.80	1.00	0.20	1.6747E+14	1.5072E+14	1.8926E+09
8	1.66	2.00	0.34	3.8889E+11	1.1438E+12	10	10	1.00	1.50	0.50	8.2920E+13	1.0365E+14	9.3708E+08
7	2.00	2.50	0.50	7.3894E+11	1.4779E+12	9	8+9	1.50	2.00	0.50	8.0994E+12	1.4174E+13	9.1532E+07
6	2.50	3.00	0.50	2.8971E+10	5.7942E+10	8	6+7	2.00	3.00	1.00	7.6791E+11	1.9198E+12	8.6782E+06
5	3.00	4.00	1.00	3.6111E+09	3.6111E+09	7	5	3.00	4.00	1.00	3.6111E+09	1.2639E+10	4.0809E+04
4	4.00	5.00	1.00	6.9118E+06	6.9118E+06	6	4	4.00	5.00	1.00	6.9118E+06	3.1103E+07	7.8110E+01
3	5.00	6.50	1.50	2.7739E+06	1.8493E+06	5	(2+3)(1/3)	5.00	6.00	1.00	1.8493E+06	1.0171E+07	2.0899E+01
2	6.50	8.00	1.50	5.4414E+05	3.6276E+05	4	(2+3)(1/3)	6.00	7.00	1.00	1.1060E+06	7.1891E+06	1.2499E+01
1	8.00	10.00	2.00	1.1553E+05	5.7765E+04	3	(2+3)(1/3)	7.00	8.00	1.00	3.6276E+05	2.7207E+06	4.0996E+00
			Sum:	2.8584E+15		2	1	8.00	10.00	2.00	1.1553E+05	1.0398E+06	1.3056E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.8584E+15	1.3485E+15	3.2303E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Active Fuel region - 10 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	4.3783E+14	1.0946E+16	20	18 (1/4)	0.01	0.02	0.01	1.0946E+14	1.6419E+12	1.2370E+09
17	0.05	0.10	0.05	1.2201E+14	2.4402E+15	19	18 (1/4)	0.02	0.03	0.01	1.0946E+14	2.7364E+12	1.2370E+09
16	0.10	0.20	0.10	9.6707E+13	9.6707E+14	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.4332E+14	1.0949E+13	2.7497E+09
15	0.20	0.30	0.10	2.6824E+13	2.6824E+14	17	17 (.8)	0.06	0.10	0.04	9.7608E+13	7.8086E+12	1.1031E+09
14	0.30	0.40	0.10	1.6209E+13	1.6209E+14	16	16	0.10	0.20	0.10	9.6707E+13	1.4506E+13	1.0929E+09
13	0.40	0.60	0.20	7.2387E+13	3.6194E+14	15	14+15	0.20	0.40	0.20	4.3033E+13	1.2910E+13	4.8632E+08
12	0.60	0.80	0.20	8.0644E+14	4.0322E+15	14	13	0.40	0.60	0.20	7.2387E+13	3.6194E+13	8.1805E+08
11	0.80	1.00	0.20	4.5654E+13	2.2827E+14	13	12 (1/2)	0.60	0.70	0.10	4.0322E+14	2.6209E+14	4.5568E+09
10	1.00	1.33	0.33	4.1948E+13	1.2712E+14	12	12 (1/2)	0.70	0.80	0.10	4.0322E+14	3.0242E+14	4.5568E+09
9	1.33	1.66	0.33	5.2041E+12	1.5770E+13	11	11	0.80	1.00	0.20	4.5654E+13	4.1089E+13	5.1594E+08
8	1.66	2.00	0.34	5.2478E+10	1.5435E+11	10	10	1.00	1.50	0.50	4.4629E+13	5.5786E+13	5.0435E+08
7	2.00	2.50	0.50	1.5416E+10	3.0832E+10	9	8+9	1.50	2.00	0.50	2.5757E+12	4.5074E+12	2.9108E+07
6	2.50	3.00	0.50	1.2840E+09	2.5680E+09	8	6+7	2.00	3.00	1.00	1.6700E+10	4.1750E+10	1.8873E+05
5	3.00	4.00	1.00	1.3602E+08	1.3602E+08	7	5	3.00	4.00	1.00	1.3602E+08	4.7607E+08	1.5372E+03
4	4.00	5.00	1.00	5.7121E+06	5.7121E+06	6	4	4.00	5.00	1.00	5.7121E+06	2.5704E+07	6.4552E+01
3	5.00	6.50	1.50	2.2924E+06	1.5283E+06	5	(2+3)(1/3)	5.00	6.00	1.00	1.5283E+06	8.4055E+06	1.7271E+01
2	6.50	8.00	1.50	4.4966E+05	2.9977E+05	4	(2+3)(1/3)	6.00	7.00	1.00	9.1402E+05	5.9411E+06	1.0329E+01
1	8.00	10.00	2.00	9.5470E+04	4.7735E+04	3	(2+3)(1/3)	7.00	8.00	1.00	2.9977E+05	2.2483E+06	3.3877E+00
			Sum:	1.6713E+15		2	1	8.00	10.00	2.00	9.5470E+04	8.5923E+05	1.0789E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.6713E+15	7.5268E+14	1.8887E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Active Fuel region - 5 Year Cc

