CVP-2007-00001
Rev. 0

Cleanup Verification Package for the 118-F-1 Burial Ground

Prepared for the U.S. Department of Energy by Washington Closure Hanford

November 2007

EXECUTIVE SUMMARY

This cleanup verification package documents completion of remedial action for the 118-F-1 Burial Ground on the Hanford Site. The 118-F-1 Burial Ground is a combination of two locations formerly called Minor Construction Burial Ground No. 2 and Solid Waste Burial Ground No. 2. The 118-F-1 site is located in the 100-FR-2 Operable Unit of the 100-F Area, approximately 300 m (1000 ft) southwest of the 105-F Reactor Building. This waste site received radioactive equipment and other miscellaneous waste from 105-F Reactor operations. The burial ground was used between 1954 and 1965, and contained three unlined burial trenches and a burial pit. Waste buried at this site included: dummy elements and irradiated process tubing; gun barrel tips, steel sleeves, and metal chips removed from the reactor; filter boxes containing reactor graphite chips; and miscellaneous construction solid waste.

Remedial action at the 118-F-1 site began on December 27, 2005, and was completed on June 22, 2007. Remedial action activities involved removing the uncontaminated overburden, the buried contaminated debris, and the underlying contaminated soil. All contaminated materials were disposed of at the Environmental Restoration Disposal Facility. Results of the verification sampling, laboratory analyses, and data evaluations for the 118-F-1 site (which includes the remediation footprint, the overburden/below cleanup level and the waste sorting pile areas) indicate that all remedial action objectives and goals for direct exposure, protection of groundwater, and protection of the Columbia River have been met (see Table ES-1).

Soil cleanup levels were established in the *Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, Hanford Site (100 Area Burial Grounds), Benton County, Washington* (ROD) (EPA 2000) based on a limited ecological risk assessment. Although not required by the ROD (EPA 2000), a comparison against ecological risk screening levels has been made for the site contaminants of concern/contaminants of potential concern. Screening levels were exceeded for seven site constituents. It is believed that the

exceedance of screening values does not indicate the existence of risk to ecological receptors, as the concentrations for these constituents are within the range of Hanford Site background levels or are consistent with those seen elsewhere at the Hanford Site. The one exception is lead, which is believed to be present due to the historic application of lead-arsenate pesticides. The exceedance of soil screening values by lead at the site will be evaluated in the context of additional lines of evidence for ecological effects. A baseline risk assessment for the river corridor portion of the Hanford Site began in 2004, which includes a more complete, quantitative ecological risk assessment. That baseline risk assessment will be used as part of the final closeout decision for this site.

The site meets cleanup standards and has been reclassified as Interim Closed Out in accordance with the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989) and the Waste Site Reclassification Guideline TPA-MP-14 (RL-TPA-90-0001) (DOE-RL 2007). A copy of the waste site reclassification form is included as Attachment ES-1 to this document.

Table ES-1. Summary of Cleanup Verification Results for the 118-F-1 Burial Ground. (2 pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?	Ref.
Direct Exposure – Radionuclides	1. Attain 15 mrem/yr dose rate above background over 1000 years.	1. Maximum dose rate calculated by RESRAD is 4.59 mrem/yr.	Yes	e
Direct Exposure – Nonradionuclides	1. Attain individual COC RAGs.	1. All individual COC concentrations are below the RAGS.	Yes	e, f
Meet Nonradionuclide Risk Requirements	1. Hazard quotient of less than 1 for noncarcinogens.	1. The hazard quotients for individual nonradionuclide COCs in the shallow zone and overburden are less than 1.	Yes	g
	2. Cumulative hazard quotient of less than 1 for noncarcinogens.	2. The cumulative hazard quotient is less than 1 for the shallow zone and overburden.	Yes	g
	3. Excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens.	3. Excess cancer risk values for individual nonradionuclide COCs are less than 1×10^{-6}.	Yes	g
	4. Attain a total excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.	4. Total excess cancer risk is less than 1×10^{-5}.	Yes	g
Groundwater/River Protection – Radionuclides	1. Attain single COC groundwater and river RAGS.	1. Cesium-137, cobalt-60, nickel-63, strontium-90, and tritium are calculated to reach groundwater in the 1,000 years of the RESRAD model run. However, none of these constituents is predicted to migrate to groundwater (and thus the Columbia River) at concentrations exceeding groundwater or river criteria within 1,000 years. Therefore, residual concentrations achieve the remedial action objectives for groundwater and river protection.	Yes	b
	2. Attain National Primary Drinking Water Regulations 4-mrem/yr (beta/gamma) dose standard to target receptor/organ.[a]	2. All organ specific doses are below the 4-mrem/yr dose standard.		h
	3. Meet drinking water standards for alpha emitters: the more stringent of 15 pCi/L MCL or 1/25th of the derived concentration guide for DOE Order 5400.5.[b]	3. RESRAD modeling indicates that the alpha emitting COCs will not impact groundwater. Therefore, the alpha activity is 0 pCi/L for all years.	N/A	h
	4. Meet total uranium standard of 21.2 pCi/L.[c]	4. Isotopic uranium concentrations are below background.	N/A	e

Table ES-1. Summary of Cleanup Verification Results for the 118-F-1 Burial Ground. (2 pages)

Regulatory Requirement	Remedial Action Goals	Results	Remedial Action Objectives Attained?	Ref.
Groundwater/River Protection – Nonradionuclides	1. Attain individual nonradionuclide groundwater and river cleanup requirements.	1. Residual concentrations of lead exceeded soil RAGs for the protection of groundwater and/or the Columbia River. However, it is predicted that lead will not migrate to groundwater (and thus the Columbia River) at concentrations exceeding groundwater or river criteria within 1,000 years.[d] Therefore, residual concentrations achieve the remedial action objectives for groundwater and river protection.	Yes	e
Other Supporting Information	1. Sample location design calculation brief (Appendix B).			i

[a] "National Primary Drinking Water Regulations" (40 *Code of Federal Regulations* 141).

[b] *Radiation Protection of the Public and the Environment* (DOE Order 5400.5).

[c] Based on the isotopic distribution of uranium in the Hanford Site background, the 30 µg/L MCL (40 CFR 141) corresponds to 21.2 pCi/L. Concentration-to-activity calculations are documented in *Calculation of Total Uranium Activity Corresponding to a Maximum Contaminant Level for Total Uranium of 30 Micrograms per Liter in Groundwater*, 0100X-CA-V0038 (BHI 2001).

[d] *100 Area Analogous Sites RESRAD Calculations*, 0100X-CA-V0050, Rev. 0, Bechtel Hanford, Inc., Richland, Washington (2005).

[e] *118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief*, 0100F-CA-V0280, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

[f] *118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations*, 0100F-CA-V0279, Rev. 1, Washington Closure Hanford, Richland, Washington (2007).

[g] *118-F-1 Burial Ground Hazard Quotient and Carcinogenic Risk Calculations*, 0100F-CA-V0283, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

[h] *118-F-1 Burial Ground Comparison to Drinking Water Standards (MCL) Calculation,* 0100F-CA-V0281, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

[i] *118-F-1 Burial Ground Shallow Zone, Process Trenches, and Overburden Sample Design*, 0100F-CA-V0282, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

COC = contaminant of concern
MCL = maximum contaminant level
N/A = not applicable
RAG = remedial action goal
RESRAD = RESidual RADioactivity (dose model)

Attachment ES-1

Waste Site Reclassification Form

Date Submitted: 10/08/07 Originator: L. M. Dittmer Phone: 372-9227	**WASTE SITE RECLASSIFICATION FORM** Operable Unit(s): 100-FR-2 Waste Site Code: 118-F-1 Type of Reclassification Action: Closed Out ☐ Interim Closed Out ☒ No Action ☐ RCRA Postclosure ☐ Rejected ☐ Consolidated ☐	Control Number: 2007-019

This form documents agreement among parties listed authorizing classification of the subject unit as Closed Out, Interim Closed Out, No Action, RCRA Postclosure, Rejected, or Consolidated. This form also authorizes backfill of the waste management unit, if appropriate, for Closed Out and Interim Closed Out units. Final removal from the NPL of No Action and Closed Out waste management units will occur at a future date.

Description of current waste site condition:

Remedial action at this site has been performed in accordance with remedial action objectives and goals established by the U.S. Environmental Protection Agency and the Washington State Department of Ecology, in concurrence with the U.S. Department of Energy, Richland Operations Office. The selected remedial action involves (1) excavating the site to the extent required to meet specified soil cleanup levels, (2) disposing of contaminated excavation materials at the Environmental Restoration Disposal Facility at the 200 Area of the Hanford Site, and (3) backfilling the site with clean soil to adjacent grade elevations. The excavation and disposal activities have been completed.

Basis for reclassification:

In accordance with this evaluation, the verification sampling results support a reclassification of this site to Interim Closed Out. The current site conditions achieve the remedial action objectives and the corresponding remedial action goals established in the *Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, Hanford Site (100 Area Burial Grounds), Benton County, Washington,* U. S. Environmental Protection Agency, Region 10, Seattle, Washington. The results of verification sampling show that residual contaminant concentrations do not preclude any future uses (as bounded by the rural-residential scenario) and allow for unrestricted use of shallow zone soils (i.e., surface to 4.6 m [15 ft] deep). The results also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River. The 118-F-1 excavation area has a maximum depth of approximately 5.5 m (18 ft), which includes a shallow zone and a deep zone. However, the entire excavation area is considered one decision unit, and is closed out using the more restrictive shallow zone cleanup criteria; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required. The basis for reclassification is described in detail in the *Cleanup Verification Package for the 118-F-1 Burial Ground* (CVP 2007-00001), Washington Closure Hanford, Richland, Washington.

Waste Site Controls:
Engineered Controls: Yes ☐ No ☒ Institutional Controls: Yes ☐ No ☒ O&M requirements: Yes ☐ No ☒
If any of the Waste Site Controls are checked Yes specify control requirements including reference to the Record of Decision, TSD Closure Letter, or other relevant documents.

S. L. Charboneau DOE Federal Project Director (printed)	Hary Charboneau Signature	11/28/07 Date
N/A Ecology Project Manager (printed)	Signature	Date
R. A. Lobos EPA Project Manager (printed)	Signature	12/20/07 Date

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ACRONYMS AND ABBREVIATIONS

BCL	below cleanup level
COC	contaminant of concern
COPC	contaminant of potential concern
CVP	Cleanup Verification Package
DOE-RL	U.S. Department of Energy, Richland Operations Office
DQA	data quality assessment
ENRE	ENvironmental REstoration database
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
GPERS	Global Positioning Environmental Radiological Surveyor
HEIS	Hanford Environmental Information System
PAH	polycyclic aromatic hydrocarbon
RAG	remedial action goal
RDR/RAWP	remedial design report/remedial action work plan
RESRAD	RESidual RADioactivity dose assessment model
ROD	record of decision
SAP	sampling and analysis plan
SSNF	suspect spent nuclear fuel
TPH	total petroleum hydrocarbons
UCL	upper confidence limit
VOA	volatile organic analysis
WAC	*Washington Administrative Code*

1.0 STATEMENT OF PROTECTIVENESS

This report demonstrates that the 118-F-1 waste site meets the objectives for interim closure as established in the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP) (DOE-RL 2005) and the *Record of Decision for the 100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-FR-2, 100-HR-2, and 100-KR-2 Operable Units, Hanford Site (100 Area Burial Grounds), Benton County, Washington* (ROD) (EPA 2000). The results of verification sampling show that residual contaminant concentrations do not preclude any future uses (as bounded by the rural-residential scenario) and allow for unrestricted use of shallow zone soils (i.e., surface to 4.6 m [15 ft] deep). The results also demonstrate that residual contaminant concentrations are protective of groundwater and the Columbia River.

2.0 BACKGROUND AND GENERAL SITE INFORMATION

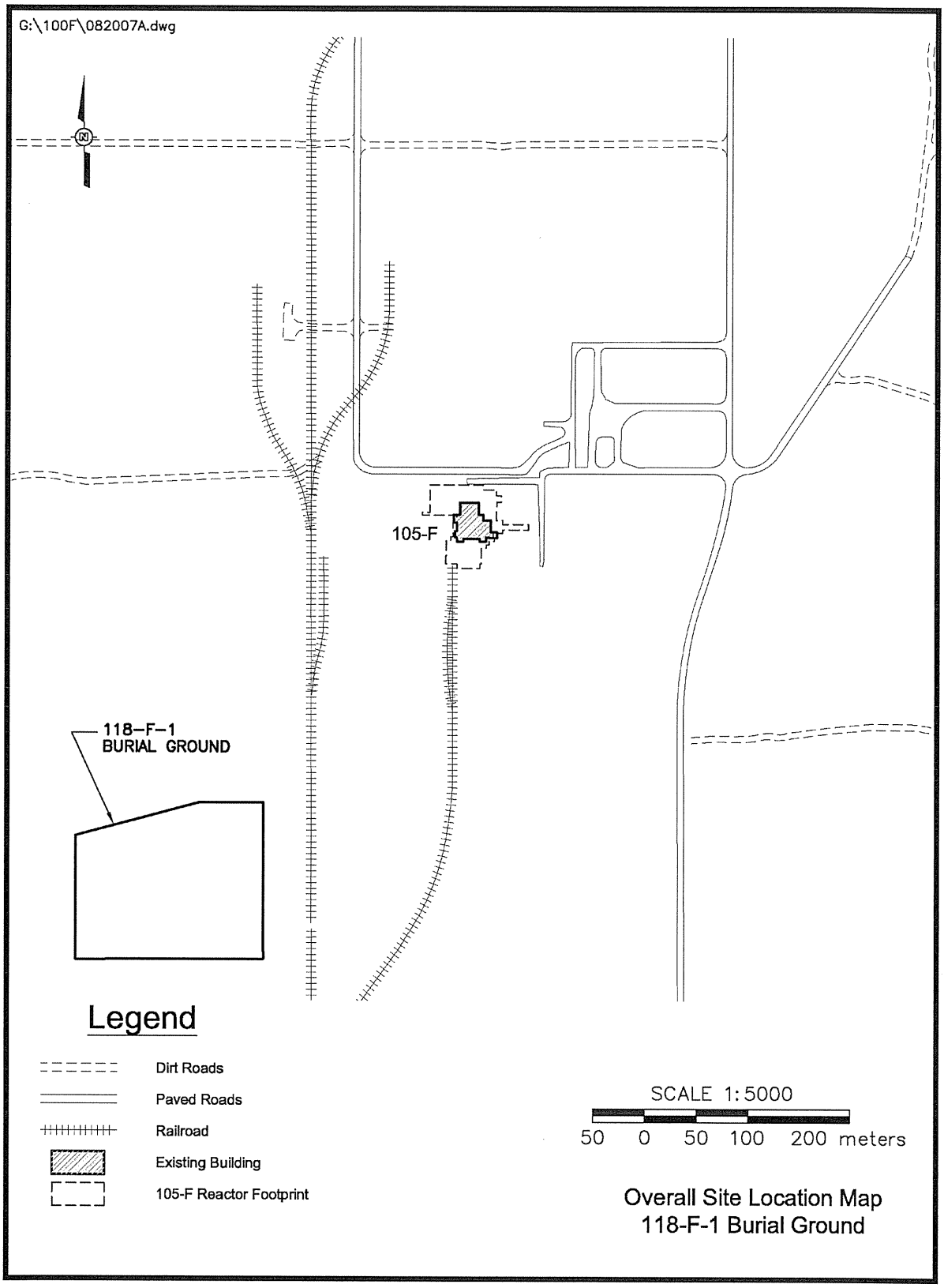
The purpose of this cleanup verification package is to document that the 118-F-1 Solid Waste Burial Ground site was remediated in accordance with the ROD (EPA 2000). Remedial action objectives and goals for the 118-F-1 site were established by the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Energy, Richland Operations Office (DOE-RL), in concurrence with the Washington State Department of Ecology. These goals and objectives are documented in the ROD (EPA 2000) and the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP) (DOE-RL 2005). The ROD (EPA 2000) provides the U.S. Department of Energy, Richland Operations Office, the authority, guidance, and objectives to conduct this remedial action.

The preferred remedy specified in the ROD (EPA 2000) and conducted for the 118-F-1 site included (1) excavating the site to the extent required to meet specified soil cleanup levels, (2) disposing of contaminated excavation materials at the Environmental Restoration Disposal Facility (ERDF) at the 200 Area of the Hanford Site, and (3) backfilling the site with overburden and clean soil to the average adjacent grade elevation. Excavation was driven by remedial action objectives for direct exposure, protection of groundwater, and protection of the Columbia River.

2.1 GENERAL SITE INFORMATION

The 118-F-1 site is located in the 100-FR-2 Operable Unit of the 100-F Area approximately 300 m (1000 ft) southwest of the 105-F Reactor Building (Figure 1). The 118-F-1 Burial Ground is a combination of two locations formerly called Minor Construction Burial Ground No. 2 and Solid Waste Burial Ground No. 2. This waste site received radioactive equipment and other miscellaneous waste from 105-F Reactor operations. According to the Waste Information Database System (WIDS), the burial ground was used between 1954 and 1965 and contained three unlined burial trenches

Figure 1. Hanford Site Map and 118-F-1 Site Plan.



and a burial pit. A geophysical investigation was conducted at the 118-F-1 Burial Ground in 2002, with results indicating that the footprint of buried debris was less than what was indicated in WIDS (BHI 2002a). Test pitting was conducted to augment the geophysical data and provide a more conclusive data set regarding the boundaries of the buried debris. The test pitting activities were conducted in representative areas where the geophysical investigation did not detect buried debris or potential trench boundaries. The excavations confirmed these areas do not contain debris (BHI 2002b).

Wastes buried at this site included: dummy elements and irradiated process tubing; gun barrel tips, steel sleeves, and metal chips removed from the reactor; filter boxes containing reactor graphite chips; and miscellaneous construction solid waste.

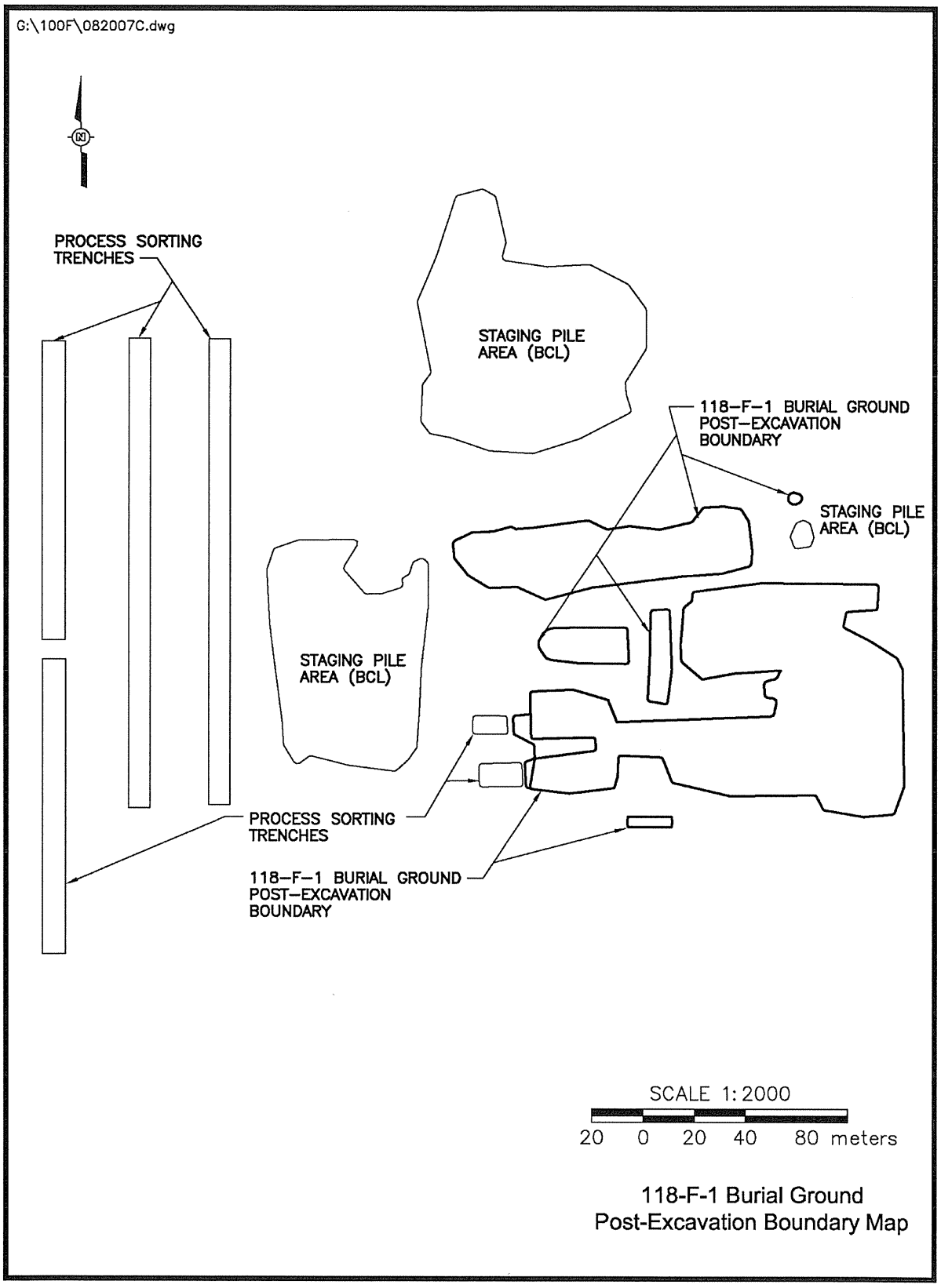
3.0 REMEDIAL ACTION SUMMARY

3.1 EXCAVATION AND DISPOSAL

Remedial action at the 118-F-1 site began on December 27, 2005. Removal of the uncontaminated overburden was completed on January 6, 2006. On August 7, 2006, excavation and sorting of contaminated material from the areas within the three trenches and burial pit indicated within the footprint of buried debris, per the geophysical investigation (BHI 2002a), was initiated. Contaminated material was placed in trenches west of the burial ground excavation areas for waste sorting. All contaminated materials were disposed at ERDF. Suspect Spent Nuclear Fuel (SSNF) was discovered during the waste debris sorting operation, and eight pieces of SSNF are to be dispositioned. All remedial activities (excavation, sorting, and load-out) were completed on June 22, 2007. Approximately 88,800 metric tons (97,900 U.S. tons) of waste and contaminated soil from the 118-F-1 Burial Ground was disposed of at ERDF and approximately 13,400 bank cubic meters (BCMs) of soil (overburden/below contaminant level [BCL] stockpile material) was segregated for use as clean backfill material. The post-remediation boundary map is shown in Figure 2. At the conclusion of excavation activities, the elevation at the deepest part of the remedial excavation was 117 m (384 ft) above sea level. The remediation excavation was approximately 11,600 m^2 (125,000 ft^2) in area with a maximum depth of approximately 5.5 m (18 ft).

Wastes encountered in the 118-F-1 Burial Ground included reactor related waste including aluminum fuel spacers, splines, reactor hardware, equipment, piping, graphite dust, sheet metal, concrete, cardboard, wood timbers, other miscellaneous debris, and SSNF. Photographs of waste excavated from the 118-F-1 Burial Ground are provided in Appendix A.

Figure 2. 118-F-1 Burial Ground Post-Excavation Boundary Map.



4.0 SAMPLING ACTIVITIES

4.1 CONTAMINANTS OF CONCERN FOR VERIFICATION SAMPLING

The *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan* (SAP) (DOE-RL 2001) identified contaminants of concern (COCs) (Table A-1, page A-21) for the 118-F-1 Burial Ground include tritium (H-3), carbon-14, cobalt-60, nickel-63, strontium-90, silver-108m, cesium-137, europium-152, europium-154, cadmium, lead, and mercury. In addition, because SSNF was encountered in the 118-F-1 Burial Ground, americium-241, plutonium-238, plutonium-239, plutonium-240, and uranium-238 were added to the list of COCs for the site.

During excavation, in-process samples were collected as necessary and analyzed for the identified COCs and for a wide range of metals, semi-volatile organic compounds, polychlorinated biphenyls, pesticides, gamma energy emitting isotopes, gross alpha radiation, and gross beta radiation. Based on the results of this sampling, no additional COCs beyond those listed above have been identified for the burial ground. The COCs/contaminants of potential concern (COPCs) detected at the 118-F-1 Burial Ground and their respective points of compliance, and the remedial action goals (RAGs), are summarized in Tables 3 through 5 (Section 5.0) of this Cleanup Verification Package.

4.2 VERIFICATION SAMPLING DESIGN

This section describes the basis for selection of an appropriate sample design and the determination of the number of verification samples to collect at the 118-F-1 Burial Ground.

4.2.1 Decision Unit Sampling

The sample strategy for the 118-F-1 Burial Ground is identified in the Burial Ground SAP (DOE-RL 2001) and specifies the site to be divided into decision units (e.g., shallow zone and deep zone) based on the size of the site. The SAP also specifies the number of verification samples to collect in each decision unit. The division of the site into decision units is also a function of the applicable RAGs. The direct exposure, groundwater protection, and river protection RAGs are applicable to soils within 4.6 m (15 ft) of the ground surface. This soil zone is referred to as the shallow zone. The groundwater protection and river protection RAGs are applicable to soils greater than 4.6 m (15 ft) below the ground surface. This soil zone is referred to as the deep zone. The 118-F-1 excavation area has a maximum depth of approximately 5.5 m (18 ft), which includes a shallow zone and a deep zone. However, the entire excavation area is considered one decision unit, and will be closed out using the more restrictive shallow zone cleanup criteria.

The 118-F-1 Burial Ground contains three decision units as follows: (1) shallow zone excavation decision unit, which includes the nine trench excavations and area between them, (2) overburden/BCL stockpile, which combines three overburden stockpile areas

into one decision unit, and (3) staging pile (labeled process or waste sorting trenches in remediation and sampling documentation) that includes the area where the waste was staged prior to removal for disposal. The calculation of the number of verification samples to collect in each of the decision units is four composite samples. This calculation, and the sample locations, is located in the sample design calculation in Appendix B. All of these decision units will be closed out using the more restrictive shallow zone cleanup criteria.

Table 1. Number of Verification Samples for the 118-F-1 Burial Ground.

Decision Unit	Waste Site Footprint (ft^2)	Size Classification (ft^2)	Decision Subunits	Verification Samples
Excavation Shallow Zone	125,000	Medium (>100,000 to 400,000)	4	17 composite
Overburden/BCL pile	117,500	Medium (>100,000 to 400,000)	4	16 composite
Waste Sorting Trenches	58,500	Small (<100,000)	1	5 composite

BCL = below cleanup level

4.3 FIELD SCREENING

4.3.1 Radiological Surveys

Radiological field screening was conducted during the site remedial actions as specified in the SAP (DOE-RL 2001). The field screening campaign was used to guide the excavation to quickly assess the presence and level of radiological contamination. Field screening at the site included radiological mapping over more than 50% of the site excavation and waste sorting trench surface area using a Global Positioning Environmental Radiological Surveyor (GPERS) with instrumentation specific to the detection of radiation associated with gamma emitting radionuclides. Any radiological "hot spots" identified as requiring additional remediation were targeted and soil (containing scattered metal debris) was removed until the radiation was no longer detected at the location. These areas were resurveyed to confirm that waste site excavation was complete. The GPERS surveys are provided in Figures C1-C26 of Appendix C. The overburden/BCL material was surveyed for radioactivity using GPERS throughout the remedial process, as shown in Figures C27-C29 of Appendix C. No contamination was identified for the overburden/BCL material.

4.4 FOCUSED SAMPLING

Focused samples are collected to verify the absence of contamination in residual soil beneath locations exhibiting visual stains, locations of buried liquid wastes or equipment, mercury-containing piping, or large inventories of dangerous/hazardous

wastes (e.g., lead bricks). Additionally, focused samples may be collected from locations where process knowledge indicates the potential for elevated concentrations of alpha or beta contamination, or where waste characterization sampling results indicate elevated concentrations of chemical contaminants above the RAGs.

Three areas of the 118-F-1 Burial Ground excavation were identified with anomalous or distinctive type waste forms. These include a steel canister of radiologically contaminated graphite chips or dust that appeared to be from reactor core boring operations. A photograph of the canister is provided in Appendix A. The canister was approximately 4 ft in diameter and approximately 6 ft long and was likely a vacuum canister used to remove waste graphite during reactor core boring operations. The canister was open at one end. The other two areas noted were excavated asbestos concrete siding or roofing (transite) materials. Transite volumes in each area were relatively low. Approximately one ERDF container of asbestos transite material was removed from each location.

Three focused samples associated with the graphite chips/dust area were analyzed for carbon-14 and tritium (H-3). Analyte selection was based on in-process characterization data of the graphite waste. The six focused samples associated with the asbestos material were analyzed for asbestos. Focused sample locations are shown on Figure 3.

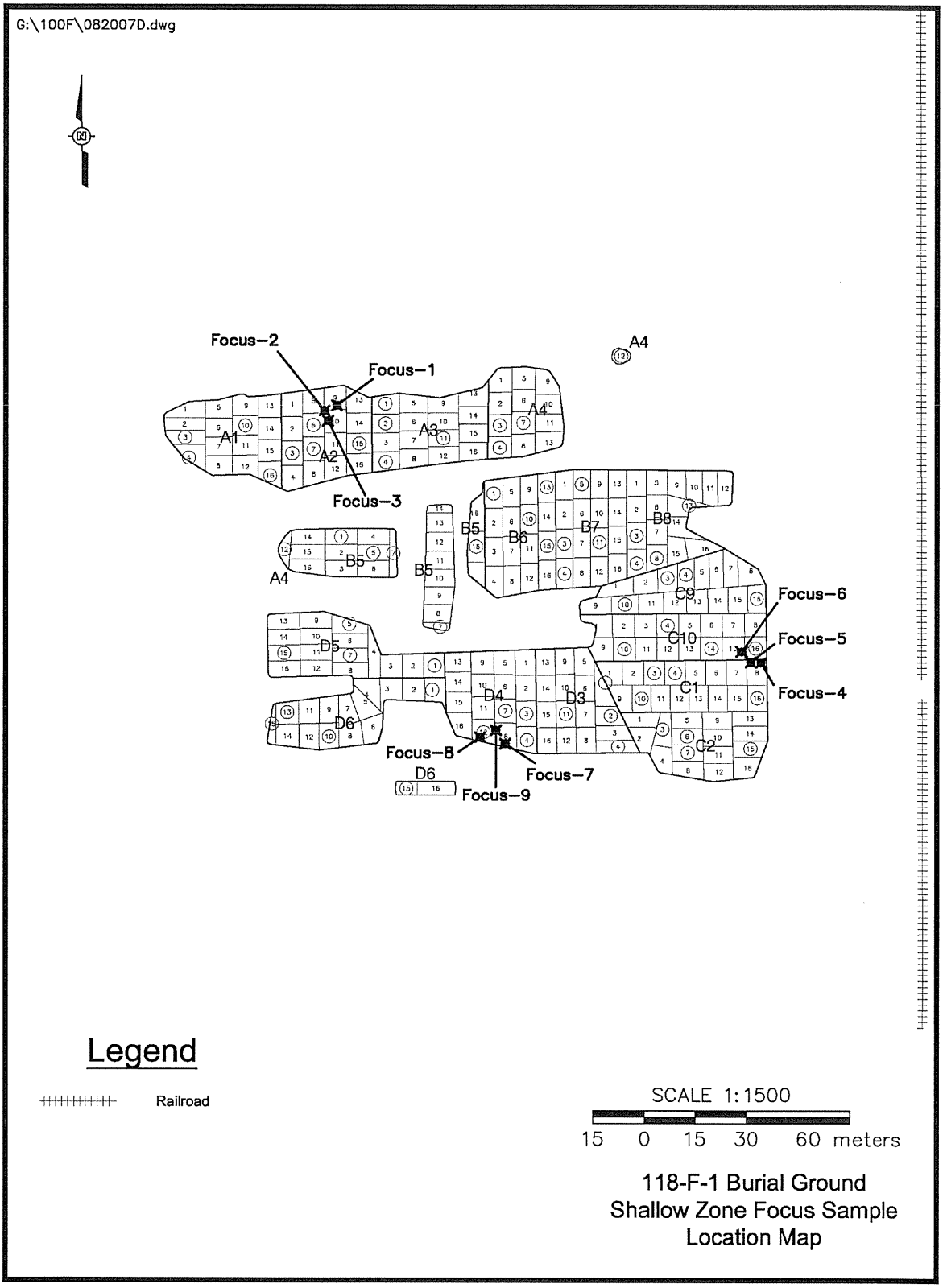
Table 2. 118-F-1 Focused Samples.

Focused Sample	Location	Associated Anomaly	COCs
FS-1	Area A2	Asbestos concrete siding or roofing (transite)	Asbestos
FS-2	Area A2	Asbestos concrete siding or roofing (transite)	Asbestos
FS-3	Area A2	Asbestos concrete siding or roofing (transite)	Asbestos
FS-4	Area C10	Open canister with graphite chips or dust	Carbon-14, tritium
FS-5	Area C10	Open canister with graphite chips or dust	Carbon-14, tritium
FS-6	Area C10	Open canister with graphite chips or dust	Carbon-14, tritium
FS-7	Area D4	Asbestos concrete siding or roofing (transite)	Asbestos
FS-8	Area D4	Asbestos concrete siding or roofing (transite)	Asbestos
FS-9	Area D4	Asbestos concrete siding or roofing (transite)	Asbestos

4.5 VERIFICATION SAMPLING

Final cleanup verification samples were collected in May 2007 and June 2007 to confirm acceptability of residual contaminant concentrations in the soil at the 118-F-1 waste site. Each verification sample was a composite formed by combining soil collected at four randomly selected nodes within each of the sampling decision subunits. The verification samples were submitted to offsite laboratories for analysis using approved EPA

Figure 3. 118-F-1 Focused Sampling Locations for Remediation Footprint.



analytical methods, as required per the SAP (DOE-RL 2001). The sample design methodology and sample location figures are presented in the calculation brief for verification sample design in Appendix B. An aerial photograph of the 118-F-1 Burial Ground, post-excavation, is presented in Appendix A.

5.0 SAMPLING RESULTS

Verification samples were analyzed using U.S. EPA-approved analytical methods. The 95% upper confidence limit on the true population mean for residual concentrations of COCs and COPCs was calculated for the excavation area as specified by the RDR/RAWP (DOE-RL 2005), with calculations provided in Appendix B. When a nonradionuclide COC or COPC was detected in fewer than 50% of the verification samples collected, the maximum detected value was used for comparison against the RAGs. If no detections for a given COC/COPC were reported in the data set, then no statistical evaluation or calculations were performed for that COC/COPC.

Comparisons of the statistical and maximum results for COCs and COPCs with the site RAGs for the excavation area, waste sorting trenches, and overburden/BCL piles are summarized in Tables 3 through 5, respectively. Contaminants that were not detected by laboratory analysis are excluded from these tables. Calculated cleanup levels are not presented in the *Cleanup Levels and Risk Calculations Database* (Ecology 2005) under *Washington Administrative Code* (WAC) 173-340-740(3) for aluminum, calcium, iron, magnesium, potassium, silicon, and sodium; therefore, these constituents are not considered site COPCs. The laboratory-reported data results for all constituents are stored in the Environmental Restoration (ENRE) project-specific database prior to archival in Hanford Environmental Information System (HEIS) and are presented in Appendix B.

Table 3. Comparison of Statistical Contaminant Concentrations to Action Levels for the 118-F-1 Excavation Shallow Zone Verification Sampling. (2 Pages)

COC/COPC	Statistical Result (pCi/g)	Generic Site Lookup Values[a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Shallow Zone Lookup Value[b]	Groundwater Protection Lookup Value	River Protection Lookup Value		
Americium-241	0.063	31.1	--[c]	--[c]	No	Yes[e]
Carbon-14	0.83	5.16	--[c]	--[c]	No	
Cesium-137	0.21	6.2	1,465[d]	1,465[d]	No	
Cobalt-60	0.038	1.4	13,900[d]	13,900[d]	No	
Europium-152	0.054	3.3	--[c]	--[c]	No	
Europium-154	0.053	3.0	--[c]	--[c]	No	
Nickel-63	2.3	83[d]	83[d]	83[d]	No	

Table 3. Comparison of Statistical Contaminant Concentrations to Action Levels for the 118-F-1 Excavation Shallow Zone Verification Sampling. (2 Pages)

COC/COPC	Statistical Result (pCi/g)	Generic Site Lookup Values[a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Shallow Zone Lookup Value[b]	Groundwater Protection Lookup Value	River Protection Lookup Value		
Plutonium-238	0.028	37.4	--[c]	--[c]	No	
Plutonium-239/240	0.11	33.9	--[c]	--[c]	No	
Silver-108m	0.017	2.38	--[c]	--[c]	No	
Strontium-90	0.38	4.5	27.6[d]	27.6[d]	No	Yes[e]
Tritium	1.4	15.8	15.8	15.8	No	
Uranium-238	0.0 (<BG)	1.1[f]	1.1[f]	1.1[f]	No	
COC/COPC	**Statistical Result (mg/kg)**	**Remedial Action Goals[a] (mg/kg)**			**Does the Statistical Data Set Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Cadmium	0.10	13.9[g]	0.81[h]	0.81[h]	No	--
Lead	5.4	353[i]	10.2[h]	10.2[h]	No	--
Mercury	0.0076	24[j]	0.33[h]	0.33[h]	No	--

[a] Lookup values and remedial action goals (RAGs) obtained from the *100 Area Remedial Action Sampling and Analysis Plan* (RDR/RAWP) (DOE-RL 2005) or calculated per *Washington Administrative Code* (WAC) 173-340-720, 730, and 740, Method B, 1996, unless otherwise noted.

[b] Activity corresponding to a single-radionuclide 15 mrem/yr exposure as calculated using a generic RESidual RADioactivity (RESRAD) model (DOE-RL 2005).

[c] No value—RESRAD modeling predicts the contaminant will not reach groundwater within 1,000 years.

[d] Revised lookup value per *100 Area Radionuclide and Nonradionuclide Lookup Values for the 1995 Interim Remedial Action Record of Decision* (BHI 2004).

[e] *118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief* (Appendix B).

[f] The calculated lookup value is below the Hanford-specific statistical soil background activity. The value presented is the Hanford-specific statistical soil background activity (DOE-RL 1996).

[g] Carcinogenic cleanup level calculated based on the inhalation exposure pathway per WAC 173-340-750[3], 1996 (Method B for air quality) and an airborne particulate mass loading rate of 0.0001 g/m^3 (WDOH 1997).

[h] Where cleanup levels are less than background, cleanup levels default to background or required detection limits per Ecology 1996, WAC 173-340-700(4)(d) and WAC 173-340-707(2), respectively.

[i] Use EPA, 1994, *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children*, EPA/540/R-93/081, Publication No. 9285.7, U.S. Environmental Protection Agency, Washington, D.C.

[j] Remedial action goal established in the 100 Area Remedial Design Report/Remedial Action Work Plan.

-- = not applicable
BG = background (obtained from DOE-RL [1996] and DOE-RL [2001], unless otherwise noted)
COC = contaminant of concern
COPC = contaminant of potential concern
RAG = remedial action goal
RESRAD = RESidual RADioactivity (dose-assessment model)

Table 4. Comparison of Statistical Contaminant Concentrations to Action Levels for the 118-F-1 Waste Sorting Trench Shallow Zone Verification Sampling). (2 Pages)

COC/COPC	Statistical Result (pCi/g)	Generic Site Lookup Values[a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Shallow Zone Lookup Value[b]	Groundwater Protection Lookup Value	River Protection Lookup Value		
Americium-241	0.089	31.1	--[c]	--[c]	No	Yes[c]
Carbon-14	0.32	5.16	--[c]	--[c]	No	
Cesium-137	0.45	6.2	1,465[d]	1,465[d]	No	
Cobalt-60	0.074	1.4	13,900[d]	13,900[d]	No	
Europium-152	0.14	3.3	--[c]	--[c]	No	
Europium-154	0.063	3.0	--[c]	--[c]	No	
Nickel-63	4.4	83[d]	83[d]	83[d]	No	
Plutonium-238	0.10	37.4	--[c]	--[c]	No	
Plutonium-239/240	0.13	33.9	--[c]	--[c]	No	
Silver-108m	0.013	2.38	--[c]	--[c]	No	
Strontium-90	0.22	4.5	27.6[d]	27.6[d]	No	
Tritium	2.0	15.8	15.8	15.8	No	
Uranium-238	0.0 (<BG)	1.1[e]	1.1[e]	1.1[e]	No	
COC/COPC	**Statistical Result (mg/kg)**	**Remedial Action Goals[a] (mg/kg)**			**Does the Statistical Data Set Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Cadmium	0.10	13.9[f]	0.81[g]	0.81[g]	No	--
Lead	18	353[h]	10.2[g]	10.2[g]	Yes	Yes[k]
Mercury	0.020	24[i]	0.33[g]	0.33[g]	No	--

[a] Lookup values and remedial action goals (RAGs) obtained from the *100 Area Remedial Action Sampling and Analysis Plan* (RDR/RAWP) (DOE-RL 2005) or calculated per *Washington Administrative Code* (WAC) 173-340-720, 730, and 740, Method B, 1996, unless otherwise noted.

[b] Activity corresponding to a single-radionuclide 15 mrem/yr exposure as calculated using a generic RESidual RADioactivity (RESRAD) model (DOE-RL 2005).

[c] No value—RESRAD modeling predicts the contaminant will not reach groundwater within 1,000 years.

[d] Revised lookup value per *100 Area Radionuclide and Nonradionuclide Lookup Values for the 1995 Interim Remedial Action Record of Decision* (BHI 2004).

[e] *118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief* (Appendix B).

[f] The calculated lookup value is below the Hanford-specific statistical soil background activity. The value presented is the Hanford-specific statistical soil background activity (DOE-RL 1996).

[g] Carcinogenic cleanup level calculated based on the inhalation exposure pathway per WAC 173-340-750[3], 1996 (Method B for air quality) and an airborne particulate mass loading rate of 0.0001 g/m^3 (WDOH 1997).

[h] Where cleanup levels are less than background, cleanup levels default to background or required detection limits per Ecology 1996, WAC 173-340-700(4)(d) and WAC 173-340-707(2), respectively.

[i] Use EPA, 1994, *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children*, EPA/540/R-93/081, Publication No. 9285.7, U.S. Environmental Protection Agency, Washington, D.C.

[j] Remedial action goal established in the 100 Area Remedial Design Report/Remedial Action Work Plan.

[k] Based on the *100 Area Analogous Sites RESRAD Calculations* (BHI 2005), residual concentrations are not expected to migrate more than 2 m (6.6 ft) vertically in 1,000 years (based on the lowest soil-partitioning distribution coefficient [lead] of 30 mL/g). The vadose zone underlying the remediation footprint is approximately 7.8 m (25 ft) thick. Therefore, residual concentrations of all contaminants are predicted to be protective of groundwater and the Columbia River.

-- = not applicable

Table 4. Comparison of Statistical Contaminant Concentrations to Action Levels for the 118-F-1 Waste Sorting Trench Shallow Zone Verification Sampling). (2 Pages)

BG = background (obtained from DOE-RL [1996] and DOE-RL [2001], unless otherwise noted)
COC = contaminant of concern
COPC = contaminant of potential concern
RAG = remedial action goal
RESRAD = RESidual RADioactivity (dose assessment model

Table 5. Comparison of Statistical Contaminant Concentrations to Action Levels for the 118-F-1 Overburden-Below Cleanup Level Verification Sampling. (2 Pages)

COC/COPC	Statistical Result (pCi/g)	Generic Site Lookup Values[a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Shallow Zone Lookup Value[b]	Groundwater Protection Lookup Value	River Protection Lookup Value		
Americium-241	0.23	31.1	--[c]	--[c]	No	Yes[e]
Cesium-137	0.0 (<BG)	5.16	--[c]	--[c]	No	
Cobalt-60	0.0075	6.2	1,465[d]	1,465[d]	No	
Europium-152	0.041	1.4	13,900	13,900	No	
Europium-154	0.018	3.3	--[c]	--[c]	No	
Nickel-63	2.5	3.0	--[c]	--[c]	No	
Plutonium-238	0.16	83[d]	83[d]	83[d]	No	
Plutonium-239/240	0.13	37.4	--[c]	--[c]	No	
Silver-108m	0.011	33.9	--[c]	--[c]	No	
Strontium-90	0.0 (<BG)	4.5	27.6[d]	27.6[d]	No	
Tritium	2.5	15.8	15.8	15.8	No	
Uranium-238	0.0 (<BG)	15.8	15.8	15.8	No	
COC/COPC	**Statistical Result (mg/kg)**	**Remedial Action Goals[a] (mg/kg)**			**Does the Statistical Data Set Exceed RAGs?**	**Does the Statistical Result Pass RESRAD Modeling?**
		Direct Exposure	**Soil Cleanup Level for Groundwater Protection**	**Soil Cleanup Level for River Protection**		
Cadmium	0.0	13.9[f]	0.81[g]	0.81[g]	No	--
Lead	12	353[h]	10.2[g]	10.2[g]	Yes	Yes[j]
Mercury	0.0076	24[i]	0.33[g]	0.33[g]	No	--

[a] Lookup values and remedial action goals (RAGs) obtained from the *100 Area Remedial Action Sampling and Analysis Plan* (RDR/RAWP) (DOE-RL 2005) or calculated per *Washington Administrative Code* (WAC) 173-340-720, 173-340-730, and 173-340-740, Method B, 1996, unless otherwise noted.

[b] Activity corresponding to a single-radionuclide 15 mrem/yr exposure as calculated using a generic RESidual RADioactivity (RESRAD) model (DOE-RL 2005).

[c] No value—RESRAD modeling predicts the contaminant will not reach groundwater within 1,000 years.

[d] Revised lookup value per *100 Area Radionuclide and Nonradionuclide Lookup Values for the 1995 Interim Remedial Action Record of Decision* (BHI 2004).

[e] *118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief* (Appendix B).

[f] Carcinogenic cleanup level calculated based on the inhalation exposure pathway per WAC 173-340-750[3], 1996 (Method B for air quality) and an airborne particulate mass loading rate of 0.0001 g/m^3 (WDOH 1997).

[g] Where cleanup levels are less than background, cleanup levels default to background or required detection limits per Ecology 1996, WAC 173-340-700(4)(d) and WAC 173-340-707(2), respectively.

[h] Use EPA, 1994, *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children*, EPA/540/R-93/081, Publication No. 9285.7, U.S. Environmental Protection Agency, Washington, D.C.

Table 5. Comparison of Statistical Contaminant Concentrations to Action Levels for the 118-F-1 Overburden-Below Cleanup Level Verification Sampling. (2 Pages)

[i] Remedial action goal established in the 100 Area Remedial Design Report/Remedial Action Work Plan.
[j] Based on the *100 Area Analogous Sites RESRAD Calculations* (BHI 2005), residual concentrations are not expected to migrate more than 2 m (6.6 ft) vertically in 1,000 years (based on the lowest soil-partitioning distribution coefficient [lead] of 30 mL/g). The vadose zone underlying the remediation footprint is approximately 7.8 m (25 ft) thick. Therefore, residual concentrations of all contaminants are predicted to be protective of groundwater and the Columbia River.

-- = not applicable
BG = background (obtained from DOE-RL [1996] and DOE-RL [2001], unless otherwise noted)
COC = contaminant of concern
COPC = contaminant of potential concern
RAG = remedial action goal
RESRAD = RESidual RADioactivity (dose-assessment model)

5.1 FOCUSED SAMPLE RESULTS

Nine focused samples were collected from the 118-F-1 waste site. The sample locations are shown in Figure 3. Six of the focused samples were of suspect asbestos-containing material. The asbestos sample results were reported as either less than 1% or none detected.

The three remaining focused samples were collected of soil underlying anomalous media found within the trenches during the remedial excavations. Statistical analysis (e.g., calculation of a 95% UCL value) is inappropriate to use for evaluation of focused samples; therefore, the sample results for each focused sample are evaluated using the maximum detected activity for each COC/COPC and comparing the value directly to the cleanup level. Table 6 provides a comparison of the maximum result of the three focused samples against the cleanup criteria. Individual sample results are provided in Appendix B.

Table 6. Comparison of Maximum Contaminant Concentrations to Action Levels for the 118-F-1 Focused Verification Sampling Event. (2 Pages)

COC/COPC	Maximum Result (pCi/g)	Generic Site Lookup Values[a] (pCi/g)			Does the Statistical Result Exceed Lookup Values?	Does the Statistical Result Pass RESRAD Modeling?
		Shallow Zone Lookup Value[b]	Groundwater Protection Lookup Value	River Protection Lookup Value		
Carbon-14	1.67 (ND)	5.16	--[c]	--[c]	No	Yes[d]
Tritium	0.541 (ND)	15.8	15.8	15.8	No	

Table 6. Comparison of Maximum Contaminant Concentrations to Action Levels for the 118-F-1 Focused Verification Sampling Event. (2 Pages)

[a] Lookup values and remedial action goals (RAGs) obtained from the *100 Area Remedial Action Sampling and Analysis Plan* (RDR/RAWP) (DOE-RL 2005) or calculated per *Washington Administrative Code* (WAC) 173-340-720, 173-340-730, and 173-340-740, Method B, 1996, unless otherwise noted.
[b] Noncarcinogenic cleanup level calculated from WAC 173-340-740(3), 1996 (Method B for soils) (as presented in the RDR/RAWP [DOE-RL 2005]). Updated oral reference dose values (as provided in the Integrated Risk Information System [IRIS]) yield Method B direct exposure RAG values of 16,000 mg/kg and 120,000 mg/kg for barium and chromium, respectively.
[c] No value—RESRAD modeling predicts the contaminant will not reach groundwater within 1,000 years.
[d] *118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief* (Appendix B).

-- = not applicable
BG = background (obtained from DOE-RL [1996] and DOE-RL [2001], unless otherwise noted)
COC = contaminant of concern
COPC = contaminant of potential concern
ND = not detected
RESRAD = RESidual RADioactivity (dose-assessment model)

5.2 DATA QUALITY ASSESSMENT PROCESS

A data quality assessment (DQA) is performed to compare the verification sampling approach, the field logbooks (WCH 2007a, b), and resulting analytical data with the sampling and data quality requirements specified by the project objectives and performance specifications.

The DQA for the 118-F-1 site established that the data are of the right type, quality, and quantity to support site verification decisions within specified error tolerances. All analytical data were found to be acceptable for decision-making purposes. The evaluation verified that the sample design was sufficient for the purpose of clean site verification. The cleanup verification sample analytical data are stored in the ENRE project-specific database for data evaluation prior to its archival in the HEIS and are summarized in Appendix B. The detailed DQA is presented in Appendix D.

6.0 CLEANUP VERIFICATION DATA EVALUATION

This section demonstrates that remedial actions at the 118-F-1 site have achieved the applicable RAGs. Sections 5.4 and 5.5 address attainment of direct exposure RAGs and groundwater and Columbia River protection RAGs, respectively. Section 5.6 summarizes the results of the WAC 173-340 three-part test performed in the 95% UCL calculation brief (Appendix B). This test is required for nonradionuclide COCs only and is based on the most restrictive RAG (defined as the lowest of the direct exposure, groundwater protection, and river protection RAGs).