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	6.7849E+14	1.6962E+16	20	18 (1/4)	0.01	0.02	0.01	1.6962E+14	2.5443E+12	1.9169E+09
17	0.05	0.10	0.05	1.9615E+14	3.9230E+15	19	18 (1/4)	0.02	0.03	0.01	1.6962E+14	4.2406E+12	1.9169E+09
16	0.10	0.20	0.10	1.6244E+14	1.6244E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	3.7848E+14	1.7031E+13	4.2771E+09
15	0.20	0.30	0.10	4.4393E+13	4.4393E+14	17	17 (.8)	0.06	0.10	0.04	1.5692E+14	1.2554E+13	1.7734E+09
14	0.30	0.40	0.10	2.8793E+13	2.8793E+14	16	16	0.10	0.20	0.10	1.6244E+14	2.4366E+13	1.8357E+09
13	0.40	0.60	0.20	3.1725E+14	1.5863E+15	15	14+15	0.20	0.40	0.20	7.3186E+13	2.1956E+13	8.2707E+08
12	0.60	0.80	0.20	1.1626E+15	5.8130E+15	14	13	0.40	0.60	0.20	3.1725E+14	1.5863E+14	3.5852E+09
11	0.80	1.00	0.20	1.5286E+14	7.6430E+14	13	12 (1/2)	0.60	0.70	0.10	5.8130E+14	3.7785E+14	6.5693E+09
10	1.00	1.33	0.33	6.6679E+13	2.0206E+14	12	12 (1/2)	0.70	0.80	0.10	5.8130E+14	4.3598E+14	6.5693E+09
9	1.33	1.66	0.33	1.4305E+13	4.3348E+13	11	11	0.80	1.00	0.20	1.5286E+14	1.3757E+14	1.7275E+09
8	1.66	2.00	0.34	3.4335E+11	1.0099E+12	10	10	1.00	1.50	0.50	7.4048E+13	9.2560E+13	8.3682E+08
7	2.00	2.50	0.50	7.3105E+11	1.4621E+12	9	8+9	1.50	2.00	0.50	7.2791E+12	1.2738E+13	8.2261E+07
6	2.50	3.00	0.50	2.3968E+10	4.7936E+10	8	6+7	2.00	3.00	1.00	7.5502E+11	1.8875E+12	8.5325E+06
5	3.00	4.00	1.00	2.9645E+09	2.9645E+09	7	5	3.00	4.00	1.00	2.9645E+09	1.0376E+10	3.3502E+04
4	4.00	5.00	1.00	3.3351E+06	3.3351E+06	6	4	4.00	5.00	1.00	3.3351E+06	1.5008E+07	3.7690E+01
3	5.00	6.50	1.50	1.3384E+06	8.9227E+05	5	(2+3)(1/3)	5.00	6.00	1.00	8.9227E+05	4.9075E+06	1.0084E+01
2	6.50	8.00	1.50	2.6251E+05	1.7501E+05	4	(2+3)(1/3)	6.00	7.00	1.00	5.3364E+05	3.4686E+06	6.0306E+00
1	8.00	10.00	2.00	5.5733E+04	2.7867E+04	3	(2+3)(1/3)	7.00	8.00	1.00	1.7501E+05	1.3126E+06	1.9778E+00
			Sum:	2.8251E+15		2	1	8.00	10.00	2.00	5.5733E+04	5.0160E+05	6.2984E-01
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.8251E+15	1.2999E+15	3.1926E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Active Fuel region - 10 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	4.7059E+14	1.1765E+16	20	18 (1/4)	0.01	0.02	0.01	1.1765E+14	1.7647E+12	1.3295E+09
17	0.05	0.10	0.05	1.3313E+14	2.6626E+15	19	18 (1/4)	0.02	0.03	0.01	1.1765E+14	2.9412E+12	1.3295E+09
16	0.10	0.20	0.10	1.0281E+14	1.0281E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.6192E+14	1.1786E+13	2.9600E+09
15	0.20	0.30	0.10	2.9204E+13	2.9204E+14	17	17 (.8)	0.06	0.10	0.04	1.0650E+14	8.5203E+12	1.2036E+09
14	0.30	0.40	0.10	1.8274E+13	1.8274E+14	16	16	0.10	0.20	0.10	1.0281E+14	1.5422E+13	1.1619E+09
13	0.40	0.60	0.20	6.8255E+13	3.4128E+14	15	14+15	0.20	0.40	0.20	4.7478E+13	1.4243E+13	5.3655E+08
12	0.60	0.80	0.20	8.1538E+14	4.0769E+15	14	13	0.40	0.60	0.20	6.8255E+13	3.4128E+13	7.7135E+08
11	0.80	1.00	0.20	4.1822E+13	2.0911E+14	13	12 (1/2)	0.60	0.70	0.10	4.0769E+14	2.6500E+14	4.6073E+09
10	1.00	1.33	0.33	3.7597E+13	1.1393E+14	12	12 (1/2)	0.70	0.80	0.10	4.0769E+14	3.0577E+14	4.6073E+09
9	1.33	1.66	0.33	4.6700E+12	1.4152E+13	11	11	0.80	1.00	0.20	4.1822E+13	3.7640E+13	4.7263E+08
8	1.66	2.00	0.34	5.5983E+10	1.6466E+11	10	10	1.00	1.50	0.50	4.0003E+13	5.0003E+13	4.5207E+08
7	2.00	2.50	0.50	1.4754E+10	2.9508E+10	9	8+9	1.50	2.00	0.50	2.3202E+12	4.0604E+12	2.6221E+07
6	2.50	3.00	0.50	1.0859E+09	2.1718E+09	8	6+7	2.00	3.00	1.00	1.5840E+10	3.9600E+10	1.7901E+05
5	3.00	4.00	1.00	1.0618E+08	1.0618E+08	7	5	3.00	4.00	1.00	1.0618E+08	3.7163E+08	1.1999E+03
4	4.00	5.00	1.00	2.7619E+06	2.7619E+06	6	4	4.00	5.00	1.00	2.7619E+06	1.2429E+07	3.1212E+01
3	5.00	6.50	1.50	1.1082E+06	7.3880E+05	5	(2+3)(1/3)	5.00	6.00	1.00	7.3880E+05	4.0634E+06	8.3492E+00
2	6.50	8.00	1.50	2.1736E+05	1.4491E+05	4	(2+3)(1/3)	6.00	7.00	1.00	4.4185E+05	2.8720E+06	4.9934E+00
1	8.00	10.00	2.00	4.6145E+04	2.3073E+04	3	(2+3)(1/3)	7.00	8.00	1.00	1.4491E+05	1.0868E+06	1.6376E+00
			Sum:	1.7218E+15		2	1	8.00	10.00	2.00	4.6145E+04	4.1531E+05	5.2148E-01
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.7218E+15	7.5131E+14	1.9458E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Active Fuel region - 10 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO E'	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	4.7059E+14	1.1765E+16	20	18 (1/4)	0.01	0.02	0.01	1.1765E+14	1.7647E+12	1.3295E+09
17	0.05	0.10	0.05	1.3313E+14	2.6626E+15	19	18 (1/4)	0.02	0.03	0.01	1.1765E+14	2.9412E+12	1.3295E+09
16	0.10	0.20	0.10	1.0281E+14	1.0281E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.6192E+14	1.1786E+13	2.9600E+09
15	0.20	0.30	0.10	2.9204E+13	2.9204E+14	17	17 (.8)	0.06	0.10	0.04	1.0650E+14	8.5203E+12	1.2036E+09
14	0.30	0.40	0.10	1.8274E+13	1.8274E+14	16	16	0.10	0.20	0.10	1.0281E+14	1.5422E+13	1.1619E+09
13	0.40	0.60	0.20	6.8255E+13	3.4128E+14	15	14+15	0.20	0.40	0.20	4.7478E+13	1.4243E+13	5.3655E+08
12	0.60	0.80	0.20	8.1538E+14	4.0769E+15	14	13	0.40	0.60	0.20	6.8255E+13	3.4128E+13	7.7135E+08
11	0.80	1.00	0.20	4.1822E+13	2.0911E+14	13	12 (1/2)	0.60	0.70	0.10	4.0769E+14	2.6500E+14	4.6073E+09
10	1.00	1.33	0.33	3.7597E+13	1.1393E+14	12	12 (1/2)	0.70	0.80	0.10	4.0769E+14	3.0577E+14	4.6073E+09
9	1.33	1.66	0.33	4.6700E+12	1.4152E+13	11	11	0.80	1.00	0.20	4.1822E+13	3.7640E+13	4.7263E+08
8	1.66	2.00	0.34	5.5983E+10	1.6466E+11	10	10	1.00	1.50	0.50	4.0003E+13	5.0003E+13	4.5207E+08
7	2.00	2.50	0.50	1.4754E+10	2.9508E+10	9	8+9	1.50	2.00	0.50	2.3202E+12	4.0604E+12	2.6221E+07
6	2.50	3.00	0.50	1.0859E+09	2.1718E+09	8	6+7	2.00	3.00	1.00	1.5840E+10	3.9600E+10	1.7901E+05
5	3.00	4.00	1.00	1.0618E+08	1.0618E+08	7	5	3.00	4.00	1.00	1.0618E+08	3.7163E+08	1.1999E+03
4	4.00	5.00	1.00	2.7619E+06	2.7619E+06	6	4	4.00	5.00	1.00	2.7619E+06	1.2429E+07	3.1212E+01
3	5.00	6.50	1.50	1.1082E+06	7.3880E+05	5	(2+3)(1/3)	5.00	6.00	1.00	7.3880E+05	4.0634E+06	8.3492E+00
2	6.50	8.00	1.50	2.1736E+05	1.4491E+05	4	(2+3)(1/3)	6.00	7.00	1.00	4.4185E+05	2.8720E+06	4.9934E+00
1	8.00	10.00	2.00	4.6145E+04	2.3073E+04	3	(2+3)(1/3)	7.00	8.00	1.00	1.4491E+05	1.0868E+06	1.6376E+00
			Sum:	1.7218E+15		2	1	8.00	10.00	2.00	4.6145E+04	4.1531E+05	5.2148E-01
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.7218E+15	7.5131E+14	1.9458E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Active Fuel region - 5 Year Co