6.1 DIRECT EXPOSURE SOIL REMEDIAL ACTION GOALS ATTAINED

6.1.1 Radionuclides

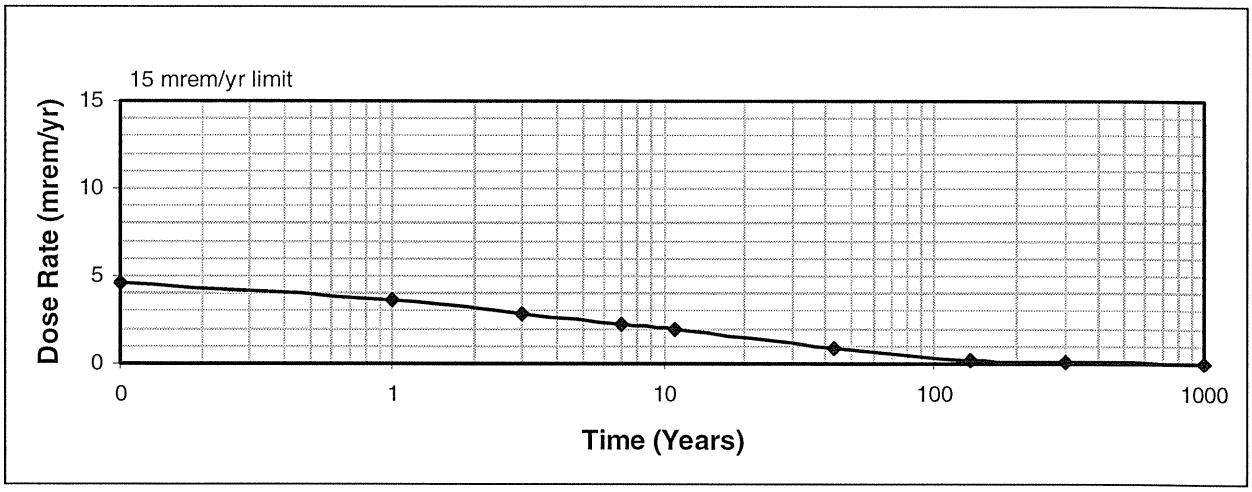
The individual radionuclide cleanup verification statistical values (Tables 3 through 5) were entered into the RESRAD computer code, Version 6.30 (ANL 2005), to estimate the dose rate and the impact on groundwater and the river from residual COC

concentrations. Separate RESRAD runs were performed for the excavation area, the overburden/BCL decision unit, and the waste sorting trenches.

The results of the 118-F-1 RESRAD dose rate estimates for the all-pathways scenarios for the excavation area, the overburden/BCL, and the waste sorting trenches are shown in Figures 4 through 6. These dose rates represent the dose contributions from soils at relevant time periods. The 2018 date corresponds to the 30-year site cleanup schedule of the *Hanford Federal Facility Agreement and Consent Order* (Ecology et al. 1989). All dose rate estimates are less than the 15 mrem/yr RAG. The RESRAD computations are shown in detail in the calculation briefs presented in Appendix B.

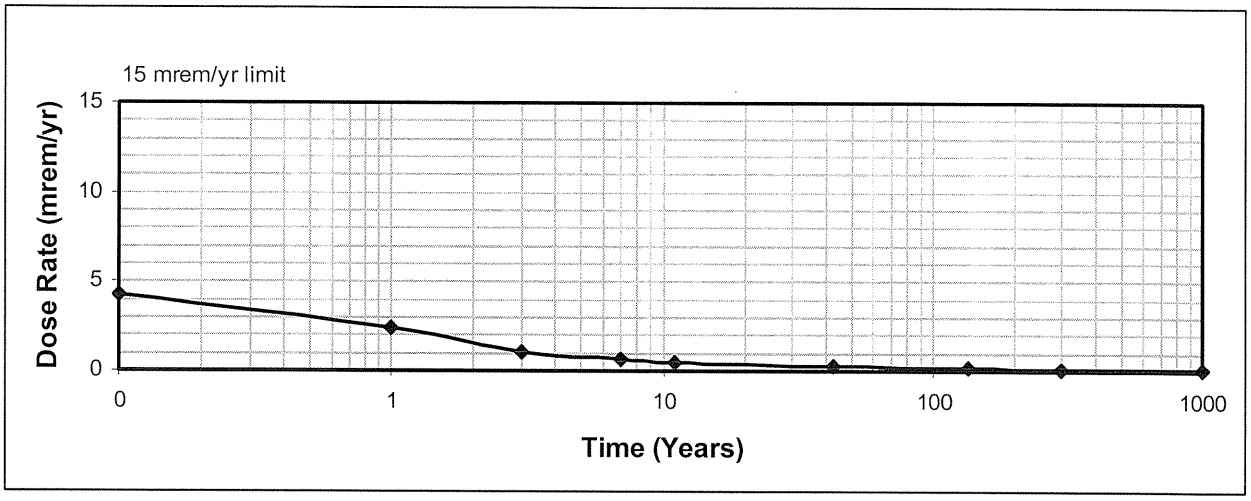
6.1.1.1 118-F-1 Remediation Footprint. The estimated maximum total all-pathways dose rate from the 118-F-1 Burial Ground remediation footprint is 4.59 mrem/yr at year zero (2007) and decreases to 4.73 x 10^{-2} mrem/yr in 1,000 years (Figure 4). The estimated dose rate in the year 2018 is 1.95 mrem/yr. The all-pathways dose rate estimate remains below the direct exposure RAG.

Figure 4. RESRAD Analysis for the Remediation Footprint– All Radionuclides, All-Pathways Dose Rate Estimate.



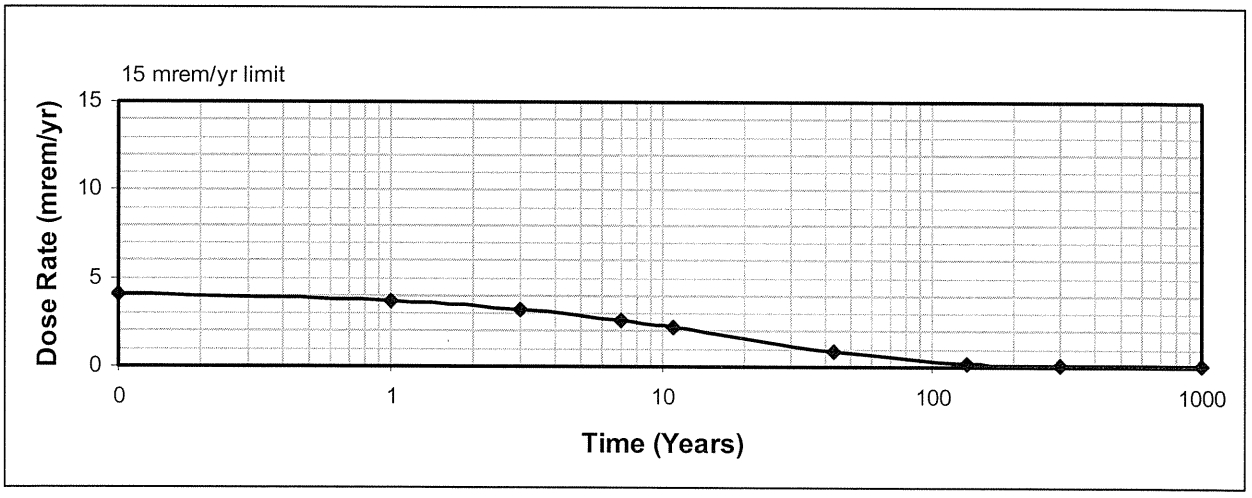
6.1.1.2 118-F-1 Overburden/BCL Soil. The estimated maximum total all-pathways dose rate from the 118-F-1 Burial Ground overburden/BCL soil is 4.23 mrem/yr at year zero (2007) and decreases to 7.36 x 10^{-2} mrem/yr in 1,000 years (Figure 5). The estimated dose rate in the year 2018 is 4.69 x 10^{-1} mrem/yr. The all-pathways dose rate estimate remains below the direct exposure RAG.

Figure 5. RESRAD Analysis for the Overburden/BCL soil– All Radionuclides, All-Pathways Dose Rate Estimate.



6.1.1.3 118-F-1 Waste Sorting Trenches. The estimated maximum total all-pathways dose rate from the 118-F-1 Burial Ground waste sorting trenches is 4.06 mrem/yr at year zero (2007) and decreases to 6.01 x 10^{-2} mrem/yr in 1,000 years (Figure 6). The estimated dose rate in the year 2018 is 2.21 mrem/yr. The all-pathways dose rate estimate remains below the direct exposure RAG.

Figure 6. RESRAD Analysis for the Waste Sorting Trenches– All Radionuclides, All-Pathways Dose Rate Estimate.



6.1.2 Nonradionuclides

6.1.2.1 Direct Comparison to RAGs. Tables 3 through 5 compare the cleanup verification statistical values to the direct exposure RAGs. All nonradionuclides are below the direct exposure cleanup criteria and, therefore, all applicable RAGs are met.

6.1.2.2 Noncarcinogenic Hazard Quotient RAG Attained. For noncarcinogenic COCs, WAC 173-340-740(3)(a)(iii)(A) and (B) specify the evaluation of the hazard quotient which is given as a daily intake divided by a reference dose. Both individual and cumulative hazard quotient values must be less than 1.0. Hazard quotient calculations were performed for the 118-F-1 Burial Ground using the highest statistical value from all sampling areas.

The details and results of the hazard quotient calculations are provided in the hazard quotient and carcinogenic risk calculation brief (Appendix B). Results of the hazard quotient calculations show that all individual hazard quotients are less than one and the cumulative hazard quotient for the 118-F-1 waste site is 1.1×10^{-1} (Appendix B). Therefore, the noncarcinogenic hazard quotient RAG has been attained for the 118-F-1 waste site.

6.1.2.3 Carcinogenic Risk RAG Attained. For individual nonradionuclide carcinogenic COCs, the WAC 173-340 Method B cleanup limits are based on an incremental cancer risk of 1×10^{-6}. For nonradionuclide carcinogenic COCs, the total excess cancer risk must be less than 1×10^{-5}. Carcinogenic risk calculations were performed for the 118-F-1 Burial Ground using the highest statistical value from all sampling areas for the nonradionuclide carcinogenic COCs. The details and results of the hazard quotient calculations are provided in the hazard quotient and carcinogenic risk calculation brief (Appendix B).

Results of the carcinogenic risk calculations show that all individual nonradionuclide carcinogenic COCs have an incremental cancer risk below 1×10^{-6} (Appendix B). The calculated total excess cancer risk for the 118-F-1 waste site is zero, which is below the Remedial Action Objective (RAO) of 1×10^{-5}. The nonradionuclide carcinogenic risk RAG has been attained for the 118-F-1 waste site.

6.2 GROUNDWATER AND COLUMBIA RIVER REMEDIAL ACTION GOALS ATTAINED

6.2.1 Radionuclides

The estimated groundwater concentrations for all of the radionuclide COCs contributed by the site soils are shown in the RESRAD calculation brief (Appendix B). Among the radionuclide contaminants of concern, only cesium-137, cobalt-60, nickel-63, strontium-90, and tritium are calculated to reach groundwater (and, therefore, the Columbia River) in 1,000 years at concentrations significantly below the RAGs. Table 7 gives the total peak concentrations predicted for each radionuclide COC along with the individual RAGs for comparison. The peak concentration for each COC is the maximum value, as predicted by RESRAD modeling, from the sampling areas (i.e., remediation footprint, overburden/BCL, and waste sorting pile area). No COC concentration is predicted to exceed the RAGs; therefore, the groundwater and Columbia River protection RAOs are attained.

Figure 7 shows the individual organ dose rate for beta- and gamma-emitting radionuclides predicted over 1,000 years as shown in the comparison to drinking water standards calculation brief (MCL calculation brief in Appendix B). The cumulative dose for each total body, bone, liver, and gastrointestinal tract for all beta- and gamma-emitting COCs is less than the 4 mrem/yr standard over 1,000 years. Results of the RESRAD calculations are shown in the MCL calculation brief (Appendix B).

Non-uranium, alpha-emitting radionuclide COCs/COPCs were not detected in the verification soil samples and no uranium isotopes were detected above background levels in the verification soil samples. Therefore, the drinking water concentration standard for non-uranium alpha emitters and the uranium standard of 30 µg/L have been met.

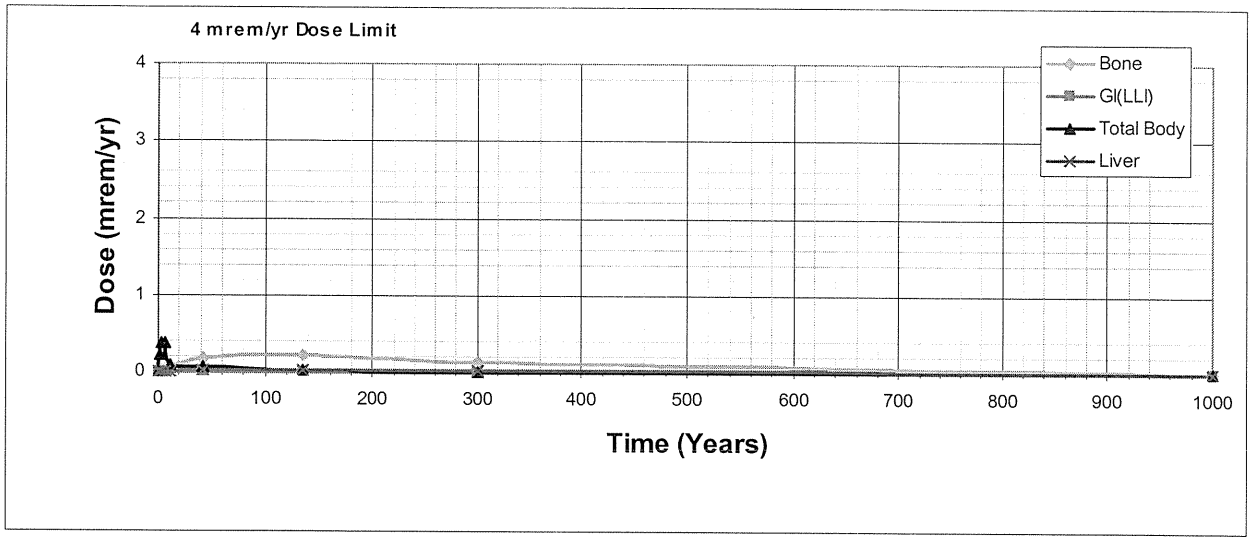
Table 7. Estimated Peak Radionuclide Groundwater Concentrations in the Soils for 118-F-1.

Radionuclide	Peak Concentration (pCi/L) [a]	RAG (pCi/L)	RAGs Attained? (Yes/No)
Cobalt-60	0.000531	100[b]	Yes
Cesium-137	0.0184	60[b]	Yes
Nickel-63	2.63	50[b]	Yes
Strontium-90	0.11	8[c]	Yes
Tritium	1,800	20,000[c]	Yes

[a] The peak concentration is the maximum predicted value from the three sampling areas (remediation footprint, overburden/BCL, and waste sorting pile area). All results are presented in the MCL calculation brief (Appendix B).
[b] Lookup value corresponding to a dose rate of 4 mrem/yr.
[c] EPA drinking water promulgated MCL (40 CFR 141.66).

CFR = *Code of Federal Regulations*
EPA = U.S. Environmental Protection Agency
MCL = maximum cleanup level
RAG = remedial action goal

Figure 7. Dose Rate to Organs from Groundwater.



6.2.2 Nonradionuclides

Tables 3 through 5 compare the statistical verification results to the groundwater protection RAGs for all sampling areas. The tables show that the statistical results for lead exceed the soil RAGs for the protection of groundwater. The residual concentrations of lead, however, are not predicted to reach groundwater (and, therefore, the Columbia River) in 1,000 years based on the *100 Area Analogous Sites RESRAD Calculations* (BHI 2005) and their contaminant-specific soil partitioning coefficient (K_d) values. Given the soil-partitioning coefficients of lead (30 mL/g) the results of RESRAD modeling (BHI 2005) indicate that these constituents will not migrate vertically more than 3 m (10 ft) in 1,000 years. The vadose zone underlying the 118-F-1 site is greater than 3 m (10 ft) thick and, as such, these contaminants will not reach groundwater (and, therefore, the Columbia River) in 1,000 years.

6.3 WAC 173-340 THREE-PART TEST FOR NONRADIONUCLIDES

Sections 5.4 and 5.5 looked separately at compliance with direct exposure RAGs and groundwater and Columbia River protection soil RAGs, respectively. When using a statistical sampling approach, a RAG requirement for nonradionuclides is the WAC 173-340-740(7)(e) three-part test. The WAC 173-340 three-part test consists of the following criteria: (1) the cleanup verification statistical value must be less than the cleanup level, (2) no single detection can exceed two times the cleanup criteria, and (3) the percentage of samples exceeding the cleanup criteria must be less than 10%.

The application of the three-part test for the 118-F-1 waste site is included in the 95% UCL calculation brief (Appendix B). Only the COCs/COPCs that failed one or more parts of the WAC 173-340 three-part test are provided in Table 8. The table lists the most restrictive RAG, the maximum detected value, the total number of samples

collected, and the percentage of samples exceeding the RAG. The final column of the table describes the result of applying the three WAC 173-340-740(7)(e) criteria using the values listed in the preceding columns.

Residual concentrations of lead fail the three-part test in comparison against the soil RAGs for the protection of groundwater and/or the Columbia River. Based on RESRAD modeling (BHI 2005) and contaminant-specific soil-partitioning coefficient values, these constituents will not vertically migrate more than 3 m (10 ft) in 1,000 years. Given a vadose zone thickness greater than 3 m (10 ft) thick underlying the 118-F-1 waste site, residual concentrations are not predicted to reach groundwater (and, therefore, the Columbia River) within 1,000 years. As such, all non-radionuclide statistical verification data sets pass the WAC 173-340 three-part test.

Table 8. Summary of the WAC 173-340 Three-Part Test for the 118-F-1 Burial Ground[a].

COC/COPC	Most Restrictive Applicable RAG	Statistical Cleanup Verification Value (mg/kg)[b]	Maximum Detected Cleanup Verification Value (mg/kg)[c]	Total Number of Samples[d]	Percentage of Cleanup Verification Data Set Exceeding RAG[e]	Cleanup Criteria Attained?
Waste Sorting Trenches						
Lead	10.2[g]	18	32	5	20%	Yes[f]
Overburden/BCL Piles						
Lead	10.2[g]	12	22.8	16	37.5%	Yes[f]

[a] Only the COCs/COPCs that failed the WAC 173-340 Three-Part Test are presented.
[b] Criterion is statistical value cannot exceed most restrictive applicable RAG.
[c] Criterion is no single detection can exceed two times the most restrictive applicable RAG.
[d] Total number of samples in the decision unit may include field duplicate samples, which are included in the evaluation as separate samples.
[e] Criterion is percentage of data set exceeding the most restrictive applicable RAG cannot exceed 10%.
[f] Based on the *100 Area Analogous Sites RESRAD Calculations* (BHI 2005) and contaminant-specific soil-portioning coefficient (K_d) value, contaminant will not migrate vertically more than 3 m (10 ft) in 1,000 years. As the vadose zone underlying the site is greater than 3 m (10 ft) thick, the contaminant will not reach groundwater (and thus the Columbia River) in 1,000 years.
[g] Where cleanup levels are less than background, cleanup levels default to background (WAC 173-340-700[4][d]) (1996).

COC = contaminant of concern
COPC = contaminant of potential concern
RAG = remedial action goal
RESRAD = RESidual Radioactivity (dose model)
WAC = *Washington Administrative Code*

6.4 COMPARISON OF SAMPLE DATA TO ECO-SCREENING LEVELS

Soil cleanup levels were established in the ROD (EPA 2000) based on a limited ecological risk assessment. Although not required by the ROD (EPA 2000), a comparison against ecological risk screening levels has been made for the site COCs/COPCs. Screening levels were not exceeded for the site constituents, with the exception of antimony, arsenic, boron, lead, selenium, silver, and vanadium. Exceedance of screening values does not necessarily indicate the existence of risk to

ecological receptors. It is believed that the presence of these constituents does not pose a risk to ecological receptors as concentrations of antimony, arsenic, selenium, silver, and vanadium are within the range of Hanford Site background levels and boron concentrations are consistent with those seen elsewhere at the Hanford Site (no established background value is available for boron). The presence of lead is believed to be due to historic application of lead-arsenate pesticides. The exceedance of soil screening values by lead at the site will be evaluated in the context of additional lines of evidence for ecological effects. A baseline risk assessment for the river corridor portion of the Hanford Site began in 2004, which includes a more complete quantitative ecological risk assessment. That baseline risk assessment will be used as part of the final closeout decision for this site.

7.0 RADIONUCLIDE RISK INFORMATION

The radionuclide RAG for direct exposure is derived from the ROD (EPA 2000) and is expressed in terms of an allowable radiation dose rate above background (i.e., 15 mrem/yr). The RAG evaluation (Section 5.0) involved using the RESRAD model to estimate total annual radiation dose rates for 1,000 years for comparison to the RAG. Radiation presents a carcinogenic risk, and the RESRAD model also calculates the excess lifetime cancer risk (ELCR) associated with the estimated radiation dose rates using the EPA's Health Effects Assessment Summary Tables (update dated April 16, 2001, "Update of Radionuclide Carcinogenicity Slope Factors," available on the Internet at www.epa.gov/radiation/heast). The "National Oil and Hazardous Substances Pollution Contingency Plan" (40 *Code of Federal Regulations* 300) presents a target range for residual risk of 10^{-4} to 10^{-6}.

Figures 8 through 10 illustrate ELCR for the remediation footprint, overburden/BCL, and waste sorting pile area as estimated using the RESRAD model. Because of radioactive decay, the risk decreases over time. The maximum predicted ELCR occurs at present (year 2007). The maximum ELCR is 9.95×10^{-5} for the remediation footprint, 5.42×10^{-5} for the overburden/BCL soil and 1.55×10^{-4} for the waste sorting pile area. The ELCR predicted for the year 2018 is 3.79×10^{-5} for the remediation footprint, 4.10×10^{-5} for the overburden/BCL soil and 9.57×10^{-5} for the waste sorting pile footprint. All three sampling areas meet the target risk range of 10^{-4} to 10^{-6}.

Figure 8. RESRAD Analysis – Radionuclide Risk, All Pathways – Remediation Footprint.

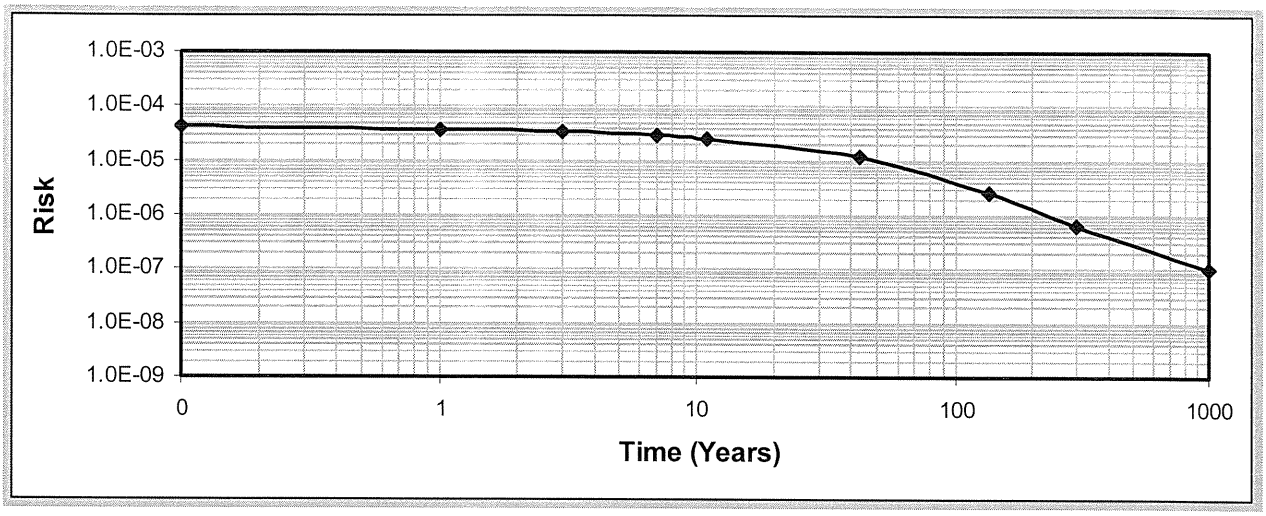


Figure 9. RESRAD Analysis – Radionuclide Risk, All Pathways – Waste Sorting Trenches.

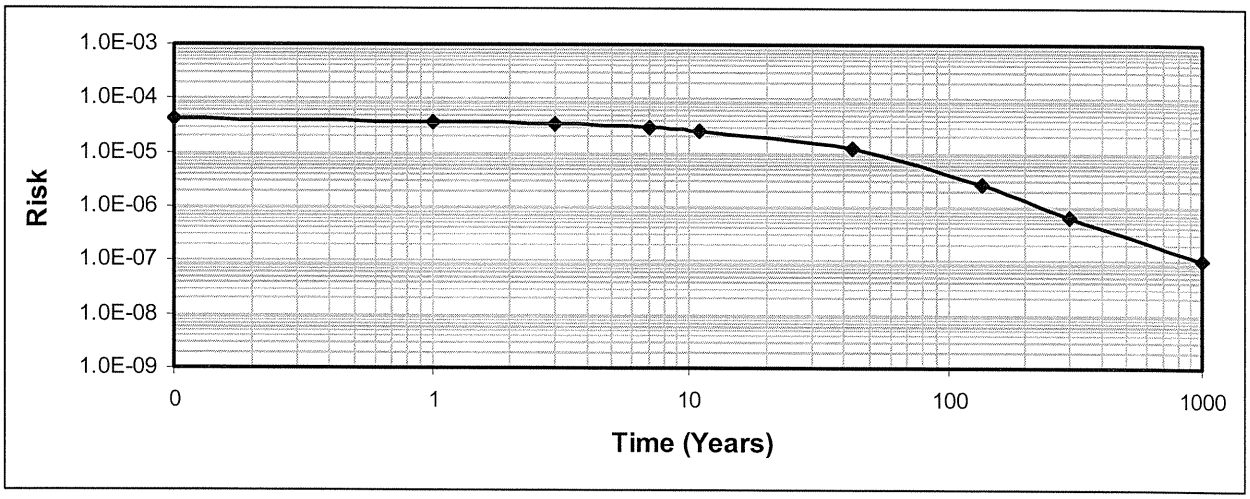
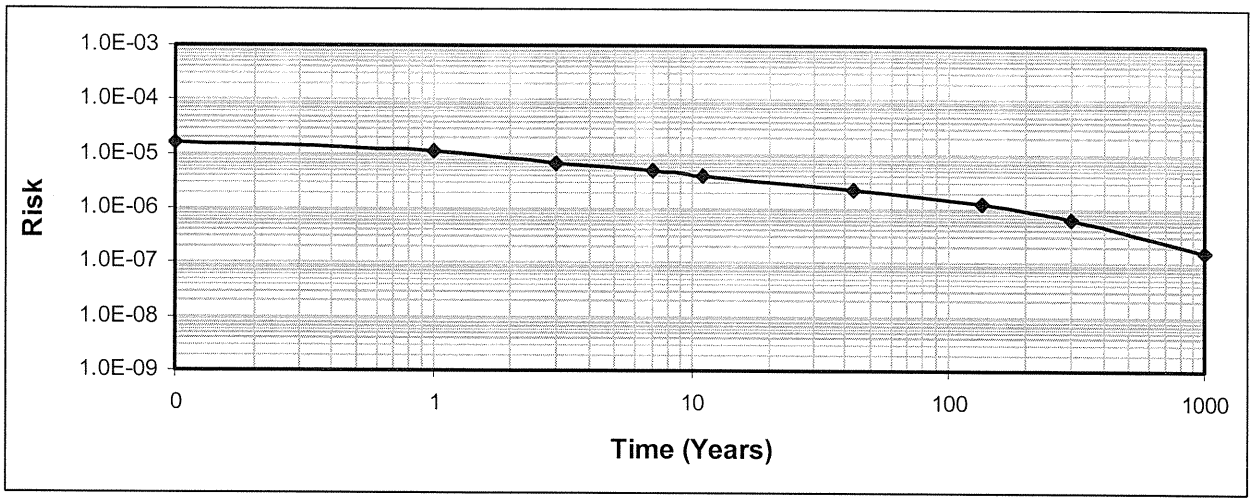


Figure 10. RESRAD Analysis – Radionuclide Risk, All Pathways – Overburden/BCL.



8.0 SUMMARY FOR WASTE SITE RECLASSIFICATION

This cleanup verification package demonstrates that remedial action at the 118-F-1 site has achieved the RAOs and corresponding RAGs established in the ROD (EPA 2000) and RDR/RAWP (DOE-RL 2005). The remaining soils at the 118-F-1 site have been sampled, analyzed, and modeled. The results of this effort indicate that the materials from the 118-F-1 site containing COCs at concentrations exceeding RAGs have been excavated and disposed of at ERDF. These results also indicate that residual concentrations will support future land uses that can be represented (or bounded) by a rural-residential scenario and that residual concentrations throughout the site pose no threat to groundwater or the Columbia River. The 118-F-1 excavation area has a maximum depth of approximately 5.5 m (18 ft), which includes a shallow zone and a deep zone. However, the entire excavation area is considered one decision unit, and will be closed out using the more restrictive shallow zone cleanup criteria; therefore, institutional controls to prevent uncontrolled drilling or excavation into the deep zone are not required. The 118-F-1 site is verified to be remediated in accordance with the ROD (EPA 2000) and may be backfilled.

9.0 REFERENCES

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40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan," *Code of Federal Regulations*, as amended.

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WCH, 2007e, *118-F-1 Burial Ground Hazard Quotient and Carcinogenic Risk Calculations*, 0100F-CA-V0283, Rev. 0, Washington Closure Hanford, Richland, Washington.

WCH, 2007f, *118-F-1 Burial Ground Comparison to Drinking Water Standards (MCL) Calculation,* 0100F-CA-V0281, Rev. 0, Washington Closure Hanford, Richland, Washington.

WCH, 2007g, *118-F-1 Burial Ground Shallow Zone, Process Trenches, and Overburden Sample Design*, 0100F-CA-V0282, Rev. 0, Washington Closure Hanford, Richland, Washington.

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APPENDIX A

118-F-1 WASTE SITE REMEDIATION PHOTOGRAPHS

Photograph A-1. Aerial View of the 118-F-1 Burial Ground and Surrounding Area (April 2007).



Photograph A-2. Steel Canister Containing Graphite.



Photograph A-3. Perforated Spacers and Timber.



Photograph A-4. 118-F-1 Metal and Concrete Debris.



APPENDIX B

RESRAD INPUT PARAMETERS AND CALCULATION BRIEF EXCERPTS

CALCULATION BRIEF EXCERPTS

DISCLAIMER FOR CALCULATIONS

The calculations that are provided in the following appendix have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

CALCULATION BRIEFS

The following calculation briefs have been prepared in accordance with ENG-1, *Engineering Services,* ENG-1-4.5, "Project Calculations," Washington Closure Hanford, Richland, Washington.

118-F-1 Burial Ground Shallow Zone, Process Trenches, and Overburden Sample Design, 0100F-CA-V0282, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

118-F-1 Burial Ground Hazard Quotient and Carcinogenic Risk Calculations, 0100F-CA-V0283, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations, 0100F-CA-V0279, Rev. 1, Washington Closure Hanford, Richland, Washington (2007).

118-F-1 Burial Ground Comparison to Drinking Water Standards (MCL) Calculation, 0100F-CA-V0281, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief, 0100F-CA-V0280, Rev. 0, Washington Closure Hanford, Richland, Washington (2007).

NOTE: The calculation briefs referenced in this appendix are kept in the active Washington Closure Hanford project files and are available upon request. When the project is completed, the files will be stored in a U.S. Department of Energy, Richland Operations Office repository. Only excerpts of the calculation briefs are included in this appendix.

Acrobat 8.0

CALCULATION COVER SHEET

Project Title: 118-F-1 Burial Ground Sample Design **Job No. 14655**

Area: 100-F

Discipline: Environmental Engineering *Calculation No: 0100F-CA-V0282

Subject: 118-F-1 Burial Ground Shallow Zone / Stockpile (BCL) Sampling Plan

Computer Program: Excel, Autodesk World, and Autodesk Land Map Program No: Excel 2003, World R2, and Land Map 2004

The attached calculations have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Total = 11 Shts	G. Cruz 7-10-07	B.A. Christensen 2007.7.11	N/A	S.W. Callison 7-11-07	7-11-07

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007)

*Obtain Calc. No. from Document Control and Form from Intranet

Washington Closure Hanford **CALCULATION SHEET**

Originator G. Cruz Date 7/10/2007 Calc. No. 0100F-CA-V0282 Rev. No. 0

Project 118-F-1 Burial Ground Sample Design Job No. 14655 Checked BAC Date 2007.7.11

Subject 118-F-1 Burial Ground Shallow Zone / Stockpile (BCL) Sampling Plan Sheet No. 1 of 3

1	**Problem:**	Calculate and display required sampling nodes in concurrence with 100 Area Burial Grounds Remedial Action Sampling			
2		and Analysis Plan, DOE/RL-2001-35 Rev. 0, for verification and closure.			
3					
4	**Given:**	-SAP (DOE/RL-2001-35 Rev. 0) requirements			
5		-Shallow Sampling Area (Surface area of each zone determined from Autodesk Land Map program,			
6		Attachment 3, Sht 1 of 5, CAD file 1F:062807A, 118-F-1 Burial Ground Phase 1 Shallow Zone Sampling Plan)			
7		Attachment 3, Sht 2 of 5, CAD file 1F:062807B, 118-F-1 Burial Ground Phase 2 Shallow Zone Sampling Plan)			
8		Attachment 3, Sht 3 of 5, CAD file 1F:062807C, 118-F-1 Burial Ground Process Trench Phase 1 Shallow Zone Sampling Plan)			
9		Attachment 3, Sht 4 of 5, CAD file 1F:062807D, 118-F-1 Burial Ground Process Trench Phase 2 Shallow Zone Sampling Plan)			
10					
11		-Stockpile Sampling Area (Surface area of each zone determined from Autodesk Land Map program,			
12		Attachment 3, Sht 5 of 5, CAD file 1F:062807E, 118-F-1 Burial Ground Stockpile (BCL) Sampling Plan)			
13					
14					
15	**Sample Design Approach:**				
16	Shallow Zone	-Develop a grid of 16 sample nodes			
17		-Use table III-4 and III-5 of the SAP to determine which four of the sixteen nodes will be sampled			
18		to collect clean up verification samples			
19					
20	Overburden:	-Develop a grid of 16 sample nodes			
21		-Use table III-4 and III-5 of the SAP to determine which four of the sixteen nodes will be sampled			
22		to collect clean up verification samples			
23					
24	Deep Zone:	-Develop a grid of 16 sample nodes			
25		-Use table III-4 and III-5 of the SAP to determine which four of the sixteen nodes will be sampled			
26		to collect clean up verification samples			
27					
28	**Determination of Phase 1 Shallow Zone Sampling Grid:**				
29					
30	Refer to tables III-4 and III-5 sampling frequency Attachment 2,				
31	Number of Decision Subunits Based on Area, DOE/RL-2001-35 Rev. 0				
32					
33	Total Area:		11374.44	m^2	
34	Area of Each Decision Subunits:		2843.61	m^2	
35					
36	Area of Each Sampling Area:		710.90	m^2	
37					
38	Area of Each Sample Node:		44.43	m^2	
39					
40	Nodes to be Sampled (as determined from Attachment 1, Table A-1, Sample Grid Point Lookup Table)				
41		Attachment 3, Sht 1 of 5, 118-F-1 Burial Ground Phase 1 Shallow Zone Sampling Plan,			
42		for Sample Location Table			
43					
44					
45					
46					

Washington Closure Hanford **CALCULATION SHEET**

Originator G. Cruz **Date** 7/10/2007 **Calc. No.** 0100F-CA-V0282 **Rev. No.** 0

Project 118-F-1 Burial Ground Sample Design **Job No.** 14655 **Checked** BAC **Date** 2007.7.11

Subject 118-F-1 Burial Ground Shallow Zone / Stockpile (BCL) Sampling Plan **Sheet No.** 2 of 3

1										
2										
3	**Determination of Phase 2 Shallow Zone Sampling Grid:**									
4										
5	Refer to tables III-4 and III-5 sampling frequency Attachment 2,									
6	Number of Decision Subunits Based on Area, DOE/RL-2001-35 Rev. 0									
7										
8	Total Area:						248.19	m^2		
9	Area of Each Decision Subunits:						248.19	m^2		
10										
11	Area of Each Sampling Area:						248.19	m^2		
12										
13	Area of Each Sample Node:						15.51	m^2		
14										
15	Nodes to be Sampled (as determined from Attachment 1, Table A-1, Sample Grid Point Lookup Table)									
16		Attachment 3, Sht 2 of 5, 118-F-1 Burial Ground Phase 2 Shallow Zone Sampling Plan,								
17		for Sample Location Table								
18										
19										
20										
21										
22	**Determination of Phase 1 Shallow Zone Sampling Grid:**									
23										
24	Refer to tables III-4 and III-5 sampling frequency Attachment 2,									
25	Number of Decision Subunits Based on Area, DOE/RL-2001-35 Rev. 0									
26										
27	Total Area:						5225.23	m^2		
28	Area of Each Decision Subunits:						5225.23	m^2		
29										
30	Area of Each Sampling Area:						1306.31	m^2		
31										
32	Area of Each Sample Node:						81.64	m^2		
33										
34	Nodes to be Sampled (as determined from Attachment 1, Table A-1, Sample Grid Point Lookup Table)									
35		Attachment 3, Sht 3 of 5, 118-F-1 Burial Ground Process Trench Phase 1 Shallow Zone Sampling Plan,								
36		for Sample Location Table								
37										
38										
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43										
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46										

Washington Closure Hanford **CALCULATION SHEET**

Originator G. Cruz Date 7/10/2007 Calc. No. 0100F-CA-V0282 Rev. No. 0

Project 118-F-1 Burial Ground Sample Design Job No. 14655 Checked KAC Date 2007-7-11

Subject 118-F-1 Burial Ground Shallow Zone / Stockpile (BCL) Sampling Plan Sheet No. 3 of 3

Determination of Phase 2 Shallow Zone Sampling Grid:			
Refer to tables III-4 and III-5 sampling frequency Attachment 2,			
Number of Decision Subunits Based on Area, DOE/RL-2001-35 Rev. 0			
Total Area:	252.47	m^2	
Area of Each Decision Subunits:	252.47	m^2	
Area of Each Sampling Area:	252.47	m^2	
Area of Each Sample Node:	15.77	m^2	
Nodes to be Sampled (as determined from Attachment 1, Table A-1, Sample Grid Point Lookup Table)			
Attachment 3, Sht 4 of 5, 118-F-1 Burial Ground Process Trench Phase 2 Shallow Zone Sampling Plan, for Sample Location Table			
Determination of Stockpile (BCL) Sampling Grid:			
Refer to tables III-4 and III-5 sampling frequency Attachment 2,			
Number of Decision Subunits Based on Area, DOE/RL-2001-35 Rev. 0			
Total Area:	10910.63	m^2	
Area of Each Decision Subunits:	2727.65	m^2	
Area of Each Sampling Area:	681.91	m^2	
Area of Each Sample Node:	42.61	m^2	
Nodes to be Sampled (as determined from Attachment 1, Table A-1, Sample Grid Point Lookup Table)			
Attachment 3, Sht 5 of 5, 118-F-1 Burial Ground Stockpile (BCL) Sampling Plan, for Sample Location Table			

Washington Closure Hanford

Originator	G. Cruz	**Date**	7/10/2007	**Calc. No.**	0100F-CA-V0282	**Rev. No.**	0
Project	118-F-1 Burial Ground Sample Design			**Job No.**	14655	**Checked**	KAC **Date** 2007-7-11
Subject	118-F-1 Burial Ground Shallow Zone / Stockpile (BCL) Sampling Plan					**Sheet No**	1 of 1

ATTACHMENT 1

Sample Grid Point Lookup Table.

Default Plan	Sampling Area 1	Sampling Area 2	Sampling Area 3	Sampling Area 4	Sampling Area 5	Sampling Area 6	Sampling Area 7	Sampling Area 8	Sampling Area 9	Sampling Area 10
Closeout	3	6	1	4	5	1	3	3	4	16
Closeout	4	7	11	3	15	15	5	13	10	10
Closeout	16	3	2	7	7	10	11	4	3	14
Closeout	10	15	4	12	1	13	4	8	16	4
Not Sampling	2	14	5	9	13	12	8	2	14	8
Not Sampling	13	10	9	13	2	16	1	12	5	3
Not Sampling	6	1	10	8	14	4	16	5	8	6
Not Sampling	1	9	13	1	10	5	12	1	1	15
Not Sampling	9	12	7	5	6	2	6	7	15	9
Not Sampling	15	16	15	14	16	6	2	15	11	1
Not Sampling	8	13	8	10	12	11	13	14	2	12
Not Sampling	5	2	3	11	4	3	9	10	7	11
Not Sampling	7	11	14	15	11	14	14	6	13	2
Not Sampling	11	4	6	2	9	7	7	11	9	7
Not Sampling	12	8	16	16	3	8	15	9	6	13
Not Sampling	14	5	12	6	8	9	10	16	12	5

** **Note:** Sample nodes for each sampling area in each waste site should be numbered consistently, e.g., begin numbering the nodes in the northwesternmost node. Then number consecutively left to right.

Washington Closure Hanford

Originator G. Cruz Date 7/10/2007 Calc. No. 0100F-CA-V0282 Rev. No. 0
Project 118-F-1 Burial Ground Sample Design Job No. 14655 Checked BAC Date 2007-7-11
Subject 118-F-1 Burial Ground Shallow Zone / Stockpile (BCL) Sampling Plan Sheet No. 1 of 1

ATTACHMENT 2

Table III-4. Number of Decision Subunits Based on Area

Decision Units [a]	Waste Site Size	Number of Decision Units
Site verification (shallow) 0 to 4.6m (15 ft)	Small area of exposed surface after excavation ≤ 9290 m^2 (≤100,000 ft^2)	1
	Medium area of exposed surface after excavation >9290 m^2 but ≤37161 m^2 (>100,000 ft^2 but ≤400,000 ft^2)	4
	Large area of exposed surface after excavation >37161 m^2 (>400,000ft^2)	8
Site verification (deep) >4.6m (>15 ft)	Small area of exposed surface after excavation ≤ 9290 m^2 (≤100,000 ft^2)	1
	Medium area of exposed surface after excavation >9290 m^2 but ≤37161 m^2 (>100,000 ft^2 but ≤400,000 ft^2)	4
	Large area of exposed surface after excavation >37161 m^2 (>400,000ft^2)	8
Overburden/layback piles	Small area of exposed surface after excavation ≤ 9290 m^2 (≤100,000 ft^2)	1
	Medium area of exposed surface after excavation >9290 m^2 but ≤37161 m^2 (>100,000 ft^2 but ≤400,000 ft^2)	4
	Large area of exposed surface after excavation >37161 m^2 (>400,000ft^2)	8

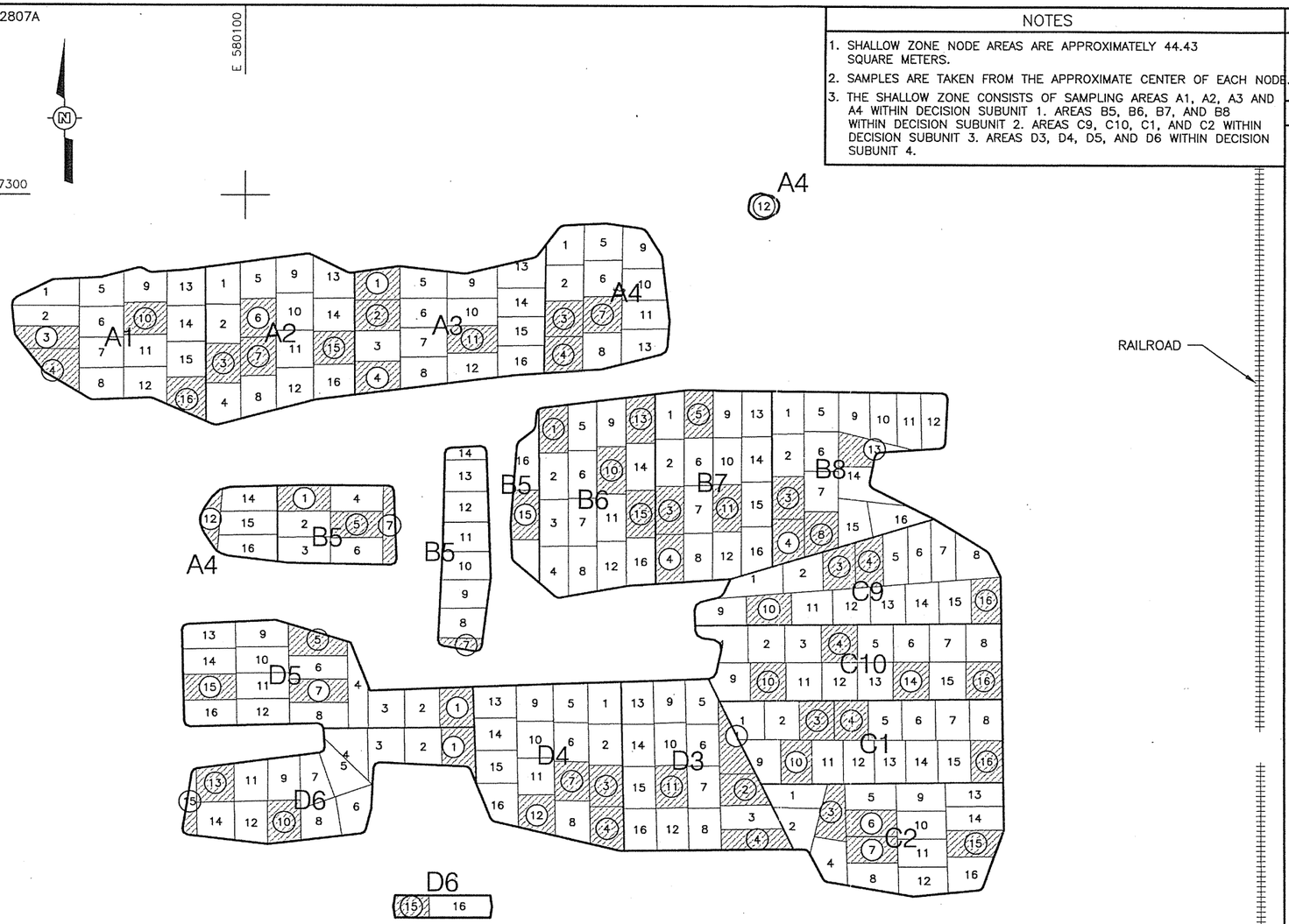
[a] The shallow zone, deep zone, and overburden each represent single decision units. Because sites may not have a deep zone, there may be two or three decision units.
Note: 1.) Metric equivalents added to original SAP table.

Table III-5. Sampling Frequency Based on Size of Remediated Waste Site.

Exposed Surface Area After Excavation	Number of Decision Subunits	Number of Blocks	Number of Discreet Samples	Number of Composite Samples
Small site ≤9290 m^2 (≤100,000 ft^2)	1	4	16	4
Medium site >9290 m^2 (>100,000 ft^2) but ≤37161 m^2 (≤400,000 ft^2)	4	16	64	16
Large site ≤37161 m^2 (>400,000 ft^2)	8	32	128	32

Note: 2.) The term "sample areas" is used interchangebly with "blocks" in this sample design.
3.) Metric equivalents corrected from original SAP table.

1F:062807A



NOTES

1. SHALLOW ZONE NODE AREAS ARE APPROXIMATELY 44.43 SQUARE METERS.
2. SAMPLES ARE TAKEN FROM THE APPROXIMATE CENTER OF EACH NODE.
3. THE SHALLOW ZONE CONSISTS OF SAMPLING AREAS A1, A2, A3 AND A4 WITHIN DECISION SUBUNIT 1. AREAS B5, B6, B7, AND B8 WITHIN DECISION SUBUNIT 2. AREAS C9, C10, C1, AND C2 WITHIN DECISION SUBUNIT 3. AREAS D3, D4, D5, AND D6 WITHIN DECISION SUBUNIT 4.

LEGEND

(8) VERIFICATION SAMPLING NODE

SAMPLE LOCATION TABLE

DECISION SUBUNIT	SAMPLING AREA	SAMPLE NODE	NORTHING	EASTING
1	A1	A1–3	147274.04	580064.82
		A1–4	147268.02	580065.91
		A1–10	147277.56	580082.40
		A1–16	147262.86	580089.69
	A2	A2–3	147269.42	580096.13
		A2–6	147277.70	580102.35
		A2–7	147270.69	580102.40
		A2–15	147272.30	580115.80
	A3	A3–1	147284.06	580123.40
		A3–2	147278.24	580123.44
		A3–4	147266.85	580123.53
		A3–11	147273.91	580140.27
	A4	A4–3	147277.70	580156.61
		A4–4	147271.13	580156.55
		A4–7	147278.48	580163.43
		A4–12A	147298.23	580192.05
		A4–12B	147241.01	580093.89
2	B5	B5–1	147244.82	580110.55
		B5–5	147240.05	580119.94
		B5–7A	147239.92	580125.74
		B5–7B	147218.16	580139.42
		B5–15	147241.92	580149.82
	B6	B6–1	147257.60	580154.83
		B6–10	147250.08	580165.17
		B6–13	147259.51	580170.26
		B6–15	147242.14	580170.37
	B7	B7–3	147242.79	580175.47
		B7–4	147233.96	580175.53
		B7–5	147260.38	580180.56
		B7–11	147243.26	580185.72
	B8	B8–3	147245.17	580196.59
		B8–4	147236.97	580196.64
		B8–8	147238.53	580202.50
		B8–13	147254.11	580211.99
3	C9	C9–3	147232.68	580205.70
		C9–4	147233.68	580211.09
		C9–10	147224.89	580193.24
		C9–16	147226.62	580231.87
	C10	C10–4	147218.66	580205.78
		C10–10	147211.63	580193.10
		C10–14	147211.86	580218.63
		C10–16	147211.93	580231.49
	C1	C1–3	147204.61	580201.80
		C1–4	147204.64	580207.93
		C1–10	147197.02	580198.12
		C1–16	147197.20	580232.02
	C2	C2–3	147187.96	580204.26
		C2–6	147185.89	580211.53
		C2–7	147181.07	580211.67
		C2–15	147182.27	580230.06
4	D3	D3–1	147201.73	580187.55
		D3–2	147191.95	580189.10
		D3–4	147182.84	580191.26
		D3–11	147192.47	580175.96
	D4	D4–3	147192.52	580164.40
		D4–4	147184.72	580164.57
		D4–7	147193.37	580158.32
		D4–12	147187.10	580152.04
	D5	D5–1	147206.74	580137.80
		D5–5	147219.08	580112.99
		D5–7	147209.75	580113.19
		D5–15	147210.38	580093.83
	D6	D6–1	147199.54	580137.13
		D6–10	147185.77	580107.06
		D6–13	147192.88	580094.77
		D6–15A	147189.48	580090.20
		D6–15B	147170.47	580129.61

ATTACHMENT 3

Attachment 3 Sheet No. 1 of 5
Originator G. CRUZ Date 7-10-07
Chk'd By BAC Date 2007-7-11
Calc. No. 0100F-CA-V0202 Rev. No. 0

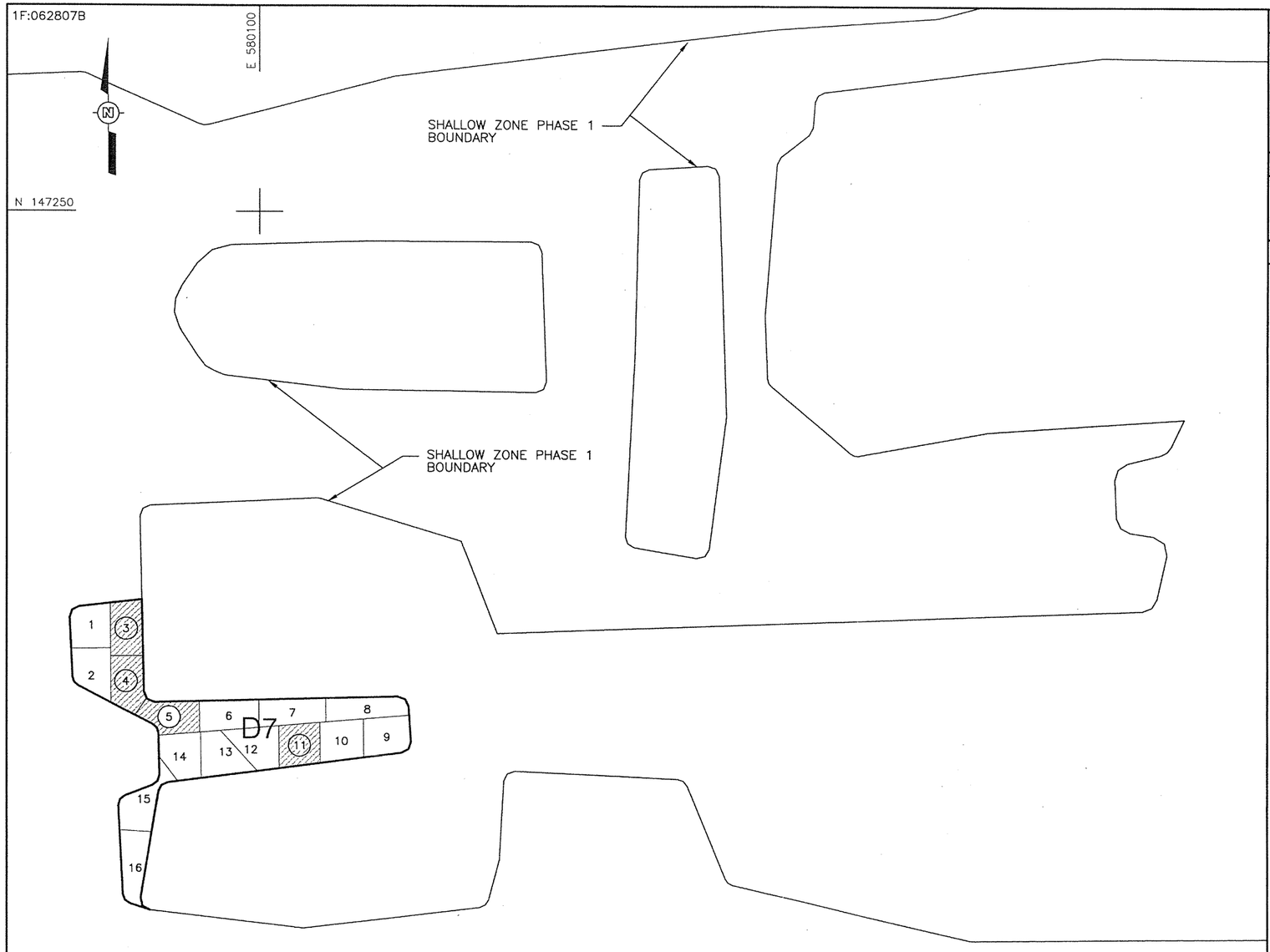
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8 0 8 16 32 meters

U.S DEPARTMENT OF ENERGY
DOE RICHLAND OPERATIONS OFFICE
RIVIER CORRIDOR CLOSURE CONTRACT

100–F AREA
118–F–1 BURIAL GROUND
PHASE 1 SHALLOW ZONE SAMPLING PLAN

1F:062807B



NOTES

1. SHALLOW ZONE NODE AREAS ARE APPROXIMATELY 15.51 SQUARE METERS.
2. SAMPLES ARE TAKEN FROM THE APPROXIMATE CENTER OF EACH NODE.
3. THE SHALLOW ZONE CONSISTS OF SAMPLING AREA D7 WITHIN WITHIN DECISION SUBUNIT 1.

LEGEND

(8) VERIFICATION SAMPLING NODE

SAMPLE LOCATION TABLE

DECISION SUBUNIT	SAMPLING AREA	SAMPLE NODE	NORTHING	EASTING
	D7	D7-3	147210.20	580087.58
		D7-4	147205.20	580087.56
		D7-5	147201.78	580091.56
		D7-11	147199.12	580103.80

Attachment 3 Sheet No. 2 of 5
Originator G.CRUZ Date 7-10-07
Chk'd By ISAC Date 7-12-07
Calc. No. 0100F-CA-V0282 Rev. No. 0

ATTACHMENT 3

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U.S DEPARTMENT OF ENERGY
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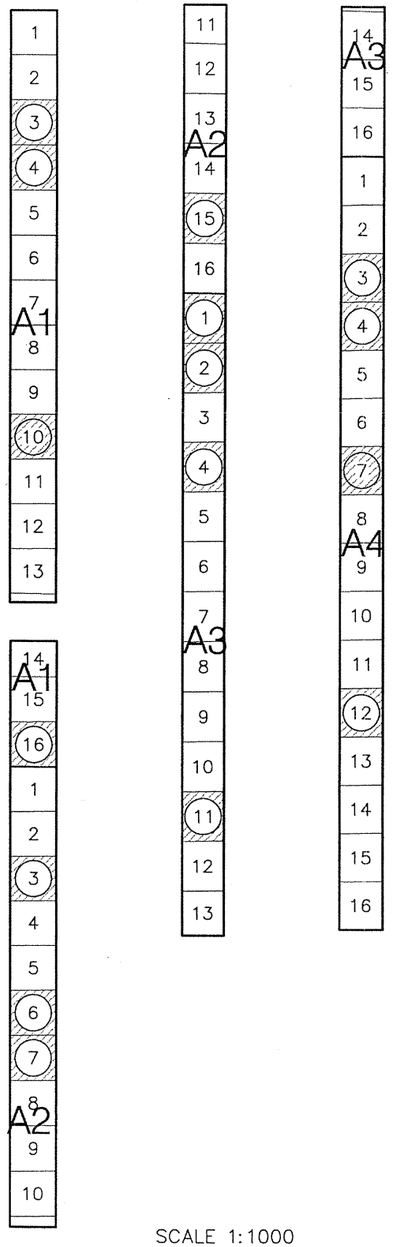
100-F AREA
118-F-1 BURIAL GROUND
PHASE 2 SHALLOW ZONE SAMPLING PLAN

1F:062807C



E 579850

N 147300



SCALE 1:1000

10 0 10 20 40 meters

NOTES

1. SHALLOW ZONE NODE AREAS ARE APPROXIMATELY 81.64 SQUARE METERS.
2. SAMPLES ARE TAKEN FROM THE APPROXIMATE CENTER OF EACH NODE.
3. THE SHALLOW ZONE CONSISTS OF SAMPLING AREAS A1, A2, A3 AND A4 WITHIN DECISION SUBUNIT 1.

LEGEND

(8) VERIFICATION SAMPLING NODE

SAMPLE LOCATION TABLE

DECISION SUBUNIT	SAMPLING AREA	SAMPLE NODE	NORTHING	EASTING
1	A1	A1-3	147337.60	579903.24
		A1-4	147328.66	579903.24
		A1-10	147275.05	579903.24
		A1-16	147213.96	579903.47
	A2	A2-3	147187.26	579903.43
		A2-6	147160.53	579903.43
		A2-7	147151.61	579903.43
		A2-15	147318.67	579936.64
	A3	A3-1	147298.91	579936.59
		A3-2	147288.94	579936.64
		A3-4	147269.12	579936.64
		A3-11	147199.74	579936.64
	A4	A4-3	147306.97	579967.53
		A4-4	147297.35	579967.53
		A4-7	147268.52	579967.53
		A4-12	147220.45	579967.53

Attachment 3 Sheet No. 3 of 5
Originator G. Crow Date 7-10-07
Ck'd By KAC Date 7.10.07
Calc. No. 0100F-CA-V0257 Rev. No. 0

ATTACHMENT 3

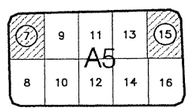
U.S DEPARTMENT OF ENERGY
DOE RICHLAND OPERATIONS OFFICE
RIVIER CORRIDOR CLOSURE CONTRACT

100-F AREA
118-F-1 BURIAL GROUND PROCESS TRENCH
PHASE 1 SHALLOW ZONE SAMPLING PLAN

1F:062807D

E 580000

N 147250



SHALLOW ZONE PHASE 1 BOUNDARY

SCALE 1:500

5 0 5 10 20 meters

NOTES

1. SHALLOW ZONE NODE AREAS ARE APPROXIMATELY 15.77 SQUARE METERS.
2. SAMPLES ARE TAKEN FROM THE APPROXIMATE CENTER OF EACH NODE.
3. THE SHALLOW ZONE CONSISTS OF SAMPLING AREA A5 WITHIN DECISION SUBUNIT 1.

LEGEND

8 VERIFICATION SAMPLING NODE

SAMPLE LOCATION TABLE

DECISION SUBUNIT	SAMPLING AREA	SAMPLE NODE	NORTHING	EASTING
	A5	A5-1	147210.48	580068.76
		A5-5	147210.44	580077.77
		A5-7	147191.22	580070.71
		A5-15	147191.44	580084.17

Attachment 3
Originator G.C. Rose
Sheet No. 4 of 5
Date 7-10-07
Date 2007-7-11
Rev. No. 0
0100F-CA-V0282

ATTACHMENT 3

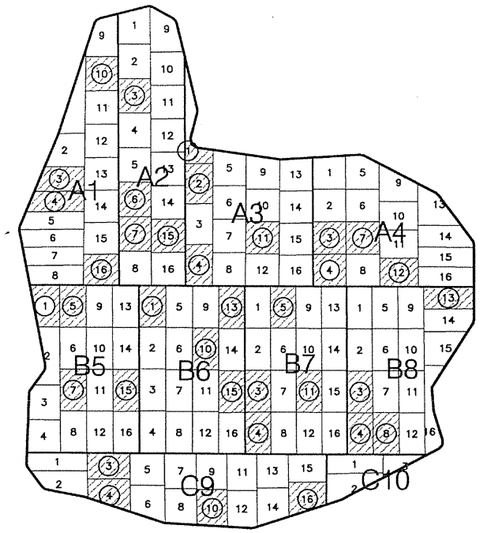
U.S DEPARTMENT OF ENERGY
DOE RICHLAND OPERATIONS OFFICE
RIVIER CORRIDOR CLOSURE CONTRACT

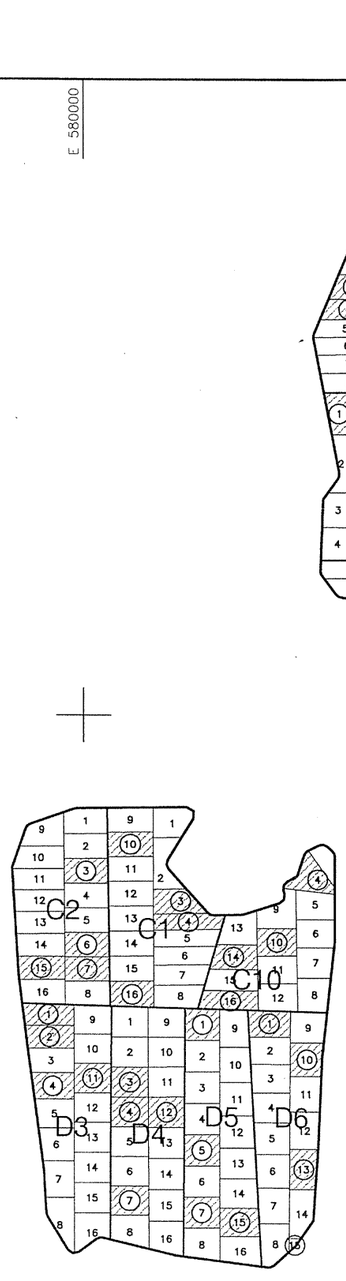
100-F AREA
118-F-1 BURIAL GROUND PROCESS TRENCH
PHASE 2 SHALLOW ZONE SAMPLING PLAN

1F:062807E

E 580000

N 147300







SCALE 1:1000

10 0 10 20 40 meters

NOTES

1. STOCKPILE ZONE NODE AREAS ARE APPROXIMATELY 42.61 SQUARE METERS.
2. SAMPLES ARE TAKEN FROM THE APPROXIMATE CENTEROF EACH NODE.
3. THE STOCKPILE ZONE CONSISTS OF SAMPLING AREAS A1, A2, A3 AND A4 WITHIN DECISION SUBUNIT 1. AREAS B5, B6, B7, AND B8 WITHIN DECISION SUBUNIT 2. AREAS C9, C10, C1, AND C2 WITHIN DECISION SUBUNIT 3. AREAS D3, D4, D5, AND D6 WITHIN DECISION SUBUNIT 4.

LEGEND

(8) VERIFICATION SAMPLING NODE

SAMPLE LOCATION TABLE

DECISION SUBUNIT	SAMPLING AREA	SAMPLE NODE	NORTHING	EASTING
1	A1	A1-3	147385.38	580052.63
		A1-4	147380.93	580051.77
		A1-10	147406.26	580060.85
		A1-16	147367.43	580060.75
	A2	A2-3	147401.91	580067.17
		A2-6	147381.39	580067.25
		A2-7	147374.55	580067.28
		A2-15	147374.17	580073.63
	A3	A3-1	147391.02	580077.35
		A3-2	147384.53	580079.51
		A3-4	147368.38	580079.50
		A3-11	147373.79	580091.87
	A4	A4-3	147373.78	580105.27
		A4-4	147367.35	580105.30
		A4-7	147373.74	580111.90
		A4-12	147366.87	580119.04
2	B5	B5-1	147360.16	580049.81
		B5-5	147360.15	580055.28
		B5-7	147343.38	580055.39
		B5-15	147343.34	580065.58
	B6	B6-1	147360.15	580070.59
		B6-10	147351.66	580080.82
		B6-13	147359.97	580085.86
		B6-15	147343.08	580085.90
	B7	B7-3	147343.21	580091.02
		B7-4	147334.82	580091.09
		B7-5	147359.98	580096.01
		B7-11	147343.18	580101.21
	B8	B8-3	147343.02	580111.40
		B8-4	147334.69	580111.46
		B8-8	147334.71	580116.58
		B8-13	147361.81	580128.74
3	C9	C9-3	147328.18	580062.24
		C9-4	147322.30	580062.38
		C9-10	147319.81	580082.15
		C9-16	147321.64	580100.97
	C10	C10-4	147267.41	580045.64
		C10-10	147254.93	580037.55
		C10-14	147251.96	580029.11
		C10-16	147243.13	580028.50
	C1	C1-3	147263.06	580018.80
		C1-4	147258.98	580020.29
		C1-10	147274.41	580009.05
		C1-16	147244.48	580009.36
	C2	C2-3	147269.08	580000.41
		C2-6	147254.38	580000.58
		C2-7	147249.52	580000.63
		C2-15	147249.73	579991.58
4	D3	D3-1	147240.44	579992.88
		D3-2	147235.95	579993.15
		D3-4	147226.20	579993.74
		D3-11	147227.76	580001.64
	D4	D4-3	147226.97	580008.87
		D4-4	147221.05	580008.85
		D4-7	147203.59	580008.82
		D4-12	147221.02	580016.00
	D5	D5-1	147238.48	580023.02
		D5-5	147213.47	580022.91
		D5-7	147201.23	580022.86
		D5-15	147199.32	580030.27
	D6	D6-1	147238.66	580036.02
		D6-10	147231.49	580043.44
		D6-13	147209.75	580042.78
		D6-15A	147194.86	580041.00
		D6-15B	147287.00	580195.19

ATTACHMENT 3

Attachment 3 Sheet No. 5 of 5
Originator G. CRUZ Date 7-10-07
Chk'd By KAE Date 2007-7-11
Data No. 0100F-CA-V0782 Rev. No. 0

U.S DEPARTMENT OF ENERGY
DOE RICHLAND OPERATIONS OFFICE
RIVIER CORRIDOR CLOSURE CONTRACT

100-F AREA
118-F-1 BURIAL GROUND
STOCKPILE (BCL) SAMPLING PLAN

Acrobat 8.0

CALCULATION COVER SHEET

Project Title: 100-F Area Field Remediation **Job No. 14655**

Area: 100-F

Discipline: Environmental Calculation No: 0100F-CA-V0283

Subject: 118-F-1 Burial Ground Hazard Quotient and Carcinogenic Risk Calculation

Computer Program: Excel Program No: Excel 2003

The attached calculations have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover = 1 Summary = 3	E. J. Farris	K. A. Anselm	H. M. Sulloway	J. D. Fancher	7/12/07

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007)

DE01-437.03

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	E. J. Farris EJF	Date:	07/12/07	Calc. No.:	0100F-CA-V0283	Rev.:	0
Project:	100-F Area Field Remediation	Job No:	14655	Checked:	K. A. Anselm KAA	Date:	7/12/07
Subject:	118-F-1 Burial Ground Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	1 of 3

PURPOSE:

Provide documentation to support the calculation of the hazard quotient (HQ) and carcinogenic (excess cancer) risk for the 118-F-1 Burial Ground Cleanup Verification Package. In accordance with the remedial action goals (RAGs) in the remedial design report/remedial action work plan (RDR/RAWP) (DOE-RL 2005), the following criteria must be met:

1) An HQ of <1.0 for all individual noncarcinogens
2) A cumulative HQ of <1.0 for noncarcinogens
3) An excess cancer risk of $<1 \times 10^{-6}$ for individual carcinogens
4) A cumulative excess cancer risk of $<1 \times 10^{-5}$ for carcinogens.

GIVEN/REFERENCES:

1) DOE-RL, 2005, *Remedial Design Report/Remedial Action Work Plan for the 100 Areas,* DOE/RL-96-17, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.

2) EPA, 1994, *Guidance Manual for the Integrated Exposure Uptake Biokinetic Model for Lead in Children*, EPA/540/R-93/081, Publication No. 9285.7-15-1, U.S. Environmental Protection Agency, Washington, D.C.

3) WAC 173-340, "Model Toxics Control Act – Cleanup," *Washington Administrative Code*, 1996.

4) WCH, 2007, *118-F-1 Burial Ground Cleanup Verification 95% UCL Calculation*, Calculation No. 0100F-CA-V0279, Washington Closure Hanford, Inc., Richland, Washington.

SOLUTION:

1) Generate an HQ for each noncarcinogenic constituent detected above background or required detection limit/practical quantitation limit and compare it to the individual HQ of <1.0 (DOE-RL 2005).
2) Sum the HQs and compare this value to the cumulative HQ of <1.0.
3) Generate an excess cancer risk value for each carcinogenic constituent detected above background or required detection limit/practical quantitation limit and compare it to the excess cancer risk of $<1 \times 10^{-6}$ (DOE-RL 2005).
4) Sum the excess cancer risk value(s) and compare it to the cumulative cancer risk of $<1 \times 10^{-5}$.

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	E. J. Farris EJF	Date:	07/12/07	Calc. No.:	0100F-CA-V0283	Rev.:	0
Project:	100-F Area Field Remediation	Job No:	14655	Checked:	K. A. Anselm KAA	Date:	7/12/07
Subject:	118-F-1 Burial Ground Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	2 of 3

METHODOLOGY:

Hazard quotient and carcinogenic risk calculations were computed using the data from the *118-F-1 Burial Ground Cleanup Verification 95% UCL Calculation*, Calculation No. 0100F-CA-V0279 (WCH 2007). Of the contaminants of concern and contaminants of potential concern in WCH (2007), boron and molybdenum require the HQ and risk calculations because these analytes were detected and a Washington State or Hanford Site background value is not available. Copper, lead, selenium, silver, and zinc are included because they were detected at a concentration above their respective Washington State or Hanford Site background value. Arsenic was detected above the Hanford Site Background value but below the WAC 173-340 Method A cleanup level. Due to the intent of Method A cleanup values and the allowance to use such values for arsenic (DOE-RL 2005), arsenic has been excluded from the Method B individual analyte and cumulative risk requirements. An example of the HQ and risk calculations is presented below:

1) For example, the maximum value for boron is 3.3 mg/kg, divided by the noncarcinogenic RAG value of 16,000 mg/kg (boron is identified as a noncarcinogen in WAC 173-340-740[3]), is 2.1×10^{-4}. Comparing this value, and all other individual values, to the requirement of <1.0, this criteria is met.

2) After the HQ calculation is completed for the appropriate analytes, the cumulative HQ can be obtained by summing the individual values. The sum of the HQ values is 1.1×10^{-1}. Comparing this value to the requirement of <1.0, this criteria is met.

3) To calculate the excess cancer risk, the maximum value is divided by the carcinogenic RAG value, then multiplied by 0.000001. There are no carcinogenic analytes detected above background levels; therefore, this calculation is not applicable and the requirement of $<1 \times 10^{-6}$ is met.

4) After these calculations are completed for the carcinogenic analytes, the cumulative excess cancer risk can be obtained by summing the individual values. There are no carcinogenic analytes detected above background levels; therefore, this calculation is not applicable and the requirement of $<1 \times 10^{-5}$ is met.

RESULTS:

1) List individual noncarcinogens and corresponding HQs >1.0: None
2) List the cumulative noncarcinogenic HQ >1.0: None
3) List individual carcinogens and corresponding excess cancer risk $>1 \times 10^{-6}$: None
4) List the cumulative excess cancer risk for carcinogens $>1 \times 10^{-5}$: None.

Table 1 shows the results of the calculations.

Washington Closure Hanford, Inc. CALCULATION SHEET

Originator:	E. J. Farris EJF	Date:	07/12/07	Calc. No.:	0100F-CA-V0283	Rev.:	0
Project:	100-F Area Field Remediation	Job No:	14655	Checked:	K. A. Anselm KAA	Date:	7/12/07
Subject:	118-F-1 Burial Ground Hazard Quotient and Carcinogenic Risk Calculation					Sheet No.	3 of 3

Table 1. Hazard Quotient and Excess Cancer Risk Results for 118-F-1 Burial Ground.

Contaminants of Potential Concern and Contaminants of Concern[a]	Maximum or Statistical Value[a] (mg/kg)	Noncarcinogen RAG[b] (mg/kg)	Hazard Quotient	Carcinogen RAG[b] (mg/kg)	Carcinogen Risk
Metals					
Boron	3.3	16,000	2.1E-04	--	--
Copper	126	2,960	4.3E-02	--	--
Lead[c]	18	353	5.1E-02	--	--
Molybdenum	0.9	400	2.3E-03	--	--
Selenium	1.5	400	3.8E-03	--	--
Silver	4.3	400	1.1E-02	--	--
Zinc	95.3	24,000	4.0E-03	--	--
Totals					
Cumulative Hazard Quotient:			**1.1E-01**		
Cumulative Excess Cancer Risk:					**0.0E+00**

Notes:
RAG = remedial action goal
-- = not applicable
[a] = From 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculation, Calculation No. 0100F-CA-V0279 (WCH 2007).
[b] = Value obtained from *Washington Administrative Code* (WAC) 173-340-740(3), Method B, 1996, unless otherwise noted.
[c] = Value for the noncarcinogen RAG obtained from EPA (1994).

CONCLUSION:

This calculation demonstrates that the 118-F-1 Burial Ground site meets the requirements for the hazard quotients and carcinogenic (excess cancer) risk as identified in the RDR/RAWP (DOE-RL 2005).

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CALCULATION COVER SHEET

Project Title: 100-F Field Remediation **Job No. 14655**

Area: 100-F

Discipline: Environmental *Calculation No: 0100F-CA-V0279

Subject: 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations

Computer Program: Excel Program No: Excel 2003

The attached calculations have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation ☒ Preliminary ☐ Superseded ☐ Voided ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	26	H. M. Sulloway	J. M. Capron	K.A. Anselm	S.W. Callison	7/12/2007
1	26	H. M. Sulloway	J. M. Capron	NA	S.W. Callison	9-10-07

SUMMARY OF REVISION

1	Corrected TDL values for cadmium and lead based on Table II-2 in 100 Area Burial Grounds SAP (DOE-RL, 2001a). Affects line 24 of pp. 12, 13, and 14. Sheet 4 line 36, added R = rejected. Revised to include results of third-party data validation which added "J" and "R" flags. Attachment 1, pp. 7, 8, 9, and 10, "J" was added to the "Q" column of following: antimony - J15283-J15287, J152D9, J15269, J15270, J15281, J15282, J15661, J15688, J15689, J15266 –J15268, J15271–J15274, J15276-J15280, J152D7, and J15249 - J15265; chromium - J152D9; magnesium - F152D9; silicon - J152D9, J15266 –J15268, J15271–J15274, and J15276-J15280. Attachment 1, p. 10, "R" was added to the "Q" column of silicon - J15283-J15287. Attachment 1, p. 3, "J" was added to the "Q" column of curium-243/244 - J152D7. Corrected decimal error on J15285, copper from 126 to 12.6, Attachment 1, p. 8. Portions of the methodology section of the summary were revised on pp. 1 and 2. Entire calculation re-issued for simplicity.

WCH-DE-018 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway Date 09/06/07 Calc. No. 0100F-CA-V0279 Rev. No. 1
Project 100-F Field Remediation Job No. 14655 Checked J. M. Capron Date 09/06/07
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations Sheet No. 1 of 14

Summary

Purpose:
Calculate the 95% upper confidence limit (UCL) values to evaluate compliance with cleanup standards for the subject site. Also, perform the Washington Administrative Code (WAC) 173-340-740(7)(e) 3-part test for each nonradioactive contaminant of concern (COC) and contaminant of potential concern (COPC) and calculate the relative percent difference (RPD) for primary-duplicate and primary-split sample pairs, as necessary.

Table of Contents:
Sheets 1 to 4 - Summary
Sheets 5 to 6 - 118-F-1 Excavation Shallow Zone Statistical Calculations
Sheets 7 to 8 - 118-F-1 Overburden/BCL Material Statistical Calculations
Sheets 9 to 10 - 118-F-1 Process Trench Shallow Zone Statistical Calculations
Sheet 11 - Ecology Software (MTCAStat) Results (Excavation Shallow Zone and Process Trench Shallow Zone)
Sheets 12 to 14 - Split/Duplicate Analysis
Attachment 1 - 118-F-1 Verification Sampling Results (11 sheets)

Given/References:
1) Sample Results (Attachment 1).
2) Background values and remedial action goals (RAGs) are taken from DOE-RL (2005), DOE-RL (2001b), and Ecology (2005).
3) DOE-RL, 2001a, *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan* (SAP), DOE/RL-2001-35, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
4) DOE-RL, 2001b, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*, DOE/RL-92-24, Rev. 4, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
5) DOE-RL, 2005, *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP), DOE/RL-96-17, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
6) Ecology, 1992, *Statistical Guidance for Ecology Site Managers*, Publication #92-54, Washington Department of Ecology, Olympia, Washington.
7) Ecology, 1993, *Statistical Guidance for Ecology Site Managers*, Supplement S-6, Analyzing Site or Background Data with Below-detection Limit or Below-PQL Values (Censored Data Sets), Publication #92-54, Washington Department of Ecology, Olympia, Washington.
8) Ecology, 2005, *Cleanup Levels and Risk Calculations (CLARC) Database*, Washington State Department of Ecology, Olympia, Washington, <https://fortress.wa.gov/ecy/clarc/CLARCHome.aspx>.
9) EPA, 1994, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review*, EPA 540/R-94/013. U.S. Environmental Protection Agency, Washington, D.C.
10) WAC 173-340, 1996, "Model Toxic Control Act - Cleanup," *Washington Administrative Code*.

Solution:
Calculation methodology is described in Ecology Pub. #92-54 (Ecology 1992, 1993), below, and in the RDR/RAWP (DOE-RL 2005). Use data from attached worksheets to perform the 95% UCL calculation for each analyte, the WAC 173-340-740(7)(e) 3-part test for nonradionuclides, and the RPD calculations, as required. The hazard quotient and carcinogenic risk calculations are located in a separate calculation brief as an appendix to the Cleanup Verification Package (CVP).

Calculation Description:
The subject calculations were performed on data from soil verification samples from the subject waste site. The data were entered into an EXCEL 2003 spreadsheet and calculations performed by using the built-in spreadsheet functions and/or creating formulae within the cells. The statistical evaluation of data for use in accordance with the RDR/RAWP (DOE-RL 2005) is documented by this calculation. Duplicate and split RPD results are used in evaluation of data quality within the CVP for this site.

Methodology:
For nonradioactive analytes with ≤50% of the data below detection limits and all detected radionuclide analytes, the statistical value calculated to evaluate the effectiveness of cleanup is the 95% UCL. For nonradioactive analytes with >50% of the data below detection limits, the maximum detected value for the data set is used instead of the 95% UCL. The 95% UCL values were not calculated for radium-226, radium-228, thorium-228, thorium-232, and potassium-40, as these isotopes are excluded from consideration as COCs based on natural occurrence and analogous site information. The 95% UCL values were also not calculated for aluminum, calcium, iron, magnesium, potassium, silicon, and sodium, as no parameters to calculate cleanup values under WAC 173-340-740(3) are available in Ecology (2005) or other reference databases. Therefore, these constituents are

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Summary (continued)

not considered site COCs/COPCs.

All calculations for Americium-241 and uranium isotopes were performed using data from isotope-specific analysis rather than data resulting from gamma spectroscopy.

Initial data results from the of split sample J152D7 showed significantly greater results of lead and cadmium than seen in the other split, or any other samples. Based on this review of the data, the laboratory was requested to reanalyze the sample. Results from the second analysis correlate well with the other data and replaced the original data for J152D7.

All nonradionuclide data reported as being undetected are set to ½ the detection limit value for calculation of the statistics (Ecology 1993). For radionuclide data, calculation of the statistics is done using the reported value. In cases where the laboratory does not report a value below the minimum detectable activity (MDA), half of the MDA is used in the calculation. For the statistical evaluation of duplicate sample pairs, the samples are averaged before being included in the data set, after adjustments for censored data as described above.

For nonradionuclides, the WAC 173-340 statistical guidance suggests that a test for distributional form be performed on the data and the 95% UCL calculated on the appropriate distribution using Ecology software. For nonradionuclide small data sets ($n < 10$) and all radionuclide data sets, the calculations are performed assuming nonparametric distribution, so no tests for distribution are performed. For nonradionuclide data sets of ten or greater, distributional testing and calculation of the 95% UCL is done using Ecology's MTCAStat software (Ecology 1993). Due to differences in addressing censored data between the RDR/RAWP (DOE-RL 2005b) and MTCAStat coding and due to a limitation in the MTCAStat coding (no direct capability to address variable quantitation limits within a data set), substitutions for censored data are performed before software input and the resulting input set treated as uncensored.

The WAC 173-340-740(7)(e) 3-part test is performed for nonradionuclide analytes only and determines if:
1) the 95% UCL exceeds the most stringent cleanup limit for each COPC/COC,
2) greater than 10% of the raw data exceed the most stringent cleanup limit for each COPC/COC,
3) the maximum value of the raw data set exceeds two times the most stringent cleanup limit for each COPC/COC.

The RPD values are evaluated for analytes detected in a primary-duplicate or primary-split sample pair for the purposes of data quality assessment within the CVP. The RPD is calculated when both the primary value and the duplicate value for a given analyte are above detection limits and are greater than 5 times the target detection limit (TDL). The TDL is a laboratory detection limit pre-determined for each analytical method, listed in Table II-2 of the SAP (DOE-RL 2001a). The RPD calculations use the following formula:

$$RPD = [\,|M-S|/((M+S)/2)]^{*}100$$

where, M = main sample value S = split (or duplicate) sample value

For quality assurance/quality control (QA/QC) split and duplicate RPD calculations, a value less than 30% indicates the data compare favorably. For regulatory splits, a threshold of 35% is used (EPA 1994). If the RPD is greater than 30% (or 35% for regulatory split data), further investigation regarding the usability of the data is performed. To assist in the identification of anomalous sample pairs, when an analyte is detected in the primary or duplicate/split sample, but was quantified at less than 5 times the TDL in one or both samples, an additional parameter is evaluated. In this case, if the difference between the primary and duplicate/split results exceeds a control limit of 2 times the TDL, further assessment regarding the usability of the data is performed. Additional discussion is provided in the data quality assessment section of the applicable CVP, as necessary.

The results presented in the summary tables that follow are for use in risk analysis and the CVP for this site. In addition to the statistical samples collected at the subject site, focused samples were collected from selected locations based on observations made during site remediation. Statistical methodology is not applicable to non-statistical sampling, and direct evaluation of detected values will be used as the compliance basis.

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Summary (continued)

Excavation Shallow Zone - WAC 173-340 3-Part Test for most stringent RAG:

95% UCL > Cleanup Limit?	NO
> 10% above Cleanup Limit?	NO
Any sample > 2x Cleanup Limit?	NO

All data sets evaluated meet the 3-part test criteria when compared to the most stringent cleanup limit.

OB/BCL - WAC 173-340 3-Part Test for most stringent RAG:

95% UCL > Cleanup Limit?	YES
> 10% above Cleanup Limit?	YES
Any sample > 2x Cleanup Limit?	YES

Because of the "yes" answer to the 3-part test for lead, additional evaluation of the attainment of cleanup criteria will be performed.

Process Trench Shallow Zone - WAC 173-340 3-Part Test for most stringent RAG:

95% UCL > Cleanup Limit?	YES
> 10% above Cleanup Limit?	YES
Any sample > 2x Cleanup Limit?	YES

Because of the "yes" answer to the 3-part test for lead, additional evaluation of the attainment of cleanup criteria will be performed.

CALCULATION SHEET

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Originator H. M. Sulloway
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Summary (continued)

Results Summary				
Analyte	Excavation Shallow Zone	OB-BCL	Process Trench Shallow Zone	Units
Americium-241	0.063	0.23	0.089	pCi/g
Carbon-14	0.83	1.9	0.32	pCi/g
Cesium-137	0.21	0 (< BG)	0.45	pCi/g
Cobalt-60	0.038	0.0075	0.074	pCi/g
Europium-152	0.054	0.041	0.14	pCi/g
Europium-154	0.053	0.018	0.063	pCi/g
Nickel-63	2.3	2.5	4.4	pCi/g
Plutonium-238	0.028	0.16	0.10	pCi/g
Plutonium-239/240	0.11	0.13	0.13	pCi/g
Silver-108m	0.017	0.011	0.013	pCi/g
Strontium-90	0.38	0 (< BG)	0.22	pCi/g
Tritium (H-3)	1.4	2.5	2.0	pCi/g
Uranium-238	0 (< BG)	0 (< BG)	0 (< BG)	pCi/g
Cadmium	0.10	0.00	0.10	mg/kg
Lead	5.4	12	18	mg/kg
Mercury	0.00	0.00	0.020	mg/kg

Abbreviations/Acronyms:

BCL = below cleanup levels
BG = background
COC = contaminant of concern
COPC = contaminant of potential concern
CVP = Cleanup Verification Package
GW = groundwater
MDA = minimum detectable activity
MTCA = Model Toxics Control Act
NA = not applicable
OB = overburden
PQL = practical quantitation limit
PT = process trench
Q = qualifier
QA/QC = quality assurance/quality control
R = rejected
RAG = remedial action goal
RDR/RAWP = Remedial Design Report/Remedial Action Work Plan
RESRAD = RESidual RADioactivity (dose assessment model)
RPD = relative percent difference
SAP = Sampling and Analysis Plan
TDL = target detection limit
U = undetected
UCL = upper confidence limit
WAC = *Washington Administrative Code*

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway
Project 100-F Field Remediation
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118-F-1 Excavation Shallow Zone Statistical Calculations

Verification Data

Sample Area	Sample Number	Sample Date	Americium-241			Carbon-14			Cesium-137			Cobalt-60			Europium-152			Europium-154			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A1	J15266	5/8/2007	-0.0687	U	0.33	-0.204	U	3.4	0.028	U	0.028	0.030	U	0.030	0.077	U	0.077	0.099	U	0.099	1.07	U	3.9	0	U	0.28
A2	J15267	5/8/2007	0.0338	U	0.26	1.18	U	3.8	0.720		0.034	0.031	U	0.031	0.11	U	0.11	0.10	U	0.10	3.64	U	4.3	0.0655	U	0.25
A3	J15268	5/8/2007	-0.0663	U	0.51	0.240	U	3.4	0.026	U	0.026	0.028	U	0.028	0.077	U	0.077	0.083	U	0.083	0.433	U	4.5	0	U	0.27
A4	J15269	6/20/2007	0	U	0.284	-1.48	U	3.14	0.035	U	0.035	0.030	U	0.030	0.080	U	0.080	0.116	U	0.116	-0.719	U	3.31	0	U	0.266
B5	J15270	6/20/2007	-0.040		0.33	-0.495	U	3.36	0.026	U	0.026	0.027	U	0.027	0.071	U	0.071	0.094	U	0.094	-0.582	U	3.4	0	U	0.249
B6	J15271	5/8/2007	0	U	0.28	0.780	U	3.5	0.146		0.033	0.036	U	0.036	0.094	U	0.094	0.12	U	0.12	4.25		3.9	-0.0280	U	0.27
B7	J15272	5/8/2007	0	U	0.33	4.27	U	4.4	0.115		0.027	0.029	U	0.029	0.072	U	0.072	0.097	U	0.097	0.640	U	4.1	-0.0356	U	0.27
Duplicate of J15272	J15273	5/8/2007	0.0549	U	0.42	0.257	U	3.6	0.0822		0.039	0.035	U	0.035	0.090	U	0.090	0.11	U	0.11	1.85	U	5.1	0	U	0.29
B8	J15274	5/8/2007	-0.0373	U	0.29	1.64	U	3.7	0.115		0.030	0.031	U	0.031	0.074	U	0.074	0.10	U	0.10	2.85	U	4.8	-0.0326	U	0.25
C9	J15661	6/20/2007	0.0650	U	0.247	0.948	U	3.11	0.071		0.040	0.032	U	0.032	0.084	U	0.084	0.133	U	0.133	-0.996	U	3.36	0.074	U	0.282
C10	J15276	6/20/2007	0.0943	U	0.45	0.804	U	3.6	0.426		0.030	0.029	U	0.029	0.076	U	0.076	0.091	U	0.091	0.371	U	5.1	0	U	0.27
C1	J15277	5/8/2007	0.108	U	0.35	0.438	U	3.6	0.0527		0.024	0.0456		0.022	0.18	U	0.18	0.093	U	0.093	7.22		4.6	0	U	0.39
C2	J15278	5/8/2007	0	U	0.29	0.997	U	3.8	0.179		0.027	0.041	U	0.041	0.067	U	0.067	0.092	U	0.092	1.54	U	4.4	0	U	0.37
D3	J15279	5/8/2007	0.194	U	0.25	0.372	U	3.4	0.0804		0.026	0.125		0.029	0.17	U	0.17	0.085	U	0.085	1.90	U	4.2	-0.0351	U	0.27
D4	J15280	5/8/2007	0	U	0.34	2.59	U	4.1	0.034	U	0.034	0.034	U	0.034	0.081	U	0.081	0.12	U	0.12	0.404	U	4.2	0	U	0.37
D5	J15281	5/21/2007	0.032	U	0.246	-1.64	U	3.32	0.128		0.017	0.047	U	0.047	0.096	U	0.096	0.061	U	0.061	0.254	U	3.18	0	U	0.149
D6	J15282	5/21/2007	0	U	0.256	-1.81	U	3.62	0.161		0.038	0.109	U	0.109	0.108	U	0.108	0.113	U	0.113	1.34	U	3.16	0	U	0.155
D7	J15688	6/21/2007	0.039	U	0.3	-0.934	U	3.2	0.052	U	0.052	0.033	U	0.033	0.080	U	0.080	0.098	U	0.098	0.219	U	3.20	0	U	0.18

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Americium-241 pCi/g	Carbon-14 pCi/g	Cesium-137 pCi/g	Cobalt-60 pCi/g	Europium-152 pCi/g	Europium-154 pCi/g	Nickel-63 pCi/g	Plutonium-238 pCi/g
A1	J15266	5/8/2007	-0.0687	-0.204	0.014	0.015	0.039	0.050	1.07	0
A2	J15267	5/8/2007	0.0338	1.18	0.720	0.016	0.055	0.05	3.64	0.0655
A3	J15268	5/8/2007	-0.0663	0.240	0.013	0.014	0.039	0.042	0.433	0
A4	J15269	6/20/2007	0	-1.48	0.018	0.015	0.040	0.058	-0.719	0
B5	J15270	6/20/2007	-0.040	-0.495	0.013	0.014	0.036	0.047	-0.582	0
B6	J15271	5/8/2007	0	0.780	0.146	0.018	0.047	0.060	4.25	-0.0280
B7	J15272/J15273	5/8/2007	0.188	2.00	0.099	0.016	0.041	0.052	2.30	0.140
B8	J15274	5/8/07	-0.0373	1.64	0.115	0.016	0.037	0.050	2.85	-0.033
C9	J15661	6/20/07	0.0650	0.948	0.071	0.016	0.042	0.067	-0.996	0.074
C10	J15276	6/20/07	0.0943	0.804	0.426	0.015	0.038	0.046	0.371	0
C1	J15277	5/8/07	0.108	0.438	0.053	0.046	0.090	0.047	7.22	0
C2	J15278	5/8/07	0	0.997	0.179	0.021	0.034	0.046	1.54	0
D3	J15279	5/8/07	0.194	0.372	0.080	0.125	0.085	0.043	1.90	-0.0351
D4	J15280	5/8/07	0	2.59	0.017	0.017	0.041	0.060	0.404	0
D5	J15281	5/21/07	0.032	-1.64	0.128	0.024	0.048	0.031	0.254	0
D6	J15282	5/21/07	0	-1.81	0.161	0.055	0.054	0.057	1.34	0
D7	J15688	6/21/07	0.039	-0.934	0.026	0.017	0.040	0.049	0.219	0

Statistical Computations

95% UCL based on	Americium-241	Carbon-14	Cesium-137	Cobalt-60	Europium-152	Europium-154	Nickel-63	Plutonium-238
	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.
N	17	17	17	17	17	17	17	17
% < Detection limit	94%	100%	35%	88%	100%	100%	88%	100%
Mean	0.032	0.32	0.13	0.027	0.047	0.050	1.5	0.011
Standard deviation	0.078	1.3	0.18	0.028	0.016	0.0085	2.1	0.044
95% UCL on mean	0.063	0.83	0.21	0.038	0.054	0.053	2.3	0.028
Maximum detected value	0	0	0.72	0.13	0	0	7.2	0
Background	NA	NA	NA	NA	NA	NA	NA	NA
Statistical value above background*	0.063	0.83	0.21	0.038	0.054	0.053	2.3	0.028

*Background is not subtracted for nonradionuclides; consideration of background is given by direct comparison against background values.

Washington Closure Hanford

CALCULATION SHEET

Originator H. M. Sulloway
Project 100-F Field Remediation
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations

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Checked J. M. Capron

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1 **118-F-1 Excavation Shallow Zone Statistical Calculations, continued**

2 **Verification Data**

3	Sample	Sample	Sample	Plutonium-239/240			Silver-108m			Stronium-90			Tritium			Uranium-238			Cadmium			Lead			Mercury		
4	Area	Number	Date	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	A1	J15266	5/8/2007	0.0736	U	0.28	0.085	U	0.085	0.0586	U	0.25.	1.64	U	4.2	0.469		0.032	0.08	U	0.08	7.9		0.77	0.01	U	0.01
6	A2	J15267	5/8/2007	0	U	0.25	0.025	U	0.025	0.0382	U	0.27	1.02	U	4.7	0.447		0.031	0.08	U	0.08	7.6		0.78	0.02	U	0.02
7	A3	J15268	5/8/2007	0.0346	U	0.26	0.021	U	0.021	0.0767	U	0.24	0.369	U	4.4	0.460		0.033	0.09	U	0.09	5.3		0.81	0.02	U	0.02
8	A4	J15269	6/20/2007	0.0830	U	0.212	0.023	U	0.023	0.079	U	0.334	0.457	U	4.08	1.25		0.192	0.15	U	0.15	3.7		0.97	0.02	U	0.02
9	B5	J15270	6/20/2007	0.228	U	0.249	0.019	U	0.019	0.515		0.384	-0.491	U	4.39	0.540		0.188	0.15	U	0.15	2.8		0.97	0.01	U	0.01
10	B6	J15271	5/8/2007	0	U	0.21	0.025	U	0.025	-0.0366	U	0.24	1.78	U	4.4	0.436		0.037	0.09	U	0.09	6.0		0.8	0.01	U	0.01
11	B7	J15272	5/8/2007	0.0711	U	0.27	0.021	U	0.021	0.213	U	0.24	1.96	U	5.3	0.496		0.032	0.08	U	0.08	4.6		0.76	0.01	U	0.01
12	Duplicate of J15272	J15273	5/8/2007	0	U	0.29	0.024	U	0.024	-0.0116	U	0.25	0.384	U	4.6	0.411		0.037	0.08	U	0.08	3.9		0.76	0.01	U	0.01
13	B8	J15274	5/8/2007	0.0652	U	0.25	0.021	U	0.021	1.32		0.24	1.30	U	4.6	0.546		0.038	0.08	U	0.08	4.4		0.72	0.02	U	0.02
14	C9	J15661	6/20/2007	0.258	U	0.282	0.026		0.026	0.362		0.32	-0.328	U	4.1	0.290		0.171	0.14	U	0.14	4.3		0.95	0.01	U	0.01
15	C10	J15276	6/20/2007	0.0349	U	0.27	0.022	U	0.022	-0.0608	U	0.27	0.0762	U	4.5	0.493		0.033	0.07	U	0.07	4.6		0.68	0.01	U	0.01
16	C1	J15277	5/8/2007	0	U	0.39	0.018	U	0.018	0.0956	U	0.31	1.19	U	4.4	0.385		0.034	0.08	U	0.08	3.0		0.75	0.02	U	0.02
17	C2	J15278	5/8/2007	0	U	0.3	0.019	U	0.019	0.649		0.26	1.56	U	4.6	0.419		0.055	0.09	U	0.09	4.6		0.8	0.02	U	0.02
18	D3	J15279	5/8/2007	0.0350	U	0.27	0.018	U	0.018	0.0690	U	0.24	-1.59	U	4.3	0.557		0.031	0.10		0.08	5.3		0.75	0.01	U	0.01
19	D4	J15280	5/8/2007	0	U	0.29	0.023	U	0.023	0.0657	U	0.26	0.429	U	5.1	0.332		0.039	0.09		0.09	4.4		0.82	0.02	U	0.02
20	D5	J15281	5/21/2007	0.0390	U	0.149	0.012	U	0.012	0.118	U	0.317	0.887	U	3.74	0.524		0.223	0.15	U	0.15	3.3		0.96	0.01	U	0.01
21	D6	J15282	5/21/2007	0.243		0.155	0.026	U	0.026	0.566		0.306	1.94	U	3.95	0.478		0.203	0.15	U	0.15	3.9		0.96	0.02	U	0.02
22	D7	J15688	6/21/2007	0.071	U	0.18	0.023	U	0.023	0.119	U	0.267	3.09	U	3.59	0.439		0.177	0.14	U	0.14	5.3		0.95	0.02	U	0.02

23 **Statistical Computation Input Data**

24	Sample	Sample	Sample	Plutonium-239/240			Silver-108m			Stronium-90			Tritium			Uranium-238			Cadmium			Lead			Mercury		
25	Area	Number	Date	pCi/g			pCi/g			pCi/g			pCi/g			pCi/g			mg/kg			mg/kg			mg/kg		
26	A1	J15266	5/8/2007	0.0736			0.043			0.0586			1.64			0.469			0.04			7.9			0.005		
27	A2	J15267	5/8/2007	0			0.013			0.0382			1.02			0.447			0.04			7.6			0.01		
28	A3	J15268	5/8/2007	0.0346			0.011			0.0767			0.369			0.460			0.05			5.3			0.01		
29	A4	J15269	6/20/2007	0.0830			0.012			0.0790			0.457			1.250			0.08			3.7			0.01		
30	B5	J15270	6/20/2007	0.228			0.010			0.515			-0.491			0.540			0.08			2.8			0.005		
31	B6	J15271	5/8/2007	0			0.013			-0.0366			1.78			0.436			0.05			6.0			0.005		
32	B7	J15272/J15273	5/8/2007	0.140			0.011			0.123			2.48			0.454			0.04			4.3			0.005		
33	B8	J15274	5/8/2007	0.0652			0.011			1.32			1.30			0.546			0.04			4.4			0.01		
34	C9	J15661	6/20/2007	0.258			0.026			0.362			-0.328			0.290			0.07			4.3			0.005		
35	C10	J15276	6/20/2007	0.0349			0.011			-0.0608			0.076			0.493			0.04			4.6			0.005		
36	C1	J15277	5/8/2007	0			0.009			0.0956			1.19			0.385			0.04			3.0			0.01		
37	C2	J15278	5/8/2007	0			0.010			0.649			1.56			0.419			0.05			4.6			0.01		
38	D3	J15279	5/8/2007	0.0350			0.009			0.069			-1.59			0.557			0.10			5.3			0.005		
39	D4	J15280	5/8/2007	0			0.012			0.066			0.429			0.332			0.09			4.4			0.01		
40	D5	J15281	5/21/2007	0.0390			0.006			0.118			0.887			0.524			0.08			3.3			0.005		
41	D6	J15282	5/21/2007	0.243			0.013			0.566			1.94			0.478			0.08			3.9			0.01		
42	D7	J15688	6/21/2007	0.071			0.012			0.119			3.09			0.439			0.07			5.3			0.01		

43 **Statistical Computations**

44		Plutonium-239/240	Silver-108m	Stronium-90	Tritium	Uranium-238	Cadmium	Lead	Mercury
45	95% UCL based on	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Greater than 50% below detection. Default to max. value.	Large data set (n >10), use MTCAStat lognormal distribution.	Greater than 50% below detection. Default to max. value.
46	N	17	17	17	17	17	17	17	17
47	% < Detection limit	94%	94%	71%	100%	0%	88%	0%	100%
48	Mean	0.077	0.013	0.24	0.93	0.50	0.059	4.7	0.0076
49	Standard deviation	0.088	0.0085	0.35	1.2	0.21	0.021	1.4	0.0026
50	95% UCL on mean	0.11	0.017	0.38	1.4	0.58	0.067	5.4	0.0087
51	Maximum detected value	0.24	0.026	1.3	0	1.3	0.10	7.9	0.00
52	Background	NA	NA	NA	NA	1.1	NA	NA	NA
53	Statistical value above background*	0.11	0.017	0.38	1.4	0 (< BG)	0.10	5.4	0.00
54	**Most Stringent Cleanup Limit for nonradionuclide and RAG type**						0.81 BG/GW/River Protection	10.2 BG/GW/River Protection	0.33 BG/GW/River Protection
55	**WAC 173-340 3-PART TEST**								
56	95% UCL > Cleanup Limit?						NA	NA	NA
57	> 10% above Cleanup Limit?						NA	NA	NA
58	Any sample > 2X Cleanup Limit?						NA	NA	NA
59	**WAC 173-340 Compliance?** YES						Because all values are below background (0.81 mg/kg), the WAC 173-340 3-part test is not required.	Because all values are below background (10.2 mg/kg), the WAC 173-340 3-part test is not required.	Because all values are below background (0.33 mg/kg), the WAC 173-340 3-part test is not required.