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	7.3171E+14	1.8293E+16	20	18 (1/4)	0.01	0.02	0.01	1.8293E+14	2.7439E+12	2.0673E+09
17	0.05	0.10	0.05	2.1083E+14	4.2166E+15	19	18 (1/4)	0.02	0.03	0.01	1.8293E+14	4.5732E+12	2.0673E+09
16	0.10	0.20	0.10	1.7622E+14	1.7622E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	4.0802E+14	1.8361E+13	4.6110E+09
15	0.20	0.30	0.10	4.7853E+13	4.7853E+14	17	17 (.8)	0.06	0.10	0.04	1.6866E+14	1.3493E+13	1.9061E+09
14	0.30	0.40	0.10	3.0605E+13	3.0605E+14	16	16	0.10	0.20	0.10	1.7622E+14	2.6433E+13	1.9915E+09
13	0.40	0.60	0.20	3.6650E+14	1.8325E+15	15	14+15	0.20	0.40	0.20	7.8458E+13	2.3537E+13	8.8665E+08
12	0.60	0.80	0.20	1.2929E+15	6.4645E+15	14	13	0.40	0.60	0.20	3.6650E+14	1.8325E+14	4.1418E+09
11	0.80	1.00	0.20	1.7851E+14	8.9255E+14	13	12 (1/2)	0.60	0.70	0.10	6.4645E+14	4.2019E+14	7.3055E+09
10	1.00	1.33	0.33	7.7033E+13	2.3343E+14	12	12 (1/2)	0.70	0.80	0.10	6.4645E+14	4.8484E+14	7.3055E+09
9	1.33	1.66	0.33	1.6407E+13	4.9718E+13	11	11	0.80	1.00	0.20	1.7851E+14	1.6066E+14	2.0173E+09
8	1.66	2.00	0.34	3.6963E+11	1.0871E+12	10	10	1.00	1.50	0.50	8.5485E+13	1.0686E+14	9.6607E+08
7	2.00	2.50	0.50	7.3662E+11	1.4732E+12	9	8+9	1.50	2.00	0.50	8.3245E+12	1.4568E+13	9.4076E+07
6	2.50	3.00	0.50	2.6199E+10	5.2398E+10	8	6+7	2.00	3.00	1.00	7.6282E+11	1.9070E+12	8.6206E+06
5	3.00	4.00	1.00	3.2467E+09	3.2467E+09	7	5	3.00	4.00	1.00	3.2467E+09	1.1363E+10	3.6691E+04
4	4.00	5.00	1.00	5.2624E+06	5.2624E+06	6	4	4.00	5.00	1.00	5.2624E+06	2.3681E+07	5.9470E+01
3	5.00	6.50	1.50	2.1119E+06	1.4079E+06	5	(2+3)(1/3)	5.00	6.00	1.00	1.4079E+06	7.7436E+06	1.5911E+01
2	6.50	8.00	1.50	4.1426E+05	2.7617E+05	4	(2+3)(1/3)	6.00	7.00	1.00	8.4205E+05	5.4733E+06	9.5160E+00
1	8.00	10.00	2.00	8.7952E+04	4.3976E+04	3	(2+3)(1/3)	7.00	8.00	1.00	2.7617E+05	2.0713E+06	3.1210E+00
			Sum:	3.1297E+15		2	1	8.00	10.00	2.00	8.7952E+04	7.9157E+05	9.9395E-01
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.1297E+15	1.4614E+15	3.5369E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Active Fuel region - 10 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	5.0847E+14	1.2712E+16	20	18 (1/4)	0.01	0.02	0.01	1.2712E+14	1.9068E+12	1.4366E+09
17	0.05	0.10	0.05	1.4309E+14	2.8618E+15	19	18 (1/4)	0.02	0.03	0.01	1.2712E+14	3.1779E+12	1.4366E+09
16	0.10	0.20	0.10	1.1203E+14	1.1203E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.8285E+14	1.2728E+13	3.1965E+09
15	0.20	0.30	0.10	3.1539E+13	3.1539E+14	17	17 (.8)	0.06	0.10	0.04	1.1447E+14	9.1578E+12	1.2936E+09
14	0.30	0.40	0.10	1.9459E+13	1.9459E+14	16	16	0.10	0.20	0.10	1.1203E+14	1.6805E+13	1.2661E+09
13	0.40	0.60	0.20	7.8284E+13	3.9142E+14	15	14+15	0.20	0.40	0.20	5.0998E+13	1.5299E+13	5.7633E+08
12	0.60	0.80	0.20	8.9532E+14	4.4766E+15	14	13	0.40	0.60	0.20	7.8284E+13	3.9142E+13	8.8469E+08
11	0.80	1.00	0.20	4.8764E+13	2.4382E+14	13	12 (1/2)	0.60	0.70	0.10	4.4766E+14	2.9098E+14	5.0590E+09
10	1.00	1.33	0.33	4.3587E+13	1.3208E+14	12	12 (1/2)	0.70	0.80	0.10	4.4766E+14	3.3575E+14	5.0590E+09
9	1.33	1.66	0.33	5.3294E+12	1.6150E+13	11	11	0.80	1.00	0.20	4.8764E+13	4.3888E+13	5.5108E+08
8	1.66	2.00	0.34	5.9969E+10	1.7638E+11	10	10	1.00	1.50	0.50	4.6332E+13	5.7916E+13	5.2360E+08
7	2.00	2.50	0.50	1.5331E+10	3.0662E+10	9	8+9	1.50	2.00	0.50	2.6439E+12	4.6269E+12	2.9879E+07
6	2.50	3.00	0.50	1.2422E+09	2.4844E+09	8	6+7	2.00	3.00	1.00	1.6573E+10	4.1433E+10	1.8729E+05
5	3.00	4.00	1.00	1.2007E+08	1.2007E+08	7	5	3.00	4.00	1.00	1.2007E+08	4.2025E+08	1.3569E+03
4	4.00	5.00	1.00	4.3529E+06	4.3529E+06	6	4	4.00	5.00	1.00	4.3529E+06	1.9588E+07	4.9192E+01
3	5.00	6.50	1.50	1.7468E+06	1.1645E+06	5	(2+3)(1/3)	5.00	6.00	1.00	1.1645E+06	6.4049E+06	1.3160E+01
2	6.50	8.00	1.50	3.4263E+05	2.2842E+05	4	(2+3)(1/3)	6.00	7.00	1.00	6.9648E+05	4.5271E+06	7.8709E+00
1	8.00	10.00	2.00	7.2742E+04	3.6371E+04	3	(2+3)(1/3)	7.00	8.00	1.00	2.2842E+05	1.7132E+06	2.5814E+00
			Sum:	1.8859E+15		2	1	8.00	10.00	2.00	7.2742E+04	6.5468E+05	8.2206E-01
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.8859E+15	8.3141E+14	2.1313E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Active Fuel region - 5 Year Cc

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	7.8269E+14	1.9567E+16	20	18 (1/4)	0.01	0.02	0.01	1.9567E+14	2.9351E+12	2.2113E+09
17	0.05	0.10	0.05	2.2467E+14	4.4934E+15	19	18 (1/4)	0.02	0.03	0.01	1.9567E+14	4.8918E+12	2.2113E+09
16	0.10	0.20	0.10	1.8938E+14	1.8938E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	4.3628E+14	1.9633E+13	4.9304E+09
15	0.20	0.30	0.10	5.1117E+13	5.1117E+14	17	17 (.8)	0.06	0.10	0.04	1.7974E+14	1.4379E+13	2.0312E+09
14	0.30	0.40	0.10	3.2276E+13	3.2276E+14	16	16	0.10	0.20	0.10	1.8938E+14	2.8407E+13	2.1402E+09
13	0.40	0.60	0.20	4.1727E+14	2.0864E+15	15	14+15	0.20	0.40	0.20	8.3393E+13	2.5018E+13	9.4242E+08
12	0.60	0.80	0.20	1.4235E+15	7.1175E+15	14	13	0.40	0.60	0.20	4.1727E+14	2.0864E+14	4.7156E+09
11	0.80	1.00	0.20	2.0492E+14	1.0246E+15	13	12 (1/2)	0.60	0.70	0.10	7.1175E+14	4.6264E+14	8.0435E+09
10	1.00	1.33	0.33	8.7309E+13	2.6457E+14	12	12 (1/2)	0.70	0.80	0.10	7.1175E+14	5.3381E+14	8.0435E+09
9	1.33	1.66	0.33	1.8553E+13	5.6221E+13	11	11	0.80	1.00	0.20	2.0492E+14	1.8443E+14	2.3158E+09
8	1.66	2.00	0.34	3.9476E+11	1.1611E+12	10	10	1.00	1.50	0.50	9.6867E+13	1.2108E+14	1.0947E+09
7	2.00	2.50	0.50	7.4121E+11	1.4824E+12	9	8+9	1.50	2.00	0.50	9.3902E+12	1.6433E+13	1.0612E+08
6	2.50	3.00	0.50	2.8364E+10	5.6728E+10	8	6+7	2.00	3.00	1.00	7.6957E+11	1.9239E+12	8.6970E+06
5	3.00	4.00	1.00	3.5216E+09	3.5216E+09	7	5	3.00	4.00	1.00	3.5216E+09	1.2326E+10	3.9798E+04
4	4.00	5.00	1.00	7.9556E+06	7.9556E+06	6	4	4.00	5.00	1.00	7.9556E+06	3.5800E+07	8.9906E+01
3	5.00	6.50	1.50	3.1928E+06	2.1285E+06	5	(2+3)(1/3)	5.00	6.00	1.00	2.1285E+06	1.1707E+07	2.4055E+01
2	6.50	8.00	1.50	6.2630E+05	4.1753E+05	4	(2+3)(1/3)	6.00	7.00	1.00	1.2730E+06	8.2747E+06	1.4387E+01
1	8.00	10.00	2.00	1.3298E+05	6.6490E+04	3	(2+3)(1/3)	7.00	8.00	1.00	4.1753E+05	3.1315E+06	4.7185E+00
			Sum:	3.4329E+15		2	1	8.00	10.00	2.00	1.3298E+05	1.1968E+06	1.5028E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.4329E+15	1.6242E+15	3.8795E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Active Fuel region - 10 Year C