60 *Background is not subtracted for nonradionuclides; consideration of background is given by direct comparison against background values.

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway
Project 100-F Field Remediation
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations

Date 09/06/07
Job No. 14655

Calc. No. 0100F-CA-V0279
Checked J. M. Capron

Rev. No. 1
Date 09/06/07
Sheet No. 7 of 14

118-F-1 Overburden/BCL Material Statistical Calculations

Verification Data

Sample Area	Sample Number	Sample Date	Americium-241			Carbon-14			Cesium-137			Cobalt-60			Europium-152			Europium-154			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
A1	J15249	5/2/2007	-0.0434	U	0.42	-0.931	U	2.5	0.0661		0.041	0.032	U	0.032	0.082	U	0.082	0.1	U	0.1	0.904	U	4.8	-0.0321	U	0.35
A2	J15250	5/2/2007	-0.0304	U	0.23	-1.48	U	3.5	0.039	U	0.039	0.031	U	0.031	0.075	U	0.075	0.093	U	0.093	2.66	U	4.9	0.0351	U	0.27
A3	J15251	5/2/2007	0	U	0.26	-0.433	U	3.9	0.027	U	0.027	0.025	U	0.025	0.066	U	0.066	0.09	U	0.09	1.03	U	4.7	0.0777	U	0.25
A4	J15252	5/2/2007	0	U	0.3	-0.978	U	3.5	0.035	U	0.035	0.031	U	0.031	0.089	U	0.089	0.092	U	0.092	0.256	U	4.4	0	U	0.21
B5	J15253	5/3/2007	-0.0384	U	0.29	-0.937	U	3.8	0.0434		0.03	0.032	U	0.032	0.087	U	0.087	0.11	U	0.11	-0.183	U	3.9	0	U	0.22
B6	J15254	5/3/2007	0	U	0.3	-1.34	U	3.9	0.0346		0.026	0.029	U	0.029	0.075	U	0.075	0.096	U	0.096	0.688	U	4.2	0.0662	U	0.25
B7	J15255	5/3/2007	0	U	0.27	-2.29	U	4.5	0.028	U	0.028	0.023	U	0.023	0.066	U	0.066	0.096	U	0.096	0	U	3.7	0.034	U	0.26
B8	J15256	5/3/2007	-0.041	U	0.39	-1.48	U	3.7	0.0436		0.03	0.029	U	0.029	0.086	U	0.086	0.091	U	0.091	0.225	U	3.9	0	U	0.38
C9	J15257	5/3/2007	0	U	0.062	-0.334	U	3.4	0.03	U	0.03	0.029	U	0.029	0.077	U	0.077	0.11	U	0.11	0	U	3.6	0	U	0.31
C10	J15258	5/3/2007	0.599		0.31	-0.041	U	3.3	0.036		0.029	0.031	U	0.031	0.073	U	0.073	0.089	U	0.089	1.50	U	6.6	-0.0783	U	0.43
C1	J15259	5/3/2007	0	U	0.3	-1.11	U	3.7	0.0483		0.041	0.037	U	0.037	0.087	U	0.087	0.11	U	0.11	1.80	U	6.1	-0.0501	U	0.38
C2	J15260	5/3/2007	-0.032	U	0.31	-0.412	U	3.3	0.0592		0.029	0.028	U	0.028	0.082	U	0.082	0.088	U	0.088	0.698	U	6.5	0.0947	U	0.24
D3	J15261	5/3/2007	.0	U	0.28	-0.452	U	4	0.0556		0.029	0.028	U	0.028	0.073	U	0.073	0.093	U	0.093	0.872	U	6.5	0	U	0.28
Duplicate of J15261	J15262	5/3/2007	-0.0685	U	0.52	0.417	U	3.7	0.0438		0.03	0.026	U	0.026	0.065	U	0.065	0.086	U	0.086	0.416	U	6.2	0.0281	U	0.27
D4	J15263	5/3/2007	0.0324	U	0.25	-0.67	U	3.8	0.05		0.038	0.031	U	0.031	0.086	U	0.086	0.12	U	0.12	-0.115	U	0.43	0	U	0.29
D5	J15264	5/3/2007	-0.0982	U	0.38	-1.51	U	3.8	0.0449		0.03	0.028	U	0.028	0.082	U	0.082	0.09	U	0.09	0.0953	U	0.36	0.0476	U	0.36
D6	J15265	5/3/2007	-0.05	U	0.38	-1.65	U	4.3	0.063		0.032	0.032	U	0.032	0.08	U	0.08	0.099	U	0.099	0.0337	U	0.32	-0.0337	U	0.26

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Americium-241 pCi/g	Carbon-14 pCi/g	Cesium-137 pCi/g	Cobalt-60 pCi/g	Europium-152 pCi/g	Europium-154 pCi/g	Nickel-63 pCi/g	Plutonium-238 pCi/g
A1	J15249	5/2/2007	0.21	1.25	0.0661	0.016	0.041	0.0500	2.40	0.175
A2	J15250	5/2/2007	0.115	1.75	0.0195	0.0155	0.0375	0.0465	2.45	0.135
A3	J15251	5/2/2007	0.13	1.95	0.0135	0.0125	0.033	0.0450	2.35	0.125
A4	J15252	5/2/2007	0.15	1.75	0.0175	0.0155	0.0445	0.0460	2.20	0.105
B5	J15253	5/3/2007	0.145	1.9	0.0434	0.016	0.0435	0.0550	1.95	0.110
B6	J15254	5/3/2007	0.15	1.95	0.0346	0.0145	0.0375	0.0480	2.10	0.125
B7	J15255	5/3/2007	0.135	2.25	0.014	0.0115	0.033	0.0480	1.85	0.130
B8	J15256	5/3/2007	0.195	1.85	0.0436	0.0145	0.043	0.0455	1.95	0.190
C9	J15257	5/3/2007	0.031	1.7	0.015	0.0145	0.0385	0.0550	1.80	0.155
C10	J15258	5/3/2007	0.599	1.65	0.036	0.0155	0.0365	0.0445	3.30	0.215
C1	J15259	5/3/2007	0.15	1.85	0.0483	0.0185	0.0435	0.0550	3.05	0.190
C2	J15260	5/3/2007	0.155	1.65	0.0592	0.014	0.041	0.0440	3.25	0.120
D3	J15261/J15263	5/3/2007	0.200	1.925	0.050	0.014	0.035	0.0448	3.18	0.138
D4	J15263	5/3/2007	0.125	1.9	0.05	0.0155	0.043	0.0600	0.22	0.145
D5	J15264	5/3/2007	0.19	1.9	0.0449	0.014	0.041	0.0450	0.18	0.180
D6	J15265	5/3/2007	0.19	2.15	0.063	0.016	0.04	0.0495	0.16	0.130

Statistical Computations

	Americium-241	Carbon-14	Cesium-137	Cobalt-60	Europium-152	Europium-154	Nickel-63	Plutonium-238
95% UCL based on	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.
N	16	16	16	16	16	16	16	16
% < Detection limit	94%	100%	25%	100%	100%	100%	100%	100%
Mean	0.18	1.8	0.039	0.015	0.039	0.049	2.0	0.15
Standard deviation	0.12	0.23	0.018	0.0016	0.0038	0.0049	1.0	0.033
95% UCL on mean	0.23	1.9	0.046	0.016	0.041	0.051	2.5	0.16
Maximum detected value	0.60	0	0.066	0	0	0	0	0
Background	NA	NA	1.1	0.008	NA	0.033	NA	0.004
Statistical value above background*	0.23	1.9	0 (< BG)	0.0075	0.041	0.018	2.5	0.16

*Background is not subtracted for nonradionuclides; consideration of background is given by direct comparison against background values.

Washington Closure Hanford

CALCULATION SHEET

Originator H. M. Sulloway
Project 100-F Field Remediation
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations

Date 09/06/07
Job No. 14655

Calc. No. 0100F-CA-V0279
Checked J. M. Capron

Rev. No. 1
Date 09/06/07
Sheet No. 8 of 14

1 **118-F-1 Overburden/BCL Material Statistical Calculations, continued**

2 **Verification Data**

3	Sample	Sample	Sample	Plutonium-239/240			Silver-108m			Stronium-90			Tritium			Uranium-238			Cadmium			Lead			Mercury		
4	Area	Number	Date	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
5	A1	J15249	5/2/2007	0.0641	U	0.25	0.023	U	0.023	0.072	U	0.32	-0.0398	U	2.7	0.459		0.21	0.09	U	0.09	10.5		0.86	0.02	U	0.02
6	A2	J15250	5/2/2007	0	U	0.27	0.02	U	0.02	-0.0205	U	0.35	-0.892	U	2.5	0.395		0.2	0.09	U	0.09	6.6		0.85	0.02	U	0.02
7	A3	J15251	5/2/2007	-0.0259	U	0.2	0.018	U	0.018	0.15	U	0.31	-0.802	U	2.8	0.635		0.19	0.09	U	0.09	11.2		0.84	0.01	U	0.01
8	A4	J15252	5/2/2007	-0.0277	U	0.21	0.024	U	0.024	0.035	U	0.28	-0.0379	U	2.5	0.367		0.19	0.09	U	0.09	15.7		0.84	0.02	U	0.02
9	B5	J15253	5/3/2007	0	U	0.22	0.024	U	0.024	0.0657	U	0.3	-0.464	U	2.8	0.523		0.19	0.09	U	0.09	22.8		0.84	0.02	U	0.02
10	B6	J15254	5/3/2007	0	U	0.25	0.02	U	0.02	0.0477	U	0.29	-1.01	U	2.8	0.453		0.22	0.09	U	0.09	10.4		0.83	0.02	U	0.02
11	B7	J15255	5/3/2007	0	U	0.26	0.017	U	0.017	-0.0738	U	0.29	-0.925	U	3.3	0.412		0.21	0.09	U	0.09	13.5		0.84	0.01	U	0.01
12	B8	J15256	5/3/2007	0	U	0.3	0.022	U	0.022	0.0726	U	0.29	-0.0795	U	2.7	0.383		0.13	0.09	U	0.09	6.9		0.84	0.01	U	0.01
13	C9	J15257	5/3/2007	0.0324	U	0.25	0.023	U	0.023	0.0354	U	0.4	0.332	U	2.5	0.469		0.12	0.089	U	0.09	5.8		0.83	0.02	U	0.02
14	C10	J15258	5/3/2007	0.0391	U	0.3	0.02	U	0.02	0.0206	U	0.24	-1.17	U	4.9	0.563		0.23	0.09	U	0.09	6.4		0.82	0.01	U	0.01
15	C1	J15259	5/3/2007	0	U	0.38	0.027	U	0.027	-0.0438	U	0.22	2.6	U	5.5	0.403		0.16	0.09	U	0.09	9.9		0.82	0.02	U	0.02
16	C2	J15260	5/3/2007	-0.0316	U	0.24	0.023	U	0.023	0.0711	U	0.27	-1.74	U	5.6	0.35		0.16	0.09	U	0.09	8.3		0.82	0.01	U	0.01
17	D3	J15261	5/3/2007	0.0371	U	0.28	0.02	U	0.02	0.0217	U	0.24	2.55	U	6.7	0.328		0.15	0.09	U	0.09	5.1		0.83	0.02	U	0.02
	Duplicate of J15261	J15262	5/3/2007	0	U	0.22	0.017	U	0.017	-0.0069	U	0.24	1.12	U	6.1	0.49		0.27	0.09	U	0.09	6.3		0.83	0.01	U	0.01
18	D4	J15263	5/3/2007	-0.115	U	0.43	0.025	U	0.025	0.0198	U	0.24	0.0212	U	6.4	0.416		0.2	0.09	U	0.09	5.6		0.81	0.007	U	0.007
19	D5	J15264	5/3/2007	0.0953	U	0.36	0.023	U	0.023	-0.0433	U	0.24	1.58	U	6.3	0.454		0.18	0.09	U	0.09	10.0		0.83	0.02	U	0.02
20	D6	J15265	5/3/2007	0.0337	U	0.32	0.022	U	0.022	-0.0547	U	0.27	2.31	U	7.3	0.511		0.19	0.09	U	0.09	8.2		0.82	0.01	U	0.01

21 **Statistical Computation Input Data**

22	Sample	Sample	Sample	Plutonium-239/240	Silver-108m	Stronium-90	Tritium	Uranium-238	Cadmium	Lead	Mercury
23	Area	Number	Date	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	mg/kg	mg/kg	mg/kg
24	A1	J15249	5/2/2007	0.125	0.0115	0.16	1.35	0.459	0.045	10.5	0.01
25	A2	J15250	5/2/2007	0.135	0.01	0.175	1.25	0.395	0.045	6.6	0.01
26	A3	J15251	5/2/2007	0.1	0.009	0.155	1.4	0.635	0.045	11.2	0.005
27	A4	J15252	5/2/2007	0.105	0.012	0.14	1.25	0.367	0.045	15.7	0.01
28	B5	J15253	5/3/2007	0.11	0.012	0.15	1.4	0.523	0.045	22.8	0.01
29	B6	J15254	5/3/2007	0.125	0.01	0.145	1.4	0.453	0.045	10.4	0.01
30	B7	J15255	5/3/2007	0.13	0.0085	0.145	1.65	0.412	0.045	13.5	0.005
31	B8	J15256	5/3/2007	0.15	0.011	0.145	1.35	0.383	0.045	6.9	0.005
32	C9	J15257	5/3/2007	0.125	0.0115	0.2	1.25	0.469	0.045	5.8	0.01
33	C10	J15258	5/3/2007	0.15	0.01	0.12	2.45	0.563	0.045	6.4	0.005
34	C1	J15259	5/3/2007	0.19	0.0135	0.11	2.75	0.403	0.045	9.9	0.01
35	C2	J15260	5/3/2007	0.12	0.0115	0.135	2.8	0.35	0.045	8.3	0.005
36	D3	J15261/J15263	5/3/2007	0.125	0.009	0.120	3.200	0.409	0.045	5.7	0
37	D4	J15263	5/3/2007	0.215	0.0125	0.12	3.2	0.416	0.045	5.6	0.0035
38	D5	J15264	5/3/2007	0.18	0.0115	0.12	3.15	0.454	0.045	10.0	0.01
39	D6	J15265	5/3/2007	0.16	0.011	0.135	3.65	0.511	0.045	8.2	0.005

40 **Statistical Computations**

41		Plutonium-239/240	Silver-108m	Stronium-90	Tritium	Uranium-238	Cadmium	Lead	Mercury
42	95% UCL based on	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Greater than 50% below detection. Default to max.	Large data set (n >10), use MTCAStat lognormal distribution.	Greater than 50% below detection. Default to max.
43	N	16	16	16	16	16	16	16	16
44	% < Detection limit	100%	100%	100%	100%	0%	100%	0%	100%
45	Mean	0.1	0.0	0	2.1	0.5	0.045	9.8	0.0076
46	Standard deviation	0.0	0.0	0	0.89	0.1	0	4.5	0.0026
47	95% UCL on mean	0.15	0.011	0.15	2.5	0.48	0.090	12	0.017
48	Maximum detected value	0	0	0	0	1	0.00	23	0.00
49	Background	0.025	NA	0.18	NA	1.1	NA	NA	NA
49	Statistical value above background*	0.129	0.011	0 (< BG)	2.5	0 (< BG)	0.00	12	0.00
50	**Most Stringent Cleanup Limit for nonradionuclide and RAG type**						0.81 BG/GW/River Protection	10.2 BG/GW/River Protection	0.33 BG/GW/River Protection
51	**WAC 173-340 3-PART TEST**								
52	95% UCL > Cleanup Limit?						NA	Yes	NA
53	> 10% above Cleanup Limit?						NA	Yes	NA
54	Any sample > 2X Cleanup Limit?						NA	Yes	NA
55	**WAC 173-340 Compliance?** **Further assessment required**						Because all values are below background (0.81 mg/kg), the WAC 173-340 3-part test is not required.	Because of the "yes" answers to the 3-part test, a detailed assessment using RESRAD will be performed. The data set meets the 3-part test criteria when compared to the direct exposure cleanup level.	Because all values are below background (0.33 mg/kg), the WAC 173-340 3-part test is not required.

56 *Background is not subtracted for nonradionuclides; consideration of background is given by direct comparison against background values.

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway
Project 100-F Field Remediation
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations

Date 09/06/07
Job No. 14655

Calc. No. 0100F-CA-V0279
Checked J. M. Capron

Rev. No. 1
Date 09/06/07
Sheet No. 9 of 14

1 **118-F-1 Process Trench Shallow Zone Statistical Calculations**
2 **Verification Data**

3	Sample	Sample	Sample	Americium-241			Carbon-14			Cesium-137			Cobalt-60			Europium-152			Europium-154			Nickel-63			Plutonium-238			Plutonium-239/240		
4	Area	Number	Date	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
5	A1	J15283	5/10/2007	0	U	0.26	-1.05	U	2.7	0.237		0.037	0.040	U	0.040	0.10	U	0.10	0.13	U	0.13	-0.37	U	3.3	0.0338	U	0.26	0.135	U	0.26
6	A2	J15284	5/10/2007	0.0372	U	0.28	-0.715	U	2.8	0.211		0.028	0.082		0.025	0.17	U	0.17	0.091	U	0.091	0.736	U	3.3	0.0448	U	0.34	0.0448	U	0.34
7	A3	J15285	5/10/2007	0.0298	U	0.23	-0.528	U	2.7	0.382		0.033	0.082	U	0.082	0.25	U	0.25	0.099	U	0.099	1.22	U	3.3	0.054	U	0.41	0	U	0.41
8	A4	J15286	5/10/2007	-0.0399	U	0.31	-0.381	U	2.8	0.191		0.025	0.062		0.034	0.21		0.07	0.1	U	0.1	14.3		3.2	0.0751	U	0.29	0.263	U	0.29
9	Duplicate of J15286	J15287	5/10/2007	0.0373	U	0.29	-1.56	U	2.7	1.00		0.032	0.114		0.034	0.14		0.08	0.098	U	0.098	1.51	U	3.3	-0.043	U	0.33	0.043	U	0.33
10	A5	J15689	6/21/2007	0	U	0.293	-1.93	U	3.42	0.078	U	0.078	0.041	U	0.041	0.09	U	0.09	0.138	U	0.138	-1.01	U	3.16	0.031	U	0.236	0.062	U	0.236

11 **Statistical Computation Input Data**

12	Sample	Sample	Sample	Americium-241	Carbon-14	Cesium-137	Cobalt-60	Europium-152	Europium-154	Nickel-63	Plutonium-238	Plutonium-239/240
13	Area	Number	Date	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g	pCi/g
14	A1	J15283	5/10/2007	0	-1.05	0.237	0.020	0.050	0.065	-0.370	0.0338	0.135
15	A2	J15284	5/10/2007	0.037	-0.715	0.211	0.082	0.085	0.046	0.736	0.0448	0.0448
16	A3	J15285	5/10/2007	0.030	-0.528	0.382	0.041	0.125	0.050	1.220	0.0540	0.0000
17	A4	J15286/ J15287	5/10/2007	0.150	1.38	0.596	0.088	0.18	0.050	7.98	0.155	0.155
18	A5	J15689	6/21/2007	0	-1.93	0.039	0.021	0.045	0.069	-1.01	0.0310	0.062

19 **Statistical Computations**

20		Americium-241	Carbon-14	Cesium-137	Cobalt-60	Europium-152	Europium-154	Nickel-63	Plutonium-238	Plutonium-239/240
21	95% UCL based on	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.
22	N	5	5	5	5	5	5	5	5	5
23	% < Detection limit	100%	100%	20%	60%	80%	100%	80%	100%	100%
24	Mean	0.043	-0.57	0.29	0.050	0.10	0.056	1.7	0.064	0.079
25	Standard deviation	0.062	1.2	0.21	0.033	0.055	0.011	3.6	0.052	0.064
26	95% UCL on mean	0.089	0.32	0.45	0.074	0.14	0.063	4.4	0.10	0.13
27	Maximum detected value	0	0	1.0	0.11	0.21	0	14	0	0
28	Background	NA	NA	NA	NA	NA	NA	NA	NA	NA
29	Statistical value above background*	0.089	0.32	0.45	0.074	0.14	0.063	4.4	0.10	0.13

30 *Background is not subtracted for nonradionuclides; consideration of background is given by direct comparison against background values.

Washington Closure Hanford

CALCULATION SHEET

Originator H. M. Sulloway
Project 100-F Field Remediation
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations

Date 09/06/07
Job No. 14655

Calc. No. 0100F-CA-V0279
Checked J. M. Capron

Rev. No. 1
Date 09/06/07
Sheet No. 10 of 14

118-F-1 Process Trench Shallow Zone Statistical Calculations, continued

Verification Data

Sample Area	Sample Number	Sample Date	Silver-108m			Stronium-90			Tritium			Uranium-238			Cadmium			Lead			Mercury		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
A1	J15283	5/10/2007	0.026	U	0.026	0.180	U	0.25	1.58	U	3.9	0.429		0.16	0.08	U	0.08	2.7		0.7	0.02	U	0.02
A2	J15284	5/10/2007	0.020	U	0.020	0.176	U	0.22	0	U	3.9	0.704		0.2	0.10		0.09	2.9		0.85	0.01	U	0.01
A3	J15285	5/10/2007	0.020	U	0.020	0.176		0.22	0	U	3.9	0.704		0.2	0.10		0.09	2.9		0.85	0.01		0.01
A4	J15286	5/10/2007	0.023	U	0.023	0.338		0.23	1.18	U	3.9	0.465		0.19	0.08	U	0.08	3.4		0.77	0.02		0.01
Duplicate of J15286	J15287	5/10/2007	0.021	U	0.021	0.144	U	0.22	0.122	U	4.1	0.297		0.21	0.09	U	0.09	4.2		0.84	0.02	U	0.02
A5	J15689	6/21/2007	0.027	U	0.027	-0.016	U	0.272	2.38	U	3.81	0.406	U	0.173	0.15	U	0.15	32		0.96	0.01	U	0.01

Statistical Computation Input Data

Sample Area	Sample Number	Sample Date	Silver-108m pCi/g			Stronium-90 pCi/g			Tritium pCi/g			Uranium-238 pCi/g			Cadmium mg/kg			Lead mg/kg			Mercury mg/kg		
A1	J15283	5/10/2007	0.013			0.180			1.58			0.429			0.040			2.7			0.010		
A2	J15284	5/10/2007	0.010			0.176			0			0.704			0.10			2.9			0.0050		
A3	J15285	5/10/2007	0.010			0.176			0			0.704			0.10			2.9			0.010		
A4	J15286/J 15287	5/10/2007	0.011			0.224			2.00			0.381			0.043			3.8			0.015		
A5	J15689	6/21/2007	0.014			-0.016			2.38			0.406			0.075			32			0.005		

Statistical Computations

	Silver-108m	Stronium-90	Tritium	Uranium-238	Cadmium	Lead	Mercury
95% UCL based on	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Radionuclide data set. Use nonparametric z-stat.	Greater than 50% below detection. Default to max. value.	Small nonradionuclide data set. Use nonparametric z-stat.	Greater than 50% below detection. Default to max. value.
N	5	5	5	5	5	5	5
% < Detection limit	100%	60%	100%	20%	60%	0%	60%
Mean	0.012	0.15	1.2	0.52	0.072	8.9	0.0090
Standard deviation	0.0017	0.094	1.1	0.16	0.029	13	0.0042
95% UCL on mean	0.013	0.22	2.0	0.65	0.093	18	0.012
Maximum detected value	0	0	0	0.70	0.10	32	0.02
Background	NA	NA	NA	1.1	NA	NA	NA
Statistical value above background*	0.013	0.217	2.0	0 (< BG)	0.10	18	0.020
Most Stringent Cleanup Limit for nonradionuclide and RAG type					0.81 BG/GW/River Protection	10.2 BG/GW/River Protection	0.33 BG/GW/River Protection
WAC 173-340 3-PART TEST							
95% UCL > Cleanup Limit?					NA	Yes	NA
> 10% above Cleanup Limit?					NA	Yes	NA
Any sample > 2X Cleanup Limit?					NA	Yes	NA
WAC 173-340 Compliance? **Further assessment required**					Because all values are below background (0.81 mg/kg), the WAC 173-340 3-part test is not required.	Because of the "yes" answers to the 3-part test, a detailed assessment using RESRAD will be performed. The data set meets the 3-part test criteria when compared to the direct exposure cleanup level.	Because all values are below background (0.33 mg/kg), the WAC 173-340 3-part test is not required.

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sullowa Date 09/06/07 Calc. No. 0100F-CA-V0279 Rev. No. 1

Project 100-F Field Remediation Job No. 14655 Checked J. M. Capron Date

Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations Sheet No. 11 of 14

Ecology Software (MTCAStat) Results

1 Excavation Shallow Zone

2 DATA	ID	Lead 95% UCL Calculation			
3 7.9	J15266				
4 7.6	J15267				
5 5.3	J15268	Number of samples		Uncensored values	
6 3.7	J15269	Uncensored	17	Mean	4.7
7 2.8	J15270	Censored		Lognormal mean	4.8
8 6.0	J15271	Detection limit or PQL		Std. devn.	1.4
9 4.3	J15272/J15273	Method detection limit		Median	4.4
10 4.4	J15274	TOTAL	17	Min.	2.8
11 4.3	J15661			Max.	7.9
12 4.6	J15276				
13 3.0	J15277				
14 4.6	J15278	Lognormal distribution?		Normal distribution?	
15 5.3	J15279	r-squared is: 0.967		r-squared is: 0.912	
16 4.4	J15280	Recommendations:			
17 3.3	J15281				
18 3.9	J15282	Use lognormal distribution.			
19 5.3	J15688				
20		UCL (Land's method) is 5.4			
21					

OB-BCL

DATA	ID	Lead 95% UCL Calculation			
11	J15249				
6.6	J15250	Number of samples		Uncensored values	
11	J15251	Uncensored	17	Mean	9.6
16	J15252	Censored		Lognormal mean	9.6
23	J15253	Detection limit or PQL		Std. devn.	4.5
10	J15254	Method detection limit		Median	8.3
14	J15255	TOTAL	17	Min.	5.1
6.9	J15256			Max.	23
5.8	J15257				
6.4	J15258				
9.9	J15259				
8.3	J15260	Lognormal distribution?		Normal distribution?	
5.1	J15261	r-squared is: 0.945		r-squared is:	0.819
6.3	J15262	Recommendations:			
5.6	J15263	Use lognormal distribution.			
10	J15264				
8.2	J15265				
		UCL (Land's method) is 12			

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway **Date** 09/06/07 **Calc. No.** 0100F-CA-V0279 **Rev. No.** 1
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. M. Capron **Date**
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations **Sheet No.** 12 of 14

Split/Duplicate Analysis, Excavation Shallow Zone

Sample Area	Sample Number	Sample Date	Americium-241			Carbon-14			Cesium-137			Cobalt-60			Europium-152			Europium-154			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
B7	J15272	5/8/2007	0	U	0.33	4.27	U	4.4	0.115		0.027	0.029	U	0.029	0.072	U	0.072	0.097	U	0.097	0.64	U	4.1	-0.0356	U	0.27
Duplicate of J15272	J15273	5/8/2007	0.0549	U	0.42	0.257	U	3.6	0.0822		0.039	0.035	U	0.035	0.09	U	0.09	0.11	U	0.11	1.85	U	5.1	0	U	0.29
Split of J15272	J152D8	5/8/2007	0.015	U	0.0398	-0.0753	U	0.821	0.0366		0.0157	-0.0045	U	0.0165	0.028	U	0.0377	-0.00259	U	0.0563	5.3		5.25	-0.00234	U	0.0561

Analysis:

TDL		1	50	0.1	0.05	0.2	0.2	30	1
Duplicate Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference
	Both >5xTDL?			No - evaluate difference					
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable
Split Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference
	Both >5xTDL?			No - evaluate difference					
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Split/Duplicate Analysis, Excavation Shallow Zone (continued)

Sample Area	Sample Number	Sample Date	Plutonium-239/240			Silver-108m			Stronium-90			Tritium			Uranium-238			Cadmium			Lead			Mercury		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
B7	J15272	5/8/2007	0.0711	U	0.27	0.021	U	0.021	0.213	U	0.24	1.96	U	5.3	0.496		0.032	0.08	U	0.08	4.6		0.76	0.01	U	0.01
Duplicate of J15272	J15273	5/8/2007	0	U	0.29	0.024	U	0.024	-0.0116	U	0.25	0.384	U	4.6	0.411		0.037	0.08	U	0.08	3.9		0.76	0.01	U	0.01
Split of J15272	J152D8	5/8/2007	-0.00234	U	0.0561	-0.00498	U	0.0116	0.0976	U	0.141	0.0131	U	0.0366	0.191		0.047	0.14	U	0.14	3.4		0.15	0.0068	U	0.0068

Analysis:

TDL		1	0.1	1	400	1	0.5	1	0.2
Duplicate Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	**Yes (continue)**	No - evaluate difference
	Both >5xTDL?					No - evaluate difference		No - evaluate difference	
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable
Split Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	**Yes (continue)**	No - evaluate difference
	Both >5xTDL?					No - evaluate difference		No - evaluate difference	
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway HMS
Project 100-F Field Remediation
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations

Date 09/06/07
Job No. 14655

Calc. No. 0100F-CA-V0279
Checked J. M. Capron JMC

Rev. No. 1
Date
Sheet No. 13 of 14

Split/Duplicate Analysis, OB-BCL

Sample Area	Sample Number	Sample Date	Americium-241			Carbon-14			Cesium-137			Cobalt-60			Europium-152			Europium-154			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
OB/BCL D3	J15261	5/3/2007	0	U	0.28	-0.452	U	4.0	0.0556		0.029	0.028	U	0.028	0.073	U	0.073	0.093	U	0.093	0.872	U	6.5	0	U	0.28
Duplicate of J15261	J15262	5/3/2007	-0.0685	U	0.52	0.417	U	3.7	0.0438		0.03	0.026	U	0.026	0.065	U	0.065	0.086	U	0.086	0.416	U	6.2	0.0281	U	0.27
Split of J15261	J152D7	5/3/2007	-0.00165	U	0.0394	0.105	U	0.814	0.0371		0.0177	0.00191	U	0.0188	-0.0184	U	0.0377	-0.00923	U	0.0612	0.606	U	1.48	0	U	0.0431

Analysis:

TDL		1	50	0.1	0.05	0.2	0.2	30	1
Duplicate Analysis	Both > MDA?	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference
	Both >5xTDL?			No - evaluate difference					
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable
Split Analysis	Both > MDA?	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference
	Both >5xTDL?			No - evaluate difference					
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Split/Duplicate Analysis, OB-BCL (continued)

Sample Area	Sample Number	Sample Date	Plutonium-239/240			Silver-108m			Stronium-90			Tritium			Uranium-238			Cadmium			Lead			Mercury		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
OB-BCL D3	J15261	5/3/2007	0.0371	U	0.28	0.02	U	0.02	0.0217	U	0.24	2.55	U	6.7	0.328		0.15	0.09	U	0.09	5.1		0.83	0.02	U	0.02
Duplicate of J15261	J15262	5/3/2007	0	U	0.22	0.017	U	0.017	-0.0069	U	0.24	1.12	U	6.1	0.49		0.27	0.09	U	0.09	6.3		0.83	0.01	U	0.01
Split of J15261	J152D7	5/3/2007	0.009	U	0.0431	0.000991	U	0.0125	0.109	U	0.126	0.0144	U	0.0338	0.167		0.0333	0.064	U	0.064	5.9		0.31	0.007	U	0.007

Analysis:

TDL		1	0.1	1	400	1	0.5	1	0.2
Duplicate Analysis	Both > PQL/MDA?	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	**Yes (continue)**	No - evaluate difference
	Both >5xTDL?					No - evaluate difference		**Yes (calc RPD)**	
	RPD							21%	
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable
Split Analysis	Both > PQL/MDA?	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	**Yes (continue)**	No - evaluate difference
	Both >5xTDL?					No - evaluate difference		**Yes (calc RPD)**	
	RPD							15%	
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	Not applicable	No - acceptable

CALCULATION SHEET

Washington Closure Hanford

Originator H. M. Sulloway **Date** 09/06/07 **Calc. No.** 0100F-CA-V0279 **Rev. No.** 1
Project 100-F Field Remediation **Job No.** 14655 **Checked** J. M. Capron **Date**
Subject 118-F-1 Burial Ground Cleanup Verification 95% UCL Calculations **Sheet No.** 14 of 14

Split/Duplicate Analysis, Process Trench Shallow Zone

Sample Area	Sample Number	Sample Date	Americium-241			Carbon-14			Cesium-137			Cobalt-60			Europium-152			Europium-154			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
PT A4	J15286	5/10/2007	-0.0399	U	0.31	-0.381	U	2.8	0.191		0.025	0.0622		0.034	0.210		0.065	0.100	U	0.100	14.3		3.2	0.0751		0.29
Duplicate of J15286	J15287	5/10/2007	0.0373	U	0.29	-1.56	U	2.7	1.00		0.032	0.114		0.034	0.144		0.077	0.098	U	0.098	1.51	U	3.3	-0.043	U	0.33
Split of J15286	J152D9	5/3/2007	0.0479		0.0186	-0.0905	U	0.823	0.0877		0.0169	0.14		0.0201	0.071	U	0.0307	0.021	U	0.0633	8.61		5.8	-0.00197		0.0409

Analysis:

TDL		1	50	0.1	0.05	0.2	0.2	30	1
Duplicate Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	No - evaluate difference	No - evaluate difference	No - evaluate difference
	Both >5xTDL?			No - evaluate difference	No - evaluate difference	No - evaluate difference			
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	***Yes - assess further***	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable
Split Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	**Yes (continue)**	**Yes (continue)**	**Yes (continue)**	No - evaluate difference	**Yes (continue)**	No - evaluate difference
	Both >5xTDL?			No - evaluate difference	No - evaluate difference	No - evaluate difference		No - evaluate difference	
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Split/Duplicate Analysis, Process Trench Shallow Zone (continued)

Sample Area	Sample Number	Sample Date	Plutonium-239/240			Silver-108m			Stronium-90			Tritium			Uranium-238			Cadmium			Lead			Mercury		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
PT A4	J15286	5/10/2007	0.263	U	0.29	0.021	U	0.021	0.144	U	0.22	0.122	U	4.1	0.297		0.21	0.09	U	0.09	4.2		0.84	0.02	U	0.02
Duplicate of J15286	J15287	5/10/2007	0.043	U	0.33	0.023	U	0.023	-0.0949	U	0.29	2.24	U	4.0	0.619		0.21	0.09	U	0.09	3		0.84	0.01	U	0.01
Split of J15286	J152D9	5/3/07	0.00623	U	0.0409	-9.6E-06	U	0.0126	0.0458		0.164	0.0379		0.0264	0.273		0.0509	0.14		0.14	3.2		0.15	0.01		0.01

Analysis:

TDL		1	0.1	1	400	1	0.5	1	0.2
Duplicate Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	**Yes (continue)**	No - evaluate difference
	Both >5xTDL?					No - evaluate difference		No - evaluate difference	
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable
Split Analysis	Both > PQL?	No - evaluate difference	No - evaluate difference	No - evaluate difference	No - evaluate difference	**Yes (continue)**	No - evaluate difference	**Yes (continue)**	No - evaluate difference
	Both >5xTDL?					No - evaluate difference		No - evaluate difference	
	RPD								
	Difference >2xTDL?	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable	No - acceptable

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Americium-241			Americium-241 GEA			Carbon-14			Cesium-137			Cobalt-60			Curium-242		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ Area 1 A1	J15266	5/8/07	-0.0687	U	0.33	0.1	U	0.1	-0.204	U	3.4	0.028	U	0.028	0.03	U	0.03	0	U	0.27
SZ Area 1 A2	J15267	5/8/07	0.0338	U	0.26	0.042	U	0.042	1.18	U	3.8	0.720		0.034	0.031	U	0.031	0	U	0.27
SZ Area 1 A3	J15268	5/8/07	-0.0663	U	0.51	0.17	U	0.17	0.240	U	3.4	0.026	U	0.026	0.028	U	0.028	0	U	0.53
SZ Area 1 A4	J15269	6/20/07	0	U	0.284	0.24	U	0.243	-1.48	U	3.14	0.035	U	0.035	0.030	U	0.030	0.076	U	0.292
SZ Area 2 B5	J15270	6/20/07	-0.040		0.33	0.090	U	0.090	-0.495	U	3.36	0.026	U	0.026	0.027	U	0.027	0	U	0.311
SZ Area 2 B6	J15271	5/8/07	0	U	0.28	0.27	U	0.27	0.780	U	3.5	0.146		0.033	0.036	U	0.036	0	U	0.29
SZ Area 2 B7	J15272	5/8/07	0	U	0.33	0.09	U	0.090	4.27	U	4.4	0.115		0.027	0.029	U	0.029	0	U	0.35
Duplicate of J15272	J15273	5/8/07	0.0549	U	0.42	0.25	U	0.25	0.257	U	3.6	0.0822		0.039	0.035	U	0.035	0.0571	U	0.44
Split of J15272	J152D8	5/8/07	0.015	U	0.0398				-0.0753	U	0.821	0.0366		0.0157	-0.0045	U	0.0165			
SZ Area 2 B8	J15274	5/8/07	-0.0373	U	0.29	0.039	U	0.039	1.64	U	3.7	0.115		0.030	0.031	U	0.031	0	U	0.3
SZ Area 3 C9	J15661	6/20/07	0.065	U	0.247	0.268	U	0.268	0.948	U	3.11	0.071		0.040	0.032	U	0.032	0	U	0.253
SZ Area 3 C10	J15276	6/20/07	0.0943	U	0.45	0.17	U	0.17	0.804	U	3.6	0.426		0.030	0.029	U	0.029	0	U	0.37
SZ Area 3 C1	J15277	5/8/07	0.108	U	0.35	0.080	U	0.080	0.438	U	3.6	0.0527		0.024	0.0456		0.022	0.0375	U	0.29
SZ Area 3 C2	J15278	5/8/07	0	U	0.29	0.033	U	0.033	0.997	U	3.8	0.179		0.027	0.041	U	0.041	0.0392	U	0.30
SZ Area 4 D3	J15279	5/8/07	0.194	U	0.25	0.15	U	0.15	0.372	U	3.4	0.0804		0.026	0.125		0.029	0	U	0.26
SZ Area 4 D4	J15280	5/8/07	0	U	0.34	0.26	U	0.26	2.59	U	4.1	0.034	U	0.034	0.034	U	0.034	0	U	0.35
SZ Area 4 D5	J15281	5/21/07	0.032	U	0.246	0.028	U	0.028	-1.64	U	3.32	0.128		0.017	0.047	U	0.047	0	U	0.251
SZ Area 4 D6	J15282	5/21/07	0	U	0.256	0.043	U	0.043	-1.8	U	3.62	0.161		0.038	0.109	U	0.109	0.034	U	0.262
SZ Area 4 D7	J15688	6/21/07	0.039	U	0.300	0.098	U	0.098	-0.934	U	3.20	0.052	U	0.052	0.033	U	0.033	0	U	0.307
OB/BCL A1	J15249	5/2/07	-0.0434	U	0.42	0.1	U	0.1	-0.931	U	2.5	0.0661		0.041	0.032	U	0.032	0.0921	U	0.35
OB/BCL A2	J15250	5/2/07	-0.0304	U	0.23	0.036	U	0.036	-1.48	U	3.5	0.039	U	0.039	0.031	U	0.031	0.0644	U	0.25
OB/BCL A3	J15251	5/2/07	0	U	0.26	0.046	U	0.046	-0.433	U	3.9	0.027	U	0.027	0.025	U	0.025	0.0356	U	0.27
OB/BCL A4	J15252	5/2/07	0	U	0.30	0.22	U	0.22	-0.978	U	3.5	0.035	U	0.035	0.031	U	0.031	0.0419	U	0.32
OB/BCL B5	J15253	5/3/07	-0.0384	U	0.29	0.11	U	0.11	-0.937	U	3.8	0.0434		0.030	0.032	U	0.032	0.0813	U	0.31
OB/BCL B6	J15254	5/3/07	0	U	0.30	0.035	U	0.035	-1.34	U	3.9	0.0346		0.026	0.029	U	0.029	0.0838	U	0.32
OB/BCL B7	J15255	5/3/07	0	U	0.27	0.045	U	0.045	-2.29	U	4.5	0.028	U	0.028	0.023	U	0.023	0.0373	U	0.28
OB/BCL B8	J15256	5/3/07	-0.0410	U	0.39	0.21	U	0.21	-1.48	U	3.7	0.0436		0.030	0.029	U	0.029	0.0868	U	0.33
OB/BCL C9	J15257	5/3/07	0	U	0.062	0.10	U	0.10	-0.334	U	3.4	0.0300	U	0.030	0.029	U	0.029	0.0275	U	0.053
OB/BCL C10	J15258	5/3/07	0.599		0.31	0.033	U	0.033	-0.041	U	3.3	0.0360		0.029	0.031	U	0.031	-0.0422	U	0.32
OB/BCL C1	J15259	5/3/07	0	U	0.3	0.24	U	0.24	-1.11	U	3.7	0.0483		0.041	0.037	U	0.037	0.0419	U	0.32
OB/BCL C2	J15260	5/3/07	-0.0320	U	0.31	0.21	U	0.21	-0.412	U	3.3	0.0592		0.029	0.028	U	0.028	0.0677	U	0.26
OB/BCL D3	J15261	5/3/07	0	U	0.28	0.091	U	0.091	-0.452	U	4	0.0556		0.029	0.028	U	0.028	0	U	0.29
Duplicate of J15261	J15262	5/3/07	-0.0685	U	0.52	0.031	U	0.031	0.417	U	3.7	0.0438		0.030	0.026	U	0.026	0	U	0.55
Split of J15261	J152D7	5/3/07	-0.00165	U	0.0394				0.105	U	0.814	0.0371		0.0177	0.00191	U	0.0188			
OB/BCL D4	J15263	5/3/07	0.0324	U	0.25	0.22	U	0.22	-0.670	U	3.8	0.0500		0.038	0.031	U	0.031	-0.0343	U	0.26
OB/BCL D5	J15264	5/3/07	-0.0982	U	0.38	0.20	U	0.2	-1.51	U	3.8	0.0449		0.030	0.028	U	0.028	0	U	0.40
OB/BCL D6	J15265	5/3/07	-0.0500	U	0.38	0.097	U	0.097	-1.65	U	4.3	0.0630		0.032	0.032	U	0.032	0	U	0.40

Note: The following abbreviations apply to all Attachment 1 tables.

Note: Data qualified with B, C, N, and/or J are considered acceptable values.