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.1301E-05
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	5.4450E+14	1.3613E+16	20	18 (1/4)	0.01	0.02	0.01	1.3613E+14	2.0419E+12	1.5383E+09
17	0.05	0.10	0.05	1.5231E+14	3.0462E+15	19	18 (1/4)	0.02	0.03	0.01	1.3613E+14	3.4031E+12	1.5383E+09
16	0.10	0.20	0.10	1.2075E+14	1.2075E+15	18	18 (.5)+17 (.2)	0.03	0.06	0.03	3.0271E+14	1.3622E+13	3.4209E+09
15	0.20	0.30	0.10	3.3722E+13	3.3722E+14	17	17 (.8)	0.06	0.10	0.04	1.2185E+14	9.7478E+12	1.3770E+09
14	0.30	0.40	0.10	2.0537E+13	2.0537E+14	16	16	0.10	0.20	0.10	1.2075E+14	1.8113E+13	1.3646E+09
13	0.40	0.60	0.20	8.8540E+13	4.4270E+14	15	14+15	0.20	0.40	0.20	5.4259E+13	1.6278E+13	6.1318E+08
12	0.60	0.80	0.20	9.7429E+14	4.8715E+15	14	13	0.40	0.60	0.20	8.8540E+13	4.4270E+13	1.0006E+09
11	0.80	1.00	0.20	5.5811E+13	2.7906E+14	13	12 (1/2)	0.60	0.70	0.10	4.8715E+14	3.1664E+14	5.5052E+09
10	1.00	1.33	0.33	4.9506E+13	1.5002E+14	12	12 (1/2)	0.70	0.80	0.10	4.8715E+14	3.6536E+14	5.5052E+09
9	1.33	1.66	0.33	5.9918E+12	1.8157E+13	11	11	0.80	1.00	0.20	5.5811E+13	5.0230E+13	6.3072E+08
8	1.66	2.00	0.34	6.3652E+10	1.8721E+11	10	10	1.00	1.50	0.50	5.2593E+13	6.5741E+13	5.9435E+08
7	2.00	2.50	0.50	1.5873E+10	3.1746E+10	9	8+9	1.50	2.00	0.50	2.9688E+12	5.1953E+12	3.3550E+07
6	2.50	3.00	0.50	1.4079E+09	2.8158E+09	8	6+7	2.00	3.00	1.00	1.7281E+10	4.3202E+10	1.9529E+05
5	3.00	4.00	1.00	1.3549E+08	1.3549E+08	7	5	3.00	4.00	1.00	1.3549E+08	4.7422E+08	1.5312E+03
4	4.00	5.00	1.00	6.5697E+06	6.5697E+06	6	4	4.00	5.00	1.00	6.5697E+06	2.9564E+07	7.4244E+01
3	5.00	6.50	1.50	2.6365E+06	1.7577E+06	5	(2+3)(1/3)	5.00	6.00	1.00	1.7577E+06	9.6672E+06	1.9863E+01
2	6.50	8.00	1.50	5.1716E+05	3.4477E+05	4	(2+3)(1/3)	6.00	7.00	1.00	1.0512E+06	6.8329E+06	1.1880E+01
1	8.00	10.00	2.00	1.0980E+05	5.4900E+04	3	(2+3)(1/3)	7.00	8.00	1.00	3.4477E+05	2.5858E+06	3.8963E+00
			Sum:	2.0460E+15		2	1	8.00	10.00	2.00	1.0980E+05	9.8820E+05	1.2408E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.0460E+15	9.1069E+14	2.3122E+10

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Plenum Region - 5 Year Cooli

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7698E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	9.3419E+10	2.3355E+12	20	18 (1/4)	0.01	0.02	0.01	2.3355E+10	3.5032E+08	4.1333E+06
17	0.05	0.10	0.05	2.0842E+09	4.1684E+10	19	18 (1/4)	0.02	0.03	0.01	2.3355E+10	5.8387E+08	4.1333E+06
16	0.10	0.20	0.10	8.6501E+09	8.6501E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	4.7126E+10	2.1207E+09	8.3404E+06
15	0.20	0.30	0.10	5.1342E+08	5.1342E+09	17	17 (.8)	0.06	0.10	0.04	1.6674E+09	1.3339E+08	2.9509E+05
14	0.30	0.40	0.10	1.9813E+09	1.9813E+10	16	16	0.10	0.20	0.10	8.6501E+09	1.2975E+09	1.5309E+06
13	0.40	0.60	0.20	4.3572E+10	2.1786E+11	15	14+15	0.20	0.40	0.20	2.4947E+09	7.4842E+08	4.4152E+05
12	0.60	0.80	0.20	2.2570E+10	1.1285E+11	14	13	0.40	0.60	0.20	4.3572E+10	2.1786E+10	7.7114E+06
11	0.80	1.00	0.20	2.8963E+08	1.4482E+09	13	12 (1/2)	0.60	0.70	0.10	1.1285E+10	7.3353E+09	1.9972E+06
10	1.00	1.33	0.33	4.5289E+11	1.3724E+12	12	12 (1/2)	0.70	0.80	0.10	1.1285E+10	8.4638E+09	1.9972E+06
9	1.33	1.66	0.33	1.2790E+11	3.8758E+11	11	11	0.80	1.00	0.20	2.8963E+08	2.6067E+08	5.1259E+04
8	1.66	2.00	0.34	9.7750E+01	2.8750E+02	10	10	1.00	1.50	0.50	5.1878E+11	6.4847E+11	9.1813E+07
7	2.00	2.50	0.50	3.0352E+06	6.0704E+06	9	8+9	1.50	2.00	0.50	6.2012E+10	1.0852E+11	1.0975E+07
6	2.50	3.00	0.50	4.7064E+03	9.4128E+03	8	6+7	2.00	3.00	1.00	3.0399E+06	7.5998E+06	5.3800E+02
5	3.00	4.00	1.00	1.3332E-12	1.3332E-12	7	5	3.00	4.00	1.00	1.3332E-12	4.6662E-12	2.3595E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	7.5387E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	7.5387E+11	8.0008E+11	1.3342E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Plenum Region - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
ORIGENS Group #	Lower E (MeV)	Upper E (MeV)	Delta E E (MeV)	SO gamma/s	SO/dE gamma/s-MeV	Bugle-93 Group #	ORIGENS Group Eq.	Lower E' (MeV)	Upper E' (MeV)	Delta E' E' (MeV)	(SO/dE)*dE' gamma/s	NF = SO*E' MEV/s	1.7698E-04 SO*NF gamma/s cc
18	0.01	0.05	0.04	2.5368E+10	6.3420E+11	20	18 (1/4)	0.01	0.02	0.01	6.3420E+09	9.5130E+07	1.1224E+06
17	0.05	0.10	0.05	9.4950E+08	1.8990E+10	19	18 (1/4)	0.02	0.03	0.01	6.3420E+09	1.5855E+08	1.1224E+06
16	0.10	0.20	0.10	2.5191E+09	2.5191E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.2874E+10	5.7933E+08	2.2784E+06
15	0.20	0.30	0.10	1.4862E+08	1.4862E+09	17	17 (.8)	0.06	0.10	0.04	7.5960E+08	6.0768E+07	1.3443E+05
14	0.30	0.40	0.10	5.6245E+08	5.6245E+09	16	16	0.10	0.20	0.10	2.5191E+09	3.7787E+08	4.4583E+05
13	0.40	0.60	0.20	1.2242E+10	6.1210E+10	15	14+15	0.20	0.40	0.20	7.1107E+08	2.1332E+08	1.2585E+05
12	0.60	0.80	0.20	6.3489E+09	3.1745E+10	14	13	0.40	0.60	0.20	1.2242E+10	6.1210E+09	2.1666E+06
11	0.80	1.00	0.20	2.5221E+07	1.2611E+08	13	12 (1/2)	0.60	0.70	0.10	3.1745E+09	2.0634E+09	5.6181E+05
10	1.00	1.33	0.33	2.3462E+11	7.1097E+11	12	12 (1/2)	0.70	0.80	0.10	3.1745E+09	2.3808E+09	5.6181E+05
9	1.33	1.66	0.33	6.6256E+10	2.0078E+11	11	11	0.80	1.00	0.20	2.5221E+07	2.2699E+07	4.4636E+03
8	1.66	2.00	0.34	7.2184E+01	2.1231E+02	10	10	1.00	1.50	0.50	2.6875E+11	3.3594E+11	4.7564E+07
7	2.00	2.50	0.50	1.5724E+06	3.1448E+06	9	8+9	1.50	2.00	0.50	3.2124E+10	5.6217E+10	5.6853E+06
6	2.50	3.00	0.50	2.4381E+03	4.8762E+03	8	6+7	2.00	3.00	1.00	1.5748E+06	3.9371E+06	2.7871E+02
5	3.00	4.00	1.00	1.1999E-12	1.1999E-12	7	5	3.00	4.00	1.00	1.1999E-12	4.1997E-12	2.1236E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.4904E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.4904E+11	4.0423E+11	6.1773E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Plenum Region - 5 Year Cooli

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7698E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	7.8523E+10	1.9631E+12	20	18 (1/4)	0.01	0.02	0.01	1.9631E+10	2.9446E+08	3.4743E+06
17	0.05	0.10	0.05	1.7649E+09	3.5298E+10	19	18 (1/4)	0.02	0.03	0.01	1.9631E+10	4.9077E+08	3.4743E+06
16	0.10	0.20	0.10	7.2580E+09	7.2580E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	3.9614E+10	1.7827E+09	7.0110E+06
15	0.20	0.30	0.10	4.3076E+08	4.3076E+09	17	17 (.8)	0.06	0.10	0.04	1.4119E+09	1.1295E+08	2.4988E+05
14	0.30	0.40	0.10	1.6618E+09	1.6618E+10	16	16	0.10	0.20	0.10	7.2580E+09	1.0887E+09	1.2845E+06
13	0.40	0.60	0.20	3.6540E+10	1.8270E+11	15	14+15	0.20	0.40	0.20	2.0926E+09	6.2777E+08	3.7034E+05
12	0.60	0.80	0.20	1.8927E+10	9.4635E+10	14	13	0.40	0.60	0.20	3.6540E+10	1.8270E+10	6.4668E+06
11	0.80	1.00	0.20	2.4585E+08	1.2293E+09	13	12 (1/2)	0.60	0.70	0.10	9.4635E+09	6.1513E+09	1.6749E+06
10	1.00	1.33	0.33	3.8473E+11	1.1658E+12	12	12 (1/2)	0.70	0.80	0.10	9.4635E+09	7.0976E+09	1.6749E+06
9	1.33	1.66	0.33	1.0865E+11	3.2924E+11	11	11	0.80	1.00	0.20	2.4585E+08	2.2127E+08	4.3511E+04
8	1.66	2.00	0.34	7.1276E+01	2.0964E+02	10	10	1.00	1.50	0.50	4.4070E+11	5.5088E+11	7.7995E+07
7	2.00	2.50	0.50	2.5784E+06	5.1568E+06	9	8+9	1.50	2.00	0.50	5.2679E+10	9.2188E+10	9.3231E+06
6	2.50	3.00	0.50	3.9980E+03	7.9960E+03	8	6+7	2.00	3.00	1.00	2.5824E+06	6.4560E+06	4.5703E+02
5	3.00	4.00	1.00	7.7863E-13	7.7863E-13	7	5	3.00	4.00	1.00	7.7863E-13	2.7252E-12	1.3780E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	6.3873E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	6.3873E+11	6.7921E+11	1.1304E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Plenum Region - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7698E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	2.1318E+10	5.3295E+11	20	18 (1/4)	0.01	0.02	0.01	5.3295E+09	7.9943E+07	9.4321E+05
17	0.05	0.10	0.05	8.0499E+08	1.6100E+10	19	18 (1/4)	0.02	0.03	0.01	5.3295E+09	1.3324E+08	9.4321E+05
16	0.10	0.20	0.10	2.1146E+09	2.1146E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.0820E+10	4.8690E+08	1.9149E+06
15	0.20	0.30	0.10	1.2473E+08	1.2473E+09	17	17 (.8)	0.06	0.10	0.04	6.4399E+08	5.1519E+07	1.1397E+05
14	0.30	0.40	0.10	4.7181E+08	4.7181E+09	16	16	0.10	0.20	0.10	2.1146E+09	3.1719E+08	3.7424E+05
13	0.40	0.60	0.20	1.0266E+10	5.1330E+10	15	14+15	0.20	0.40	0.20	5.9654E+08	1.7896E+08	1.0558E+05
12	0.60	0.80	0.20	5.3243E+09	2.6622E+10	14	13	0.40	0.60	0.20	1.0266E+10	5.1330E+09	1.8169E+06
11	0.80	1.00	0.20	2.1394E+07	1.0697E+08	13	12 (1/2)	0.60	0.70	0.10	2.6622E+09	1.7304E+09	4.7115E+05
10	1.00	1.33	0.33	1.9931E+11	6.0397E+11	12	12 (1/2)	0.70	0.80	0.10	2.6622E+09	1.9966E+09	4.7115E+05
9	1.33	1.66	0.33	5.6284E+10	1.7056E+11	11	11	0.80	1.00	0.20	2.1394E+07	1.9255E+07	3.7863E+03
8	1.66	2.00	0.34	5.0362E+01	1.4812E+02	10	10	1.00	1.50	0.50	2.2830E+11	2.8538E+11	4.0405E+07
7	2.00	2.50	0.50	1.3357E+06	2.6714E+06	9	8+9	1.50	2.00	0.50	2.7289E+10	4.7756E+10	4.8296E+06
6	2.50	3.00	0.50	2.0711E+03	4.1422E+03	8	6+7	2.00	3.00	1.00	1.3378E+06	3.3444E+06	2.3676E+02
5	3.00	4.00	1.00	7.0074E-13	7.0074E-13	7	5	3.00	4.00	1.00	7.0074E-13	2.4526E-12	1.2402E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	2.9604E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.9604E+11	3.4327E+11	5.2393E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Plenum Region - 5 Year Cooli

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7698E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	8.4807E+10	2.1202E+12	20	18 (1/4)	0.01	0.02	0.01	2.1202E+10	3.1803E+08	3.7523E+06
17	0.05	0.10	0.05	1.9214E+09	3.8428E+10	19	18 (1/4)	0.02	0.03	0.01	2.1202E+10	5.3004E+08	3.7523E+06
16	0.10	0.20	0.10	7.8523E+09	7.8523E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	4.2788E+10	1.9255E+09	7.5726E+06
15	0.20	0.30	0.10	4.6599E+08	4.6599E+09	17	17 (.8)	0.06	0.10	0.04	1.5371E+09	1.2297E+08	2.7204E+05
14	0.30	0.40	0.10	1.7973E+09	1.7973E+10	16	16	0.10	0.20	0.10	7.8523E+09	1.1778E+09	1.3897E+06
13	0.40	0.60	0.20	3.9515E+10	1.9758E+11	15	14+15	0.20	0.40	0.20	2.2633E+09	6.7899E+08	4.0056E+05
12	0.60	0.80	0.20	2.0469E+10	1.0235E+11	14	13	0.40	0.60	0.20	3.9515E+10	1.9758E+10	6.9934E+06
11	0.80	1.00	0.20	2.6177E+08	1.3089E+09	13	12 (1/2)	0.60	0.70	0.10	1.0235E+10	6.6524E+09	1.8113E+06
10	1.00	1.33	0.33	4.1985E+11	1.2723E+12	12	12 (1/2)	0.70	0.80	0.10	1.0235E+10	7.6759E+09	1.8113E+06
9	1.33	1.66	0.33	1.1857E+11	3.5930E+11	11	11	0.80	1.00	0.20	2.6177E+08	2.3559E+08	4.6328E+04
8	1.66	2.00	0.34	8.7505E+01	2.5737E+02	10	10	1.00	1.50	0.50	4.8093E+11	6.0116E+11	8.5115E+07
7	2.00	2.50	0.50	2.8138E+06	5.6276E+06	9	8+9	1.50	2.00	0.50	5.7488E+10	1.0060E+11	1.0174E+07
6	2.50	3.00	0.50	4.3630E+03	8.7260E+03	8	6+7	2.00	3.00	1.00	2.8182E+06	7.0454E+06	4.9876E+02
5	3.00	4.00	1.00	1.0539E-12	1.0539E-12	7	5	3.00	4.00	1.00	1.0539E-12	3.6887E-12	1.8652E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	6.9551E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	6.9551E+11	7.4085E+11	1.2309E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Plenum Region - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7698E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	2.3087E+10	5.7718E+11	20	18 (1/4)	0.01	0.02	0.01	5.7718E+09	8.6576E+07	1.0215E+06
17	0.05	0.10	0.05	8.7729E+08	1.7546E+10	19	18 (1/4)	0.02	0.03	0.01	5.7718E+09	1.4429E+08	1.0215E+06
16	0.10	0.20	0.10	2.2884E+09	2.2884E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.1719E+10	5.2735E+08	2.0740E+06
15	0.20	0.30	0.10	1.3498E+08	1.3498E+09	17	17 (.8)	0.06	0.10	0.04	7.0183E+08	5.6147E+07	1.2421E+05
14	0.30	0.40	0.10	5.1034E+08	5.1034E+09	16	16	0.10	0.20	0.10	2.2884E+09	3.4326E+08	4.0500E+05
13	0.40	0.60	0.20	1.1102E+10	5.5510E+10	15	14+15	0.20	0.40	0.20	6.4532E+08	1.9360E+08	1.1421E+05
12	0.60	0.80	0.20	5.7582E+09	2.8791E+10	14	13	0.40	0.60	0.20	1.1102E+10	5.5510E+09	1.9648E+06
11	0.80	1.00	0.20	2.3497E+07	1.1749E+08	13	12 (1/2)	0.60	0.70	0.10	2.8791E+09	1.8714E+09	5.0954E+05
10	1.00	1.33	0.33	2.1750E+11	6.5909E+11	12	12 (1/2)	0.70	0.80	0.10	2.8791E+09	2.1593E+09	5.0954E+05
9	1.33	1.66	0.33	6.1423E+10	1.8613E+11	11	11	0.80	1.00	0.20	2.3497E+07	2.1147E+07	4.1585E+03
8	1.66	2.00	0.34	6.3985E+01	1.8819E+02	10	10	1.00	1.50	0.50	2.4914E+11	3.1143E+11	4.4093E+07
7	2.00	2.50	0.50	1.4577E+06	2.9154E+06	9	8+9	1.50	2.00	0.50	2.9781E+10	5.2116E+10	5.2706E+06
6	2.50	3.00	0.50	2.2602E+03	4.5204E+03	8	6+7	2.00	3.00	1.00	1.4600E+06	3.6499E+06	2.5838E+02
5	3.00	4.00	1.00	9.4851E-13	9.4851E-13	7	5	3.00	4.00	1.00	9.4851E-13	3.3198E-12	1.6787E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.2271E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.2271E+11	3.7450E+11	5.7113E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Plenum Region - 5 Year Cooli