B = method blank contamination
BCL = below cleanup levels
C = method blank contamination
GEA = gamma energy analysis
J = estimated
MDA = minimum detectable activity
N = spiked analyte recovery outside control limits
OB = overburden
PQL = practical quantitation limit
PT = process trench
Q = qualifier
R = rejected
SZ = shallow zone
U = undetected

Attachment 1 Sheet No. 1 of 11
Originator H. M. Sullowa Date 09/06/07
Checked J. M. Capron Date 9/10/07
Calc. No. 0100F-CA-V0279 Rev. No. 1

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Americium-241			Americium-241 GEA			Carbon-14			Cesium-137			Cobalt-60			Curium-242		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
PT A1	J15283	5/10/07	0	U	0.26	0.27	U	0.27	-1.05	U	2.7	0.237		0.037	0.040	U	0.040	0	U	0.27
PT A2	J15284	5/10/07	0.0372	U	0.28	0.035	U	0.035	-0.715	U	2.8	0.211		0.028	0.0817		0.025	0.0387	U	0.30
PT A3	J15285	5/10/07	0.0298	U	0.23	0.17	U	0.17	-0.528	U	2.7	0.382		0.033	0.082	U	0.082	-0.0310	U	0.24
PT A4	J15286	5/10/07	-0.0399	U	0.31	0.09	U	0.09	-0.381	U	2.8	0.191		0.025	0.0622		0.034	0.0415	U	0.32
Duplicate of J15286	J15287	5/10/07	0.0373	U	0.29	0.039	U	0.039	-1.56	U	2.7	1.00		0.032	0.114		0.034	0	U	0.30
Split of J15286	J152D9	5/10/07	0.0479		0.0186				-0.0905	U	0.823	0.088		0.0169	0.140		0.0201			
PT A5	J15689	6/21/07	0	U	0.293	0.297	U	0.297	-1.93	U	3.42	0.078	U	0.078	0.041	U	0.041	0	U	0.299

Sample Location	Sample Number	Sample Date	Curium-243/244			Europium-152			Europium-154			Europium-155			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ Area 1 A1	J15266	5/8/07	-0.0344	U	0.33	0.077	U	0.077	0.099	U	0.099	0.082	U	0.082	1.07	U	3.9	0	U	0.28
SZ Area 1 A2	J15267	5/8/07	0	U	0.32	0.11	U	0.11	0.10	U	0.10	0.070	U	0.070	3.64	U	4.3	0.0655	U	0.25
SZ Area 1 A3	J15268	5/8/07	0.199	U	0.51	0.077	U	0.077	0.083	U	0.083	0.097	U	0.097	0.433	U	4.5	0	U	0.27
SZ Area 1 A4	J15269	6/20/07	0	U	0.285	0.080	U	0.080	0.116	U	0.116	0.094	U	0.094	-0.719	U	3.31	0	U	0.266
SZ Area 2 B5	J15270	6/20/07	0.04	U	0.488	0.071	U	0.071	0.094	U	0.094	0.077	U	0.077	-0.582	U	3.4	0	U	0.249
SZ Area 2 B6	J15271	5/8/07	0.0723	U	0.35	0.094	U	0.094	0.12	U	0.12	0.099	U	0.099	4.25		3.9	-0.0280	U	0.27
SZ Area 2 B7	J15272	5/8/07	-0.0436	U	0.33	0.072	U	0.072	0.097	U	0.097	0.077	U	0.077	0.640	U	4.1	-0.0356	U	0.27
Duplicate of J15272	J15273	5/8/07	0.0550	U	0.53	0.090	U	0.090	0.11	U	0.11	0.096	U	0.096	1.85	U	5.1	0	U	0.29
Split of J15272	J152D8	5/8/07	0.0416		0.0399	0.028	U	0.0377	-0.00259	U	0.0563	0.00251	U	0.0400	5.30		5.25	-0.00234	U	0.0561
SZ Area 2 B8	J15274	5/8/07	0.0373	U	0.29	0.074	U	0.074	0.10	U	0.10	0.064	U	0.064	2.85	U	4.8	-0.0326	U	0.25
SZ Area 3 C9	J15661	6/20/07	0.097	U	0.309	0.084	U	0.084	0.133	U	0.133	0.103	U	0.103	-0.996	U	3.36	0.074	U	0.282
SZ Area 3 C10	J15276	6/20/07	-0.0472	U	0.63	0.076	U	0.076	0.091	U	0.091	0.097	U	0.097	0.371	U	5.1	0	U	0.27
SZ Area 3 C1	J15277	5/8/07	0.0723	U	0.48	0.18	U	0.18	0.093	U	0.093	0.069	U	0.069	7.22		4.6	0	U	0.39
SZ Area 3 C2	J15278	5/8/07	0.189	U	0.46	0.067	U	0.067	0.092	U	0.092	0.066	U	0.066	1.54	U	4.4	0	U	0.37
SZ Area 4 D3	J15279	5/8/07	0	U	0.31	0.17	U	0.17	0.085	U	0.085	0.086	U	0.086	1.90	U	4.2	-0.0351	U	0.27
SZ Area 4 D4	J15280	5/8/07	0.0440	U	0.34	0.081	U	0.081	0.12	U	0.12	0.094	U	0.094	0.404	U	4.2	0	U	0.37
SZ Area 4 D5	J15281	5/21/07	-0.064	U	0.355	0.096	U	0.096	0.061	U	0.061	0.054	U	0.054	0.254	U	3.18	0	U	0.149
SZ Area 4 D6	J15282	5/21/07	-0.034	U	0.256	0.108	U	0.108	0.113	U	0.113	0.081	U	0.081	1.34	U	3.16	0	U	0.155
SZ Area 4 D7	J15688	6/21/07	0.079	U	0.300	0.080	U	0.080	0.098	U	0.098	0.083	U	0.083	0.219	U	3.20	0	U	0.180
OB/BCL A1	J15249	5/2/07	0.130	U	0.42	0.082	U	0.082	0.10	U	0.10	0.083	U	0.083	0.904	U	4.8	-0.0321	U	0.35
OB/BCL A2	J15250	5/2/07	-0.0608	U	0.29	0.075	U	0.075	0.093	U	0.093	0.066	U	0.066	2.66	U	4.9	0.0351	U	0.27
OB/BCL A3	J15251	5/2/07	0	U	0.26	0.066	U	0.066	0.090	U	0.090	0.065	U	0.065	1.03	U	4.7	0.0777	U	0.25
OB/BCL A4	J15252	5/2/07	0.0396	U	0.38	0.089	U	0.089	0.092	U	0.092	0.12	U	0.12	0.256	U	4.4	0	U	0.21
OB/BCL B5	J15253	5/3/07	-0.0385	U	0.29	0.087	U	0.087	0.11	U	0.11	0.091	U	0.091	-0.183	U	3.9	0	U	0.22
OB/BCL B6	J15254	5/3/07	0.0396	U	0.38	0.075	U	0.075	0.096	U	0.096	0.066	U	0.066	0.688	U	4.2	0.0662	U	0.25
OB/BCL B7	J15255	5/3/07	-0.0353	U	0.27	0.066	U	0.066	0.096	U	0.096	0.061	U	0.061	0	U	3.7	0.0340	U	0.26
OB/BCL B8	J15256	5/3/07	0	U	0.59	0.086	U	0.086	0.091	U	0.091	0.11	U	0.11	0.225	U	3.9	0	U	0.38
OB/BCL C9	J15257	5/3/07	0.0456	U	0.094	0.077	U	0.077	0.11	U	0.11	0.084	U	0.084	0	U	3.6	0	U	0.31
OB/BCL C10	J15258	5/3/07	0.120	U	0.38	0.073	U	0.073	0.089	U	0.089	0.063	U	0.063	1.50	U	6.6	-0.0783	U	0.43
OB/BCL C1	J15259	5/3/07	-0.0397	U	0.30	0.087	U	0.087	0.11	U	0.11	0.11	U	0.11	1.80	U	6.1	-0.0501	U	0.38
OB/BCL C2	J15260	5/3/07	0.0320	U	0.31	0.082	U	0.082	0.088	U	0.088	0.11	U	0.11	0.698	U	6.5	0.0947	U	0.24

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Curium-243/244			Europium-152			Europium-154			Europium-155			Nickel-63			Plutonium-238		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
OB/BCL D3	J15261	5/3/07	-0.0361	U	0.35	0.073	U	0.073	0.093	U	0.093	0.077	U	0.077	0.872	U	6.5	0	U	0.28
Duplicate of J15261	J15262	5/3/07	0	U	0.52	0.065	U	0.065	0.086	U	0.086	0.060	U	0.06	0.416	U	6.2	0.0281	U	0.27
Split of J15261	J152D7	5/3/07	0.0412	J	0.0395	-0.0184	U	0.0377	-0.00923	U	0.0612	0.0685	U	0.0536	0.606	U	1.48	0	U	0.0431
OB/BCL D4	J15263	5/3/07	-0.0325	U	0.31	0.086	U	0.086	0.12	U	0.12	0.10	U	0.10	0.471	U	5.9	-0.115	U	0.43
OB/BCL D5	J15264	5/3/07	0.148	U	0.38	0.082	U	0.082	0.090	U	0.090	0.11	U	0.11	-0.0824	U	6.2	0.0953	U	0.36
OB/BCL D6	J15265	5/3/07	-0.100	U	0.48	0.080	U	0.080	0.099	U	0.099	0.080	U	0.080	0.837	U	5.2	0.0337	U	0.32
PT A1	J15283	5/10/07	-0.0686	U	0.33	0.10	U	0.10	0.13	U	0.13	0.10	U	0.10	-0.370	U	3.3	0.0338	U	0.26
PT A2	J15284	5/10/07	0.149	U	0.28	0.17	U	0.17	0.091	U	0.091	0.060	U	0.060	0.736	U	3.3	0.0448	U	0.34
PT A3	J15285	5/10/07	0.149	U	0.29	0.25	U	0.25	0.099	U	0.099	0.10	U	0.10	1.22	U	3.3	0.054	U	0.41
PT A4	J15286	5/10/07	0.0400	U	0.31	0.210		0.065	0.10	U	0.10	0.077	U	0.077	14.3		3.2	0.0751	U	0.29
Duplicate of J15286	J15287	5/10/07	0.0370	U	0.290	0.144		0.077	0.098	U	0.098	0.061	U	0.061	1.51	U	3.3	-0.043	U	0.33
Split of J15286	J152D9	5/10/07	0.0403		0.0186	0.071	U	0.0307	0.021	U	0.0633	0.0114	U	0.0401	8.61		5.80	-0.0020	U	0.0409
PT A5	J15689	6/21/07	-0.038	U	0.293	0.090	U	0.090	0.138	U	0.138	0.116	U	0.116	-1.01	U	3.16	0.031	U	0.236

Sample Location	Sample Number	Sample Date	Plutonium-239/240			Potassium-40			Radium-226			Radium-228			Silver-108m			Thorium-228 GEA		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ Area 1 A1	J15266	5/8/07	0.0736	U	0.28	13.1		0.26	0.403		0.048	0.613		0.12	0.085	U	0.085	0.742		0.051
SZ Area 1 A2	J15267	5/8/07	0	U	0.25	14.2		0.29	0.442		0.061	0.566		0.12	0.025	U	0.025	0.643		0.042
SZ Area 1 A3	J15268	5/8/07	0.0346	U	0.26	11.1		0.31	0.355		0.06	0.525		0.10	0.021	U	0.021	0.635		0.049
SZ Area 1 A4	J15269	6/20/07	0.083	U	0.212	12.8		0.268	0.361		0.061	0.610		0.132	0.023	U	0.023	0.526		0.040
SZ Area 2 B5	J15270	6/20/07	0.228	U	0.249	11.9		0.211	0.364		0.044	0.649		0.086	0.019	U	0.019	0.654		0.045
SZ Area 2 B6	J15271	5/8/07	0	U	0.21	12.8		0.34	0.467		0.066	0.599		0.13	0.025	U	0.025	0.686		0.069
SZ Area 2 B7	J15272	5/8/07	0.0711	U	0.27	12.1		0.26	0.397		0.044	0.545		0.10	0.021	U	0.021	0.687		0.050
Duplicate of J15272	J15273	5/8/07	0	U	0.29	12.2		0.27	0.397		0.064	0.592		0.14	0.024	U	0.024	0.604		0.044
Split of J15272	J152D8	5/8/07	-0.00234	U	0.0561										-0.00498	U	0.0116			
SZ Area 2 B8	J15274	5/8/07	0.0652	U	0.25	13.3		0.30	0.393		0.056	0.585		0.10	0.021	U	0.021	0.618		0.037
SZ Area 3 C9	J15661	6/20/07	0.258	U	0.282	12.3		0.331	0.421		0.066	0.538		0.143	0.026		0.026	0.514		0.043
SZ Area 3 C10	J15276	6/20/07	0.0349	U	0.27	13.0		0.23	0.393		0.059	0.591		0.11	0.022	U	0.022	0.722		0.052
SZ Area 3 C1	J15277	5/8/07	0	U	0.39	14.1		0.2	0.375		0.043	0.630		0.097	0.018	U	0.018	0.645		0.042
SZ Area 3 C2	J15278	5/8/07	0	U	0.3	13.3		0.24	0.397		0.048	0.589		0.096	0.019	U	0.019	0.574		0.031
SZ Area 4 D3	J15279	5/8/07	0.0350	U	0.27	12.5		0.26	0.451		0.047	0.627		0.11	0.018	U	0.018	0.686		0.047
SZ Area 4 D4	J15280	5/8/07	0	U	0.29	12.5		0.27	0.424		0.063	0.692		0.14	0.023	U	0.023	0.584		0.042
SZ Area 4 D5	J15281	5/21/07	0.039	U	0.149	15.6		0.136	0.410		0.031	0.629		0.073	0.012	U	0.012	0.624		0.021
SZ Area 4 D6	J15282	5/21/07	0.243		0.155	14.5		0.310	0.388		0.066	0.546		0.137	0.026	U	0.026	0.619		0.04
SZ Area 4 D7	J15688	6/21/07	0.071	U	0.180	14.4		0.277	0.424		0.043	0.700		0.131	0.023	U	0.023	0.845	U	0.052

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Plutonium-239/240			Potassium-40			Radium-226			Radium-228			Silver-108m			Thorium-228 GEA		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
OB/BCL A1	J15249	5/2/07	0.0641	U	0.25	12.4		0.26	0.481		0.049	0.739		0.12	0.023	U	0.023	0.836		0.052
OB/BCL A2	J15250	5/2/07	0	U	0.27	12.1		0.26	0.434		0.049	0.692		0.12	0.020	U	0.02	0.667		0.039
OB/BCL A3	J15251	5/2/07	-0.0259	U	0.20	13.2		0.29	0.586		0.050	0.734		0.12	0.018	U	0.018	0.778		0.033
OB/BCL A4	J15252	5/2/07	-0.0277	U	0.21	12.8		0.30	0.468		0.065	0.817		0.12	0.024	U	0.024	0.840		0.057
OB/BCL B5	J15253	5/3/07	0	U	0.22	13.5		0.29	0.555		0.059	0.918		0.12	0.024	U	0.024	1.04		0.054
OB/BCL B6	J15254	5/3/07	0	U	0.25	12.2		0.28	0.453		0.051	0.703		0.13	0.020	U	0.020	0.706		0.038
OB/BCL B7	J15255	5/3/07	0	U	0.26	13.2		0.26	0.451		0.047	0.727		0.11	0.017	U	0.017	0.732		0.031
OB/BCL B8	J15256	5/3/07	0	U	0.30	11.5		0.37	0.482		0.056	0.718		0.12	0.022	U	0.022	0.810		0.051
OB/BCL C9	J15257	5/3/07	0.0324	U	0.25	11.5		0.29	0.404		0.053	0.571		0.14	0.023	U	0.023	0.766		0.056
OB/BCL C10	J15258	5/3/07	0.0391	U	0.30	11.9		0.30	0.386		0.054	0.648		0.12	0.020	U	0.020	0.638		0.036
OB/BCL C1	J15259	5/3/07	0	U	0.38	13.2		0.36	0.474		0.061	0.719		0.14	0.027	U	0.027	0.844		0.073
OB/BCL C2	J15260	5/3/07	-0.0316	U	0.24	11.7		0.34	0.465		0.061	0.702		0.11	0.023	U	0.023	0.833		0.062
OB/BCL D3	J15261	5/3/07	0.0371	U	0.28	12.7		0.23	0.406		0.043	0.721		0.10	0.020	U	0.020	0.808		0.050
Duplicate of J15261	J15262	5/3/07	0	U	0.22	12.4		0.23	0.404		0.045	0.713		0.11	0.017	U	0.017	0.642		0.036
Split of J15261	J152D7	5/3/07	0.00900	U	0.0431										0.000991	U	0.0125			
OB/BCL D4	J15263	5/3/07	0	U	0.29	12.4		0.33	0.433		0.057	0.654		0.12	0.025	U	0.025	0.553		0.044
OB/BCL D5	J15264	5/3/07	0.0476	U	0.36	12.8		0.30	0.494		0.049	0.797		0.13	0.023	U	0.023	0.842		0.054
OB/BCL D6	J15265	5/3/07	-0.0337	U	0.26	12.7		0.26	0.477		0.049	0.703		0.13	0.022	U	0.022	0.853		0.047
PT A1	J15283	5/10/07	0.135	U	0.26	13.6		0.36	0.413		0.070	0.556		0.15	0.026	U	0.026	0.496		0.044
PT A2	J15284	5/10/07	0.0	U	0.34	12.8		0.26	0.392		0.048	0.448		0.092	0.020	U	0.02	0.485		0.035
PT A3	J15285	5/10/07	0	U	0.41	11.9		0.20	0.384		0.056	0.636		0.13	0.023	U	0.023	0.626		0.059
PT A4	J15286	5/10/07	0.263	U	0.29	12.4		0.24	0.375		0.049	0.623		0.11	0.021	U	0.021	0.600		0.051
Duplicate of J15286	J15287	5/10/07	0.0430	U	0.33	12.7		0.27	0.386		0.051	0.466		0.10	0.023	U	0.023	0.516		0.036
Split of J15286	J152D9	5/10/07	0.00623	U	0.0409										-9.6E-06	U	0.0126			
PT A5	J15689	6/21/07	0.062	U	0.236	13.7		0.343	0.544		0.071	1.02		0.146	0.027	U	0.027	0.813		0.047

Sample Location	Sample Number	Sample Date	Thorium-232 GEA			Total beta radiostrontium			Tritium			Uranium-233/234			Uranium-235			Uranium-235 GEA		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ Area 1 A1	J15266	5/8/07	0.613		0.12	0.0586	U	0.25	1.64	U	4.2	0.469		0.026	0.0163	U	0.031	0.13	U	0.13
SZ Area 1 A2	J15267	5/8/07	0.566		0.12	0.0382	U	0.27	1.02	U	4.7	0.451		0.031	0.0148	U	0.038	0.13	U	0.13
SZ Area 1 A3	J15268	5/8/07	0.525		0.1	0.0767	U	0.24	0.369	U	4.4	0.494		0.033	0.0309	U	0.039	0.13	U	0.13
SZ Area 1 A4	J15269	6/20/07	0.610		0.132	0.079	U	0.334	0.457	U	4.08	0.903		0.192	0.030	U	0.232	0.142	U	0.142

Attachment	1	Sheet No.	4 of 11
Originator	H. M. Sulloway	Date	09/06/07
Checked	J. M. Capron	Date	09/06/07
Calc. No.	0100F-CA-V0279	Rev. No.	1

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Thorium-232 GEA			Total beta radiostrontium			Tritium			Uranium-233/234			Uranium-235			Uranium-235 GEA		
			pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA	pCi/g	Q	MDA
SZ Area 2 B5	J15270	6/20/07	0.649		0.086	0.515		0.384	-0.491	U	4.39	0.466		0.188	0	U	0.227	0.120	U	0.120
SZ Area 2 B6	J15271	5/8/07	0.599		0.13	-0.0366	U	0.24	1.78	U	4.4	0.426		0.046	0	U	0.045	0.15	U	0.15
SZ Area 2 B7	J15272	5/8/07	0.545		0.10	0.213	U	0.24	1.96	U	5.3	0.441		0.032	0.0103	U	0.039	0.12	U	0.12
Duplicate of J15272	J15273	5/8/07	0.592		0.14	-0.0116	U	0.25	0.384	U	4.6	0.406		0.037	0.0117	U	0.045	0.15	U	0.15
Split of J15272	J152D8	5/8/07				0.0976	U	0.141	0.0131	U	0.0366	0.208		0.0497	-0.0007	U	0.0354			
SZ Area 2 B8	J15274	5/8/07	0.585		0.10	1.32		0.24	1.3	U	4.6	0.601		0.038	0.0061	U	0.046	0.12	U	0.12
SZ Area 3 C9	J15661	6/20/07	0.538		0.143	0.362		0.32	-0.328	U	4.10	0.380		0.171	0.027	U	0.207	0.154	U	0.154
SZ Area 3 C10	J15276	6/20/07	0.591		0.11	-0.0608	U	0.27	0.0762	U	4.5	0.416		0.033	0	U	0.040	0.13	U	0.13
SZ Area 3 C1	J15277	5/8/07	0.630		0.097	0.0956	U	0.31	1.19	U	4.4	0.496		0.034	0.0107	U	0.041	0.11	U	0.11
SZ Area 3 C2	J15278	5/8/07	0.589		0.096	0.649		0.26	1.56	U	4.6	0.464		0.055	0.0302	U	0.046	0.10	U	0.1
SZ Area 4 D3	J15279	5/8/07	0.627		0.11	0.0690	U	0.24	-1.59	U	4.3	0.565		0.045	0.0443		0.038	0.11	U	0.11
SZ Area 4 D4	J15280	5/8/07	0.692		0.14	0.0657	U	0.26	0.429	U	5.1	0.446		0.039	0.0588		0.038	0.14	U	0.14
SZ Area 4 D5	J15281	5/21/07	0.639		0.073	0.118	U	0.317	0.887	U	3.74	0.320		0.223	0.035	U	0.27	0.069	U	0.069
SZ Area 4 D6	J15282	5/21/07	0.546		0.137	0.566		0.306	1.94	U	3.95	0.425		0.203	0	U	0.246	0.128	U	0.128
SZ Area 4 D7	J15688	6/21/07	0.700		0.13	0.119	U	0.267	3.09	U	3.59	0.508		0.177	0	U	0.214	0.126	U	0.126
OB/BCL A1	J15249	5/2/07	0.739		0.12	0.0720	U	0.32	-0.0398	U	2.7	0.351		0.21	0.0327	U	0.25	0.13	U	0.13
OB/BCL A2	J15250	5/2/07	0.692		0.12	-0.0205	U	0.35	-0.892	U	2.5	0.290		0.20	0	U	0.24	0.12	U	0.12
OB/BCL A3	J15251	5/2/07	0.734		0.12	0.150	U	0.31	-0.802	U	2.8	0.537		0.19	0.0296	U	0.23	0.12	U	0.12
OB/BCL A4	J15252	5/2/07	0.817		0.12	0.0350	U	0.28	-0.0379	U	2.5	0.342		0.19	0	U	0.23	0.16	U	0.16
OB/BCL B5	J15253	5/3/07	0.918		0.12	0.0657	U	0.30	-0.464	U	2.8	0.673		0.19	0.0302	U	0.23	0.14	U	0.14
OB/BCL B6	J15254	5/3/07	0.703		0.13	0.0477	U	0.29	-1.01	U	2.8	0.424		0.22	0	U	0.26	0.11	U	0.11
OB/BCL B7	J15255	5/3/07	0.727		0.11	-0.0738	U	0.29	-0.925	U	3.3	0.385		0.21	0	U	0.25	0.14	U	0.14
OB/BCL B8	J15256	5/3/07	0.718		0.12	0.0726	U	0.29	-0.0795	U	2.7	0.532		0.13	0.0604	U	0.15	0.15	U	0.15
OB/BCL C9	J15257	5/3/07	0.571		0.14	0.0354	U	0.4	0.332	U	2.5	0.420		0.12	0.0392	U	0.15	0.13	U	0.13
OB/BCL C10	J15258	5/3/07	0.648		0.12	0.0206	U	0.24	-1.17	U	4.9	0.712		0.23	0	U	0.27	0.10	U	0.10
OB/BCL C1	J15259	5/3/07	0.719		0.14	-0.0438	U	0.22	2.60	U	5.5	0.403		0.16	0.103	U	0.2	0.16	U	0.16
OB/BCL C2	J15260	5/3/07	0.702		0.11	0.0711	U	0.27	-1.74	U	5.6	0.392		0.16	0.0499	U	0.19	0.15	U	0.15
OB/BCL D3	J15261	5/3/07	0.721		0.10	0.0217	U	0.24	2.55	U	6.7	0.541		0.15	0.0234	U	0.18	0.12	U	0.12
Duplicate of J15261	J15262	5/3/07	0.713		0.11	-0.0069	U	0.24	1.12	U	6.1	0.350		0.27	0	U	0.32	0.10	U	0.10
Split of J15261	J152D7	5/3/07				0.109	U	0.126	0.0144	U	0.0338	0.132		0.0333	0.00557	U	0.0333			
OB/BCL D4	J15263	5/3/07	0.654		0.12	0.0198	U	0.24	0.0212	U	6.4	0.572		0.20	0	U	0.24	0.14	U	0.14
OB/BCL D5	J15264	5/3/07	0.797		0.13	-0.0433	U	0.24	1.58	U	6.3	0.430		0.18	0.0867	U	0.22	0.15	U	0.15
OB/BCL D6	J15265	5/3/07	0.703		0.13	-0.0547	U	0.27	2.31	U	7.3	0.292		0.19	0.0295	U	0.23	0.13	U	0.13
PT A1	J15283	5/10/07	0.556		0.15	0.180	U	0.25	1.58	U	3.9	0.558		0.16	0.0520	U	0.20	0.15	U	0.15
PT A2	J15284	5/10/07	0.448		0.093	0.176	U	0.22	0	U	3.9	0.470		0.2	0.0316	U	0.24	0.11	U	0.11
PT A3	J15285	5/10/07	0.636		0.13	0.338		0.23	1.18	U	3.9	0.588		0.19	0.0297	U	0.23	0.13	U	0.13
PT A4	J15286	5/10/07	0.623		0.11	0.144	U	0.22	0.122	U	4.1	0.647		0.21	0.0326	U	0.25	0.12	U	0.12
Duplicate of J15286	J15287	5/10/07	0.466		0.10	-0.0949	U	0.29	2.24	U	4.0	0.592		0.21	0.0978	U	0.25	0.11	U	0.11
Split of J15286	J152D9	5/10/07				0.0458		0.164	0.0379		0.0264	0.291		0.0297	0.0762		0.0297			
PT A5	J15689	6/21/07	1.02		0.143	-0.016	U	0.272	2.38	U	3.81	0.429		0.173	0.027	U	0.209	0.172	U	0.172

Attachment	1	Sheet No.	5 of 11
Originator	H. M. Sulloway	Date	09/06/07
Checked	J. M. Capron	Date	
Calc. No.	0100F-CA-V0279	Rev. No.	1

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Uranium-238			Uranium-238 GEA		
			pCi/g	Q	MDA	pCi/g	Q	MDA
SZ Area 1 A1	J15266	5/8/07	0.469		0.032	3.4	U	3.4
SZ Area 1 A2	J15267	5/8/07	0.447		0.031	3.7	U	3.7
SZ Area 1 A3	J15268	5/8/07	0.460		0.033	3.2	U	3.2
SZ Area 1 A4	J15269	6/20/07	1.25		0.192	3.8	U	3.8
SZ Area 2 B5	J15270	6/20/07	0.540		0.188	3.08	U	3.08
SZ Area 2 B6	J15271	5/8/07	0.436		0.037	3.9	U	3.9
SZ Area 2 B7	J15272	5/8/07	0.496		0.032	3.4	U	3.4
Duplicate of J15272	J15273	5/8/07	0.411		0.037	3.9	U	3.9
Split of J15272	J152D8	5/8/07	0.191		0.047			
SZ Area 2 B8	J15274	5/8/07	0.546		0.038	3.3	U	3.3
SZ Area 3 C9	J15661	6/20/07	0.290		0.171	3.87	U	3.87
SZ Area 3 C10	J15276	6/20/07	0.493		0.033	3.1	U	3.1
SZ Area 3 C1	J15277	5/8/07	0.385		0.034	3.0	U	3.0
SZ Area 3 C2	J15278	5/8/07	0.419		0.055	3.0	U	3.0
SZ Area 4 D3	J15279	5/8/07	0.557		0.031	2.8	U	2.8
SZ Area 4 D4	J15280	5/8/07	0.332		0.039	3.8	U	3.8
SZ Area 4 D5	J15281	5/21/07	0.524		0.223	2.02	U	2.02
SZ Area 4 D6	J15282	5/21/07	0.478		0.203	3.96	U	3.96
SZ Area 4 D7	J15688	6/21/07	0.439		0.177	3.59	U	3.59
OB/BCL A1	J15249	5/2/07	0.459		0.21	3.6	U	3.6
OB/BCL A2	J15250	5/2/07	0.395		0.20	3.5	U	3.5
OB/BCL A3	J15251	5/2/07	0.635		0.19	3.3	U	3.3
OB/BCL A4	J15252	5/2/07	0.367		0.19	3.5	U	3.5
OB/BCL B5	J15253	5/3/07	0.523		0.19	3.8	U	3.8
OB/BCL B6	J15254	5/3/07	0.453		0.22	3.2	U	3.2
OB/BCL B7	J15255	5/3/07	0.412		0.21	3.1	U	3.1
OB/BCL B8	J15256	5/3/07	0.383		0.13	3.3	U	3.3
OB/BCL C9	J15257	5/3/07	0.469		0.12	3.5	U	3.5
OB/BCL C10	J15258	5/3/07	0.563		0.23	3.3	U	3.3
OB/BCL C1	J15259	5/3/07	0.403		0.16	4.7	U	4.7
OB/BCL C2	J15260	5/3/07	0.350		0.16	3.2	U	3.2
OB/BCL D3	J15261	5/3/07	0.328		0.15	3.2	U	3.2
Duplicate of J15261	J15262	5/3/07	0.490		0.27	3.1	U	3.1
Split of J15261	J152D7	5/3/07	0.167		0.0333			
OB/BCL D4	J15263	5/3/07	0.416		0.20	4.2	U	4.2
OB/BCL D5	J15264	5/3/07	0.454		0.18	3.3	U	3.3
OB/BCL D6	J15265	5/3/07	0.511		0.19	3.4	U	3.4
PT A1	J15283	5/10/07	0.429		0.16	4.4	U	4.4
PT A2	J15284	5/10/07	0.704		0.20	3.3	U	3.3
PT A3	J15285	5/10/07	0.465		0.19	3.2	U	3.2
PT A4	J15286	5/10/07	0.297		0.21	3.3	U	3.3
Duplicate of J15286	J15287	5/10/07	0.619		0.21	3.3	U	3.3
Split of J15286	J152D9	5/10/07	0.273		0.0509			
PT A5	J15689	6/21/07	0.406	U	0.173	4.38	U	4.38

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Aluminum			Antimony			Arsenic			Barium			Beryllium			Boron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ Area 1 A1	J15266	5/8/07	5020		4.0	0.88	J	0.88	4.2		1.1	54.8		0.05	0.24		0.03	1.3		1.0
SZ Area 1 A2	J15267	5/8/07	5060		4.1	0.89	J	0.89	3.3		1.1	48		0.06	0.24		0.03	1.4		1.1
SZ Area 1 A3	J15268	5/8/07	4510		4.2	0.93	J	0.93	2.2		1.2	55.2		0.06	0.24		0.03	1.3		1.1
SZ Area 1 A4	J15269	6/20/07	4790		5.3	0.65	J	0.65	1.2	U	1.2	52.4		0.06	0.18		0.06	1.1	U	1.1
SZ Area 2 B5	J15270	6/20/07	4060		5.3	0.65	J	0.65	1.2	U	1.2	52		0.06	0.16		0.06	1.1	U	1.1
SZ Area 2 B6	J15271	5/8/07	5090		4.1	0.91	J	0.91	1.7		1.2	52		0.06	0.24		0.03	1.9		1.1
SZ Area 2 B7	J15272	5/8/07	4790		3.9	0.86	J	0.86	2.1		1.1	56.2		0.05	0.24		0.03	1.4		1.0
Duplicate of J15272	J15273	5/8/07	4370		4.0	0.87	J	0.87	1.2		1.1	50.6		0.05	0.23		0.03	1.2		1.0
Split of J15272	J152D8	5/8/07	5540	N	6.3	2.3	N	0.34	1.6		0.28	63		0.51	0.21	B	0.071	1.5	U	1.5
SZ Area 2 B8	J15274	5/8/07	5100		3.7	0.82	J	0.82	2.1		1	47.2		0.05	0.23		0.03	1.0		0.97
SZ Area 3 C9	J15661	6/20/07	4880		5.2	0.63	J	0.63	1.2	U	1.2	57.1		0.06	0.15		0.06	1.0	U	1.0
SZ Area 3 C10	J15276	6/20/07	4970		3.6	0.78	J	0.78	2.1		1	49.2		0.05	0.21		0.02	1.1		0.93
SZ Area 3 C1	J15277	5/8/07	4240		3.9	0.86	J	0.86	1.5		1.1	31.9		0.05	0.16		0.03	1.1		1.0
SZ Area 3 C2	J15278	5/8/07	5100		4.2	0.91	J	0.91	2		1.2	48.7		0.06	0.23		0.03	1.5		1.1
SZ Area 4 D3	J15279	5/8/07	5230		3.9	0.92	J	0.86	3		1.1	52.1		0.05	0.20		0.03	1.6		1.0
SZ Area 4 D4	J15280	5/8/07	5760		4.3	0.93	J	0.93	2.5		1.2	53.9		0.06	0.23		0.03	2.0		1.1
SZ Area 4 D5	J15281	5/21/07	4560		5.2	0.64	J	0.64	1.2	U	1.2	35.4		0.06	0.16		0.06	1.0	U	1.0
SZ Area 4 D6	J15282	5/21/07	4240		5.2	0.64	J	0.64	1.2		1.2	36.8		0.06	0.17		0.06	1.0	U	1.0
SZ Area 4 D7	J15688	6/21/07	4980		5.2	0.63	J	0.63	2.3		1.2	43		0.06	0.19		0.06	1.0	U	1.0
OB/BCL A1	J15249	5/2/07	6000		4.5	0.98	J	0.98	3.5		1.3	67.2		0.06	0.33		0.03	1.5		1.2
OB/BCL A2	J15250	5/2/07	5550		4.4	0.97	J	0.97	1.9		1.2	62.9		0.06	0.36		0.03	1.7		1.1
OB/BCL A3	J15251	5/2/07	6440		4.4	0.96	J	0.96	4.4		1.2	73.0		0.06	0.39		0.03	2.4		1.1
OB/BCL A4	J15252	5/2/07	6550		4.4	0.96	J	0.96	5.3		1.2	77.7		0.06	0.41		0.03	2.4		1.1
OB/BCL B5	J15253	5/3/07	7980		4.4	0.96	J	0.96	7.5		1.2	85.3		0.06	0.45		0.03	2.2		1.1
OB/BCL B6	J15254	5/3/07	5730		4.3	0.95	J	0.95	2.5		1.2	88.2		0.06	0.41		0.03	2.2		1.1
OB/BCL B7	J15255	5/3/07	5710		4.4	0.96	J	0.96	2.8		1.2	66.8		0.06	0.43		0.03	1.6		1.1
OB/BCL B8	J15256	5/3/07	5640		4.4	0.96	J	0.96	1.5		1.2	73.1		0.06	0.36		0.03	3.1		1.1
OB/BCL C9	J15257	5/3/07	5020		4.3	0.95	J	0.95	1.2	U	1.2	60.8		0.06	0.33		0.03	1.2		1.1
OB/BCL C10	J15258	5/3/07	4940		4.3	0.94	J	0.94	1.2		1.2	67.1		0.06	0.35		0.03	1.9		1.1
OB/BCL C1	J15259	5/3/07	6350		4.3	0.93	J	0.93	2.5		1.2	78.9		0.06	0.42		0.03	2.5		1.1
OB/BCL C2	J15260	5/3/07	5820		4.3	0.93	J	0.93	2.4		1.2	88.8		0.06	0.43		0.03	3.3		1.1
OB/BCL D3	J15261	5/3/07	5130		4.3	0.95	J	0.95	1.2		1.2	73.4		0.06	0.41		0.03	2.0		1.1
Duplicate of J15261	J15262	5/3/07	5570		4.3	0.95	J	0.95	1.2	U	1.2	74.5		0.06	0.45		0.03	1.6		1.1
Split of J15261	J152D7	5/3/07	12200	N	5.3	1.4	N	0.53	2.3		0.25	99.5		0.25	0.26	B	0.073	10.1	BC N	1.6
OB/BCL D4	J15263	5/3/07	4760		4.2	0.92	J	0.92	1.2	U	1.2	63.7		0.06	0.40		0.03	1.7		1.1
OB/BCL D5	J15264	5/3/07	6140		4.3	0.94	J	0.94	3.8		1.2	76.4		0.06	0.48		0.03	2.0		1.1
OB/BCL D6	J15265	5/3/07	5970		4.3	0.94	J	0.94	2.5		1.2	74.1		0.06	0.46		0.03	1.8		1.1
PT A1	J15283	5/10/07	5300		3.7	0.81	J	0.81	1.6		1	37.3		0.05	0.20		0.03	0.96	U	0.96
PT A2	J15284	5/10/07	4640		4.4	0.97	J	0.97	1.5		1.2	36.0		0.06	0.19		0.03	1.1	U	1.1
PT A3	J15285	5/10/07	5530		4.0	0.88	J	0.88	1.1	U	1.1	40.1		0.05	0.23		0.03	1.0	U	1.0
PT A4	J15286	5/10/07	4920		4.4	0.96	J	0.96	1.2	U	1.2	41.2		0.06	0.21		0.03	1.1	U	1.1
Duplicate of J15286	J15287	5/10/07	5070		4.4	0.96	J	0.96	1.4		1.2	45.5		0.06	0.21		0.03	1.1	U	1.1
Split of J15286	J152D9	5/10/07	6910	N	6.2	1.6	J	0.33	1.6		0.28	50.4		0.50	0.21	B	0.070	4.8	B	1.5
PT A5	J15689	6/21/07	6270		5.2	0.64	J	0.64	11.2		1.2	83.8		0.06	0.32		0.06	1.2		1.0

Attachment	1	Sheet No.	7 of 11
Originator	H. M. Sulloway	Date	09/06/07
Checked	J. M. Capron	Date	
Calc. No.	0100F-CA-V0279	Rev. No.	1

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Cadmium			Calcium			Chromium			Cobalt			Copper			Iron		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ Area 1 A1	J15266	5/8/07	0.08	U	0.08	3750		2.1	8.0		0.22	6.4		0.25	10.0		0.33	16700		8.1
SZ Area 1 A2	J15267	5/8/07	0.08	U	0.08	4250		2.1	9.4		0.22	5.6		0.25	10.8		0.33	15200		8.2
SZ Area 1 A3	J15268	5/8/07	0.09	U	0.09	3630		2.2	7.7		0.23	6.6		0.26	9.8		0.35	18900		8.6
SZ Area 1 A4	J15269	6/20/07	0.15	U	0.15	3570		5.9	6.6		0.29	6.2		0.24	10.6		0.27	18400		1.0
SZ Area 2 B5	J15270	6/20/07	0.15	U	0.15	3370		5.9	5.6		0.29	5.9		0.24	9.9		0.27	16400		1.0
SZ Area 2 B6	J15271	5/8/07	0.09	U	0.09	4230		2.1	9.2		0.23	6.8		0.26	16.0		0.34	19400		8.4
SZ Area 2 B7	J15272	5/8/07	0.08	U	0.08	3830		2.0	7.7		0.22	6.7		0.24	11.5		0.32	19600		8.0
Duplicate of J15272	J15273	5/8/07	0.08	U	0.08	3590		2.0	6.6		0.22	6.5		0.24	10.5		0.33	18700		8.1
Split of J15272	J152D8	5/8/07	0.14	U	0.14	4090		8.7	7.6		0.36	12.1		0.51	26.4	N	0.31	22200	N	2.4
SZ Area 2 B8	J15274	5/8/07	0.08	U	0.08	3860		1.9	8.8		0.20	5.9		0.23	12.1		0.31	16900		7.6
SZ Area 3 C9	J15661	6/20/07	0.14	U	0.14	3510		5.7	6.6		0.29	6.1		0.23	12.9		0.26	18100		1.0
SZ Area 3 C10	J15276	6/20/07	0.07	U	0.07	4010		1.8	8.3		0.20	6.4		0.22	11.1		0.29	17600		7.2
SZ Area 3 C1	J15277	5/8/07	0.08	U	0.08	4860		2.0	7.9		0.22	4.7		0.24	11.0		0.32	11900		8.0
SZ Area 3 C2	J15278	5/8/07	0.09	U	0.09	4250		2.1	8.2		0.23	6.2		0.26	11.7		0.34	17100		8.4
SZ Area 4 D3	J15279	5/8/07	0.1		0.08	3560		2.0	9.0		0.22	7.2		0.24	12.7		0.32	19500		8.0
SZ Area 4 D4	J15280	5/8/07	0.09		0.09	3930		2.2	9.0		0.23	7.0		0.26	11.9		0.35	20100		8.6
SZ Area 4 D5	J15281	5/21/07	0.15	U	0.15	4710		5.8	8.3		0.29	4.3		0.23	10.7		0.26	12600		0.99
SZ Area 4 D6	J15282	5/21/07	0.15	U	0.15	2800		5.8	6.6		0.29	4.5		0.23	10.6		0.26	12500		0.99
SZ Area 4 D7	J15688	6/21/07	0.14	U	0.14	3330		5.8	7.2		0.29	4.6		0.23	11.3		0.26	13200		0.98
OB/BCL A1	J15249	5/2/07	0.09	U	0.09	3530		2.3	8.7		0.24	7.4		0.27	12.6		0.37	20300		9
OB/BCL A2	J15250	5/2/07	0.09	U	0.09	3430		2.3	7.5		0.24	7.0		0.27	11.5		0.36	19900		8.9
OB/BCL A3	J15251	5/2/07	0.09	U	0.09	3730		2.2	9.8		0.24	7.4		0.27	14.1		0.36	20700		8.9
OB/BCL A4	J15252	5/2/07	0.09	U	0.09	3810		2.2	9.9		0.24	7.8		0.27	13.8		0.36	21200		8.9
OB/BCL B5	J15253	5/3/07	0.09	U	0.09	3940		2.3	11.6		0.24	8.3		0.27	14.2		0.36	22000		8.9
OB/BCL B6	J15254	5/3/07	0.09	U	0.09	3780		2.2	7.9		0.24	7.0		0.27	11.8		0.35	20100		8.7
OB/BCL B7	J15255	5/3/07	0.09	U	0.09	3660		2.2	8.6		0.24	7.2		0.27	12.2		0.36	21100		8.9
OB/BCL B8	J15256	5/3/07	0.09	U	0.09	3660		2.2	8.7		0.24	7.2		0.27	13.8		0.36	21100		8.8
OB/BCL C9	J15257	5/3/07	0.09	U	0.09	3330		2.2	7.2		0.24	6.7		0.27	11.3		0.36	19000		8.8
OB/BCL C10	J15258	5/3/07	0.09	U	0.09	3400		2.2	7.2		0.24	6.9		0.27	11.3		0.36	18500		8.7
OB/BCL C1	J15259	5/3/07	0.09	U	0.09	3780		2.2	9.6		0.23	7.7		0.26	13.4		0.35	22000		8.6
OB/BCL C2	J15260	5/3/07	0.09	U	0.09	3800		2.2	8.9		0.26	7.2		0.26	12.0		0.35	20300		8.5
OB/BCL D3	J15261	5/3/07	0.09	U	0.09	3320		2.2	8.0		0.24	7.1		0.27	11.0		0.36	19800		8.8
Duplicate of J15261	J15262	5/3/07	0.09	U	0.09	3600		2.2	7.6		0.24	7.0		0.27	11.5		0.36	20400		8.7
Split of J15261	J152D7	5/3/07	0.064	U	0.064	7280	N	21.2	12.7		0.24	13.6		0.24	12		0.42	26300	N	3.9
OB/BCL D4	J15263	5/3/07	0.09	U	0.09	3350		2.2	8.6		0.23	6.6		0.26	10.3		0.36	18700		8.5
OB/BCL D5	J15264	5/3/07	0.09	U	0.09	6220		2.2	8.8		0.24	7.1		0.27	12.2		0.35	20800		8.7
OB/BCL D6	J15265	5/3/07	0.09	U	0.09	3920		2.2	8.4		0.23	7.4		0.26	11.7		0.35	20500		8.6
PT A1	J15283	5/10/07	0.08	U	0.08	3670		1.9	11.1		0.20	4.9		0.23	12.2		0.3	15200		7.50
PT A2	J15284	5/10/07	0.1		0.09	3770		2.3	7.8		0.24	4.8		0.27	11.1		0.36	13000		8.90
PT A3	J15285	5/10/07	0.08	U	0.08	3990		2.1	9.7		0.22	5.9		0.25	12.6		0.33	17200		8.10
PT A4	J15286	5/10/07	0.09	U	0.09	4690		2.3	9.2		0.24	5.5		0.27	10.8		0.36	14200		8.90
Duplicate of J15286	J15287	5/10/07	0.09	U	0.09	4780		2.2	9.6		0.24	5.8		0.27	11		0.36	15900		8.80
Split of J15286	J152D9	5/10/07	0.14		0.14	5060		8.5	11.5	J	0.36	8.9		0.5	12.6		0.3	18600	N	2.40
PT A5	J15689	6/21/07	0.15	U	0.15	3490		5.8	8.8		0.29	7.8		0.23	13.1		0.26	18100		0.99

Attachment	1	Sheet No.	8 of 11
Originator	H. M. Sulloway	Date	09/06/07
Checked	J. M. Capron	Date	
Calc. No.	0100F-CA-V0279	Rev. No.	1

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Lead			Magnesium			Manganese			Mercury			Molybdenum			Nickel		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ Area 1 A1	J15266	5/8/07	7.9		0.77	3570		2.0	278		0.05	0.01	U	0.01	0.36	U	0.36	9.7		0.52
SZ Area 1 A2	J15267	5/8/07	7.6		0.78	3630		2.0	257		0.06	0.02	U	0.02	0.36	U	0.36	10.9		0.53
SZ Area 1 A3	J15268	5/8/07	5.3		0.81	3730		2.1	278		0.06	0.02	U	0.02	0.47		0.38	10.0		0.55
SZ Area 1 A4	J15269	6/20/07	3.7		0.97	3560		2.4	261		0.21	0.02	U	0.02	0.47	U	0.47	10.2		0.8
SZ Area 2 B5	J15270	6/20/07	2.8		0.97	3360		2.4	250		0.21	0.01	U	0.01	0.47	U	0.47	8.8		0.80
SZ Area 2 B6	J15271	5/8/07	6.0		0.80	3810		2.1	280		0.06	0.01	U	0.01	0.47		0.37	10.8		0.54
SZ Area 2 B7	J15272	5/8/07	4.6		0.76	3700		2.0	283		0.05	0.01	U	0.01	0.35	U	0.35	9.7		0.51
Duplicate of J15272	J15273	5/8/07	3.9		0.76	3580		2.0	273		0.05	0.01	U	0.01	0.35	U	0.35	9.6		0.52
Split of J15272	J152D8	5/8/07	3.4		0.15	4670		12.4	299	N	0.1	0.0068	U	0.0068	1.2	U	1.2	11.3		0.77
SZ Area 2 B8	J15274	5/8/07	4.4		0.72	3710		1.9	256		0.05	0.02	U	0.02	0.33	U	0.33	10.3		0.49
SZ Area 3 C9	J15661	6/20/07	4.3		0.95	3590		2.3	279		0.2	0.01	U	0.01	0.46	U	0.46	9.8		0.77
SZ Area 3 C10	J15276	6/20/07	4.6		0.68	3640		1.8	274		0.05	0.01	U	0.01	0.38		0.32	10.7		0.46
SZ Area 3 C1	J15277	5/8/07	3.0		0.75	3210		2	207		0.05	0.02	U	0.02	1.12	U	0.35	8.4		0.51
SZ Area 3 C2	J15278	5/8/07	4.6		0.80	3790		2.1	285		0.09	0.02	U	0.02	0.46		0.37	9.4		0.54
SZ Area 4 D3	J15279	5/8/07	5.3		0.75	4090		2	299		0.05	0.01	U	0.01	0.44		0.35	11.9		0.51
SZ Area 4 D4	J15280	5/8/07	4.4		0.82	4170		2.1	309		0.06	0.02	U	0.02	0.38	U	0.38	10.9		0.55
SZ Area 4 D5	J15281	5/21/07	3.3		0.96	3320		2.4	216		0.2	0.01	U	0.01	0.47	U	0.47	10.3		0.79
SZ Area 4 D6	J15282	5/21/07	3.9		0.96	2850		2.4	213		0.2	0.02	U	0.02	0.47	U	0.47	8.4		0.79
SZ Area 4 D7	J15688	6/21/07	5.3		0.95	3180		2.3	227		0.2	0.02	U	0.02	0.46	U	0.46	9.4		0.78
OB/BCL A1	J15249	5/2/07	10.5		0.86	4040		2.2	320		0.06	0.02	U	0.02	0.59		0.4	10.2		0.58
OB/BCL A2	J15250	5/2/07	6.6		0.85	3840		2.2	307		0.06	0.02	U	0.02	0.90		0.39	9.9		0.57
OB/BCL A3	J15251	5/2/07	11.2		0.84	4050		2.2	331		0.06	0.01	U	0.01	0.78		0.39	10.2		0.57
OB/BCL A4	J15252	5/2/07	15.7		0.84	4170		2.2	352		0.06	0.02	U	0.02	0.56		0.39	11.1		0.57
OB/BCL B5	J15253	5/3/07	22.8		0.84	4590		2.2	372		0.06	0.02	U	0.02	0.62		0.39	11.8		0.57
OB/BCL B6	J15254	5/3/07	10.4		0.83	3980		2.2	313		0.06	0.02	U	0.02	0.70		0.38	10.8		0.56
OB/BCL B7	J15255	5/3/07	13.5		0.84	3930		2.2	337		0.06	0.01	U	0.01	0.54		0.39	10.3		0.57
OB/BCL B8	J15256	5/3/07	6.9		0.84	3960		2.2	308		0.06	0.01	U	0.01	0.39	U	0.39	10.2		0.57
OB/BCL C9	J15257	5/3/07	5.8		0.83	3850		2.2	294		0.06	0.02	U	0.02	0.39	U	0.39	9.9		0.57
OB/BCL C10	J15258	5/3/07	6.4		0.82	3780		2.2	288		0.06	0.01	U	0.01	0.50		0.38	10.2		0.56
OB/BCL C1	J15259	5/3/07	9.9		0.82	4270		2.1	346		0.06	0.02	U	0.02	0.67		0.38	11.1		0.55
OB/BCL C2	J15260	5/3/07	8.3		0.82	4020		2.1	320		0.06	0.01	U	0.01	0.83		0.38	10.7		0.55
OB/BCL D3	J15261	5/3/07	5.1		0.83	3860		2.2	314		0.06	0.02	U	0.02	0.66		0.39	10.1		0.57
Duplicate of J15261	J15262	5/3/07	6.3		0.83	3860		2.2	326		0.06	0.01	U	0.01	0.73		0.38	9.7		0.56
Split of J15261	J152D7	5/3/07	5.9		0.31	5260		9.3	400	N	0.42	0.007	U	0.007	0.93	U	0.93	11.8		1.2
OB/BCL D4	J15263	5/3/07	5.6		0.81	3830		2.1	299		0.06	0.02	U	0.02	0.57		0.37	10.5		0.55
OB/BCL D5	J15264	5/3/07	10.0		0.83	4070		2.2	315		0.06	0.01	U	0.01	0.41		0.38	12.0		0.56
OB/BCL D6	J15265	5/3/07	8.2		0.82	4110		2.1	331		0.06	0.01	U	0.01	0.49		0.38	10.7		0.56
PT A1	J15283	5/10/07	2.7		0.70	3910		1.8	201		0.05	0.02	U	0.02	0.33	U	0.33	10.8		0.48
PT A2	J15284	5/10/07	2.9		0.85	3470		2.2	187		0.06	0.01	U	0.01	0.39	U	0.39	8.7		0.57
PT A3	J15285	5/10/07	3.4		0.77	4030		2.0	227		0.05	0.02		0.01	0.36	U	0.36	10.4		0.52
PT A4	J15286	5/10/07	4.2		0.84	3740		2.2	231		0.06	0.02	U	0.02	0.39	U	0.39	10.9		0.57
Duplicate of J15286	J15287	5/10/07	3.0		0.84	3850		2.2	235		0.06	0.01	U	0.01	0.39	U	0.39	10.7		0.57
Split of J15286	J152D9	5/10/07	3.2		0.15	5050	J	12.2	257	N	0.10	0.0067		0.0067	1.2		1.2	13.6		0.76
PT A5	J15689	6/21/07	32.0		0.96	3620		2.4	366		0.2	0.01	U	0.01	0.66		0.47	10.1		0.79

Attachment	1	Sheet No.	9 of 11
Originator	H. M. Sulloway	Date	09/06/07
Checked	J. M. Capron	Date	
Calc. No.	0100F-CA-V0279	Rev. No.	1

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Potassium			Selenium			Silicon			Silver			Sodium			Vanadium		
			mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL	mg/kg	Q	PQL
SZ Area 1 A1	J15266	5/8/07	812		13.4	1.0	U	1.0	492	J	1.2	0.25	U	0.25	94.9		1.2	42.0		0.27
SZ Area 1 A2	J15267	5/8/07	749		13.6	1.0	U	1.0	540	J	1.2	0.25	U	0.25	87.0		1.2	35.5		0.28
SZ Area 1 A3	J15268	5/8/07	809		14.2	1.1	U	1.1	449	J	1.2	0.26	U	0.26	92.6		1.3	50		0.29
SZ Area 1 A4	J15269	6/20/07	782		9.4	1.3	U	1.3	1050	J	2.5	0.27	U	0.27	121		4.8	46.1		0.24
SZ Area 2 B5	J15270	6/20/07	794		9.4	1.3	U	1.3	922	J	2.5	0.27	U	0.27	101		4.8	40.2		0.24
SZ Area 2 B6	J15271	5/8/07	849		13.9	1.1	U	1.1	449	J	1.2	0.26	U	0.26	110		1.3	51.2		0.28
SZ Area 2 B7	J15272	5/8/07	826		13.2	1.0	U	1.0	383	J	1.1	0.24	U	0.24	118		1.2	54.2		0.27
Duplicate of J15272	J15273	5/8/07	798		13.3	1.0	U	1.0	458	J	1.1	0.24	U	0.24	88.3		1.2	50.7		0.27
Split of J15272	J152D8	5/8/07	1180		51	0.18	U	0.18	259	N	4.1	0.2	UN	0.2	136		10.2	60.3		0.69
SZ Area 2 B8	J15274	5/8/07	764		12.5	0.95	U	0.95	406	J	1.1	0.23	U	0.23	101		1.1	42.6		0.26
SZ Area 3 C9	J15661	6/20/07	929		9.2	1.2	U	1.2	1130	J	2.5	0.26	U	0.26	108		4.7	44.2		0.23
SZ Area 3 C10	J15276	6/20/07	817		11.9	0.90	U	0.90	428	J	1	0.22	U	0.22	90.1		1.1	45.3		0.24
SZ Area 3 C1	J15277	5/8/07	528		13.1	0.99	U	0.99	307	J	1.1	0.24	U	0.24	104		1.2	29.7		0.27
SZ Area 3 C2	J15278	5/8/07	769		13.9	1.1	U	1.1	392	J	1.2	0.26	U	0.26	91.9		1.3	43.3		0.28
SZ Area 4 D3	J15279	5/8/07	872		13.1	1.0	U	1.0	392	J	1.1	0.24	U	0.24	99.5		1.2	50.4		0.27
SZ Area 4 D4	J15280	5/8/07	918		14.2	1.1	U	1.1	379	J	1.2	0.26	U	0.26	110		1.3	52.7		0.29
SZ Area 4 D5	J15281	5/21/07	532		9.3	1.3	U	1.3	713	J	2.5	0.26	U	0.26	97.8		4.8	27.6		0.23
SZ Area 4 D6	J15282	5/21/07	582		9.3	1.3	U	1.3	825	J	2.5	0.26	U	0.26	83.9		4.8	28.6		0.23
SZ Area 4 D7	J15688	6/21/07	697		9.2	1.2	U	1.2	872	J	2.5	0.26	U	0.26	108		4.7	30.6		0.23
OB/BCL A1	J15249	5/2/07	1090		14.9	1.1	U	1.1	500		1.3	0.27	U	0.27	91.2		1.3	51.0		0.31
OB/BCL A2	J15250	5/2/07	1000		14.7	1.1	U	1.1	633		1.3	0.27	U	0.27	106		1.3	51.7		0.30
OB/BCL A3	J15251	5/2/07	1220		14.6	1.1	U	1.1	534		1.3	0.27	U	0.27	113		1.3	51.0		0.30
OB/BCL A4	J15252	5/2/07	1180		14.6	1.1	U	1.1	472		1.3	0.27	U	0.27	120		1.3	53.3		0.30
OB/BCL B5	J15253	5/3/07	1480		14.7	1.1	U	1.1	373		1.3	4.3		0.27	135		1.3	52.7		0.30
OB/BCL B6	J15254	5/3/07	1100		14.4	1.1	U	1.1	476		1.2	0.27	U	0.27	125		1.3	53.4		0.30
OB/BCL B7	J15255	5/3/07	1100		14.6	1.3		1.1	423		1.3	0.27	U	0.27	104		1.3	56.7		0.30
OB/BCL B8	J15256	5/3/07	1080		14.6	1.4		1.1	378		1.3	0.27	U	0.27	139		1.3	56.1		0.30
OB/BCL C9	J15257	5/3/07	944		14.5	1.1	U	1.1	600		1.2	0.27	U	0.27	101		1.3	48.6		0.30
OB/BCL C10	J15258	5/3/07	923		14.4	1.1	U	1.1	517		1.2	0.27	U	0.27	94.5		1.3	48.5		0.29
OB/BCL C1	J15259	5/3/07	1220		14.2	1.1	U	1.1	396		1.2	0.26	U	0.26	118		1.3	57.7		0.29
OB/BCL C2	J15260	5/3/07	1210		14.2	1.1	U	1.1	428		1.2	0.26	U	0.26	122		1.3	54.0		0.29
OB/BCL D3	J15261	5/3/07	1050		14.5	1.1	U	1.1	451		1.3	0.27	U	0.27	89.9		1.3	53.6		0.3
Duplicate of J15261	J15262	5/3/07	1130		14.4	1.3		1.1	586		1.2	0.27	U	0.27	102		1.3	54.1		0.3
Split of J15261	J152D7	5/3/07	1440	N	153	0.46	U	0.46	1010	CN	4.2	0.38	UN	0.38	1300	N	12.5	77.1	U	0.56
OB/BCL D4	J15263	5/3/07	874		14.1	1.1	U	1.1	540		1.2	0.26	U	0.26	94.1		1.3	51.9		0.29
OB/BCL D5	J15264	5/3/07	1170		14.4	1.5		1.1	448		1.2	0.27	U	0.27	118		1.3	55.5		0.30
OB/BCL D6	J15265	5/3/07	1140		14.3	1.1	U	1.1	448		1.2	0.26	U	0.26	125		1.3	53.3		0.29
PT A1	J15283	5/10/07	607		12.3	0.93	U	0.93	621	R	1.1	0.23	U	0.23	118		1.1	36.9		0.25
PT A2	J15284	5/10/07	534		14.7	1.1	U	1.1	1130	R	1.3	0.27	U	0.27	147		1.3	32.4		0.30
PT A3	J15285	5/10/07	590		13.4	1.0	U	1.0	562	R	12	0.25	U	0.25	138		1.2	44.2		0.27
PT A4	J15286	5/10/07	592		14.7	1.1	U	1.1	608	R	1.3	0.88		0.27	116		1.3	36.6		0.30
Duplicate of J15286	J15287	5/10/07	582		14.6	1.1	U	1.1	543	R	1.3	0.27	U	0.27	110		1.3	38.4		0.30
Split of J15286	J152D9	5/10/07	1030		50.3	0.17		0.17	490	J	4.0	0.20		0.20	195		10.1	44.8		0.68
PT A5	J15689	6/21/07	1330		9.3	1.3	U	1.3	1240	J	2.5	0.26	U	0.26	104		4.8	41.1		0.23

Attachment 1. 118-F-1 Verification Sampling Results.