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7698E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	9.1068E+10	2.2767E+12	20	18 (1/4)	0.01	0.02	0.01	2.2767E+10	3.4151E+08	4.0293E+06
17	0.05	0.10	0.05	2.0753E+09	4.1506E+10	19	18 (1/4)	0.02	0.03	0.01	2.2767E+10	5.6918E+08	4.0293E+06
16	0.10	0.20	0.10	8.4446E+09	8.4446E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	4.5949E+10	2.0677E+09	8.1321E+06
15	0.20	0.30	0.10	5.0112E+08	5.0112E+09	17	17 (.8)	0.06	0.10	0.04	1.6602E+09	1.3282E+08	2.9383E+05
14	0.30	0.40	0.10	1.9325E+09	1.9325E+10	16	16	0.10	0.20	0.10	8.4446E+09	1.2667E+09	1.4945E+06
13	0.40	0.60	0.20	4.2484E+10	2.1242E+11	15	14+15	0.20	0.40	0.20	2.4336E+09	7.3009E+08	4.3070E+05
12	0.60	0.80	0.20	2.2007E+10	1.1004E+11	14	13	0.40	0.60	0.20	4.2484E+10	2.1242E+10	7.5188E+06
11	0.80	1.00	0.20	2.7766E+08	1.3883E+09	13	12 (1/2)	0.60	0.70	0.10	1.1004E+10	7.1523E+09	1.9474E+06
10	1.00	1.33	0.33	4.5425E+11	1.3765E+12	12	12 (1/2)	0.70	0.80	0.10	1.1004E+10	8.2526E+09	1.9474E+06
9	1.33	1.66	0.33	1.2828E+11	3.8873E+11	11	11	0.80	1.00	0.20	2.7766E+08	2.4989E+08	4.9140E+04
8	1.66	2.00	0.34	1.0648E+02	3.1318E+02	10	10	1.00	1.50	0.50	5.2033E+11	6.5042E+11	9.2089E+07
7	2.00	2.50	0.50	3.0443E+06	6.0886E+06	9	8+9	1.50	2.00	0.50	6.2196E+10	1.0884E+11	1.1008E+07
6	2.50	3.00	0.50	4.7204E+03	9.4408E+03	8	6+7	2.00	3.00	1.00	3.0490E+06	7.6226E+06	5.3962E+02
5	3.00	4.00	1.00	1.3992E-12	1.3992E-12	7	5	3.00	4.00	1.00	1.3992E-12	4.8972E-12	2.4763E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	7.5132E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	7.5132E+11	8.0127E+11	1.3297E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Plenum Region - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7698E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	2.4847E+10	6.2118E+11	20	18 (1/4)	0.01	0.02	0.01	6.2118E+09	9.3176E+07	1.0994E+06
17	0.05	0.10	0.05	9.4829E+08	1.8966E+10	19	18 (1/4)	0.02	0.03	0.01	6.2118E+09	1.5529E+08	1.0994E+06
16	0.10	0.20	0.10	2.4616E+09	2.4616E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.2613E+10	5.6759E+08	2.2323E+06
15	0.20	0.30	0.10	1.4518E+08	1.4518E+09	17	17 (.8)	0.06	0.10	0.04	7.5863E+08	6.0691E+07	1.3426E+05
14	0.30	0.40	0.10	5.4876E+08	5.4876E+09	16	16	0.10	0.20	0.10	2.4616E+09	3.6924E+08	4.3565E+05
13	0.40	0.60	0.20	1.1936E+10	5.9680E+10	15	14+15	0.20	0.40	0.20	6.9394E+08	2.0818E+08	1.2281E+05
12	0.60	0.80	0.20	6.1912E+09	3.0956E+10	14	13	0.40	0.60	0.20	1.1936E+10	5.9680E+09	2.1124E+06
11	0.80	1.00	0.20	2.5617E+07	1.2809E+08	13	12 (1/2)	0.60	0.70	0.10	3.0956E+09	2.0121E+09	5.4786E+05
10	1.00	1.33	0.33	2.3532E+11	7.1309E+11	12	12 (1/2)	0.70	0.80	0.10	3.0956E+09	2.3217E+09	5.4786E+05
9	1.33	1.66	0.33	6.6454E+10	2.0138E+11	11	11	0.80	1.00	0.20	2.5617E+07	2.3055E+07	4.5337E+03
8	1.66	2.00	0.34	8.0041E+01	2.3541E+02	10	10	1.00	1.50	0.50	2.6955E+11	3.3694E+11	4.7706E+07
7	2.00	2.50	0.50	1.5771E+06	3.1542E+06	9	8+9	1.50	2.00	0.50	3.2220E+10	5.6385E+10	5.7023E+06
6	2.50	3.00	0.50	2.4454E+03	4.8908E+03	8	6+7	2.00	3.00	1.00	1.5795E+06	3.9489E+06	2.7955E+02
5	3.00	4.00	1.00	1.2592E-12	1.2592E-12	7	5	3.00	4.00	1.00	1.2592E-12	4.4072E-12	2.2285E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.4888E+11		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.4888E+11	4.0511E+11	6.1745E+07

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Top End Fitting - 5 Year Cool

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	4.7282E+10	1.1821E+12	20	18 (1/4)	0.01	0.02	0.01	1.1821E+10	1.7731E+08	2.1003E+06
17	0.05	0.10	0.05	8.0154E+09	1.6031E+11	19	18 (1/4)	0.02	0.03	0.01	1.1821E+10	2.9551E+08	2.1003E+06
16	0.10	0.20	0.10	2.5954E+09	2.5954E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.5244E+10	1.1360E+09	4.4854E+06
15	0.20	0.30	0.10	1.3570E+08	1.3570E+09	17	17 (.8)	0.06	0.10	0.04	6.4123E+09	5.1299E+08	1.1393E+06
14	0.30	0.40	0.10	2.8419E+08	2.8419E+09	16	16	0.10	0.20	0.10	2.5954E+09	3.8931E+08	4.6115E+05
13	0.40	0.60	0.20	3.5458E+09	1.7729E+10	15	14+15	0.20	0.40	0.20	4.1989E+08	1.2597E+08	7.4606E+04
12	0.60	0.80	0.20	1.8878E+09	9.4390E+09	14	13	0.40	0.60	0.20	3.5458E+09	1.7729E+09	6.3002E+05
11	0.80	1.00	0.20	8.8219E+09	4.4110E+10	13	12 (1/2)	0.60	0.70	0.10	9.4390E+08	6.1354E+08	1.6771E+05
10	1.00	1.33	0.33	2.3275E+12	7.0530E+12	12	12 (1/2)	0.70	0.80	0.10	9.4390E+08	7.0793E+08	1.6771E+05
9	1.33	1.66	0.33	6.5729E+11	1.9918E+12	11	11	0.80	1.00	0.20	8.8219E+09	7.9397E+09	1.5675E+06
8	1.66	2.00	0.34	1.9354E+02	5.6924E+02	10	10	1.00	1.50	0.50	2.6661E+12	3.3326E+12	4.7371E+08
7	2.00	2.50	0.50	1.5598E+07	3.1196E+07	9	8+9	1.50	2.00	0.50	3.1869E+11	5.5770E+11	5.6624E+07
6	2.50	3.00	0.50	2.4187E+04	4.8374E+04	8	6+7	2.00	3.00	1.00	1.5622E+07	3.9055E+07	2.7758E+03
5	3.00	4.00	1.00	8.0025E-12	8.0025E-12	7	5	3.00	4.00	1.00	8.0025E-12	2.8009E-11	1.4219E-15
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.0574E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.0574E+12	3.9040E+12	5.4323E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 1 Top End Fitting - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	2.2760E+10	5.6900E+11	20	18 (1/4)	0.01	0.02	0.01	5.6900E+09	8.5350E+07	1.0110E+06
17	0.05	0.10	0.05	4.1415E+09	8.2830E+10	19	18 (1/4)	0.02	0.03	0.01	5.6900E+09	1.4225E+08	1.0110E+06
16	0.10	0.20	0.10	1.1851E+09	1.1851E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.2208E+10	5.4937E+08	2.1692E+06
15	0.20	0.30	0.10	6.0774E+07	6.0774E+08	17	17 (.8)	0.06	0.10	0.04	3.3132E+09	2.6506E+08	5.8869E+05
14	0.30	0.40	0.10	1.0954E+08	1.0954E+09	16	16	0.10	0.20	0.10	1.1851E+09	1.7777E+08	2.1057E+05
13	0.40	0.60	0.20	9.9791E+08	4.9896E+09	15	14+15	0.20	0.40	0.20	1.7031E+08	5.1094E+07	3.0261E+04
12	0.60	0.80	0.20	5.6925E+08	2.8463E+09	14	13	0.40	0.60	0.20	9.9791E+08	4.9896E+08	1.7731E+05
11	0.80	1.00	0.20	2.5526E+08	1.2763E+09	13	12 (1/2)	0.60	0.70	0.10	2.8463E+08	1.8501E+08	5.0572E+04
10	1.00	1.33	0.33	1.2056E+12	3.6533E+12	12	12 (1/2)	0.70	0.80	0.10	2.8463E+08	2.1347E+08	5.0572E+04
9	1.33	1.66	0.33	3.4045E+11	1.0317E+12	11	11	0.80	1.00	0.20	2.5526E+08	2.2973E+08	4.5355E+04
8	1.66	2.00	0.34	5.8929E+00	1.7332E+01	10	10	1.00	1.50	0.50	1.3810E+12	1.7262E+12	2.4537E+08
7	2.00	2.50	0.50	8.0794E+06	1.6159E+07	9	8+9	1.50	2.00	0.50	1.6507E+11	2.8887E+11	2.9329E+07
6	2.50	3.00	0.50	1.2528E+04	2.5056E+04	8	6+7	2.00	3.00	1.00	8.0919E+06	2.0230E+07	1.4378E+03
5	3.00	4.00	1.00	7.2009E-12	7.2009E-12	7	5	3.00	4.00	1.00	7.2009E-12	2.5203E-11	1.2795E-15
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.5761E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.5761E+12	2.0175E+12	2.8005E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Top End Fitting - 5 Year Cool

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	3.9886E+10	9.9715E+11	20	18 (1/4)	0.01	0.02	0.01	9.9715E+09	1.4957E+08	1.7717E+06
17	0.05	0.10	0.05	6.7670E+09	1.3534E+11	19	18 (1/4)	0.02	0.03	0.01	9.9715E+09	2.4929E+08	1.7717E+06
16	0.10	0.20	0.10	2.1874E+09	2.1874E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.1296E+10	9.5834E+08	3.7839E+06
15	0.20	0.30	0.10	1.1434E+08	1.1434E+09	17	17 (.8)	0.06	0.10	0.04	5.4136E+09	4.3309E+08	9.6189E+05
14	0.30	0.40	0.10	2.3904E+08	2.3904E+09	16	16	0.10	0.20	0.10	2.1874E+09	3.2811E+08	3.8866E+05
13	0.40	0.60	0.20	2.9735E+09	1.4868E+10	15	14+15	0.20	0.40	0.20	3.5338E+08	1.0601E+08	6.2789E+04
12	0.60	0.80	0.20	1.5835E+09	7.9175E+09	14	13	0.40	0.60	0.20	2.9735E+09	1.4868E+09	5.2833E+05
11	0.80	1.00	0.20	7.4881E+09	3.7441E+10	13	12 (1/2)	0.60	0.70	0.10	7.9175E+08	5.1464E+08	1.4068E+05
10	1.00	1.33	0.33	1.9651E+12	5.9548E+12	12	12 (1/2)	0.70	0.80	0.10	7.9175E+08	5.9381E+08	1.4068E+05
9	1.33	1.66	0.33	5.5494E+11	1.6816E+12	11	11	0.80	1.00	0.20	7.4881E+09	6.7393E+09	1.3305E+06
8	1.66	2.00	0.34	1.7805E+02	5.2368E+02	10	10	1.00	1.50	0.50	2.2510E+12	2.8137E+12	3.9995E+08
7	2.00	2.50	0.50	1.3169E+07	2.6338E+07	9	8+9	1.50	2.00	0.50	2.6906E+11	4.7086E+11	4.7807E+07
6	2.50	3.00	0.50	2.0421E+04	4.0842E+04	8	6+7	2.00	3.00	1.00	1.3189E+07	3.2974E+07	2.3435E+03
5	3.00	4.00	1.00	4.6736E-12	4.6736E-12	7	5	3.00	4.00	1.00	4.6736E-12	1.6358E-11	8.3041E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	2.5813E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.5813E+12	3.2962E+12	4.5864E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 2 Top End Fitting - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	1.9205E+10	4.8013E+11	20	18 (1/4)	0.01	0.02	0.01	4.8013E+09	7.2019E+07	8.5309E+05
17	0.05	0.10	0.05	3.4965E+09	6.9930E+10	19	18 (1/4)	0.02	0.03	0.01	4.8013E+09	1.2003E+08	8.5309E+05
16	0.10	0.20	0.10	9.9949E+08	9.9949E+09	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.0302E+10	4.6358E+08	1.8304E+06
15	0.20	0.30	0.10	5.1246E+07	5.1246E+08	17	17 (.8)	0.06	0.10	0.04	2.7972E+09	2.2378E+08	4.9701E+05
14	0.30	0.40	0.10	9.2226E+07	9.2226E+08	16	16	0.10	0.20	0.10	9.9949E+08	1.4992E+08	1.7759E+05
13	0.40	0.60	0.20	8.3687E+08	4.1844E+09	15	14+15	0.20	0.40	0.20	1.4347E+08	4.3042E+07	2.5492E+04
12	0.60	0.80	0.20	4.7782E+08	2.3891E+09	14	13	0.40	0.60	0.20	8.3687E+08	4.1844E+08	1.4870E+05
11	0.80	1.00	0.20	2.1633E+08	1.0817E+09	13	12 (1/2)	0.60	0.70	0.10	2.3891E+08	1.5529E+08	4.2450E+04
10	1.00	1.33	0.33	1.0178E+12	3.0842E+12	12	12 (1/2)	0.70	0.80	0.10	2.3891E+08	1.7918E+08	4.2450E+04
9	1.33	1.66	0.33	2.8744E+11	8.7103E+11	11	11	0.80	1.00	0.20	2.1633E+08	1.9470E+08	3.8438E+04
8	1.66	2.00	0.34	4.1114E+00	1.2092E+01	10	10	1.00	1.50	0.50	1.1659E+12	1.4573E+12	2.0715E+08
7	2.00	2.50	0.50	6.8213E+06	1.3643E+07	9	8+9	1.50	2.00	0.50	1.3936E+11	2.4389E+11	2.4762E+07
6	2.50	3.00	0.50	1.0577E+04	2.1154E+04	8	6+7	2.00	3.00	1.00	6.8319E+06	1.7080E+07	1.2139E+03
5	3.00	4.00	1.00	4.2054E-12	4.2054E-12	7	5	3.00	4.00	1.00	4.2054E-12	1.4719E-11	7.4722E-16
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.3306E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.3306E+12	1.7033E+12	2.3642E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Top End Fitting - 5 Year Cool

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	4.3579E+10	1.0895E+12	20	18 (1/4)	0.01	0.02	0.01	1.0895E+10	1.6342E+08	1.9358E+06
17	0.05	0.10	0.05	7.4069E+09	1.4814E+11	19	18 (1/4)	0.02	0.03	0.01	1.0895E+10	2.7237E+08	1.9358E+06
16	0.10	0.20	0.10	2.3870E+09	2.3870E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.3271E+10	1.0472E+09	4.1348E+06
15	0.20	0.30	0.10	1.2472E+08	1.2472E+09	17	17 (.8)	0.06	0.10	0.04	5.9255E+09	4.7404E+08	1.0528E+06
14	0.30	0.40	0.10	2.5990E+08	2.5990E+09	16	16	0.10	0.20	0.10	2.3870E+09	3.5805E+08	4.2412E+05
13	0.40	0.60	0.20	3.2158E+09	1.6079E+10	15	14+15	0.20	0.40	0.20	3.8462E+08	1.1539E+08	6.8339E+04
12	0.60	0.80	0.20	1.7143E+09	8.5715E+09	14	13	0.40	0.60	0.20	3.2158E+09	1.6079E+09	5.7138E+05
11	0.80	1.00	0.20	7.9464E+09	3.9732E+10	13	12 (1/2)	0.60	0.70	0.10	8.5715E+08	5.5715E+08	1.5230E+05
10	1.00	1.33	0.33	2.1510E+12	6.5182E+12	12	12 (1/2)	0.70	0.80	0.10	8.5715E+08	6.4286E+08	1.5230E+05
9	1.33	1.66	0.33	6.0745E+11	1.8408E+12	11	11	0.80	1.00	0.20	7.9464E+09	7.1518E+09	1.4119E+06
8	1.66	2.00	0.34	1.8444E+02	5.4247E+02	10	10	1.00	1.50	0.50	2.4639E+12	3.0799E+12	4.3779E+08
7	2.00	2.50	0.50	1.4416E+07	2.8832E+07	9	8+9	1.50	2.00	0.50	2.9452E+11	5.1541E+11	5.2331E+07
6	2.50	3.00	0.50	2.2353E+04	4.4706E+04	8	6+7	2.00	3.00	1.00	1.4438E+07	3.6096E+07	2.5654E+03
5	3.00	4.00	1.00	6.3261E-12	6.3261E-12	7	5	3.00	4.00	1.00	6.3261E-12	2.2141E-11	1.1240E-15
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	2.8251E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	2.8251E+12	3.6077E+12	5.0196E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 3 Top End Fitting - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	2.1012E+10	5.2530E+11	20	18 (1/4)	0.01	0.02	0.01	5.2530E+09	7.8795E+07	9.3335E+05
17	0.05	0.10	0.05	3.8273E+09	7.6546E+10	19	18 (1/4)	0.02	0.03	0.01	5.2530E+09	1.3133E+08	9.3335E+05
16	0.10	0.20	0.10	1.0920E+09	1.0920E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.1271E+10	5.0722E+08	2.0027E+06
15	0.20	0.30	0.10	5.5971E+07	5.5971E+08	17	17 (.8)	0.06	0.10	0.04	3.0618E+09	2.4495E+08	5.4403E+05
14	0.30	0.40	0.10	1.0046E+08	1.0046E+09	16	16	0.10	0.20	0.10	1.0920E+09	1.6380E+08	1.9403E+05
13	0.40	0.60	0.20	9.0506E+08	4.5253E+09	15	14+15	0.20	0.40	0.20	1.5643E+08	4.6929E+07	2.7795E+04
12	0.60	0.80	0.20	5.1857E+08	2.5929E+09	14	13	0.40	0.60	0.20	9.0506E+08	4.5253E+08	1.6081E+05
11	0.80	1.00	0.20	2.3363E+08	1.1682E+09	13	12 (1/2)	0.60	0.70	0.10	2.5929E+08	1.6854E+08	4.6070E+04
10	1.00	1.33	0.33	1.1142E+12	3.3764E+12	12	12 (1/2)	0.70	0.80	0.10	2.5929E+08	1.9446E+08	4.6070E+04
9	1.33	1.66	0.33	3.1464E+11	9.5345E+11	11	11	0.80	1.00	0.20	2.3363E+08	2.1027E+08	4.1511E+04
8	1.66	2.00	0.34	5.2236E+00	1.5364E+01	10	10	1.00	1.50	0.50	1.2763E+12	1.5954E+12	2.2677E+08
7	2.00	2.50	0.50	7.4668E+06	1.4934E+07	9	8+9	1.50	2.00	0.50	1.5255E+11	2.6697E+11	2.7106E+07
6	2.50	3.00	0.50	1.1578E+04	2.3156E+04	8	6+7	2.00	3.00	1.00	7.4784E+06	1.8696E+07	1.3288E+03
5	3.00	4.00	1.00	5.6924E-12	5.6924E-12	7	5	3.00	4.00	1.00	5.6924E-12	1.9923E-11	1.0114E-15
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.4566E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.4566E+12	1.8645E+12	2.5881E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Top End Fitting - 5 Year Cool