Sample Location	Sample Number	Sample Date	Zinc		
			mg/kg	Q	PQL
SZ Area 1 A1	J15266	5/8/07	35.5		0.08
SZ Area 1 A2	J15267	5/8/07	33.6		0.08
SZ Area 1 A3	J15268	5/8/07	38.0		0.09
SZ Area 1 A4	J15269	6/20/07	37.1		0.12
SZ Area 2 B5	J15270	6/20/07	32.7		0.12
SZ Area 2 B6	J15271	5/8/07	39.7		0.09
SZ Area 2 B7	J15272	5/8/07	38.7		0.08
Duplicate of J15272	J15273	5/8/07	37.3		0.08
Split of J15272	J152D8	5/8/07	37.6		1.4
SZ Area 2 B8	J15274	5/8/07	35.4		0.08
SZ Area 3 C9	J15661	6/20/07	43.0		0.11
SZ Area 3 C10	J15276	6/20/07	37.0		0.07
SZ Area 3 C1	J15277	5/8/07	26.2		0.08
SZ Area 3 C2	J15278	5/8/07	37.4		0.09
SZ Area 4 D3	J15279	5/8/07	95.3		0.08
SZ Area 4 D4	J15280	5/8/07	39.1		0.09
SZ Area 4 D5	J15281	5/21/07	28.2		0.12
SZ Area 4 D6	J15282	5/21/07	28.4		0.12
SZ Area 4 D7	J15688	6/21/07	31.3		0.12
OB/BCL A1	J15249	5/2/07	42.0		0.09
OB/BCL A2	J15250	5/2/07	47.5		0.09
OB/BCL A3	J15251	5/2/07	44.1		0.09
OB/BCL A4	J15252	5/2/07	47.7		0.09
OB/BCL B5	J15253	5/3/07	46.2		0.09
OB/BCL B6	J15254	5/3/07	43.4		0.09
OB/BCL B7	J15255	5/3/07	43.4		0.09
OB/BCL B8	J15256	5/3/07	42.8		0.09
OB/BCL C9	J15257	5/3/07	40.4		0.09
OB/BCL C10	J15258	5/3/07	40.7		0.09
OB/BCL C1	J15259	5/3/07	45.6		0.09
OB/BCL C2	J15260	5/3/07	45.3		0.09
OB/BCL D3	J15261	5/3/07	42.0		0.09
Duplicate of J15261	J15262	5/3/07	43.7		0.09
Split of J15261	J152D7	5/3/07	48.2		1.6
OB/BCL D4	J15263	5/3/07	41.7		0.09
OB/BCL D5	J15264	5/3/07	43.7		0.09
OB/BCL D6	J15265	5/3/07	43.5		0.09
PT A1	J15283	5/10/07	32.9		0.08
PT A2	J15284	5/10/07	36.4		0.09
PT A3	J15285	5/10/07	39.3		0.08
PT A4	J15286	5/10/07	31.9		0.09
Duplicate of J15286	J15287	5/10/07	33.6		0.09
Split of J15286	J152D9	5/10/07	33.5		1.4
PT A5	J15689	6/21/07	40.4		0.12

CALCULATION COVER SHEET

Project Title:	118-F-1 Burial Ground Cleanup Verification	**Job No.**	14655
Area	100-F Area		
Discipline	Environmental	***Calc. No.**	0100F-CA-V0281
Subject	118-F-1 Burial Ground Comparison to Drinking Water Standards (MCL) Calculation		
Computer Program	Excel	**Program No.**	Excel 2003

The attached calculations have been generated to document compliance with established cleanup levels.
These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation X **Preliminary** **Superseded** **Voided**

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover - 1 Calculations - 3 Total - 4	S. W. Clark 7/11/07	M. W. Perrott 7/12/07	H. M. Sulloway 7/12/07	S. W. Callison for	7/10/07

SUMMARY OF REVISIONS

WCH-DE-018 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

Washington Closure Hanford **CALCULATION SHEET**

Originator	S. W. Clark	**Date**	7/11/07	**Calc. No.** 0100F-CA-V0281	**Rev. No.** 0
Project	118-F-1 Burial Ground Cleanup Verification	**Job No.**	14655	**Checked** M. W. Perrott	**Date** 7/12/07
Subject	118-F-1 Burial Ground Comparison to Drinking Water Standards (MCL) Calculation				**Sheet No.** 1 of 3

Purpose:
Compare RESRAD derived groundwater radionuclide concentrations to remedial action goals and maximum contaminant levels (MCLs) for groundwater. Compare beta/gamma emitter dose contributions to the maximum allowable dose of 4 mrem/yr. Compare alpha emitter dose contributions to the maximum allowable gross particle activity of 15 pCi/L or 1/25th of the derived concentration guide (DCG).

Table of Contents:
1. Calculation Summary
2. Comparison to MCLs
3. Cumulative Dose Comparison

Given/References:
1) RESRAD derived groundwater radionuclide concentrations from Calculation 0100F-CA-V0280, *118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief*. Only the predicted groundwater concentrations from the Process Trench shallow zone are evaluated in this MCL calculation brief because these concentrations are the highest for the 118-F-1 remediation areas. The Excavation shallow zone and the overburden/below cleanup level stockpile area soil all have lower predicted groundwater concentrations and will have lesser contributions to the maximum allowable dose of 4 mrem/yr.

2) Remedial action goals for groundwater and MCLs summarized in Table 2-3 of the *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP), DOE/RL-96-17, Rev. 5, U.S. Department of Energy, Richland Operations office, Richland, WA.

3) Maximum allowable dose of 4 mrem/yr for beta/gamma emitters and maximum allowable gross particle activity of 15 pCi/L for alpha emitters from: 40 CFR 141, "National Primary Drinking Water Regulation," *Code of Federal Regulations* , as amended (40 CFR Part 141, Subpart G, 141.66).

4) 1/25th of the derived concentration guide (DCG) values from *Radiation Protection of the Public and Environment,* DOE Order 5400.5, U.S. Department of Energy, Washington D.C.

5) Individual organ-dose caclulation methodology for beta/gamma emitter dose contribution to the maximum allowable dose of 4 mrem/yr from: *Maximum Permissible Body Burdens and Maximum Permissible Concetrations of Radionuclides in Air or Water for Occupational Exposure*, National Bureau of Standards (NBS) Handbook 69, as amended, U.S. Department of Commerce, Washington D.C., and National Primary Drinking Water Regulations, EPA-570/9-76-003, U.S. Environmental Protection Agency, Office of Water Supply, Washington D.C.

Solution:
1. The site data for the calculation are the groundwater concentrations for the contaminants of concern (COCs) (daughter products are not considered) over time from the RESRAD groundwater concentration file.

2. Compare the concentrations for each radionuclide to the groundwater remedial action goal and MCL given in the RDR/RAWP, Table 2-3.

3. The cumulative dose for each organ for all beta and gamma emitting COCs (C-14, Co-60, Cs-137, Eu-152, Eu-154, H-3, Ni-63, and Sr-90) at time t is calculated separately using the concentration corresponding to 4 mrem/year dose (C4) and the sum of fractions equation shown below (from EPA-570/9-76-003). The organs for which doses need to be computed are total body, bone, liver and gastrointestinal tract [lower large intestine] (GI(LLI)). The individual organ doses are compared to 4 mrem/yr.

Doseorgan x (t) = [ConcA(t)/C4A(x) + ConcB(t)/C4B(x) + ...] x (4 mrem/yr)

Where:
Doseorgan x (t) is the total dose to organ x in mrem/yr.
ConcA(t), ConcB(t), etc., are the concentrations of isotope A, B, etc., at time t in pCi/L, for all gamma emitting COCs.
C4A(x), C4B(x), etc., are the 4 mrem/yr dose equivalent concentrations for organ x of isotope A, B, etc., at time t in pCi/L, for all organs and for all gamma emitting COCs.
If the dose for organ x < 4 mrem/yr, then the standard is met..

Conclusions:
1. The concentrations for each of the radionuclide COCs are less than the groundwater remedial action goals and MCLs given in the RDR/RAWP, Table 2-3.

2. The cumulative dose for each total body, bone, liver and gastrointestinal tract for all beta and gamma emitting COCs is less than 4 mrem/yr

3. RESRAD modeling indicates that the alpha emitting COCs (Am-241, Pu-238, Pu-239, and Pu-240) will not impact groundwater. Therefore, concentrations for the alpha emitting COCs are less than the maximum allowable gross particle activity of 15 pCi/L and the 1/25th of the DCG.

4. The total uranium COCs (U-233/234, U-235, and U-238) are present at concentrations less than natural background.

Washington Closure Hanford

CALCULATION SHEET

Originator S. W. Clark SWC Date 7/11/07 Calc. No. 0100F-CA-V0281 Rev. No. 0
Project 118-F-1 Burial Ground Cleanup Verification Job 14655 Checked M. W. Perrott MWP Date 7/12/07
Subject 118-F-1 Burial Ground Comparison to Drinking Water Standards (MCL) Calculation Sheet No. 2 of 3

Table of Comparisons of the Maximum Concentration of Each Radionuclide to its Groundwater MCL
Data derived from RESRAD modelling, units are pCi/L.

Radionuclide	Time (years) 0	1	3	7	11	43	135	300	1000	MCL	Exceeds MCL?	Peak Conc.	Year of Peak Conc.
C-14	0	0	0	0	0	0	0	0	0	2,000	No	0	0
Co-60	0	1.67E-04	3.85E-04	5.31E-04	4.93E-04	2.86E-05	4.99E-10	4.15E-19	0	100	No	5.31E-04	7
Cs-137	0	1.13E-03	3.24E-03	6.90E-03	9.88E-03	1.84E-02	6.87E-03	3.35E-04	1.03E-10	60	No	2.90E-02	43
Eu-152	0	0	0	0	0	0	0	0	0	200	No	0	0
Eu-154	0	0	0	0	0	0	0	0	0	60	No	0	0
H-3	0	1.05E+03	1.80E+03	1.75E+03	2.34E+02	1.14E-06	7.42E-31	0	0	20000	No	1.80E+03	3
Ni-63	0	5.19E-02	1.54E-01	3.48E-01	5.31E-01	1.64E+00	2.63E+00	1.75E+00	3.47E-02	50	No	2.63E+00	135
Sr-90	0	6.97E-03	1.99E-02	4.23E-02	6.04E-02	1.10E-01	3.81E-02	1.64E-03	2.88E-10	8	No	1.10E-01	43

Washington Closure Hanford

CALCULATION SHEET

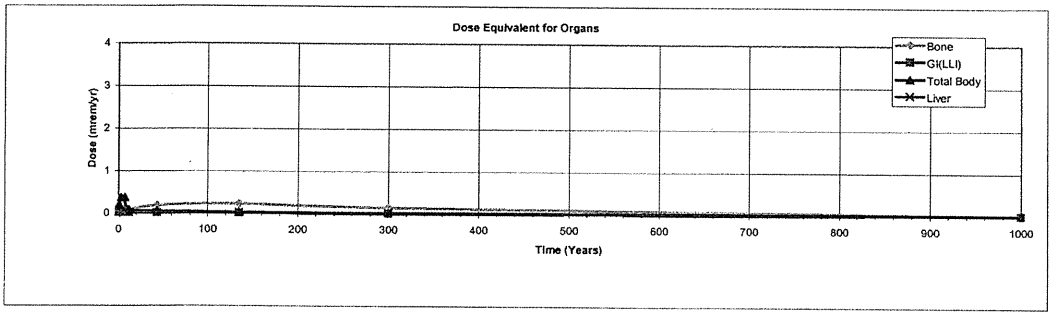
Originator: S. W. Clark — Date: 7/11/07 — Calc. No. 0100C-CA-V0036 — Rev. No. 0
Project: 118-F-1 Burial Ground Cleanup Verification — Job: 14655 — Checked: M. W. Perrott — Date: 7/12/07
Subject: 118-F-1 Burial Ground Comparison to Drinking Water Standards (MCL) Calculation — Sheet No. 3 of 3

Table Showing the Calculation of the Cumulative Dose for All Radionuclides and Comparison to the 4 mrem/yr Drinking Water Standard
Data derived from RESRAD modelling, units are pCi/L.

Radionuclide	Time (years)									Organ	C_4	Exceeds 4 mrem/yr?	Peak Conc.	Year of Peak Conc.
	0	1	3	7	11	43	135	300	1000					
C-14	0	0	0	0	0	0	0	0	0	Total Body	9,000	No	0	0
										Bone	2,000	No		
										Fat	2,000	No		
Co-60	0	1.67E-04	3.85E-04	5.31E-04	4.93E-04	2.86E-05	4.99E-10	4.15E-19	0	GI(LLI)	100	No	5.31E-04	7
										Total Body	900	No		
										Liver	3,000	No		
Cs-137	0	1.13E-03	3.24E-03	6.90E-03	9.88E-03	1.84E-02	6.87E-03	3.35E-04	1.03E-10	Bone	80	No	2.90E-02	43
										GI(LLI)	2,000	No		
										Total Body	200	No		
										Liver	60	No		
Eu-152	0	0	0	0	0	0	0	0	0	Bone	30,000	No	0.00E+00	0
										GI(LLI)	200	No		
										Total Body	200,000	No		
										Liver	100,000	No		
Eu-154	0	0	0	0	0	0	0	0	0	Bone	5,000	No	0.00E+00	0
										GI(LLI)	60	No		
										Total Body	70,000	No		
										Liver	60,000	No		
H-3	0	1.05E+03	1.80E+03	1.75E+03	2.34E+02	1.14E-06	7.42E-31	0	0	Total Body	20,000	No	1.80E+03	3
Ni-63	0	5.19E-02	1.54E-01	3.48E-01	5.31E-01	1.64E+00	2.63E+00	1.75E+00	3.47E-02	Bone	50	No	2.63E+00	135
										GI(LLI)	3,000	No		
										Total Body	2,000	No		
										Liver	600	No		
Sr-90	0	6.97E-03	1.99E-02	4.23E-02	6.04E-02	1.10E-01	3.81E-02	1.64E-03	2.88E-10	Bone	8	No	1.10E-01	43
										GI(LLI)	100	No		
										Total Body	8	No		

Cumulative dose for each organ (with time)

Organ	Time (years)									Exceeds 4 mrem/yr?	Peak Conc.	Year of Peak Conc.
	0	1	3	7	11	43	135	300	1000			
Bone	0	7.69E-03	2.24E-02	4.93E-02	7.32E-02	1.87E-01	2.30E-01	1.41E-01	2.78E-03	No	2.30E-01	135
GI(LLI)	0	3.57E-04	1.02E-03	2.19E-03	3.16E-03	6.62E-03	5.04E-03	2.40E-03	4.63E-05	No	6.62E-03	43
Total Body	0	2.14E-01	3.70E-01	3.72E-01	7.83E-02	5.86E-02	2.44E-02	4.33E-03	6.94E-05	No	3.72E-01	7
Liver	0	4.22E-04	1.24E-03	2.78E-03	4.20E-03	1.22E-02	1.80E-02	1.17E-02	2.31E-04	No	1.80E-02	135



CALCULATION COVER SHEET

Project Title: 118-F-1 Burial Ground Cleanup Verification **Job No:** 14655
Area: 100-F Area
Discipline: Environmental *__Calculation No:__ 0100F-CA-V0280
Subject: 118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief
Computer Program: RESRAD **Program No:** Version 6.3

The attached calculations have been generated to document compliance with established cleanup levels. These calculations should be used in conjunction with other relevant documents in the administrative record.

Committed Calculation ☒ **Preliminary** ☐ **Superseded** ☐ **Voided** ☐

Rev.	Sheet Numbers	Originator	Checker	Reviewer	Approval	Date
0	Cover – 1 pg Summary – 6 pg Attm. 1 - 1 pg Attm. 2 - 32 pg Attm. 3 - 52 pg Attm. 4 - 19 pg Attm. 5 - 32 pg Attm. 6 - 52 pg Attm. 7 - 19 pg Attm. 8 - 30 pg Attm. 9 - 43 pg Attm. 10 - 19 pg Total – 306 pages	S. W. Clark S.W. Clark 7/11/07	M. W. Perrott M.W. Perrott 7/12/07	H. M. Sulloway H.M. Sulloway 7/12/07	S. W. Callison for	7/12/07

SUMMARY OF REVISION

WCH-DE-018 (05/08/2007) *Obtain Calc. No. from Document Control and Form from Intranet

Washington Closure Hanford CALCULATION SHEET

Originator:	S. W. Clark	Date:	7/11/07	Calc. No.:	0100F-CA-V0280	Rev.:	0
Project:	118-F-1 Burial Ground Cleanup	Job No:	14655	Checked:	M. W. Perrott	Date:	7/12/07
Subject:	118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief					Sheet No.	1 of 6

PURPOSE:

Calculate the soil and groundwater concentrations, dose, and risk contributions from remaining radionuclide contaminants in remediated 118-F-1 Burial Ground areas, in overburden/below cleanup level soil, and in staging pile (stockpile) areas over a period of 1,000 years.

GIVEN/REFERENCES:

1) Cleanup verification data from *118-F-1 Burial Ground 95% UCL Calculation*, Calculation No. 0100F-CA-V0279, Rev. 0, Washington Closure Hanford, Richland, Washington.
2) *Remedial Design Report/Remedial Action Work Plan for the 100 Area* (RDR/RAWP), DOE/RL-96-17, Rev. 5, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
3) Radioactive and nonradioactive contaminants of concern from the *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan*, DOE/RL-2001-35, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. For the purpose of these RESRAD calculations, the radioactive contaminants of concern (COCs) are americium-241, carbon-14, cesium-137, cobalt-60, europium-152, europium-154, nickel-63, plutonium-238, plutonium-239/240, silver-108m, strontium-90, tritium (H-3), and uranium-238. The nonradionuclide contaminants of concern are cadmium, lead, and mercury. Attainment of remedial action goals (RAGs) by residual concentrations of nonradionuclides is discussed in the *118-F-1 Burial Ground 95% UCL Calculation*. All direct exposure RAGs are met and protection of groundwater and the river can be demonstrated by the results of vertical migration modeling in the *100 Area Analogous Sites RESRAD Calculations*, 0100X-CA-V0050, Rev. 0, Bechtel Hanford, Inc., Richland, Washington, which predicts that none of the nonradionuclides will migrate to groundwater (and thus the Columbia River) within 1,000 years.
4) RESidual RADioactivity (RESRAD) computer code, version 6.3, to calculate compliance with residual radioactivity guidelines, developed for the U.S. Department of Energy by the Environmental Assessment Division of Argonne National Laboratory, Argonne, Illinois.
5) Sample design data from the *118-F-1 Burial Ground Sampling Plan*, Calculation No. 0100F-CA-V0282, Rev. 0, Washington Closure Hanford, Richland, Washington.
6) Groundwater elevation from *Hanford Groundwater Monitoring for Fiscal Year 2006* PNNL-16346, Pacific Northwest National Laboratory, Richland, Washington.

SOLUTION:

1) Separate RESRAD runs were performed for the 118-F-1 Burial Ground Excavation shallow zone, Process Trench shallow zone, and overburden/below cleanup level stockpile (OB/BCL) material. Table 1 shows the elevations (NAVD88) and thickness of each soil horizon. Attachment 1 shows representative dimensions of soil horizons and contaminant pathways considered for dose, risk, and groundwater protection. Input factors for each run are shown in the "Summary" section of the RESRAD "Mixture Sums and Single Radionuclide Guidelines" printouts in the Attachments to this Calculation Summary.

Washington Closure Hanford CALCULATION SHEET

Originator:	S. W. Clark	Date:	7/11/07	Calc. No.:	0100F-CA-V0280	Rev.:	0
Project:	118-F-1 Burial Ground Cleanup	Job No:	14655	Checked:	M. W. Perrott	Date:	7/12/07
Subject:	118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief					Sheet No.	2 of 6

Table 1. Waste Site Dimensions for RESRAD Modeling

Parameter	Units	Excavation Shallow Zone	Process Trench Shallow Zone	OB/BCL
Contaminated Zone Dimensions				
Cover Depth	m	0	0	0
Area of Contaminated Zone (CZ)	m^2	11,623	5,478	10,911
Length Parallel to Aquifer Flow	m	186	164	212
Elevations of Vadose Zone Horizons				
Elevation: Surface	m	123.0	123.0	123.0
Elevation: Groundwater	m	114.5	114.5	114.5
Thickness: Contaminated Zone	m	8.5	8.5	8.5
Thickness: Unsaturated Zone	m	0	0	0

OB/BCL = Overburden/Below Cleanup Levels Stockpile Material

2) The year where the peak dose (or concentration) occurs from each individual radionuclide COC and layer is determined by a preliminary run. This year is then added for all horizons for the final RESRAD runs. For the direct exposure pathway (i.e. soil ingestion and inhalation and external radiation), the peak year occurred at year zero (year 2007) for all COCs. For the water pathways (i.e. drinking water and food ingestion) the peak year was year 3 for tritium, year 7 for cobalt-60, year 43 for cesium-137 and strontium-90, and year 135 for nickel-63. The 3-, 7-, 43-, and 135-year time periods were added to all RESRAD runs.

To be conservative, shallow zone evaluations for radionuclides were performed for the 118-F-1 Burial Ground areas assuming that the residual contamination levels from the shallow zone sample data sets extend uniformly from the surface to groundwater (Attachment 1).

METHODOLOGY:

1) Runs of RESRAD version 6.3 were completed for the 118-F-1 Burial Ground Excavation shallow zone, Process Trench shallow zone, and overburden/below cleanup level stockpile (OB/BCL) material soils using the radionuclide concentrations shown in Table 2. RESRAD numerical output reports for dose, risk, and concentration for the Excavation, Process Trench, and OB/BCL material soils are presented in the Attachments to this calculation summary.

Table 2. Cleanup Verification Data Set [a]

COCs	Excavation Shallow Zone	Process Trench Shallow Zone	OB/BCL
Radionuclide Activity (pCi/g)			
Americium-241	0.063	0.089	0.23
Carbon-14	0.83	0.32	1.9
Cesium-137	0.21	0.45	0(< BG)
Cobalt-60	0.038	0.074	0.0075
Europium-152	0.054	0.14	0.041
Europium-154	0.053	0.063	0.018
Nickel-63	2.3	4.4	2.5
Plutonium-238	0.028	0.10	0.16
Plutonium-239	0.082	0.105	0.105
Plutonium-240	0.021	0.025	0.025
Silver-108m	0.017	0.013	0.011
Strontium-90	0.38	0.22	0(< BG)
Tritium (H-3)	1.4	2.0	2.5
Uranium-238	0(<BG)	0(<BG)	0(<BG)

-- = Not detected or not evaluated by laboratory analysis (for all samples in the data set).
OB/BCL = Overburden/Below Cleanup Levels Stockpile Material
[a] Soil concentration values are from *118-F-1 Burial Ground 95% UCL Calculation*, Calculation No. 0100F-CA-V0279, Rev. 0, Washington Closure Hanford, Richland, Washington. Refer to the 95% UCL for nonradionuclide concentrations. Nonradionuclides are not evaluated in this RESRAD calculation.

RESULTS:

1) Radionuclide "All Pathways" Dose Rate

The "all pathways" (maximum) dose rates are shown in Table 3. The maximum all pathways dose rate from the 118-F-1 Burial Ground is 4.59 mrem/yr at year zero (2007) from the Excavation shallow zone. The maximum all-pathways dose rates from the Process Trench shallow zone and overburden/below cleanup level stockpile material soil are, respectively, 4.06 and 4.23 mrem/yr at year zero (2007).

Table 3. All Pathways Dose Rate (mrem/yr)

RESRAD Run	Vadose Zone Horizons	"All Pathways" Dose Contributions in mrem/yr at Each Time Slice (yr)								
		0	1	3	7	11	43	135	300	1000
Excavation	Shallow Zone	4.59E+00	3.65E+00	2.82E+00	2.29E+00	1.95E+00	8.81E-01	2.07E-01	8.66E-02	4.73E-02
Process Trench	Shallow Zone	4.06E+00	3.70E+00	3.25E+00	2.64E+00	2.21E+00	9.05E-01	2.22E-01	1.03E-01	6.01E-02
OB/BCL	Shallow Zone	4.23E+00	2.44E+00	1.07E+00	6.39E-01	4.69E-01	2.86E-01	2.02E-01	1.43E-01	7.36E-02

OB/BCL = Overburden/Below Cleanup Levels Stockpile Material

2) Radionuclide Excess Lifetime Cancer Risk

The radionuclide excess lifetime cancer risk (ELCR) results are shown in Table 4. The maximum ELCR for the 118-F-1 Burial Ground is 4.45×10^{-5} at year zero (2007) for the Process Trench shallow zone. The maximum ELCR results for the Excavation shallow zone and

overburden/below cleanup level stockpile material soil are, respectively, 4.12×10^{-5} and 1.69×10^{-5} which also occur at year zero (2007).

Table 4. Radionuclide Excess Lifetime Cancer Risk

RESRAD Run	Vadose Zone Horizons	Excess Cancer Risk at Each Time Slice (yr)								
		0	1	3	7	11	43	135	300	1000
Excavation	Shallow Zone	4.12E-05	3.77E-05	3.37E-05	2.93E-05	2.59E-05	1.22E-05	2.56E-06	6.67E-07	1.04E-07
Process Trench	Shallow Zone	4.45E-05	4.21E-05	3.85E-05	3.29E-05	2.86E-05	1.24E-05	2.42E-06	6.29E-07	1.29E-07
OB/BCL	Shallow Zone	1.69E-05	1.15E-05	7.00E-06	5.05E-06	3.99E-06	2.21E-06	1.29E-06	6.54E-07	1.62E-07

OB/BCL = Overburden/Below Cleanup Levels Stockpile Material

3) Radionuclide Groundwater Protection

The radionuclide concentrations in groundwater calculated by the RESRAD model are summarized in Table 5. Among the radionuclide contaminants of concern only cobalt-60, cesium-137, nickel-63, strontium-90, and tritium are calculated to reach groundwater in the 1,000 years of the RESRAD model evaluation. The organ specific dose via the groundwater (and river) pathway is presented in a separate calculation brief [*118-F-1 Burial Ground Comparison To Drinking Water Standards (MCL) Calculation*, Calculation No. 0100F-CA-V0281, Rev. 0, Washington Closure Hanford, Richland, Washington]. Only concentrations are presented here.

Table 5. Predicted Groundwater (Well Water/Drinking Water) Concentrations (2 Pages)

Radio-nuclides	RESRAD Run	Groundwater Concentrations in pCi/L at Each Time Slice (yr)									RAGs, pCi/L
		0	1	3	7	11	43	135	300	1000	
Co-60	Excavation	0	8.58E-05	1.98E-04	2.73E-04	2.53E-04	1.47E-05	2.56E-10	2.13E-19	0	100
	Process Trench	0	1.67E-04	3.85E-04	5.31E-04	4.93E-04	2.86E-05	4.99E-10	4.15E-19	0	
	OB/BCL	0	1.69E-05	3.90E-05	5.38E-05	5.00E-05	2.90E-06	5.05E-11	4.21E-20	0	
Cs-137	Excavation	0	5.28E-04	1.51E-03	3.22E-03	4.61E-03	8.59E-03	3.21E-03	1.56E-04	4.78E-11	60
	Process Trench	0	1.13E-03	3.24E-03	6.90E-03	9.88E-03	1.84E-02	6.87E-03	3.35E-04	1.03E-10	
	OB/BCL	0	0	0	0	0	0	0	0	0	
Tritium (H-3)	Excavation	0	5.87E+02	1.01E+03	8.47E+02	7.81E+01	3.80E-07	2.44E-31	0	0	20,000
	Process Trench	0	8.38E+02	1.44E+03	7.76E+02	7.15E+01	3.47E-07	2.21E-31	0	0	
	OB/BCL	0	1.05E+03	1.80E+03	1.75E+03	2.34E+02	1.14E-06	7.42E-31	0	0	
Ni-63	Excavation	0	2.71E-02	8.03E-02	1.82E-01	2.78E-01	8.58E-01	1.37E+00	9.13E-01	1.82E-02	50
	Process Trench	0	5.19E-02	1.54E-01	3.48E-01	5.31E-01	1.64E+00	2.63E+00	1.75E+00	3.47E-02	
	OB/BCL	0	2.95E-02	8.72E-02	1.98E-01	3.02E-01	9.33E-01	1.49E+00	9.93E-01	1.97E-02	

Washington Closure Hanford	CALCULATION SHEET						
Originator:	S. W. Clark	Date:	7/11/07	Calc. No.:	0100F-CA-V0280	Rev.:	0
Project:	118-F-1 Burial Ground Cleanup	Job No:	14655	Checked:	M. W. Perrott	Date:	7/12/07
Subject:	118-F-1 Burial Ground Cleanup Verification RESRAD Calculation Brief					Sheet No.	5 of 6

Table 5. Predicted Groundwater (Well Water/Drinking Water) Concentrations (2 Pages)

Radio-nuclides	RESRAD Run	Groundwater Concentrations in pCi/L at Each Time Slice (yr)									RAGs, pCi/L
		0	1	3	7	11	43	135	300	1000	
Sr-90	Excavation	0	6.97E-03	1.99E-02	4.23E-02	6.04E-02	1.10E-01	3.81E-02	1.64E-03	2.88E-10	8
	Process Trench	0	4.04E-03	1.15E-02	2.45E-02	3.50E-02	6.35E-02	2.21E-02	9.47E-04	1.45E-10	
	OB/BCL	0	0	0	0	0	0	0	0	0	

RAGs = Remedial action goals from the 100 Area RDR/RAWP
OB/BCL = Overburden/Below Cleanup Levels Stockpile Material

CONCLUSIONS:

- The "all pathways" (maximum) dose rates are shown in Table 3. The maximum all pathways dose rate from the 118-F-1 Burial Ground is 4.59 mrem/yr at year zero (2007) from the Excavation shallow zone. The maximum all-pathways dose rates from the Process Trench shallow zone and overburden/below cleanup level stockpile material are, respectively, 4.06 and 4.23 mrem/yr at year zero (2007).

- The radionuclide excess lifetime cancer risk (ELCR) results are shown in Table 4. The maximum ELCR for the 118-F-1 Burial Ground is 4.45×10^{-5} at year zero (2007) for the Process Trench shallow zone. The maximum ELCR results for the Excavation shallow zone and overburden/below cleanup level stockpile material soil are, respectively, 4.12×10^{-5} and 1.69×10^{-5} which also occur at year zero (2007).

- The dominant pathway for the dose rate for the Excavation shallow zone and overburden/ below cleanup level stockpile material soil RESRAD evaluations is the plant ingestion pathway due to carbon-14 (see Attachment 2 and Attachment 8). The dominant pathway for the dose rate for the Process Trench shallow zone is the direct external exposure (external gamma) pathway due to cesium-137 (see Attachment 5). See Table 6, below.

Table 6. Dominant Pathways and Primary Radionuclides for RESRAD Evaluations

RESRAD Run	Vadose Zone Horizon	Dominant Pathway	Primary Radionuclide	Reference
Excavation	Shallow Zone	Plant Ingestion	Carbon-14	Attachment 2
Process Trench	Shallow Zone	External Gamma	Cesium-137	Attachment 5
OB/BCL	Shallow Zone	Plant Ingestion	Carbon-14	Attachment 8

OB/BCL = Overburden/Below Cleanup Levels Stockpile Material

- None of the site COCs are projected to exceed remedial action goals (RAGs).

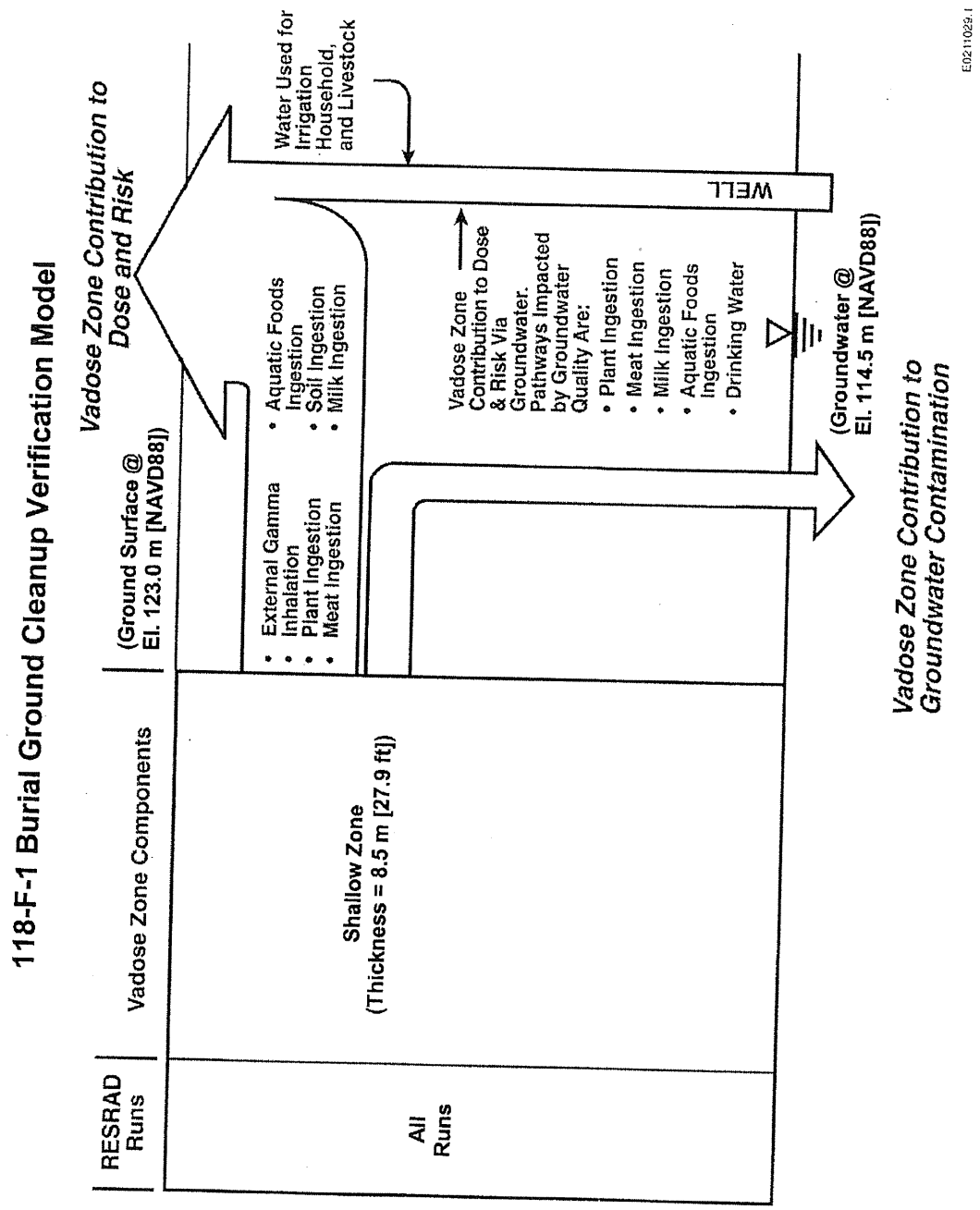
- Among the radionuclide contaminants of concern, cesium-137, cobalt-60, nickel-63, strontium-90, and tritium (H-3) are calculated to reach groundwater in the 1,000 years of the

RESRAD model run. These radionuclides are predicted to reach groundwater at concentrations significantly below the RAGs.

ATTACHMENTS:

1. Graphic showing 118-F-1 Cleanup Verification Model (1pages)
2. RESRAD Output: 118-F-1 Excavation Shallow Zone Radionuclides – Mixture Sums and Single Radionuclide Guidelines (32 pages)
3. RESRAD Output: 118-F-1 Excavation Shallow Zone Radionuclides – Intake Quantities and Health Risk Factors (52 pages)
4. RESRAD Output: 118-F-1 Excavation Shallow Zone Radionuclides – Concentration of Radionuclides, (19 pages)
5. RESRAD Output: 118-F-1 Process Trench Shallow Zone Radionuclides – Mixture Sums and Single Radionuclide Guidelines (32 pages)
6. RESRAD Output: 118-F-1 Process Trench Shallow Zone Radionuclides - Intake Quantities and Health Risk Factors (52 pages)
7. RESRAD Output: 118-F-1 Process Trench Shallow Zone Radionuclides - Concentration of Radionuclides (19 pages)
8. RESRAD Output: 118-F-1 Overburden/Below Cleanup Levels Radionuclides – Mixture Sums and Single Radionuclide Guidelines (30 pages)
9. RESRAD Output: 118-F-1 Overburden/Below Cleanup Levels Radionuclides – Intake Quantities and Health Risk Factors (43 pages)
10. RESRAD Output: 118-F-1 Overburden/Below Cleanup Levels Radionuclides – Concentration of Radionuclides (19 pages)

ATTACHMENT 1



Attachment 1 Sheet No. 1 of 1
Originator: S. W. Clark SWC Date 7/11/07
Chk'd By M. W. Perrott MWP Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 1
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

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Attachment 2 Sheet No. 1 of 32
Originator: S. W. Clark Date 7/11/07
Chk'd By M. W. Perrott Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 2
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Ag-108m+D	2.830E-04	2.830E-04	DCF2(2)
B-1	Am-241	4.440E-01	4.440E-01	DCF2(3)
B-1	C-14	2.090E-06	2.090E-06	DCF2(4)
B-1	Co-60	2.190E-04	2.190E-04	DCF2(5)
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(6)
B-1	Eu-152	2.210E-04	2.210E-04	DCF2(7)
B-1	Eu-154	2.860E-04	2.860E-04	DCF2(9)
B-1	Gd-152	2.430E-01	2.430E-01	DCF2(10)
B-1	H-3	6.400E-08	6.400E-08	DCF2(11)
B-1	Ni-63	6.290E-06	6.290E-06	DCF2(12)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(13)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(14)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(15)
B-1	Pu-238	3.920E-01	3.920E-01	DCF2(16)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(18)
B-1	Pu-240	4.290E-01	4.290E-01	DCF2(19)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(21)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(22)
B-1	Sr-90+D	1.308E-03	1.300E-03	DCF2(23)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(24)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(25)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(26)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(27)
B-1	U-233	1.350E-01	1.350E-01	DCF2(28)
B-1	U-234	1.320E-01	1.320E-01	DCF2(29)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(30)
B-1	U-236	1.250E-01	1.250E-01	DCF2(31)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Ag-108m+D	7.620E-06	7.620E-06	DCF3(2)
D-1	Am-241	3.640E-03	3.640E-03	DCF3(3)
D-1	C-14	2.090E-06	2.090E-06	DCF3(4)
D-1	Co-60	2.690E-05	2.690E-05	DCF3(5)
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(6)
D-1	Eu-152	6.480E-06	6.480E-06	DCF3(7)
D-1	Eu-154	9.550E-06	9.550E-06	DCF3(9)
D-1	Gd-152	1.610E-04	1.610E-04	DCF3(10)
D-1	H-3	6.400E-08	6.400E-08	DCF3(11)
D-1	Ni-63	5.770E-07	5.770E-07	DCF3(12)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(13)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(14)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(15)
D-1	Pu-238	3.200E-03	3.200E-03	DCF3(16)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(18)
D-1	Pu-240	3.540E-03	3.540E-03	DCF3(19)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(21)

Attachment 2 Sheet No. 2 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 3
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(22)
D-1	Sr-90+D	1.528E-04	1.420E-04	DCF3(23)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(24)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(25)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(26)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(27)
D-1	U-233	2.890E-04	2.890E-04	DCF3(28)
D-1	U-234	2.830E-04	2.830E-04	DCF3(29)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(30)
D-1	U-236	2.690E-04	2.690E-04	DCF3(31)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Ag-108m+D , plant/soil concentration ratio, dimensionless	1.500E-01	1.500E-01	RTF(2,1)
D-34	Ag-108m+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-03	3.000E-03	RTF(2,2)
D-34	Ag-108m+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.500E-02	2.500E-02	RTF(2,3)
D-34				
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(3,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(3,3)
D-34				
D-34	C-14 , plant/soil concentration ratio, dimensionless	5.500E+00	5.500E+00	RTF(4,1)
D-34	C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.100E-02	3.100E-02	RTF(4,2)
D-34	C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.200E-02	1.200E-02	RTF(4,3)
D-34				
D-34	Co-60 , plant/soil concentration ratio, dimensionless	8.000E-02	8.000E-02	RTF(5,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(5,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(5,3)
D-34				
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(6,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	8.000E-03	8.000E-03	RTF(6,3)
D-34				
D-34	Eu-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(7,2)
D-34	Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-05	5.000E-05	RTF(7,3)
D-34				
D-34	Eu-154 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(9,2)
D-34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-05	5.000E-05	RTF(9,3)
D-34				
D-34	Gd-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(10,2)
D-34	Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(10,3)
D-34				

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 4
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	H-3 , plant/soil concentration ratio, dimensionless	4.800E+00	4.800E+00	RTF(11,1)
D-34	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(11,2)
D-34	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(11,3)
D-34				
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(12,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(12,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(12,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(13,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(13,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(13,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(14,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(14,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(14,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(15,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(15,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(15,3)
D-34				
D-34	Pu-238 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(16,1)
D-34	Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(16,2)
D-34	Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(16,3)
D-34				
D-34	Pu-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(18,1)
D-34	Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(18,2)
D-34	Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(18,3)
D-34				
D-34	Pu-240 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(19,1)
D-34	Pu-240 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(19,2)
D-34	Pu-240 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(19,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(21,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(22,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(23,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(23,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(23,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(24,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(24,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(24,3)
D-34				

Attachment 2 Sheet No. 4 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 5
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(25,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(25,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(25,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(26,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(26,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(26,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(27,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(27,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(27,3)
D-34				
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(28,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(28,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(28,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(29,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(29,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(29,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(30,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(30,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(30,3)
D-34				
D-34	U-236 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(31,1)
D-34	U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(31,2)
D-34	U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(31,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Ag-108m+D , fish	5.000E+00	5.000E+00	BIOFAC(2,1)
D-5	Ag-108m+D , crustacea and mollusks	7.700E+02	7.700E+02	BIOFAC(2,2)
D-5				
D-5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(3,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
D-5				
D-5	C-14 , fish	5.000E+04	5.000E+04	BIOFAC(4,1)
D-5	C-14 , crustacea and mollusks	9.100E+03	9.100E+03	BIOFAC(4,2)
D-5				
D-5	Co-60 , fish	3.000E+02	3.000E+02	BIOFAC(5,1)
D-5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(5,2)
D-5				
D-5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(6,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(6,2)
D-5				
D-5	Eu-152 , fish	5.000E+01	5.000E+01	BIOFAC(7,1)
D-5	Eu-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(7,2)

Attachment 2 Sheet No. 5 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 6
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	Eu-154 , fish	5.000E+01	5.000E+01	BIOFAC(9,1)
D-5	Eu-154 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(9,2)
D-5	Gd-152 , fish	2.500E+01	2.500E+01	BIOFAC(10,1)
D-5	Gd-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(10,2)
D-5	H-3 , fish	1.000E+00	1.000E+00	BIOFAC(11,1)
D-5	H-3 , crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(11,2)
D-5	Ni-63 , fish	1.000E+02	1.000E+02	BIOFAC(12,1)
D-5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(12,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(13,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(13,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(14,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(15,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(15,2)
D-5	Pu-238 , fish	3.000E+01	3.000E+01	BIOFAC(16,1)
D-5	Pu-238 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(16,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(18,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(18,2)
D-5	Pu-240 , fish	3.000E+01	3.000E+01	BIOFAC(19,1)
D-5	Pu-240 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(19,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(21,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(21,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(22,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(22,2)
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(23,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(23,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(24,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(24,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(25,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(25,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(26,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(26,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(27,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(27,2)

Attachment 2 Sheet No. 6 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 7
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(28,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(28,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(29,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(29,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(30,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(30,2)
D-5				
D-5	U-236 , fish	1.000E+01	1.000E+01	BIOFAC(31,1)
D-5	U-236 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(31,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Attachment 2 Sheet No. 7 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 8
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Site-Specific Parameter Summary

Menu	Parameter		User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)		1.162E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)		8.500E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)		1.860E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)		1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)		0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)		1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)		3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)		7.000E+00	1.000E+01	---	T(4)
R011	Times for calculations (yr)		1.100E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)		4.300E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)		1.350E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)		3.000E+02	1.000E+03	---	T(8)
R011	Times for calculations (yr)		1.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)		not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g):	Ag-108m	1.700E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g):	Am-241	6.300E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g):	C-14	8.300E-01	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g):	Co-60	3.800E-02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g):	Cs-137	2.100E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g):	Eu-152	5.400E-02	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g):	Eu-154	5.300E-02	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g):	H-3	1.400E+00	0.000E+00	---	S1(11)
R012	Initial principal radionuclide (pCi/g):	Ni-63	2.300E+00	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g):	Pu-238	2.800E-02	0.000E+00	---	S1(16)
R012	Initial principal radionuclide (pCi/g):	Pu-239	8.200E-02	0.000E+00	---	S1(18)
R012	Initial principal radionuclide (pCi/g):	Pu-240	2.100E-02	0.000E+00	---	S1(19)
R012	Initial principal radionuclide (pCi/g):	Sr-90	3.800E-01	0.000E+00	---	S1(23)
R012	Concentration in groundwater (pCi/L):	Ag-108m	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L):	Am-241	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L):	C-14	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L):	Co-60	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L):	Cs-137	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L):	Eu-152	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L):	Eu-154	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L):	H-3	not used	0.000E+00	---	W1(11)
R012	Concentration in groundwater (pCi/L):	Ni-63	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L):	Pu-238	not used	0.000E+00	---	W1(16)
R012	Concentration in groundwater (pCi/L):	Pu-239	not used	0.000E+00	---	W1(18)
R012	Concentration in groundwater (pCi/L):	Pu-240	not used	0.000E+00	---	W1(19)
R012	Concentration in groundwater (pCi/L):	Sr-90	not used	0.000E+00	---	W1(23)
R013	Cover depth (m)		0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)		not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)		not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)		1.600E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)		1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity		4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity		1.500E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)		2.500E+02	1.000E+01	---	HCCZ

Attachment 2 Sheet No. 8 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	3.400E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	8.000E+00	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.100E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.600E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	7.600E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.500E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	1.500E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	5.530E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.250E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	4.600E+00	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	0	1	---	NS
R016	Distribution coefficients for Ag-108m				
R016	Contaminated zone (cm**3/g)	9.000E+01	0.000E+00	---	DCNUCC(2)
R016	Saturated zone (cm**3/g)	9.000E+01	0.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.521E-05	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Am-241				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+01	---	DCNUCC(3)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for C-14				
R016	Contaminated zone (cm**3/g)	2.000E+02	0.000E+00	---	DCNUCC(4)
R016	Saturated zone (cm**3/g)	2.000E+02	0.000E+00	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm**3/g)	5.000E+01	1.000E+03	---	DCNUCC(5)
R016	Saturated zone (cm**3/g)	5.000E+01	1.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 10
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm**3/g)	5.000E+01	4.600E+03	---	DCNUCC(6)
R016	Saturated zone (cm**3/g)	5.000E+01	4.600E+03	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Eu-152				
R016	Contaminated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCC(7)
R016	Saturated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Eu-154				
R016	Contaminated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCC(9)
R016	Saturated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for H-3				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(11)
R016	Saturated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.854E-02	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for Ni-63				
R016	Contaminated zone (cm**3/g)	3.000E+01	1.000E+03	---	DCNUCC(12)
R016	Saturated zone (cm**3/g)	3.000E+01	1.000E+03	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.951E-04	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for Pu-238				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(16)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(18)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(18)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(18)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)
R016	Distribution coefficients for Pu-240				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(19)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(19)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(19)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(19)

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Chk'd By M. W. Perrott Date
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ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 11
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	2.500E+01	3.000E+01	---	DCNUCC(23)
R016	Saturated zone (cm**3/g)	2.500E+01	3.000E+01	---	DCNUCS(23)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.339E-04	ALEACH(23)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(23)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.921E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Gd-152				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCC(10)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.123E-06	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(13)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.282E-05	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(15)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.869E-05	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(21)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(21)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.380E-05	ALEACH(21)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(21)
R016	Distribution coefficients for daughter Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(22)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(22)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.380E-05	ALEACH(22)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(22)

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Chk'd By M. W. Perrott Date
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ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 12
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Th-228				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(24)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(24)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(24)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(24)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(25)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(25)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(25)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(25)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(26)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(26)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(26)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(26)
R016	Distribution coefficients for daughter Th-232				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(27)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(27)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(27)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(27)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(28)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(28)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(28)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(28)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(29)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(29)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(29)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(29)
R016	Distribution coefficients for daughter U-235				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(30)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(30)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(30)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(30)
R016	Distribution coefficients for daughter U-236				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(31)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(31)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(31)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(31)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH

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Chk'd By M. W. Perrott Date
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ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 13
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	8.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.000E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.100E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	2.700E+00	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	1.000E+02	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	3.600E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	1.970E+01	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	7.300E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	7.300E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.581E+00	FMEAT
R018	Contamination fraction of milk	-1	-1	0.581E+00	FMILK

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Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
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ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 14
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	2.000E-05	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	3.000E-02	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	2.000E-02	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	9.800E-01	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	3.000E-01	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	7.000E-07	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	1.000E-10	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	8.000E-01	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	2.000E-01	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	8.894E+01	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)

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Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
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ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 15
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	1	---	---	LYMAX
TITL	Maximum number of integration points for risk	5	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Attachment 2 Sheet No. 15 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 16
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Contaminated Zone Dimensions
Area: 11623.00 square meters
Thickness: 8.50 meters
Cover Depth: 0.00 meters

Initial Soil Concentrations, pCi/g

Ag-108m	1.700E-02
Am-241	6.300E-02
C-14	8.300E-01
Co-60	3.800E-02
Cs-137	2.100E-01
Eu-152	5.400E-02
Eu-154	5.300E-02
H-3	1.400E+00
Ni-63	2.300E+00
Pu-238	2.800E-02
Pu-239	8.200E-02
Pu-240	2.100E-02
Sr-90	3.800E-01

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
TDOSE(t):	4.586E+00	3.652E+00	2.824E+00	2.290E+00	1.953E+00	8.805E-01	2.066E-01	8.656E-02	4.734E-02
M(t):	3.058E-01	2.435E-01	1.882E-01	1.527E-01	1.302E-01	5.870E-02	1.378E-02	5.771E-03	3.156E-03

0Maximum TDOSE(t): 4.586E+00 mrem/yr at t = 0.000E+00 years

Attachment 2 Sheet No. 16 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 17
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	1.047E-01	0.0228	1.973E-07	0.0000	0.000E+00	0.0000	1.095E-03	0.0002	8.700E-05	0.0000	1.647E-03	0.0004	7.565E-06	0.0000
Am-241	1.819E-03	0.0004	1.147E-03	0.0003	0.000E+00	0.0000	1.293E-02	0.0028	1.363E-04	0.0000	1.480E-05	0.0000	1.339E-02	0.0029
C-14	7.452E-06	0.0000	3.035E-04	0.0001	0.000E+00	0.0000	1.139E+00	0.2482	2.584E-01	0.0563	2.093E-01	0.0456	1.013E-04	0.0000
Co-60	3.948E-01	0.0861	3.413E-07	0.0000	0.000E+00	0.0000	4.608E-03	0.0010	2.541E-03	0.0006	5.822E-04	0.0001	5.970E-05	0.0000
Cs-137	4.567E-01	0.0996	2.747E-07	0.0000	0.000E+00	0.0000	2.367E-02	0.0052	2.122E-02	0.0046	1.318E-02	0.0029	6.132E-04	0.0001
Eu-152	2.428E-01	0.0529	4.894E-07	0.0000	0.000E+00	0.0000	4.931E-05	0.0000	9.814E-06	0.0000	6.484E-07	0.0000	2.044E-05	0.0000
Eu-154	2.609E-01	0.0569	6.217E-07	0.0000	0.000E+00	0.0000	7.133E-05	0.0000	1.420E-05	0.0000	9.379E-07	0.0000	2.956E-05	0.0000
H-3	0.000E+00	0.0000	1.316E-03	0.0003	0.000E+00	0.0000	3.333E-02	0.0073	4.838E-03	0.0011	8.164E-03	0.0018	5.233E-06	0.0000
Ni-63	0.000E+00	0.0000	5.933E-07	0.0000	0.000E+00	0.0000	3.739E-03	0.0008	5.414E-04	0.0001	5.013E-03	0.0011	7.750E-05	0.0000
Pu-238	2.851E-06	0.0000	4.502E-04	0.0001	0.000E+00	0.0000	5.053E-03	0.0011	1.065E-04	0.0000	2.891E-06	0.0000	5.233E-03	0.0011
Pu-239	1.572E-05	0.0000	1.443E-03	0.0003	0.000E+00	0.0000	1.637E-02	0.0036	3.451E-04	0.0001	9.366E-06	0.0000	1.695E-02	0.0037
Pu-240	2.061E-06	0.0000	3.695E-04	0.0001	0.000E+00	0.0000	4.192E-03	0.0009	8.838E-05	0.0000	2.399E-06	0.0000	4.341E-03	0.0009
Sr-90	5.984E-03	0.0013	2.039E-05	0.0000	0.000E+00	0.0000	9.816E-01	0.2140	2.031E-01	0.0443	1.147E-01	0.0250	3.391E-03	0.0007
Total	1.468E+00	0.3200	5.052E-03	0.0011	0.000E+00	0.0000	2.225E+00	0.4852	4.915E-01	0.1072	3.527E-01	0.0769	4.422E-02	0.0096

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.075E-01	0.0234
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.944E-02	0.0064
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.607E+00	0.3503
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.026E-01	0.0878
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.154E-01	0.1124
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.429E-01	0.0530
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.610E-01	0.0569
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.765E-02	0.0104
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.372E-03	0.0020
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.085E-02	0.0024
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.513E-02	0.0077
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.996E-03	0.0020
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.309E+00	0.2854
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.586E+00	1.0000

*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 17 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 18
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	1.041E-01	0.0285	1.962E-07	0.0000	0.000E+00	0.0000	1.089E-03	0.0003	8.652E-05	0.0000	1.638E-03	0.0004	7.523E-06	0.0000
Am-241	1.816E-03	0.0005	1.145E-03	0.0003	0.000E+00	0.0000	1.291E-02	0.0035	1.361E-04	0.0000	1.477E-05	0.0000	1.337E-02	0.0037
C-14	3.413E-06	0.0000	1.390E-04	0.0000	0.000E+00	0.0000	5.372E-01	0.1471	1.360E-01	0.0372	1.058E-01	0.0290	4.640E-05	0.0000
Co-60	3.461E-01	0.0948	2.992E-07	0.0000	0.000E+00	0.0000	4.040E-03	0.0011	2.227E-03	0.0006	5.104E-04	0.0001	5.233E-05	0.0000
Cs-137	4.462E-01	0.1222	2.684E-07	0.0000	0.000E+00	0.0000	2.312E-02	0.0063	2.074E-02	0.0057	1.288E-02	0.0035	5.991E-04	0.0002
Eu-152	2.305E-01	0.0631	4.646E-07	0.0000	0.000E+00	0.0000	4.681E-05	0.0000	9.316E-06	0.0000	6.155E-07	0.0000	1.940E-05	0.0000
Eu-154	2.412E-01	0.0660	5.746E-07	0.0000	0.000E+00	0.0000	6.592E-05	0.0000	1.312E-05	0.0000	8.668E-07	0.0000	2.732E-05	0.0000
H-3	0.000E+00	0.0000	7.251E-04	0.0002	0.000E+00	0.0000	1.873E-02	0.0051	2.934E-03	0.0008	4.813E-03	0.0013	2.882E-06	0.0000
Ni-63	0.000E+00	0.0000	5.890E-07	0.0000	0.000E+00	0.0000	3.712E-03	0.0010	5.375E-04	0.0001	4.976E-03	0.0014	7.693E-05	0.0000
Pu-238	2.828E-06	0.0000	4.466E-04	0.0001	0.000E+00	0.0000	5.013E-03	0.0014	1.057E-04	0.0000	2.869E-06	0.0000	5.191E-03	0.0014
Pu-239	1.572E-05	0.0000	1.443E-03	0.0004	0.000E+00	0.0000	1.637E-02	0.0045	3.451E-04	0.0001	9.365E-06	0.0000	1.695E-02	0.0046
Pu-240	2.061E-06	0.0000	3.694E-04	0.0001	0.000E+00	0.0000	4.192E-03	0.0011	8.837E-05	0.0000	2.398E-06	0.0000	4.341E-03	0.0012
Sr-90	5.842E-03	0.0016	1.991E-05	0.0000	0.000E+00	0.0000	9.583E-01	0.2624	1.983E-01	0.0543	1.120E-01	0.0307	3.310E-03	0.0009
Total	1.376E+00	0.3767	4.290E-03	0.0012	0.000E+00	0.0000	1.585E+00	0.4339	3.615E-01	0.0990	2.426E-01	0.0664	4.400E-02	0.0120

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0
Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.069E-01	0.0293
Am-241	1.045E-14	0.0000	4.675E-17	0.0000	0.000E+00	0.0000	1.022E-15	0.0000	2.915E-17	0.0000	2.011E-16	0.0000	2.939E-02	0.0080
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.792E-01	0.2133
Co-60	1.672E-06	0.0000	1.657E-07	0.0000	0.000E+00	0.0000	1.715E-07	0.0000	2.748E-07	0.0000	1.090E-07	0.0000	3.530E-01	0.0966
Cs-137	1.914E-05	0.0000	1.230E-05	0.0000	0.000E+00	0.0000	1.940E-06	0.0000	4.714E-06	0.0000	4.990E-06	0.0000	5.036E-01	0.1379
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.305E-01	0.0631
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.413E-01	0.0661
H-3	2.734E-02	0.0075	9.471E-06	0.0000	0.000E+00	0.0000	7.827E-03	0.0021	6.833E-04	0.0002	2.327E-03	0.0006	6.540E-02	0.0179
Ni-63	1.138E-05	0.0000	3.887E-07	0.0000	0.000E+00	0.0000	1.205E-06	0.0000	6.205E-07	0.0000	8.372E-06	0.0000	9.325E-03	0.0026
Pu-238	2.835E-08	0.0000	1.172E-10	0.0000	0.000E+00	0.0000	2.916E-09	0.0000	9.873E-11	0.0000	6.045E-10	0.0000	1.076E-02	0.0029
Pu-239	2.733E-11	0.0000	1.130E-13	0.0000	0.000E+00	0.0000	2.810E-12	0.0000	9.533E-14	0.0000	5.824E-13	0.0000	3.513E-02	0.0096
Pu-240	2.116E-10	0.0000	8.743E-13	0.0000	0.000E+00	0.0000	2.176E-11	0.0000	7.365E-13	0.0000	4.511E-12	0.0000	8.995E-03	0.0025
Sr-90	7.745E-04	0.0002	1.637E-05	0.0000	0.000E+00	0.0000	8.862E-05	0.0000	7.027E-05	0.0000	5.812E-05	0.0000	1.279E+00	0.3501
Total	2.815E-02	0.0077	3.870E-05	0.0000	0.000E+00	0.0000	7.919E-03	0.0022	7.592E-04	0.0002	2.399E-03	0.0007	3.652E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 18 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 19
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	1.030E-01	0.0365	1.941E-07	0.0000	0.000E+00	0.0000	1.077E-03	0.0004	8.557E-05	0.0000	1.620E-03	0.0006	7.441E-06	0.0000
Am-241	1.810E-03	0.0006	1.142E-03	0.0004	0.000E+00	0.0000	1.287E-02	0.0046	1.357E-04	0.0000	1.473E-05	0.0000	1.333E-02	0.0047
C-14	7.154E-07	0.0000	2.913E-05	0.0000	0.000E+00	0.0000	1.126E-01	0.0399	2.851E-02	0.0101	2.217E-02	0.0079	9.726E-06	0.0000
Co-60	2.660E-01	0.0942	2.300E-07	0.0000	0.000E+00	0.0000	3.105E-03	0.0011	1.712E-03	0.0006	3.923E-04	0.0001	4.022E-05	0.0000
Cs-137	4.260E-01	0.1509	2.563E-07	0.0000	0.000E+00	0.0000	2.207E-02	0.0078	1.979E-02	0.0070	1.229E-02	0.0044	5.719E-04	0.0002
Eu-152	2.077E-01	0.0736	4.187E-07	0.0000	0.000E+00	0.0000	4.218E-05	0.0000	8.395E-06	0.0000	5.547E-07	0.0000	1.748E-05	0.0000
Eu-154	2.060E-01	0.0730	4.908E-07	0.0000	0.000E+00	0.0000	5.631E-05	0.0000	1.121E-05	0.0000	7.404E-07	0.0000	2.334E-05	0.0000
H-3	0.000E+00	0.0000	2.199E-04	0.0001	0.000E+00	0.0000	5.683E-03	0.0020	8.899E-04	0.0003	1.460E-03	0.0005	8.742E-07	0.0000
Ni-63	0.000E+00	0.0000	5.803E-07	0.0000	0.000E+00	0.0000	3.657E-03	0.0013	5.296E-04	0.0002	4.903E-03	0.0017	7.580E-05	0.0000
Pu-238	2.784E-06	0.0000	4.396E-04	0.0002	0.000E+00	0.0000	4.934E-03	0.0017	1.040E-04	0.0000	2.824E-06	0.0000	5.110E-03	0.0018
Pu-239	1.571E-05	0.0000	1.443E-03	0.0005	0.000E+00	0.0000	1.637E-02	0.0058	3.450E-04	0.0001	9.364E-06	0.0000	1.695E-02	0.0060
Pu-240	2.060E-06	0.0000	3.693E-04	0.0001	0.000E+00	0.0000	4.191E-03	0.0015	8.834E-05	0.0000	2.398E-06	0.0000	4.340E-03	0.0015
Sr-90	5.568E-03	0.0020	1.897E-05	0.0000	0.000E+00	0.0000	9.133E-01	0.3234	1.890E-01	0.0669	1.068E-01	0.0378	3.155E-03	0.0011
Total	1.216E+00	0.4307	3.663E-03	0.0013	0.000E+00	0.0000	1.100E+00	0.3896	2.412E-01	0.0854	1.496E-01	0.0530	4.363E-02	0.0155

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
0
Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.058E-01	0.0375
Am-241	2.862E-13	0.0000	1.217E-15	0.0000	0.000E+00	0.0000	3.064E-14	0.0000	1.217E-15	0.0000	6.760E-15	0.0000	2.930E-02	0.0104
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.633E-01	0.0578
Co-60	3.874E-06	0.0000	3.959E-07	0.0000	0.000E+00	0.0000	4.248E-07	0.0000	9.827E-07	0.0000	3.064E-07	0.0000	2.713E-01	0.0961
Cs-137	5.509E-05	0.0000	3.650E-05	0.0000	0.000E+00	0.0000	5.969E-06	0.0000	2.094E-05	0.0000	1.742E-05	0.0000	4.809E-01	0.1703
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.078E-01	0.0736
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.061E-01	0.0730
H-3	4.707E-02	0.0167	1.648E-05	0.0000	0.000E+00	0.0000	1.380E-02	0.0049	1.299E-03	0.0005	4.140E-03	0.0015	7.458E-02	0.0264
Ni-63	3.375E-05	0.0000	1.174E-06	0.0000	0.000E+00	0.0000	3.715E-06	0.0000	2.289E-06	0.0000	2.761E-05	0.0000	9.235E-03	0.0033
Pu-238	2.543E-07	0.0000	1.075E-09	0.0000	0.000E+00	0.0000	2.745E-08	0.0000	1.144E-09	0.0000	6.158E-09	0.0000	1.059E-02	0.0038
Pu-239	2.463E-10	0.0000	1.041E-12	0.0000	0.000E+00	0.0000	2.659E-11	0.0000	1.110E-12	0.0000	5.963E-12	0.0000	3.513E-02	0.0124
Pu-240	1.907E-09	0.0000	8.062E-12	0.0000	0.000E+00	0.0000	2.059E-10	0.0000	8.578E-12	0.0000	4.618E-11	0.0000	8.992E-03	0.0032
Sr-90	2.221E-03	0.0008	4.772E-05	0.0000	0.000E+00	0.0000	2.632E-04	0.0001	2.447E-04	0.0001	1.835E-04	0.0001	1.221E+00	0.4323
Total	4.939E-02	0.0175	1.023E-04	0.0000	0.000E+00	0.0000	1.407E-02	0.0050	1.568E-03	0.0006	4.368E-03	0.0015	2.824E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 19 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 20
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	1.007E-01	0.0440	1.898E-07	0.0000	0.000E+00	0.0000	1.053E-03	0.0005	8.370E-05	0.0000	1.584E-03	0.0007	7.278E-06	0.0000
Am-241	1.799E-03	0.0008	1.134E-03	0.0005	0.000E+00	0.0000	1.279E-02	0.0056	1.348E-04	0.0001	1.463E-05	0.0000	1.324E-02	0.0058
C-14	3.137E-08	0.0000	1.277E-06	0.0000	0.000E+00	0.0000	4.938E-03	0.0022	1.250E-03	0.0005	9.722E-04	0.0004	4.264E-07	0.0000
Co-60	1.571E-01	0.0686	1.358E-07	0.0000	0.000E+00	0.0000	1.834E-03	0.0008	1.011E-03	0.0004	2.317E-04	0.0001	2.376E-05	0.0000
Cs-137	3.882E-01	0.1695	2.335E-07	0.0000	0.000E+00	0.0000	2.012E-02	0.0088	1.804E-02	0.0079	1.120E-02	0.0049	5.212E-04	0.0002
Eu-152	1.687E-01	0.0736	3.400E-07	0.0000	0.000E+00	0.0000	3.426E-05	0.0000	6.818E-06	0.0000	4.505E-07	0.0000	1.420E-05	0.0000
Eu-154	1.503E-01	0.0656	3.581E-07	0.0000	0.000E+00	0.0000	4.109E-05	0.0000	8.177E-06	0.0000	5.403E-07	0.0000	1.703E-05	0.0000
H-3	0.000E+00	0.0000	2.021E-05	0.0000	0.000E+00	0.0000	5.221E-04	0.0002	8.177E-05	0.0000	1.341E-04	0.0001	8.032E-08	0.0000
Ni-63	0.000E+00	0.0000	5.633E-07	0.0000	0.000E+00	0.0000	3.550E-03	0.0015	5.141E-04	0.0002	4.760E-03	0.0021	7.358E-05	0.0000
Pu-238	2.697E-06	0.0000	4.259E-04	0.0002	0.000E+00	0.0000	4.780E-03	0.0021	1.008E-04	0.0000	2.738E-06	0.0000	4.950E-03	0.0022
Pu-239	1.571E-05	0.0000	1.442E-03	0.0006	0.000E+00	0.0000	1.636E-02	0.0071	3.450E-04	0.0002	9.362E-06	0.0000	1.695E-02	0.0074
Pu-240	2.059E-06	0.0000	3.691E-04	0.0002	0.000E+00	0.0000	4.188E-03	0.0018	8.830E-05	0.0000	2.396E-06	0.0000	4.337E-03	0.0019
Sr-90	5.057E-03	0.0022	1.723E-05	0.0000	0.000E+00	0.0000	8.296E-01	0.3622	1.717E-01	0.0749	9.697E-02	0.0423	2.866E-03	0.0013
Total	9.719E-01	0.4243	3.412E-03	0.0015	0.000E+00	0.0000	8.998E-01	0.3928	1.933E-01	0.0844	1.159E-01	0.0506	4.300E-02	0.0188

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+00 years
0
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.035E-01	0.0452
Am-241	3.650E-12	0.0000	1.552E-14	0.0000	0.000E+00	0.0000	3.970E-13	0.0000	1.712E-14	0.0000	9.031E-14	0.0000	2.911E-02	0.0127
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.162E-03	0.0031
Co-60	5.349E-06	0.0000	5.512E-07	0.0000	0.000E+00	0.0000	5.973E-07	0.0000	1.492E-06	0.0000	4.441E-07	0.0000	1.602E-01	0.0700
Cs-137	1.173E-04	0.0001	7.842E-05	0.0000	0.000E+00	0.0000	1.295E-05	0.0000	4.905E-05	0.0000	3.894E-05	0.0000	4.384E-01	0.1914
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.687E-01	0.0737
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.504E-01	0.0656
H-3	3.965E-02	0.0173	1.403E-05	0.0000	0.000E+00	0.0000	1.192E-02	0.0052	1.206E-03	0.0005	3.608E-03	0.0016	5.715E-02	0.0250
Ni-63	7.654E-05	0.0000	2.675E-06	0.0000	0.000E+00	0.0000	8.516E-06	0.0000	5.480E-06	0.0000	6.442E-05	0.0000	9.056E-03	0.0040
Pu-238	1.366E-06	0.0000	5.812E-09	0.0000	0.000E+00	0.0000	1.495E-07	0.0000	6.578E-09	0.0000	3.428E-08	0.0000	1.026E-02	0.0045
Pu-239	1.337E-09	0.0000	5.690E-12	0.0000	0.000E+00	0.0000	1.464E-10	0.0000	6.453E-12	0.0000	3.354E-11	0.0000	3.512E-02	0.0153
Pu-240	1.035E-08	0.0000	4.404E-11	0.0000	0.000E+00	0.0000	1.133E-09	0.0000	4.983E-11	0.0000	2.597E-10	0.0000	8.988E-03	0.0039
Sr-90	4.713E-03	0.0021	1.017E-04	0.0000	0.000E+00	0.0000	5.640E-04	0.0002	5.454E-04	0.0002	3.994E-04	0.0002	1.112E+00	0.4857
Total	4.456E-02	0.0195	1.974E-04	0.0001	0.000E+00	0.0000	1.250E-02	0.0055	1.807E-03	0.0008	4.111E-03	0.0018	2.290E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 20 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 21
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.100E+01 years
0
Water Independent Pathways (Inhalation excludes radon)
0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	9.853E-02	0.0504	1.857E-07	0.0000	0.000E+00	0.0000	1.030E-03	0.0005	8.187E-05	0.0000	1.550E-03	0.0008	7.119E-06	0.0000
Am-241	1.787E-03	0.0009	1.127E-03	0.0006	0.000E+00	0.0000	1.270E-02	0.0065	1.339E-04	0.0001	1.454E-05	0.0000	1.315E-02	0.0067
C-14	1.371E-09	0.0000	5.584E-08	0.0000	0.000E+00	0.0000	2.159E-04	0.0001	5.466E-05	0.0000	4.250E-05	0.0000	1.864E-08	0.0000
Co-60	9.282E-02	0.0475	8.024E-08	0.0000	0.000E+00	0.0000	1.083E-03	0.0006	5.973E-04	0.0003	1.369E-04	0.0001	1.403E-05	0.0000
Cs-137	3.538E-01	0.1811	2.128E-07	0.0000	0.000E+00	0.0000	1.833E-02	0.0094	1.644E-02	0.0084	1.021E-02	0.0052	4.750E-04	0.0002
Eu-152	1.370E-01	0.0701	2.762E-07	0.0000	0.000E+00	0.0000	2.782E-05	0.0000	5.537E-06	0.0000	3.658E-07	0.0000	1.153E-05	0.0000
Eu-154	1.097E-01	0.0561	2.613E-07	0.0000	0.000E+00	0.0000	2.998E-05	0.0000	5.966E-06	0.0000	3.942E-07	0.0000	1.242E-05	0.0000
H-3	0.000E+00	0.0000	1.853E-06	0.0000	0.000E+00	0.0000	4.788E-05	0.0000	7.499E-06	0.0000	1.230E-05	0.0000	7.365E-09	0.0000
Ni-63	0.000E+00	0.0000	5.469E-07	0.0000	0.000E+00	0.0000	3.446E-03	0.0018	4.991E-04	0.0003	4.621E-03	0.0024	7.143E-05	0.0000
Pu-238	2.613E-06	0.0000	4.126E-04	0.0002	0.000E+00	0.0000	4.631E-03	0.0024	9.763E-05	0.0000	2.655E-06	0.0000	4.796E-03	0.0025
Pu-239	1.571E-05	0.0000	1.442E-03	0.0007	0.000E+00	0.0000	1.636E-02	0.0084	3.449E-04	0.0002	9.360E-06	0.0000	1.694E-02	0.0087
Pu-240	2.058E-06	0.0000	3.689E-04	0.0002	0.000E+00	0.0000	4.186E-03	0.0021	8.825E-05	0.0000	2.395E-06	0.0000	4.335E-03	0.0022
Sr-90	4.594E-03	0.0024	1.565E-05	0.0000	0.000E+00	0.0000	7.535E-01	0.3857	1.559E-01	0.0798	8.808E-02	0.0451	2.603E-03	0.0013
Total	7.982E-01	0.4086	3.369E-03	0.0017	0.000E+00	0.0000	8.156E-01	0.4175	1.743E-01	0.0892	1.047E-01	0.0536	4.242E-02	0.0217

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.100E+01 years
0
Water Dependent Pathways
0

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.012E-01	0.0518
Am-241	1.410E-11	0.0000	6.010E-14	0.0000	0.000E+00	0.0000	1.545E-12	0.0000	6.807E-14	0.0000	3.542E-13	0.0000	2.892E-02	0.0148
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.131E-04	0.0002
Co-60	4.968E-06	0.0000	5.132E-07	0.0000	0.000E+00	0.0000	5.575E-07	0.0000	1.420E-06	0.0000	4.179E-07	0.0000	9.466E-02	0.0485
Cs-137	1.682E-04	0.0001	1.126E-04	0.0001	0.000E+00	0.0000	1.864E-05	0.0000	7.203E-05	0.0000	5.652E-05	0.0000	3.996E-01	0.2046
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.370E-01	0.0701
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.097E-01	0.0562
H-3	3.653E-03	0.0019	1.293E-06	0.0000	0.000E+00	0.0000	1.098E-03	0.0006	1.111E-04	0.0001	3.324E-04	0.0002	5.266E-03	0.0027
Ni-63	1.168E-04	0.0001	4.089E-06	0.0000	0.000E+00	0.0000	1.304E-05	0.0000	8.486E-06	0.0000	9.909E-05	0.0001	8.880E-03	0.0045
Pu-238	3.327E-06	0.0000	1.418E-08	0.0000	0.000E+00	0.0000	3.655E-07	0.0000	1.631E-08	0.0000	8.429E-08	0.0000	9.946E-03	0.0051
Pu-239	3.290E-09	0.0000	1.403E-11	0.0000	0.000E+00	0.0000	3.615E-10	0.0000	1.618E-11	0.0000	8.332E-11	0.0000	3.511E-02	0.0180
Pu-240	2.547E-08	0.0000	1.085E-10	0.0000	0.000E+00	0.0000	2.798E-09	0.0000	1.248E-10	0.0000	6.451E-10	0.0000	8.983E-03	0.0046
Sr-90	6.731E-03	0.0034	1.455E-04	0.0001	0.000E+00	0.0000	8.078E-04	0.0004	7.892E-04	0.0004	5.745E-04	0.0003	1.014E+00	0.5190
Total	1.068E-02	0.0055	2.640E-04	0.0001	0.000E+00	0.0000	1.939E-03	0.0010	9.823E-04	0.0005	1.063E-03	0.0005	1.953E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 21 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 22
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.300E+01 years
0
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	8.257E-02	0.0938	1.556E-07	0.0000	0.000E+00	0.0000	8.635E-04	0.0010	6.861E-05	0.0001	1.299E-03	0.0015	5.966E-06	0.0000
Am-241	1.696E-03	0.0019	1.069E-03	0.0012	0.000E+00	0.0000	1.206E-02	0.0137	1.272E-04	0.0001	1.380E-05	0.0000	1.248E-02	0.0142
C-14	1.644E-20	0.0000	6.695E-19	0.0000	0.000E+00	0.0000	2.589E-15	0.0000	6.560E-16	0.0000	5.100E-16	0.0000	2.235E-19	0.0000
Co-60	1.376E-03	0.0016	1.189E-09	0.0000	0.000E+00	0.0000	1.605E-05	0.0000	8.852E-06	0.0000	2.028E-06	0.0000	2.080E-07	0.0000
Cs-137	1.683E-01	0.1911	1.012E-07	0.0000	0.000E+00	0.0000	8.719E-03	0.0099	7.819E-03	0.0089	4.856E-03	0.0055	2.259E-04	0.0003
Eu-152	2.592E-02	0.0294	5.225E-08	0.0000	0.000E+00	0.0000	5.264E-06	0.0000	1.048E-06	0.0000	6.922E-08	0.0000	2.182E-06	0.0000
Eu-154	8.811E-03	0.0100	2.099E-08	0.0000	0.000E+00	0.0000	2.409E-06	0.0000	4.793E-07	0.0000	3.167E-08	0.0000	9.982E-07	0.0000
H-3	0.000E+00	0.0000	8.664E-15	0.0000	0.000E+00	0.0000	2.239E-13	0.0000	3.509E-14	0.0000	5.754E-14	0.0000	3.444E-17	0.0000
Ni-63	0.000E+00	0.0000	4.313E-07	0.0000	0.000E+00	0.0000	2.718E-03	0.0031	3.936E-04	0.0004	3.645E-03	0.0041	5.634E-05	0.0001
Pu-238	2.028E-06	0.0000	3.201E-04	0.0004	0.000E+00	0.0000	3.593E-03	0.0041	7.575E-05	0.0001	2.073E-06	0.0000	3.721E-03	0.0042
Pu-239	1.568E-05	0.0000	1.439E-03	0.0016	0.000E+00	0.0000	1.633E-02	0.0185	3.442E-04	0.0004	9.343E-06	0.0000	1.691E-02	0.0192
Pu-240	2.049E-06	0.0000	3.673E-04	0.0004	0.000E+00	0.0000	4.168E-03	0.0047	8.787E-05	0.0001	2.385E-06	0.0000	4.316E-03	0.0049
Sr-90	2.129E-03	0.0024	7.254E-06	0.0000	0.000E+00	0.0000	3.492E-01	0.3966	7.226E-02	0.0821	4.081E-02	0.0464	1.206E-03	0.0014
Total	2.908E-01	0.3302	3.204E-03	0.0036	0.000E+00	0.0000	3.976E-01	0.4516	8.118E-02	0.0922	5.064E-02	0.0575	3.893E-02	0.0442

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.300E+01 years
0
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.481E-02	0.0963
Am-241	8.133E-10	0.0000	3.477E-12	0.0000	0.000E+00	0.0000	8.971E-11	0.0000	4.063E-12	0.0000	2.081E-11	0.0000	2.745E-02	0.0312
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.756E-15	0.0000
Co-60	2.886E-07	0.0000	2.990E-08	0.0000	0.000E+00	0.0000	3.259E-08	0.0000	8.511E-08	0.0000	2.468E-08	0.0000	1.403E-03	0.0016
Cs-137	3.135E-04	0.0004	2.106E-04	0.0002	0.000E+00	0.0000	3.498E-05	0.0000	1.385E-04	0.0002	1.071E-04	0.0001	1.907E-01	0.2166
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.593E-02	0.0294
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.815E-03	0.0100
H-3	1.776E-11	0.0000	6.287E-15	0.0000	0.000E+00	0.0000	5.340E-12	0.0000	5.404E-13	0.0000	1.616E-12	0.0000	2.559E-11	0.0000
Ni-63	3.615E-04	0.0004	1.267E-05	0.0000	0.000E+00	0.0000	4.049E-05	0.0000	2.674E-05	0.0000	3.096E-04	0.0004	7.564E-03	0.0086
Pu-238	4.548E-05	0.0001	1.943E-07	0.0000	0.000E+00	0.0000	5.020E-06	0.0000	2.282E-07	0.0000	1.167E-06	0.0000	7.766E-03	0.0088
Pu-239	4.880E-08	0.0000	2.089E-10	0.0000	0.000E+00	0.0000	5.387E-09	0.0000	2.468E-10	0.0000	1.250E-09	0.0000	3.505E-02	0.0398
Pu-240	3.771E-07	0.0000	1.611E-09	0.0000	0.000E+00	0.0000	4.163E-08	0.0000	1.892E-09	0.0000	9.672E-09	0.0000	8.944E-03	0.0102
Sr-90	1.224E-02	0.0139	2.650E-04	0.0003	0.000E+00	0.0000	1.474E-03	0.0017	1.459E-03	0.0017	1.054E-03	0.0012	4.821E-01	0.5475
Total	1.296E-02	0.0147	4.885E-04	0.0006	0.000E+00	0.0000	1.555E-03	0.0018	1.625E-03	0.0018	1.472E-03	0.0017	8.805E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 22 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 23
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.350E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	4.968E-02	0.2404	9.361E-08	0.0000	0.000E+00	0.0000	5.195E-04	0.0025	4.128E-05	0.0002	7.813E-04	0.0038	3.589E-06	0.0000
Am-241	1.461E-03	0.0071	9.203E-04	0.0045	0.000E+00	0.0000	1.039E-02	0.0503	1.098E-04	0.0005	1.188E-05	0.0001	1.074E-02	0.0520
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	7.579E-09	0.0000	6.552E-15	0.0000	0.000E+00	0.0000	8.845E-11	0.0000	4.877E-11	0.0000	1.118E-11	0.0000	1.146E-12	0.0000
Cs-137	1.987E-02	0.0961	1.195E-08	0.0000	0.000E+00	0.0000	1.030E-03	0.0050	9.232E-04	0.0045	5.734E-04	0.0028	2.667E-05	0.0001
Eu-152	2.162E-04	0.0010	4.358E-10	0.0000	0.000E+00	0.0000	4.391E-08	0.0000	8.738E-09	0.0000	5.773E-10	0.0000	1.820E-08	0.0000
Eu-154	6.262E-06	0.0000	1.492E-11	0.0000	0.000E+00	0.0000	1.712E-09	0.0000	3.407E-10	0.0000	2.251E-11	0.0000	7.094E-10	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	2.180E-07	0.0000	0.000E+00	0.0000	1.374E-03	0.0066	1.990E-04	0.0010	1.842E-03	0.0089	2.848E-05	0.0001
Pu-238	9.794E-07	0.0000	1.544E-04	0.0007	0.000E+00	0.0000	1.733E-03	0.0084	3.653E-05	0.0002	1.025E-06	0.0000	1.794E-03	0.0087
Pu-239	1.560E-05	0.0001	1.431E-03	0.0069	0.000E+00	0.0000	1.624E-02	0.0786	3.424E-04	0.0017	9.293E-06	0.0000	1.682E-02	0.0814
Pu-240	2.024E-06	0.0000	3.628E-04	0.0018	0.000E+00	0.0000	4.116E-03	0.0199	8.678E-05	0.0004	2.356E-06	0.0000	4.263E-03	0.0206
Sr-90	2.332E-04	0.0011	7.946E-07	0.0000	0.000E+00	0.0000	3.825E-02	0.1851	7.915E-03	0.0383	4.471E-03	0.0216	1.321E-04	0.0006
Total	7.148E-02	0.3459	2.870E-03	0.0139	0.000E+00	0.0000	7.365E-02	0.3564	9.654E-03	0.0467	7.693E-03	0.0372	3.381E-02	0.1636

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.350E+02 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.102E-02	0.2469
Am-241	1.887E-08	0.0000	8.103E-11	0.0000	0.000E+00	0.0000	2.085E-09	0.0000	9.508E-11	0.0000	4.849E-10	0.0000	2.363E-02	0.1144
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	5.027E-12	0.0000	5.212E-13	0.0000	0.000E+00	0.0000	5.685E-13	0.0000	1.493E-12	0.0000	4.315E-13	0.0000	7.736E-09	0.0000
Cs-137	1.170E-04	0.0006	7.868E-05	0.0004	0.000E+00	0.0000	1.308E-05	0.0001	5.208E-05	0.0003	4.014E-05	0.0002	2.272E-02	0.1100
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.162E-04	0.0010
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.265E-06	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	5.789E-04	0.0028	2.030E-05	0.0001	0.000E+00	0.0000	6.490E-05	0.0003	4.300E-05	0.0002	4.969E-04	0.0024	4.648E-03	0.0225
Pu-238	2.120E-04	0.0010	9.061E-07	0.0000	0.000E+00	0.0000	2.343E-05	0.0001	1.071E-06	0.0000	5.456E-06	0.0000	3.962E-03	0.0192
Pu-239	3.065E-07	0.0000	1.333E-09	0.0000	0.000E+00	0.0000	3.388E-08	0.0000	1.588E-09	0.0000	7.836E-09	0.0000	3.486E-02	0.1687
Pu-240	2.348E-06	0.0000	1.004E-08	0.0000	0.000E+00	0.0000	2.595E-07	0.0000	1.185E-08	0.0000	6.043E-08	0.0000	8.836E-03	0.0428
Sr-90	4.255E-03	0.0206	9.214E-05	0.0004	0.000E+00	0.0000	5.127E-04	0.0025	5.091E-04	0.0025	3.671E-04	0.0018	5.674E-02	0.2746
Total	5.165E-03	0.0250	1.920E-04	0.0009	0.000E+00	0.0000	6.144E-04	0.0030	6.053E-04	0.0029	9.097E-04	0.0044	2.066E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 23 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 24
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	1.997E-02	0.2307	3.763E-08	0.0000	0.000E+00	0.0000	2.088E-04	0.0024	1.659E-05	0.0002	3.141E-04	0.0036	1.443E-06	0.0000
Am-241	1.118E-03	0.0129	7.030E-04	0.0081	0.000E+00	0.0000	7.947E-03	0.0918	8.435E-05	0.0010	9.076E-06	0.0001	8.206E-03	0.0948
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	2.805E-18	0.0000	2.425E-24	0.0000	0.000E+00	0.0000	3.274E-20	0.0000	1.805E-20	0.0000	4.136E-21	0.0000	4.241E-22	0.0000
Cs-137	4.306E-04	0.0050	2.590E-10	0.0000	0.000E+00	0.0000	2.231E-05	0.0003	2.001E-05	0.0002	1.243E-05	0.0001	5.781E-07	0.0000
Eu-152	4.041E-08	0.0000	8.149E-14	0.0000	0.000E+00	0.0000	8.208E-12	0.0000	1.634E-12	0.0000	1.079E-13	0.0000	3.402E-12	0.0000
Eu-154	1.414E-11	0.0000	3.368E-17	0.0000	0.000E+00	0.0000	3.864E-15	0.0000	7.690E-16	0.0000	5.081E-17	0.0000	1.601E-15	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	6.414E-08	0.0000	0.000E+00	0.0000	4.042E-04	0.0047	5.854E-05	0.0007	5.420E-04	0.0063	8.379E-06	0.0001
Pu-238	2.702E-07	0.0000	4.174E-05	0.0005	0.000E+00	0.0000	4.684E-04	0.0054	9.878E-06	0.0001	3.013E-07	0.0000	4.849E-04	0.0056
Pu-239	1.545E-05	0.0002	1.418E-03	0.0164	0.000E+00	0.0000	1.609E-02	0.1858	3.391E-04	0.0039	9.204E-06	0.0001	1.666E-02	0.1925
Pu-240	1.979E-06	0.0000	3.548E-04	0.0041	0.000E+00	0.0000	4.025E-03	0.0465	8.486E-05	0.0010	2.304E-06	0.0000	4.169E-03	0.0482
Sr-90	4.418E-06	0.0001	1.506E-08	0.0000	0.000E+00	0.0000	7.247E-04	0.0084	1.500E-04	0.0017	8.471E-05	0.0010	2.504E-06	0.0000
Total	2.154E-02	0.2488	2.517E-03	0.0291	0.000E+00	0.0000	2.989E-02	0.3453	7.633E-04	0.0088	9.741E-04	0.0113	2.953E-02	0.3412

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.051E-02	0.2369
Am-241	9.711E-08	0.0000	4.202E-10	0.0000	0.000E+00	0.0000	1.073E-08	0.0000	4.899E-10	0.0000	2.496E-09	0.0000	1.807E-02	0.2087
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	4.186E-21	0.0000	4.340E-22	0.0000	0.000E+00	0.0000	4.735E-22	0.0000	1.245E-21	0.0000	3.596E-22	0.0000	2.867E-18	0.0000
Cs-137	5.706E-06	0.0001	3.836E-06	0.0000	0.000E+00	0.0000	6.378E-07	0.0000	2.543E-06	0.0000	1.959E-06	0.0000	5.006E-04	0.0058
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.043E-08	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.414E-11	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	3.846E-04	0.0044	1.349E-05	0.0002	0.000E+00	0.0000	4.313E-05	0.0005	2.860E-05	0.0003	3.303E-04	0.0038	1.813E-03	0.0209
Pu-238	2.443E-04	0.0028	1.046E-06	0.0000	0.000E+00	0.0000	2.701E-05	0.0003	1.235E-06	0.0000	6.291E-06	0.0001	1.285E-03	0.0148
Pu-239	6.444E-07	0.0000	2.925E-09	0.0000	0.000E+00	0.0000	7.124E-08	0.0000	3.465E-09	0.0000	1.624E-08	0.0000	3.453E-02	0.3989
Pu-240	4.827E-06	0.0001	2.063E-08	0.0000	0.000E+00	0.0000	5.336E-07	0.0000	2.439E-08	0.0000	1.243E-07	0.0000	8.643E-03	0.0999
Sr-90	1.825E-04	0.0021	3.954E-06	0.0000	0.000E+00	0.0000	2.200E-05	0.0003	2.186E-05	0.0003	1.576E-05	0.0002	1.212E-03	0.0140
Total	8.227E-04	0.0095	2.235E-05	0.0003	0.000E+00	0.0000	9.339E-05	0.0011	5.427E-05	0.0006	3.545E-04	0.0041	8.656E-02	1.0000

*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 24 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 25
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
0
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	4.181E-04	0.0088	7.880E-10	0.0000	0.000E+00	0.0000	4.373E-06	0.0001	3.474E-07	0.0000	6.577E-06	0.0001	3.021E-08	0.0000
Am-241	3.623E-04	0.0077	2.243E-04	0.0047	0.000E+00	0.0000	2.575E-03	0.0544	2.834E-05	0.0006	2.911E-06	0.0001	2.618E-03	0.0553
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	3.753E-11	0.0000	2.258E-17	0.0000	0.000E+00	0.0000	1.945E-12	0.0000	1.744E-12	0.0000	1.083E-12	0.0000	5.039E-14	0.0000
Eu-152	6.160E-24	0.0000	1.841E-17	0.0000	0.000E+00	0.0000	4.190E-17	0.0000	8.339E-18	0.0000	2.204E-19	0.0000	1.737E-17	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	3.571E-10	0.0000	0.000E+00	0.0000	2.251E-06	0.0000	3.259E-07	0.0000	3.018E-06	0.0001	4.665E-08	0.0000
Pu-238	4.708E-08	0.0000	1.676E-07	0.0000	0.000E+00	0.0000	1.902E-06	0.0000	4.111E-08	0.0000	9.199E-09	0.0000	1.904E-06	0.0000
Pu-239	1.484E-05	0.0003	1.361E-03	0.0288	0.000E+00	0.0000	1.544E-02	0.3263	3.256E-04	0.0069	8.837E-06	0.0002	1.599E-02	0.3379
Pu-240	1.800E-06	0.0000	3.227E-04	0.0068	0.000E+00	0.0000	3.661E-03	0.0773	7.719E-05	0.0016	2.096E-06	0.0000	3.792E-03	0.0801
Sr-90	2.177E-13	0.0000	7.418E-16	0.0000	0.000E+00	0.0000	3.571E-11	0.0000	7.389E-12	0.0000	4.174E-12	0.0000	1.234E-13	0.0000
Total	7.972E-04	0.0168	1.908E-03	0.0403	0.000E+00	0.0000	2.169E-02	0.4582	4.318E-04	0.0091	2.345E-05	0.0005	2.241E-02	0.4733

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
0
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.295E-04	0.0091
Am-241	4.901E-07	0.0000	2.212E-09	0.0000	0.000E+00	0.0000	5.418E-08	0.0000	2.466E-09	0.0000	1.254E-08	0.0000	5.812E-03	0.1228
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	1.745E-12	0.0000	1.173E-12	0.0000	0.000E+00	0.0000	1.951E-13	0.0000	7.788E-13	0.0000	5.995E-13	0.0000	4.685E-11	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.623E-17	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	7.648E-06	0.0002	2.683E-07	0.0000	0.000E+00	0.0000	8.577E-07	0.0000	5.691E-07	0.0000	6.571E-06	0.0001	2.156E-05	0.0005
Pu-238	4.545E-05	0.0010	2.106E-07	0.0000	0.000E+00	0.0000	5.026E-06	0.0001	2.312E-07	0.0000	1.169E-06	0.0000	5.616E-05	0.0012
Pu-239	1.144E-06	0.0000	6.355E-09	0.0000	0.000E+00	0.0000	1.265E-07	0.0000	7.266E-09	0.0000	2.652E-08	0.0000	3.315E-02	0.7003
Pu-240	7.555E-06	0.0002	3.229E-08	0.0000	0.000E+00	0.0000	8.352E-07	0.0000	3.819E-08	0.0000	1.945E-07	0.0000	7.866E-03	0.1662
Sr-90	3.214E-11	0.0000	6.963E-13	0.0000	0.000E+00	0.0000	3.875E-12	0.0000	3.853E-12	0.0000	2.776E-12	0.0000	9.096E-11	0.0000
Total	6.229E-05	0.0013	5.198E-07	0.0000	0.000E+00	0.0000	6.899E-06	0.0001	8.482E-07	0.0000	7.973E-06	0.0002	4.734E-02	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 2 Sheet No. 25 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 26
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m+D	Ag-108m+D	1.000E+00	6.326E+00	6.291E+00	6.222E+00	6.086E+00	5.953E+00	4.989E+00	3.001E+00	1.206E+00	2.526E-02
0Am-241	Am-241	1.000E+00	4.673E-01	4.666E-01	4.650E-01	4.620E-01	4.590E-01	4.356E-01	3.749E-01	2.863E-01	9.128E-02
Am-241	Np-237+D	1.000E+00	0.000E+00	1.932E-06	5.918E-06	1.385E-05	2.173E-05	8.293E-05	2.418E-04	4.724E-04	9.710E-04
Am-241	U-233	1.000E+00	0.000E+00	2.521E-13	5.677E-12	6.876E-11	2.623E-10	1.487E-08	3.437E-07	1.766E-06	8.867E-06
Am-241	Th-229+D	1.000E+00	0.000E+00	2.295E-15	7.677E-15	3.244E-14	8.431E-14	5.200E-12	2.685E-10	3.252E-09	7.103E-08
Am-241	äDSR(j)		4.673E-01	4.666E-01	4.651E-01	4.620E-01	4.590E-01	4.357E-01	3.751E-01	2.868E-01	9.226E-02
0C-14	C-14	1.000E+00	1.936E+00	9.388E-01	1.968E-01	8.629E-03	3.772E-04	4.525E-15	0.000E+00	0.000E+00	0.000E+00
0Co-60	Co-60	1.000E+00	1.060E+01	9.289E+00	7.139E+00	4.217E+00	2.491E+00	3.692E-02	2.036E-07	7.545E-17	0.000E+00
0Cs-137+D	Cs-137+D	1.000E+00	2.454E+00	2.398E+00	2.290E+00	2.088E+00	1.903E+00	9.080E-01	1.082E-01	2.384E-03	2.231E-10
0Eu-152	Eu-152	7.208E-01	3.242E+00	3.077E+00	2.773E+00	2.252E+00	1.829E+00	3.461E-01	2.886E-03	5.396E-07	8.225E-23
0Eu-152	Eu-152	2.792E-01	1.256E+00	1.192E+00	1.074E+00	8.724E-01	7.085E-01	1.340E-01	1.118E-03	2.090E-07	3.186E-23
Eu-152	Gd-152	2.792E-01	0.000E+00	8.153E-17	2.324E-16	4.909E-16	7.007E-16	1.436E-15	1.605E-15	1.605E-15	1.597E-15
Eu-152	äDSR(j)		1.256E+00	1.192E+00	1.074E+00	8.724E-01	7.085E-01	1.340E-01	1.118E-03	2.090E-07	1.597E-15
0Eu-154	Eu-154	1.000E+00	4.925E+00	4.552E+00	3.888E+00	2.837E+00	2.070E+00	1.663E-01	1.182E-04	2.668E-10	2.963E-34
0H-3	H-3	1.000E+00	3.404E-02	4.671E-02	5.327E-02	4.082E-02	3.761E-03	1.828E-11	1.173E-35	0.000E+00	0.000E+00
0Ni-63	Ni-63	1.000E+00	4.075E-03	4.054E-03	4.015E-03	3.937E-03	3.861E-03	3.289E-03	2.021E-03	7.884E-04	9.372E-06
0Pu-238	Pu-238	1.840E-09	7.129E-10	7.072E-10	6.961E-10	6.744E-10	6.533E-10	5.069E-10	2.444E-10	6.605E-11	2.566E-13
0Pu-238	Pu-238	1.000E+00	3.874E-01	3.844E-01	3.783E-01	3.665E-01	3.551E-01	2.755E-01	1.328E-01	3.590E-02	1.395E-04
Pu-238	U-234	1.000E+00	0.000E+00	1.340E-06	1.094E-05	5.713E-05	1.380E-04	1.867E-03	8.685E-03	1.001E-02	1.853E-03
Pu-238	Th-230	1.000E+00	0.000E+00	1.234E-12	1.216E-11	7.949E-11	2.291E-10	7.160E-09	1.200E-07	4.602E-07	1.195E-06
Pu-238	Ra-226+D	1.000E+00	0.000E+00	2.602E-14	5.493E-13	6.706E-12	2.564E-11	1.549E-09	4.629E-08	3.859E-07	4.134E-06
Pu-238	Pb-210+D	1.000E+00	0.000E+00	2.937E-14	1.468E-13	6.750E-13	1.985E-12	3.350E-10	3.568E-08	5.199E-07	7.666E-06
Pu-238	äDSR(j)		3.874E-01	3.844E-01	3.783E-01	3.666E-01	3.552E-01	2.774E-01	1.415E-01	4.591E-02	2.006E-03
0Pu-239	Pu-239	1.000E+00	4.285E-01	4.285E-01	4.284E-01	4.283E-01	4.282E-01	4.274E-01	4.251E-01	4.211E-01	4.043E-01
Pu-239	U-235+D	1.000E+00	0.000E+00	9.236E-10	5.064E-09	2.245E-08	5.185E-08	7.031E-07	4.315E-06	8.918E-06	1.452E-05
Pu-239	Pa-231	1.000E+00	0.000E+00	1.071E-13	9.659E-13	6.160E-12	1.738E-11	5.479E-10	1.085E-08	5.882E-08	4.354E-07
Pu-239	Ac-227+D	1.000E+00	0.000E+00	6.998E-14	2.175E-13	1.097E-12	3.201E-12	3.962E-10	1.957E-08	1.463E-07	1.261E-06
Pu-239	äDSR(j)		4.285E-01	4.285E-01	4.284E-01	4.283E-01	4.282E-01	4.274E-01	4.251E-01	4.211E-01	4.043E-01
0Pu-240	Pu-240	4.950E-08	2.120E-08	2.120E-08	2.120E-08	2.118E-08	2.117E-08	2.108E-08	2.082E-08	2.036E-08	1.852E-08

Attachment 2 Sheet No. 26 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 27
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Pu-240	Pu-240	1.000E+00	4.284E-01	4.283E-01	4.282E-01	4.280E-01	4.277E-01	4.259E-01	4.206E-01	4.113E-01	3.741E-01
Pu-240	U-236	1.000E+00	0.000E+00	1.333E-08	1.094E-07	5.774E-07	1.409E-06	2.065E-05	1.283E-04	2.637E-04	4.127E-04
Pu-240	Th-232	1.000E+00	0.000E+00	2.938E-19	1.099E-17	4.454E-17	9.988E-17	2.346E-15	4.447E-14	2.393E-13	1.767E-12
Pu-240	Ra-228+D	1.000E+00	0.000E+00	2.005E-19	1.724E-17	9.496E-17	2.778E-16	8.445E-15	1.308E-13	6.766E-13	4.921E-12
Pu-240	Th-228+D	1.000E+00	0.000E+00	1.670E-20	3.391E-18	2.969E-17	1.172E-16	5.444E-15	7.639E-14	3.722E-13	2.627E-12
Pu-240	äDSR(j)		4.284E-01	4.283E-01	4.282E-01	4.280E-01	4.277E-01	4.259E-01	4.208E-01	4.116E-01	3.745E-01
0Sr-90+D	Sr-90+D	1.000E+00	3.444E+00	3.365E+00	3.212E+00	2.928E+00	2.668E+00	1.269E+00	1.493E-01	3.191E-03	2.394E-10

The DSR includes contributions from associated (half-life ó 180 days) daughters.