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	4.7239E+10	1.1810E+12	20	18 (1/4)	0.01	0.02	0.01	1.1810E+10	1.7715E+08	2.0984E+06
17	0.05	0.10	0.05	8.0402E+09	1.6080E+11	19	18 (1/4)	0.02	0.03	0.01	1.1810E+10	2.9524E+08	2.0984E+06
16	0.10	0.20	0.10	2.5848E+09	2.5848E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	2.5228E+10	1.1352E+09	4.4824E+06
15	0.20	0.30	0.10	1.3501E+08	1.3501E+09	17	17 (.8)	0.06	0.10	0.04	6.4322E+09	5.1457E+08	1.1429E+06
14	0.30	0.40	0.10	2.8063E+08	2.8063E+09	16	16	0.10	0.20	0.10	2.5848E+09	3.8772E+08	4.5927E+05
13	0.40	0.60	0.20	3.4574E+09	1.7287E+10	15	14+15	0.20	0.40	0.20	4.1564E+08	1.2469E+08	7.3851E+04
12	0.60	0.80	0.20	1.8450E+09	9.2250E+09	14	13	0.40	0.60	0.20	3.4574E+09	1.7287E+09	6.1431E+05
11	0.80	1.00	0.20	8.4035E+09	4.2018E+10	13	12 (1/2)	0.60	0.70	0.10	9.2250E+08	5.9963E+08	1.6391E+05
10	1.00	1.33	0.33	2.3351E+12	7.0761E+12	12	12 (1/2)	0.70	0.80	0.10	9.2250E+08	6.9188E+08	1.6391E+05
9	1.33	1.66	0.33	6.5942E+11	1.9982E+12	11	11	0.80	1.00	0.20	8.4035E+09	7.5632E+09	1.4931E+06
8	1.66	2.00	0.34	1.9043E+02	5.6009E+02	10	10	1.00	1.50	0.50	2.6748E+12	3.3435E+12	4.7526E+08
7	2.00	2.50	0.50	1.5649E+07	3.1298E+07	9	8+9	1.50	2.00	0.50	3.1972E+11	5.5951E+11	5.6808E+07
6	2.50	3.00	0.50	2.4265E+04	4.8530E+04	8	6+7	2.00	3.00	1.00	1.5673E+07	3.9183E+07	2.7848E+03
5	3.00	4.00	1.00	8.3983E-12	8.3983E-12	7	5	3.00	4.00	1.00	8.3983E-12	2.9394E-11	1.4922E-15
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	3.0665E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	3.0665E+12	3.9163E+12	5.4486E+08

Rescaling ORIGENS Gamma Source to the BUGLE-93 Energy Group Structure and Normalizing for DS 4 Top End Fitting - 10 Year Coo

	1	2	3	4	5			6	7	8	9	10	11
												NF =	1.7768E-04
ORIGENS	Lower	Upper	Delta E	SO	SO/dE	Bugle-93	ORIGENS	Lower	Upper	Delta E'	(SO/dE)*dE'	SO*E'	SO*NF
Group #	E (MeV)	E (MeV)	E (MeV)	gamma/s	gamma/s-MeV	Group #	Group Eq.	E' (MeV)	E' (MeV)	E' (MeV)	gamma/s	MEV/s	gamma/s cc
18	0.01	0.05	0.04	2.2803E+10	5.7008E+11	20	18 (1/4)	0.01	0.02	0.01	5.7008E+09	8.5511E+07	1.0129E+06
17	0.05	0.10	0.05	4.1547E+09	8.3094E+10	19	18 (1/4)	0.02	0.03	0.01	5.7008E+09	1.4252E+08	1.0129E+06
16	0.10	0.20	0.10	1.1836E+09	1.1836E+10	18	18 (.5)+17 (.2)	0.03	0.06	0.03	1.2232E+10	5.5046E+08	2.1735E+06
15	0.20	0.30	0.10	6.0654E+07	6.0654E+08	17	17 (.8)	0.06	0.10	0.04	3.3238E+09	2.6590E+08	5.9057E+05
14	0.30	0.40	0.10	1.0863E+08	1.0863E+09	16	16	0.10	0.20	0.10	1.1836E+09	1.7754E+08	2.1030E+05
13	0.40	0.60	0.20	9.7310E+08	4.8655E+09	15	14+15	0.20	0.40	0.20	1.6928E+08	5.0785E+07	3.0078E+04
12	0.60	0.80	0.20	5.5942E+08	2.7971E+09	14	13	0.40	0.60	0.20	9.7310E+08	4.8655E+08	1.7290E+05
11	0.80	1.00	0.20	2.5104E+08	1.2552E+09	13	12 (1/2)	0.60	0.70	0.10	2.7971E+08	1.8181E+08	4.9699E+04
10	1.00	1.33	0.33	1.2095E+12	3.6652E+12	12	12 (1/2)	0.70	0.80	0.10	2.7971E+08	2.0978E+08	4.9699E+04
9	1.33	1.66	0.33	3.4155E+11	1.0350E+12	11	11	0.80	1.00	0.20	2.5104E+08	2.2594E+08	4.4605E+04
8	1.66	2.00	0.34	6.5343E+00	1.9219E+01	10	10	1.00	1.50	0.50	1.3855E+12	1.7318E+12	2.4617E+08
7	2.00	2.50	0.50	8.1056E+06	1.6211E+07	9	8+9	1.50	2.00	0.50	1.6560E+11	2.8980E+11	2.9424E+07
6	2.50	3.00	0.50	1.2569E+04	2.5138E+04	8	6+7	2.00	3.00	1.00	8.1182E+06	2.0295E+07	1.4424E+03
5	3.00	4.00	1.00	7.5570E-12	7.5570E-12	7	5	3.00	4.00	1.00	7.5570E-12	2.6450E-11	1.3427E-15
4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	6	4	4.00	5.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
3	5.00	6.50	1.50	0.0000E+00	0.0000E+00	5	(2+3)(1/3)	5.00	6.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
2	6.50	8.00	1.50	0.0000E+00	0.0000E+00	4	(2+3)(1/3)	6.00	7.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	3	(2+3)(1/3)	7.00	8.00	1.00	0.0000E+00	0.0000E+00	0.0000E+00
			Sum:	1.5812E+12		2	1	8.00	10.00	2.00	0.0000E+00	0.0000E+00	0.0000E+00
						1	None	10.00	14.00	4.00	0.0000E+00	0.0000E+00	0.0000E+00
										Sum:	1.5812E+12	2.0240E+12	2.8094E+08