0

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	2.371E+00	2.384E+00	2.411E+00	2.465E+00	2.520E+00	3.007E+00	4.998E+00	1.243E+01	5.938E+02
Am-241	3.210E+01	3.215E+01	3.225E+01	3.247E+01	3.268E+01	3.443E+01	3.999E+01	5.230E+01	1.626E+02
C-14	7.749E+00	1.598E+01	7.622E+01	1.738E+03	3.976E+04	*4.455E+12	*4.455E+12	*4.455E+12	*4.455E+12
Co-60	1.416E+00	1.615E+00	2.101E+00	3.557E+00	6.022E+00	4.062E+02	7.368E+07	*1.132E+15	*1.132E+15
Cs-137	6.112E+00	6.255E+00	6.551E+00	7.186E+00	7.882E+00	1.652E+01	1.386E+02	6.292E+03	6.724E+10
Eu-152	3.335E+00	3.513E+00	3.899E+00	4.801E+00	5.911E+00	3.124E+01	3.746E+03	2.004E+07	*1.765E+14
Eu-154	3.046E+00	3.295E+00	3.858E+00	5.287E+00	7.246E+00	9.019E+01	1.269E+05	5.622E+10	*2.639E+14
H-3	4.407E+02	3.211E+02	2.816E+02	3.675E+02	3.988E+03	8.206E+11	*9.597E+15	*9.597E+15	*9.597E+15
Ni-63	3.681E+03	3.700E+03	3.736E+03	3.810E+03	3.885E+03	4.561E+03	7.422E+03	1.902E+04	1.601E+06
Pu-238	3.872E+01	3.903E+01	3.965E+01	4.092E+01	4.223E+01	5.408E+01	1.060E+02	3.267E+02	7.479E+03
Pu-239	3.501E+01	3.501E+01	3.501E+01	3.502E+01	3.503E+01	3.510E+01	3.528E+01	3.562E+01	3.710E+01
Pu-240	3.502E+01	3.502E+01	3.503E+01	3.505E+01	3.507E+01	3.522E+01	3.565E+01	3.644E+01	4.005E+01
Sr-90	4.355E+00	4.457E+00	4.669E+00	5.124E+00	5.622E+00	1.182E+01	1.005E+02	4.701E+03	6.267E+10

*At specific activity limit

Attachment 2 Sheet No. 27 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 28
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ag-108m	1.700E-02	0.000E+00	6.326E+00	2.371E+00	6.326E+00	2.371E+00
Am-241	6.300E-02	0.000E+00	4.673E-01	3.210E+01	4.673E-01	3.210E+01
C-14	8.300E-01	0.000E+00	1.936E+00	7.749E+00	1.936E+00	7.749E+00
Co-60	3.800E-02	0.000E+00	1.060E+01	1.416E+00	1.060E+01	1.416E+00
Cs-137	2.100E-01	0.000E+00	2.454E+00	6.112E+00	2.454E+00	6.112E+00
Eu-152	5.400E-02	0.000E+00	4.497E+00	3.335E+00	4.497E+00	3.335E+00
Eu-154	5.300E-02	0.000E+00	4.925E+00	3.046E+00	4.925E+00	3.046E+00
H-3	1.400E+00	3.115 ñ 0.006	5.328E-02	2.815E+02	3.404E-02	4.407E+02
Ni-63	2.300E+00	0.000E+00	4.075E-03	3.681E+03	4.075E-03	3.681E+03
Pu-238	2.800E-02	0.000E+00	3.874E-01	3.872E+01	3.874E-01	3.872E+01
Pu-239	8.200E-02	0.000E+00	4.285E-01	3.501E+01	4.285E-01	3.501E+01
Pu-240	2.100E-02	0.000E+00	4.284E-01	3.502E+01	4.284E-01	3.502E+01
Sr-90	3.800E-01	0.000E+00	3.444E+00	4.355E+00	3.444E+00	4.355E+00

Attachment 2 Sheet No. 28 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 29
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr								
			t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	Ag-108m	1.000E+00	1.075E-01	1.069E-01	1.058E-01	1.035E-01	1.012E-01	8.481E-02	5.102E-02	2.051E-02	4.295E-04
OAm-241	Am-241	1.000E+00	2.944E-02	2.939E-02	2.930E-02	2.911E-02	2.892E-02	2.745E-02	2.362E-02	1.804E-02	5.750E-03
ONp-237	Am-241	1.000E+00	0.000E+00	1.217E-07	3.729E-07	8.726E-07	1.369E-06	5.224E-06	1.523E-05	2.976E-05	6.117E-05
OU-233	Am-241	1.000E+00	0.000E+00	1.588E-14	3.577E-13	4.332E-12	1.652E-11	9.369E-10	2.165E-08	1.113E-07	5.586E-07
OTh-229	Am-241	1.000E+00	0.000E+00	1.446E-16	4.836E-16	2.043E-15	5.312E-15	3.276E-13	1.692E-11	2.049E-10	4.475E-09
OC-14	C-14	1.000E+00	1.607E+00	7.792E-01	1.633E-01	7.162E-03	3.131E-04	3.756E-15	0.000E+00	0.000E+00	0.000E+00
OCo-60	Co-60	1.000E+00	4.026E-01	3.530E-01	2.713E-01	1.602E-01	9.466E-02	1.403E-03	7.736E-09	2.867E-18	0.000E+00
OCs-137	Cs-137	1.000E+00	5.154E-01	5.036E-01	4.809E-01	4.384E-01	3.996E-01	1.907E-01	2.272E-02	5.006E-04	4.685E-11
OEu-152	Eu-152	7.208E-01	1.750E-01	1.662E-01	1.498E-01	1.216E-01	9.877E-02	1.869E-02	1.559E-04	2.914E-08	4.441E-24
Eu-152	Eu-152	2.792E-01	6.780E-02	6.437E-02	5.801E-02	4.711E-02	3.826E-02	7.238E-03	6.037E-05	1.129E-08	1.720E-24
Eu-152	äDOSE(j)		2.429E-01	2.305E-01	2.078E-01	1.687E-01	1.370E-01	2.593E-02	2.162E-04	4.043E-08	6.162E-24
OGd-152	Eu-152	2.792E-01	0.000E+00	4.402E-18	1.255E-17	2.651E-17	3.784E-17	7.755E-17	8.669E-17	8.666E-17	8.623E-17
OEu-154	Eu-154	1.000E+00	2.610E-01	2.413E-01	2.061E-01	1.504E-01	1.097E-01	8.815E-03	6.265E-06	1.414E-11	0.000E+00
OH-3	H-3	1.000E+00	4.765E-02	6.540E-02	7.458E-02	5.715E-02	5.266E-03	2.559E-11	0.000E+00	0.000E+00	0.000E+00
ONi-63	Ni-63	1.000E+00	9.372E-03	9.325E-03	9.235E-03	9.056E-03	8.880E-03	7.564E-03	4.648E-03	1.813E-03	2.156E-05
OPu-238	Pu-238	1.840E-09	1.996E-11	1.980E-11	1.949E-11	1.888E-11	1.829E-11	1.419E-11	6.843E-12	1.850E-12	7.186E-15
Pu-238	Pu-238	1.000E+00	1.085E-02	1.076E-02	1.059E-02	1.026E-02	9.942E-03	7.714E-03	3.719E-03	1.005E-03	3.905E-06
Pu-238	äDOSE(j)		1.085E-02	1.076E-02	1.059E-02	1.026E-02	9.942E-03	7.714E-03	3.719E-03	1.005E-03	3.905E-06
OU-234	Pu-238	1.000E+00	0.000E+00	3.751E-08	3.064E-07	1.600E-06	3.865E-06	5.228E-05	2.432E-04	2.802E-04	5.189E-05
OTh-230	Pu-238	1.000E+00	0.000E+00	3.454E-14	3.404E-13	2.226E-12	6.415E-12	2.005E-10	3.360E-09	1.289E-08	3.346E-08
ORa-226	Pu-238	1.000E+00	0.000E+00	7.285E-16	1.538E-14	1.878E-13	7.179E-13	4.336E-11	1.296E-09	1.081E-08	1.157E-07
OPb-210	Pu-238	1.000E+00	0.000E+00	8.224E-16	4.110E-15	1.890E-14	5.559E-14	9.379E-12	9.991E-10	1.456E-08	2.146E-07
OPu-239	Pu-239	1.000E+00	3.513E-02	3.513E-02	3.513E-02	3.512E-02	3.511E-02	3.505E-02	3.486E-02	3.453E-02	3.315E-02
OU-235	Pu-239	1.000E+00	0.000E+00	7.574E-11	4.152E-10	1.841E-09	4.252E-09	5.765E-08	3.538E-07	7.312E-07	1.191E-06
OPa-231	Pu-239	1.000E+00	0.000E+00	8.785E-15	7.921E-14	5.051E-13	1.425E-12	4.493E-11	8.894E-10	4.823E-09	3.571E-08
OAc-227	Pu-239	1.000E+00	0.000E+00	5.738E-15	1.783E-14	8.997E-14	2.625E-13	3.249E-11	1.605E-09	1.200E-08	1.034E-07
OPu-240	Pu-240	4.950E-08	4.453E-10	4.452E-10	4.451E-10	4.449E-10	4.446E-10	4.427E-10	4.372E-10	4.276E-10	3.889E-10

Attachment 2 Sheet No. 29 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 30
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Pu-240	Pu-240	1.000E+00	8.996E-03	8.995E-03	8.992E-03	8.988E-03	8.983E-03	8.944E-03	8.833E-03	8.638E-03	7.857E-03
Pu-240	äDOSE(j)		8.996E-03	8.995E-03	8.992E-03	8.988E-03	8.983E-03	8.944E-03	8.833E-03	8.638E-03	7.857E-03
OU-236	Pu-240	1.000E+00	0.000E+00	2.799E-10	2.298E-09	1.213E-08	2.959E-08	4.336E-07	2.695E-06	5.538E-06	8.668E-06
OTh-232	Pu-240	1.000E+00	0.000E+00	6.170E-21	2.309E-19	9.353E-19	2.097E-18	4.926E-17	9.339E-16	5.024E-15	3.711E-14
ORa-228	Pu-240	1.000E+00	0.000E+00	4.211E-21	3.620E-19	1.994E-18	5.833E-18	1.773E-16	2.747E-15	1.421E-14	1.034E-13
OTh-228	Pu-240	1.000E+00	0.000E+00	3.506E-22	7.121E-20	6.236E-19	2.461E-18	1.143E-16	1.604E-15	7.817E-15	5.516E-14
OSr-90	Sr-90	1.000E+00	1.309E+00	1.279E+00	1.221E+00	1.112E+00	1.014E+00	4.821E-01	5.674E-02	1.212E-03	9.096E-11

THF(i) is the thread fraction of the parent nuclide.

Attachment 2 Sheet No. 30 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 31
Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	Ag-108m	1.000E+00	1.700E-02	1.691E-02	1.672E-02	1.636E-02	1.600E-02	1.341E-02	8.066E-03	3.242E-03	6.789E-05
OAm-241	Am-241	1.000E+00	6.300E-02	6.290E-02	6.269E-02	6.228E-02	6.188E-02	5.873E-02	5.053E-02	3.860E-02	1.230E-02
ONp-237	Am-241	1.000E+00	0.000E+00	2.039E-08	6.107E-08	1.420E-07	2.224E-07	8.469E-07	2.468E-06	4.822E-06	9.909E-06
OU-233	Am-241	1.000E+00	0.000E+00	4.455E-14	3.998E-13	2.164E-12	5.312E-12	7.745E-11	6.681E-10	2.616E-09	1.197E-08
OTh-229	Am-241	1.000E+00	0.000E+00	1.403E-18	3.779E-17	4.779E-16	1.846E-15	1.064E-13	2.970E-12	2.726E-11	5.086E-10
OC-14	C-14	1.000E+00	8.300E-01	3.801E-01	7.968E-02	3.494E-03	1.527E-04	1.831E-15	0.000E+00	0.000E+00	0.000E+00
OCo-60	Co-60	1.000E+00	3.800E-02	3.331E-02	2.560E-02	1.512E-02	8.933E-03	1.324E-04	7.294E-10	2.700E-19	0.000E+00
OCs-137	Cs-137	1.000E+00	2.100E-01	2.052E-01	1.959E-01	1.785E-01	1.627E-01	7.737E-02	9.135E-03	1.980E-04	1.726E-11
OEu-152	Eu-152	7.208E-01	3.892E-02	3.695E-02	3.330E-02	2.704E-02	2.196E-02	4.155E-03	3.466E-05	6.479E-09	9.876E-25
Eu-152	Eu-152	2.792E-01	1.508E-02	1.431E-02	1.290E-02	1.047E-02	8.507E-03	1.610E-03	1.342E-05	2.510E-09	3.825E-25
Eu-152	äS(j):		5.400E-02	5.126E-02	4.620E-02	3.752E-02	3.047E-02	5.765E-03	4.808E-05	8.989E-09	1.370E-24
OGd-152	Eu-152	2.792E-01	0.000E+00	9.429E-17	2.688E-16	5.677E-16	8.104E-16	1.661E-15	1.857E-15	1.856E-15	1.847E-15
OEu-154	Eu-154	1.000E+00	5.300E-02	4.898E-02	4.184E-02	3.053E-02	2.228E-02	1.790E-03	1.272E-06	2.871E-12	3.188E-36
OH-3	H-3	1.000E+00	1.400E+00	7.712E-01	2.339E-01	2.149E-02	1.971E-03	9.214E-12	5.276E-36	0.000E+00	0.000E+00
ONi-63	Ni-63	1.000E+00	2.300E+00	2.283E+00	2.249E+00	2.184E+00	2.120E+00	1.672E+00	8.452E-01	2.487E-01	1.384E-03
OPu-238	Pu-238	1.840E-09	5.152E-11	5.111E-11	5.031E-11	4.874E-11	4.722E-11	3.664E-11	1.766E-11	4.774E-12	1.855E-14
Pu-238	Pu-238	1.000E+00	2.800E-02	2.778E-02	2.734E-02	2.649E-02	2.566E-02	1.991E-02	9.600E-03	2.594E-03	1.008E-05
Pu-238	äS(j):		2.800E-02	2.778E-02	2.734E-02	2.649E-02	2.566E-02	1.991E-02	9.600E-03	2.594E-03	1.008E-05
OU-234	Pu-238	1.000E+00	0.000E+00	7.896E-08	2.343E-07	5.353E-07	8.234E-07	2.717E-06	5.309E-06	5.273E-06	9.559E-07
OTh-230	Pu-238	1.000E+00	0.000E+00	3.560E-13	3.181E-12	1.707E-11	4.157E-11	5.677E-10	4.113E-09	1.231E-08	2.870E-08
ORa-226	Pu-238	1.000E+00	0.000E+00	5.145E-17	1.381E-15	1.735E-14	6.659E-14	3.641E-12	8.831E-11	6.490E-10	6.388E-09
OPb-210	Pu-238	1.000E+00	0.000E+00	3.975E-19	3.166E-17	9.076E-16	5.354E-15	9.708E-13	5.028E-11	5.070E-10	6.082E-09
OPu-239	Pu-239	1.000E+00	8.200E-02	8.200E-02	8.199E-02	8.197E-02	8.195E-02	8.180E-02	8.136E-02	8.058E-02	7.737E-02
OU-235	Pu-239	1.000E+00	0.000E+00	8.064E-11	2.413E-10	5.598E-10	8.747E-10	3.270E-09	9.058E-09	1.629E-08	2.623E-08
OPa-231	Pu-239	1.000E+00	0.000E+00	8.535E-16	7.666E-15	4.158E-14	1.023E-13	1.514E-12	1.367E-11	5.814E-11	3.777E-10
OAc-227	Pu-239	1.000E+00	0.000E+00	8.987E-18	2.385E-16	2.927E-15	1.098E-14	5.101E-13	8.879E-12	4.795E-11	3.588E-10
OPu-240	Pu-240	4.950E-08	1.039E-09	1.039E-09	1.039E-09	1.039E-09	1.038E-09	1.033E-09	1.021E-09	9.981E-10	9.079E-10

Attachment 2 Sheet No. 31 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 2

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1RESRAD, Version 6.3      T« Limit = 180 days        07/11/2007  14:08  Page  32
 Summary : 118-F-1 Excavation Shallow Zone RESRAD Calculation
 File    : 118-F-1_Excavation_SZ.RAD

                                        Individual Nuclide Soil Concentration
                                      Parent Nuclide and Branch Fraction Indicated
ONuclide Parent   THF(i)                                                S(j,t), pCi/g
   (j)     (i)             t= 0.000E+00 1.000E+00 3.000E+00 7.000E+00 1.100E+01 4.300E+01 1.350E+02 3.000E+02 1.000E+03
 ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ   ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ ÄÄÄÄÄÄÄÄÄÄ
 Pu-240  Pu-240  1.000E+00    2.100E-02 2.100E-02 2.099E-02 2.098E-02 2.097E-02 2.088E-02 2.062E-02 2.016E-02 1.834E-02
 Pu-240  äS(j):              2.100E-02 2.100E-02 2.099E-02 2.098E-02 2.097E-02 2.088E-02 2.062E-02 2.016E-02 1.834E-02
OU-236   Pu-240  1.000E+00    0.000E+00 6.208E-10 1.857E-09 4.308E-09 6.730E-09 2.513E-08 6.934E-08 1.238E-07 1.913E-07
OTh-232  Pu-240  1.000E+00    0.000E+00 1.532E-20 1.376E-19 7.463E-19 1.836E-18 2.720E-17 2.458E-16 1.047E-15 6.866E-15
ORa-228  Pu-240  1.000E+00    0.000E+00 5.976E-22 1.520E-20 1.724E-19 6.017E-19 1.880E-17 2.188E-16 9.969E-16 6.785E-15
OTh-228  Pu-240  1.000E+00    0.000E+00 5.073E-23 3.426E-21 7.296E-20 3.319E-19 1.623E-17 2.100E-16 9.805E-16 6.759E-15
OSr-90   Sr-90   1.000E+00    3.800E-01 3.710E-01 3.536E-01 3.212E-01 2.917E-01 1.352E-01 1.481E-02 2.806E-04 1.382E-11
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 THF(i) is the thread fraction of the parent nuclide.
ORESCALC.EXE execution time =   21.45 seconds
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Attachment 2 Sheet No. 32 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Table of Contents

Part III: Intake Quantities and Health Risk Factors

Cancer Risk Slope Factors 2
Risk Slope and ETFG for the Ground Pathway 6
Amount of Intake Quantities and Excess Cancer Risks
Time= 0.000E+00 8
Time= 1.000E+00 13
Time= 3.000E+00 18
Time= 7.000E+00 23
Time= 1.100E+01 28
Time= 4.300E+01 33
Time= 1.350E+02 38
Time= 3.000E+02 43
Time= 1.000E+03 48

Attachment 3 Sheet No. 1 of 52
Originator: S. W. Clark Date 7/11/07
Chk'd By M. W. Perrott Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 2
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Cancer Risk Slope Factors Summary Table
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Ac-227+D	1.47E-06	3.48E-10	SLPF(1,1)
Sf-1	Ag-108m+D	7.19E-06	7.18E-06	SLPF(2,1)
Sf-1	Am-241	2.76E-08	2.76E-08	SLPF(3,1)
Sf-1	C-14	7.83E-12	7.83E-12	SLPF(4,1)
Sf-1	Co-60	1.24E-05	1.24E-05	SLPF(5,1)
Sf-1	Cs-137+D	2.55E-06	5.32E-10	SLPF(6,1)
Sf-1	Eu-152	5.30E-06	5.30E-06	SLPF(7,1)
Sf-1	Eu-154	5.83E-06	5.83E-06	SLPF(9,1)
Sf-1	Gd-152	0.00E+00	0.00E+00	SLPF(10,1)
Sf-1	H-3	0.00E+00	0.00E+00	SLPF(11,1)
Sf-1	Ni-63	0.00E+00	0.00E+00	SLPF(12,1)
Sf-1	Np-237+D	7.97E-07	5.36E-08	SLPF(13,1)
Sf-1	Pa-231	1.39E-07	1.39E-07	SLPF(14,1)
Sf-1	Pb-210+D	4.21E-09	1.41E-09	SLPF(15,1)
Sf-1	Pu-238	7.22E-11	7.22E-11	SLPF(16,1)
Sf-1	Pu-239	2.00E-10	2.00E-10	SLPF(18,1)
Sf-1	Pu-240	6.98E-11	6.98E-11	SLPF(19,1)
Sf-1	Ra-226+D	8.49E-06	2.29E-08	SLPF(21,1)
Sf-1	Ra-228+D	4.53E-06	0.00E+00	SLPF(22,1)
Sf-1	Sr-90+D	1.96E-08	4.82E-10	SLPF(23,1)
Sf-1	Th-228+D	7.76E-06	5.59E-09	SLPF(24,1)
Sf-1	Th-229+D	1.17E-06	2.25E-07	SLPF(25,1)
Sf-1	Th-230	8.19E-10	8.19E-10	SLPF(26,1)
Sf-1	Th-232	3.42E-10	3.42E-10	SLPF(27,1)
Sf-1	U-233	9.82E-10	9.82E-10	SLPF(28,1)
Sf-1	U-234	2.52E-10	2.52E-10	SLPF(29,1)
Sf-1	U-235+D	5.43E-07	5.18E-07	SLPF(30,1)
Sf-1	U-236	1.25E-10	1.25E-10	SLPF(31,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Ac-227+D	2.09E-07	1.49E-07	SLPF(1,2)
Sf-2	Ag-108m+D	2.67E-11	2.67E-11	SLPF(2,2)
Sf-2	Am-241	2.81E-08	2.81E-08	SLPF(3,2)
Sf-2	C-14	7.07E-12	7.07E-12	SLPF(4,2)
Sf-2	Co-60	3.58E-11	3.58E-11	SLPF(5,2)
Sf-2	Cs-137+D	1.19E-11	1.19E-11	SLPF(6,2)
Sf-2	Eu-152	9.10E-11	9.10E-11	SLPF(7,2)
Sf-2	Eu-154	1.15E-10	1.15E-10	SLPF(9,2)
Sf-2	Gd-152	9.10E-09	9.10E-09	SLPF(10,2)
Sf-2	H-3	1.99E-13	1.99E-13	SLPF(11,2)
Sf-2	Ni-63	5.77E-12	5.77E-12	SLPF(12,2)
Sf-2	Np-237+D	1.77E-08	1.77E-08	SLPF(13,2)
Sf-2	Pa-231	4.55E-08	4.55E-08	SLPF(14,2)
Sf-2	Pb-210+D	1.39E-08	2.77E-09	SLPF(15,2)
Sf-2	Pu-238	3.36E-08	3.36E-08	SLPF(16,2)
Sf-2	Pu-239	3.33E-08	3.33E-08	SLPF(18,2)
Sf-2	Pu-240	3.33E-08	3.33E-08	SLPF(19,2)
Sf-2	Ra-226+D	1.16E-08	1.15E-08	SLPF(21,2)
Sf-2	Ra-228+D	5.23E-09	5.18E-09	SLPF(22,2)

Attachment 3 Sheet No. 2 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 3
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-2	Sr-90+D	1.13E-10	1.05E-10	SLPF(23,2)
Sf-2	Th-228+D	1.43E-07	1.32E-07	SLPF(24,2)
Sf-2	Th-229+D	2.25E-07	1.75E-07	SLPF(25,2)
Sf-2	Th-230	2.85E-08	2.85E-08	SLPF(26,2)
Sf-2	Th-232	4.33E-08	4.33E-08	SLPF(27,2)
Sf-2	U-233	1.16E-08	1.16E-08	SLPF(28,2)
Sf-2	U-234	1.14E-08	1.14E-08	SLPF(29,2)
Sf-2	U-235+D	1.01E-08	1.01E-08	SLPF(30,2)
Sf-2	U-236	1.05E-08	1.05E-08	SLPF(31,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,3)
Sf-3	Ag-108m+D	1.12E-11	1.12E-11	SLPF(2,3)
Sf-3	Am-241	1.34E-10	1.34E-10	SLPF(3,3)
Sf-3	C-14	2.00E-12	2.00E-12	SLPF(4,3)
Sf-3	Co-60	2.23E-11	2.23E-11	SLPF(5,3)
Sf-3	Cs-137+D	3.74E-11	3.74E-11	SLPF(6,3)
Sf-3	Eu-152	8.70E-12	8.70E-12	SLPF(7,3)
Sf-3	Eu-154	1.49E-11	1.49E-11	SLPF(9,3)
Sf-3	Gd-152	3.85E-11	3.85E-11	SLPF(10,3)
Sf-3	H-3	1.44E-13	1.44E-13	SLPF(11,3)
Sf-3	Ni-63	9.51E-13	9.51E-13	SLPF(12,3)
Sf-3	Np-237+D	9.10E-11	8.29E-11	SLPF(13,3)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(14,3)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(15,3)
Sf-3	Pu-238	1.69E-10	1.69E-10	SLPF(16,3)
Sf-3	Pu-239	1.74E-10	1.74E-10	SLPF(18,3)
Sf-3	Pu-240	1.74E-10	1.74E-10	SLPF(19,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(21,3)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(22,3)
Sf-3	Sr-90+D	9.53E-11	6.88E-11	SLPF(23,3)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(24,3)
Sf-3	Th-229+D	7.16E-10	2.90E-10	SLPF(25,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(26,3)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(27,3)
Sf-3	U-233	9.69E-11	9.69E-11	SLPF(28,3)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(29,3)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(30,3)
Sf-3	U-236	9.03E-11	9.03E-11	SLPF(31,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	4.86E-10	2.01E-10	SLPF(1,4)
Sf-3	Ag-108m+D	8.14E-12	8.14E-12	SLPF(2,4)
Sf-3	Am-241	1.04E-10	1.04E-10	SLPF(3,4)
Sf-3	C-14	1.55E-12	1.55E-12	SLPF(4,4)
Sf-3	Co-60	1.57E-11	1.57E-11	SLPF(5,4)
Sf-3	Cs-137+D	3.04E-11	3.04E-11	SLPF(6,4)
Sf-3	Eu-152	6.07E-12	6.07E-12	SLPF(7,4)
Sf-3	Eu-154	1.03E-11	1.03E-11	SLPF(9,4)
Sf-3	Gd-152	2.97E-11	2.97E-11	SLPF(10,4)

Attachment 3 Sheet No. 3 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 4
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-3	H-3	1.12E-13	1.12E-13	SLPF(11,4)
Sf-3	Ni-63	6.70E-13	6.70E-13	SLPF(12,4)
Sf-3	Np-237+D	6.74E-11	6.18E-11	SLPF(13,4)
Sf-3	Pa-231	1.73E-10	1.73E-10	SLPF(14,4)
Sf-3	Pb-210+D	1.27E-09	8.81E-10	SLPF(15,4)
Sf-3	Pu-238	1.31E-10	1.31E-10	SLPF(16,4)
Sf-3	Pu-239	1.35E-10	1.35E-10	SLPF(18,4)
Sf-3	Pu-240	1.35E-10	1.35E-10	SLPF(19,4)
Sf-3	Ra-226+D	3.86E-10	3.85E-10	SLPF(21,4)
Sf-3	Ra-228+D	1.04E-09	1.04E-09	SLPF(22,4)
Sf-3	Sr-90+D	7.40E-11	5.59E-11	SLPF(23,4)
Sf-3	Th-228+D	3.00E-10	1.07E-10	SLPF(24,4)
Sf-3	Th-229+D	5.28E-10	2.24E-10	SLPF(25,4)
Sf-3	Th-230	9.10E-11	9.10E-11	SLPF(26,4)
Sf-3	Th-232	1.01E-10	1.01E-10	SLPF(27,4)
Sf-3	U-233	7.18E-11	7.18E-11	SLPF(28,4)
Sf-3	U-234	7.07E-11	7.07E-11	SLPF(29,4)
Sf-3	U-235+D	7.18E-11	6.96E-11	SLPF(30,4)
Sf-3	U-236	6.70E-11	6.70E-11	SLPF(31,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	1.16E-09	3.81E-10	SLPF(1,5)
Sf-3	Ag-108m+D	1.92E-11	1.92E-11	SLPF(2,5)
Sf-3	Am-241	2.17E-10	2.17E-10	SLPF(3,5)
Sf-3	C-14	2.79E-12	2.79E-12	SLPF(4,5)
Sf-3	Co-60	4.03E-11	4.03E-11	SLPF(5,5)
Sf-3	Cs-137+D	4.33E-11	4.33E-11	SLPF(6,5)
Sf-3	Eu-152	1.62E-11	1.62E-11	SLPF(7,5)
Sf-3	Eu-154	2.85E-11	2.85E-11	SLPF(9,5)
Sf-3	Gd-152	6.29E-11	6.29E-11	SLPF(10,5)
Sf-3	H-3	2.20E-13	2.20E-13	SLPF(11,5)
Sf-3	Ni-63	1.79E-12	1.79E-12	SLPF(12,5)
Sf-3	Np-237+D	1.62E-10	1.46E-10	SLPF(13,5)
Sf-3	Pa-231	3.74E-10	3.74E-10	SLPF(14,5)
Sf-3	Pb-210+D	2.66E-09	1.84E-09	SLPF(15,5)
Sf-3	Pu-238	2.72E-10	2.72E-10	SLPF(16,5)
Sf-3	Pu-239	2.76E-10	2.76E-10	SLPF(18,5)
Sf-3	Pu-240	2.77E-10	2.77E-10	SLPF(19,5)
Sf-3	Ra-226+D	7.30E-10	7.29E-10	SLPF(21,5)
Sf-3	Ra-228+D	2.29E-09	2.28E-09	SLPF(22,5)
Sf-3	Sr-90+D	1.44E-10	9.18E-11	SLPF(23,5)
Sf-3	Th-228+D	8.09E-10	2.89E-10	SLPF(24,5)
Sf-3	Th-229+D	1.29E-09	4.96E-10	SLPF(25,5)
Sf-3	Th-230	2.02E-10	2.02E-10	SLPF(26,5)
Sf-3	Th-232	2.31E-10	2.31E-10	SLPF(27,5)
Sf-3	U-233	1.60E-10	1.60E-10	SLPF(28,5)
Sf-3	U-234	1.58E-10	1.58E-10	SLPF(29,5)
Sf-3	U-235+D	1.63E-10	1.57E-10	SLPF(30,5)
Sf-3	U-236	1.49E-10	1.49E-10	SLPF(31,5)

Attachment 3 Sheet No. 4 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 5
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	7.60E+02	7.60E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.50E+02	1.50E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	2.50E+02	2.50E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Attachment 3 Sheet No. 5 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 6
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Risk Slope and Environmental Transport Factors for the Ground Pathway

ONuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)								
	t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ac-225	4.500E-08	6.506E-01	6.506E-01	6.506E-01	6.506E-01	6.506E-01	6.506E-01	6.506E-01	6.506E-01	6.506E-01
Ac-227	3.480E-10	6.515E-01	6.515E-01	6.515E-01	6.515E-01	6.515E-01	6.515E-01	6.515E-01	6.515E-01	6.515E-01
Ac-228	4.530E-06	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01
Ag-108	8.560E-08	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01
Ag-108m	7.180E-06	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01
Am-241	2.760E-08	6.606E-01	6.606E-01	6.606E-01	6.606E-01	6.606E-01	6.606E-01	6.606E-01	6.606E-01	6.606E-01
At-217	1.320E-09	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01
At-218	3.570E-09	6.605E-01	6.605E-01	6.605E-01	6.605E-01	6.605E-01	6.605E-01	6.605E-01	6.605E-01	6.605E-01
Ba-137m	2.690E-06	6.375E-01	6.375E-01	6.375E-01	6.375E-01	6.375E-01	6.375E-01	6.375E-01	6.375E-01	6.375E-01
Bi-210	2.760E-09	6.436E-01	6.436E-01	6.436E-01	6.436E-01	6.436E-01	6.436E-01	6.436E-01	6.436E-01	6.436E-01
Bi-211	1.880E-07	6.438E-01	6.438E-01	6.438E-01	6.438E-01	6.438E-01	6.438E-01	6.438E-01	6.438E-01	6.438E-01
Bi-212	8.870E-07	6.386E-01	6.386E-01	6.386E-01	6.386E-01	6.386E-01	6.386E-01	6.386E-01	6.386E-01	6.386E-01
Bi-213	5.650E-07	6.410E-01	6.410E-01	6.410E-01	6.410E-01	6.410E-01	6.410E-01	6.410E-01	6.410E-01	6.410E-01
Bi-214	7.480E-06	6.402E-01	6.402E-01	6.402E-01	6.402E-01	6.402E-01	6.402E-01	6.402E-01	6.402E-01	6.402E-01
C-14	7.830E-12	6.675E-01	6.675E-01	6.675E-01	6.675E-01	6.675E-01	6.675E-01	6.675E-01	6.675E-01	6.675E-01
Co-60	1.240E-05	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01
Cs-137	5.320E-10	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01
Eu-152	5.300E-06	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01
Eu-154	5.830E-06	6.412E-01	6.412E-01	6.412E-01	6.412E-01	6.412E-01	6.412E-01	6.412E-01	6.412E-01	6.412E-01
Fr-221	1.110E-07	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01
Fr-223	1.400E-07	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	0.000E+00	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01
Ni-63	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Np-237	5.360E-08	6.530E-01	6.530E-01	6.530E-01	6.530E-01	6.530E-01	6.530E-01	6.530E-01	6.530E-01	6.530E-01
Pa-231	1.390E-07	6.440E-01	6.440E-01	6.440E-01	6.440E-01	6.440E-01	6.440E-01	6.440E-01	6.440E-01	6.440E-01
Pa-233	7.430E-07	6.447E-01	6.447E-01	6.447E-01	6.447E-01	6.447E-01	6.447E-01	6.447E-01	6.447E-01	6.447E-01
Pb-209	5.370E-10	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01
Pb-210	1.410E-09	6.678E-01	6.678E-01	6.678E-01	6.678E-01	6.678E-01	6.678E-01	6.678E-01	6.678E-01	6.678E-01
Pb-211	2.290E-07	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01
Pb-212	5.090E-07	6.480E-01	6.480E-01	6.480E-01	6.480E-01	6.480E-01	6.480E-01	6.480E-01	6.480E-01	6.480E-01
Pb-214	9.820E-07	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01
Po-210	3.950E-11	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01
Po-211	3.580E-08	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-213	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.860E-10	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01
Po-215	7.480E-10	6.409E-01	6.409E-01	6.409E-01	6.409E-01	6.409E-01	6.409E-01	6.409E-01	6.409E-01	6.409E-01
Po-216	7.870E-11	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01
Po-218	4.260E-11	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01
Pu-238	7.220E-11	6.729E-01	6.729E-01	6.729E-01	6.729E-01	6.729E-01	6.729E-01	6.729E-01	6.729E-01	6.729E-01
Pu-239	2.000E-10	6.494E-01	6.494E-01	6.494E-01	6.494E-01	6.494E-01	6.494E-01	6.494E-01	6.494E-01	6.494E-01
Pu-240	6.980E-11	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01
Ra-223	4.340E-07	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01
Ra-224	3.720E-08	6.470E-01	6.470E-01	6.470E-01	6.470E-01	6.470E-01	6.470E-01	6.470E-01	6.470E-01	6.470E-01
Ra-225	5.910E-09	6.666E-01	6.666E-01	6.666E-01	6.666E-01	6.666E-01	6.666E-01	6.666E-01	6.666E-01	6.666E-01
Ra-226	2.290E-08	6.485E-01	6.485E-01	6.485E-01	6.485E-01	6.485E-01	6.485E-01	6.485E-01	6.485E-01	6.485E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rn-219	2.250E-07	6.437E-01	6.437E-01	6.437E-01	6.437E-01	6.437E-01	6.437E-01	6.437E-01	6.437E-01	6.437E-01
Rn-220	1.700E-09	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 7
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Risk Slope and Environmental Transport Factors for the Ground Pathway

ONuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)								
	t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Rn-222	1.740E-09	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01	6.383E-01
Sr-90	4.820E-10	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01
Th-227	3.780E-07	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01
Th-228	5.590E-09	6.504E-01	6.504E-01	6.504E-01	6.504E-01	6.504E-01	6.504E-01	6.504E-01	6.504E-01	6.504E-01
Th-229	2.250E-07	6.513E-01	6.513E-01	6.513E-01	6.513E-01	6.513E-01	6.513E-01	6.513E-01	6.513E-01	6.513E-01
Th-230	8.190E-10	6.528E-01	6.528E-01	6.528E-01	6.528E-01	6.528E-01	6.528E-01	6.528E-01	6.528E-01	6.528E-01
Th-231	2.450E-08	6.536E-01	6.536E-01	6.536E-01	6.536E-01	6.536E-01	6.536E-01	6.536E-01	6.536E-01	6.536E-01
Th-232	3.420E-10	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01
Tl-207	1.520E-08	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01
Tl-208	1.760E-05	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01	6.418E-01
Tl-209	9.830E-06	6.417E-01	6.417E-01	6.417E-01	6.417E-01	6.417E-01	6.417E-01	6.417E-01	6.417E-01	6.417E-01
Tl-210	0.000E+00	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01
U-233	9.820E-10	6.497E-01	6.497E-01	6.497E-01	6.497E-01	6.497E-01	6.497E-01	6.497E-01	6.497E-01	6.497E-01
U-234	2.520E-10	6.565E-01	6.565E-01	6.565E-01	6.565E-01	6.565E-01	6.565E-01	6.565E-01	6.565E-01	6.565E-01
U-235	5.180E-07	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01	6.483E-01
U-236	1.250E-10	6.617E-01	6.617E-01	6.617E-01	6.617E-01	6.617E-01	6.617E-01	6.617E-01	6.617E-01	6.617E-01
Y-90	1.910E-08	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01	6.395E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Attachment 3 Sheet No. 7 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 8
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	6.972E-04	1.437E+02	1.142E+01	2.161E+02	9.928E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.722E+02
Am-241	2.584E-03	3.553E+00	3.745E-02	4.065E-03	3.679E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.273E+00
C-14	1.452E+02	5.448E+05	1.237E+05	1.002E+05	4.847E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.686E+05
Co-60	1.558E-03	1.713E+02	9.445E+01	2.164E+01	2.219E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.896E+02
Cs-137	8.613E-03	4.733E+02	4.244E+02	2.636E+02	1.226E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.174E+03
Eu-152	2.215E-03	7.610E+00	1.514E+00	1.001E-01	3.154E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.238E+01
Eu-154	2.174E-03	7.469E+00	1.486E+00	9.821E-02	3.095E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.215E+01
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	2.057E+04	5.207E+05	7.560E+04	1.276E+05	8.176E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.240E+05
Ni-63	9.433E-02	6.480E+03	9.384E+02	8.689E+03	1.343E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.624E+04
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	1.148E-03	1.579E+00	3.329E-02	9.034E-04	1.635E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.248E+00
Pu-239	3.363E-03	4.624E+00	9.749E-02	2.646E-03	4.789E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.513E+00
Pu-240	8.613E-04	1.184E+00	2.497E-02	6.776E-04	1.226E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.436E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Sr-90	1.558E-02	6.424E+03	1.329E+03	7.509E+02	2.219E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.526E+03
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 8 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 9
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years
0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.423E-18	0.0000	1.287E-20	0.0000	1.408E-19	0.0000	1.322E-21	0.0000	7.366E-22	0.0000	1.020E-19	0.0000
Ag-108m	2.156E-06	0.0523	5.147E-13	0.0000	4.449E-08	0.0011	3.535E-09	0.0001	6.692E-08	0.0016	5.270E-10	0.0000
Am-241	3.363E-08	0.0008	2.126E-09	0.0001	1.394E-08	0.0003	1.469E-10	0.0000	1.595E-11	0.0000	2.337E-08	0.0006
C-14	1.097E-11	0.0000	2.596E-09	0.0001	2.756E-06	0.0669	6.264E-07	0.0152	5.071E-07	0.0123	3.419E-10	0.0000
Co-60	2.261E-06	0.0548	4.177E-13	0.0000	2.860E-08	0.0007	1.577E-08	0.0004	3.613E-09	0.0001	6.695E-10	0.0000
Cs-137	7.363E-06	0.1787	2.215E-12	0.0000	3.825E-07	0.0093	3.430E-07	0.0083	2.130E-07	0.0052	1.147E-08	0.0003
Eu-152	2.790E-06	0.0677	3.061E-12	0.0000	1.005E-09	0.0000	2.001E-10	0.0000	1.322E-11	0.0000	7.759E-10	0.0000
Eu-154	2.280E-06	0.0553	2.876E-12	0.0000	1.280E-09	0.0000	2.548E-10	0.0000	1.684E-11	0.0000	1.015E-09	0.0000
Gd-152	0.000E+00	0.0000	1.028E-23	0.0000	1.495E-22	0.0000	2.974E-23	0.0000	7.863E-25	0.0000	1.012E-22	0.0000
H-3	0.000E+00	0.0000	1.070E-08	0.0003	1.962E-07	0.0048	2.859E-08	0.0007	4.817E-08	0.0012	4.703E-11	0.0000
Ni-63	0.000E+00	0.0000	1.464E-11	0.0000	1.658E-07	0.0040	2.400E-08	0.0006	2.223E-07	0.0054	6.467E-09	0.0002
Np-237	4.643E-12	0.0000	6.562E-15	0.0000	9.248E-13	0.0000	3.173E-14	0.0000	3.804E-16	0.0000	8.540E-14	0.0000
Pa-231	6.732E-19	0.0000	1.403E-20	0.0000	9.552E-19	0.0000	2.077E-19	0.0000	5.263E-22	0.0000	1.643E-19	0.0000
Pb-210	4.364E-21	0.0000	9.061E-22	0.0000	3.153E-18	0.0000	1.151E-19	0.0000	1.043E-19	0.0000	2.473E-19	0.0000
Pu-238	3.632E-11	0.0000	1.030E-09	0.0000	7.125E-09	0.0002	1.502E-10	0.0000	4.076E-12	0.0000	1.187E-08	0.0003
Pu-239	3.192E-10	0.0000	3.357E-09	0.0001	2.412E-08	0.0006	5.084E-10	0.0000	1.380E-11	0.0000	3.962E-08	0.0010
Pu-240	2.937E-11	0.0000	8.587E-10	0.0000	6.169E-09	0.0001	1.301E-10	0.0000	3.530E-12	0.0000	1.017E-08	0.0002
Ra-226	5.312E-17	0.0000	4.634E-21	0.0000	1.128E-17	0.0000	3.320E-19	0.0000	7.788E-19	0.0000	4.167E-19	0.0000
Ra-228	1.987E-22	0.0000	1.467E-26	0.0000	2.190E-22	0.0000	6.364E-24	0.0000	1.502E-23	0.0000	9.130E-24	0.0000
Sr-90	1.018E-07	0.0025	3.778E-11	0.0000	1.309E-05	0.3175	2.708E-06	0.0657	1.530E-06	0.0371	6.845E-08	0.0017
Th-228	2.524E-22	0.0000	2.963E-25	0.0000	2.057E-24	0.0000	6.839E-26	0.0000	8.603E-27	0.0000	2.392E-24	0.0000
Th-229	2.079E-19	0.0000	2.550E-21	0.0000	1.126E-20	0.0000	2.418E-22	0.0000	3.367E-23	0.0000	2.082E-20	0.0000
Th-230	1.588E-18	0.0000	3.471E-18	0.0000	2.004E-17	0.0000	4.277E-19	0.0000	5.919E-20	0.0000	3.503E-17	0.0000
Th-232	3.030E-26	0.0000	2.398E-25	0.0000	1.018E-24	0.0000	2.173E-26	0.0000	3.009E-27	0.0000	1.822E-24	0.0000
U-233	2.479E-19	0.0000	1.848E-19	0.0000	5.446E-18	0.0000	1.906E-19	0.0000	8.526E-19	0.0000	3.630E-18	0.0000
U-234	5.316E-15	0.0000	1.502E-14	0.0000	4.319E-13	0.0000	1.458E-14	0.0000	6.817E-14	0.0000	2.965E-13	0.0000
U-235	1.243E-14	0.0000	1.464E-17	0.0000	4.855E-16	0.0000	1.639E-17	0.0000	7.663E-17	0.0000	3.371E-16	0.0000
U-236	2.248E-17	0.0000	1.170E-16	0.0000	3.454E-15	0.0000	1.166E-16	0.0000	5.451E-16	0.0000	2.365E-15	0.0000
Total	1.698E-05	0.4121	2.073E-08	0.0005	1.671E-05	0.4055	3.751E-06	0.0910	2.591E-06	0.0629	1.748E-07	0.0042

Attachment 3 Sheet No. 9 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 10
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

	Water		Fish		Plant		Meat		Milk		All Pathways**	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.455E-18	0.0000	3.976E-20	0.0000	2.162E-19	0.0000	1.301E-21	0.0000	1.668E-21	0.0000	3.395E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.272E-06	0.0551
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.323E-08	0.0018
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.892E-06	0.0944
Co-60	5.770E-11	0.0000	8.463E-12	0.0000	9.191E-12	0.0000	2.337E-11	0.0000	6.883E-12	0.0000	2.309E-06	0.0560
Cs-137	3.443E-09	0.0001	2.841E-09	0.0001	4.708E-10	0.0000	1.835E-09	0.0000	1.432E-09	0.0000	8.323E-06	0.2019
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.792E-06	0.0677
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.282E-06	0.0554
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.915E-22	0.0000
H-3	5.180E-07	0.0126	2.357E-10	0.0000	2.002E-07	0.0049	2.026E-08	0.0005	6.061E-08	0.0015	1.083E-06	0.0263
Ni-63	5.204E-09	0.0001	2.587E-10	0.0000	8.255E-10	0.0000	5.406E-10	0.0000	6.290E-09	0.0002	4.316E-07	0.0105
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.692E-12	0.0000
Pa-231	1.152E-18	0.0000	7.871E-21	0.0000	1.828E-19	0.0000	1.459E-19	0.0000	7.016E-22	0.0000	3.504E-18	0.0000
Pb-210	7.626E-19	0.0000	2.161E-19	0.0000	2.396E-19	0.0000	2.604E-20	0.0000	2.669E-20	0.0000	4.896E-18	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.022E-08	0.0005
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.793E-08	0.0016
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.736E-08	0.0004
Ra-226	1.842E-18	0.0000	5.137E-20	0.0000	2.810E-19	0.0000	3.652E-20	0.0000	1.042E-19	0.0000	6.824E-17	0.0000
Ra-228	6.896E-23	0.0000	1.964E-24	0.0000	1.071E-23	0.0000	1.432E-24	0.0000	4.199E-24	0.0000	5.355E-22	0.0000
Sr-90	1.091E-07	0.0026	3.039E-09	0.0001	1.689E-08	0.0004	1.657E-08	0.0004	1.203E-08	0.0003	1.765E-05	0.4283
Th-228	5.802E-24	0.0000	3.399E-25	0.0000	9.443E-25	0.0000	2.175E-26	0.0000	3.187E-27	0.0000	2.644E-22	0.0000
Th-229	3.345E-20	0.0000	1.851E-21	0.0000	6.862E-21	0.0000	2.792E-22	0.0000	5.283E-23	0.0000	2.853E-19	0.0000
Th-230	5.984E-17	0.0000	3.190E-18	0.0000	1.204E-17	0.0000	5.051E-19	0.0000	9.601E-20	0.0000	1.363E-16	0.0000
Th-232	4.021E-24	0.0000	2.172E-25	0.0000	7.618E-25	0.0000	2.778E-26	0.0000	5.185E-27	0.0000	8.167E-24	0.0000
U-233	5.257E-16	0.0000	3.026E-18	0.0000	7.807E-17	0.0000	3.506E-18	0.0000	1.805E-17	0.0000	6.389E-16	0.0000
U-234	5.940E-11	0.0000	3.424E-13	0.0000	8.840E-12	0.0000	3.989E-13	0.0000	2.048E-12	0.0000	7.186E-11	0.0000
U-235	6.501E-14	0.0000	3.772E-16	0.0000	9.737E-15	0.0000	4.393E-16	0.0000	2.256E-15	0.0000	9.118E-14	0.0000
U-236	4.666E-13	0.0000	2.684E-15	0.0000	6.928E-14	0.0000	3.125E-15	0.0000	1.605E-14	0.0000	5.644E-13	0.0000
Total	6.359E-07	0.0154	6.383E-09	0.0002	2.184E-07	0.0053	3.923E-08	0.0010	8.037E-08	0.0020	4.121E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 10 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	2.156E-06	0.0523	5.147E-13	0.0000	0.000E+00	0.0000	4.449E-08	0.0011	3.535E-09	0.0001	6.692E-08	0.0016	5.270E-10	0.0000
Am-241	3.363E-08	0.0008	2.126E-09	0.0001	0.000E+00	0.0000	1.394E-08	0.0003	1.469E-10	0.0000	1.595E-11	0.0000	2.337E-08	0.0006
C-14	1.097E-11	0.0000	2.596E-09	0.0001	0.000E+00	0.0000	2.756E-06	0.0669	6.264E-07	0.0152	5.071E-07	0.0123	3.419E-10	0.0000
Co-60	2.261E-06	0.0548	4.177E-13	0.0000	0.000E+00	0.0000	2.860E-08	0.0007	1.577E-08	0.0004	3.613E-09	0.0001	6.695E-10	0.0000
Cs-137	7.363E-06	0.1787	2.215E-12	0.0000	0.000E+00	0.0000	3.825E-07	0.0093	3.430E-07	0.0083	2.130E-07	0.0052	1.147E-08	0.0003
Eu-152	2.790E-06	0.0677	3.061E-12	0.0000	0.000E+00	0.0000	1.005E-09	0.0000	2.001E-10	0.0000	1.322E-11	0.0000	7.759E-10	0.0000
Eu-154	2.280E-06	0.0553	2.876E-12	0.0000	0.000E+00	0.0000	1.280E-09	0.0000	2.548E-10	0.0000	1.684E-11	0.0000	1.015E-09	0.0000
H-3	0.000E+00	0.0000	1.070E-08	0.0003	0.000E+00	0.0000	1.962E-07	0.0048	2.859E-08	0.0007	4.817E-08	0.0012	4.703E-11	0.0000
Ni-63	0.000E+00	0.0000	1.464E-11	0.0000	0.000E+00	0.0000	1.658E-07	0.0040	2.400E-08	0.0006	2.223E-07	0.0054	6.467E-09	0.0002
Pu-238	3.632E-11	0.0000	1.030E-09	0.0000	0.000E+00	0.0000	7.125E-09	0.0002	1.502E-10	0.0000	4.145E-12	0.0000	1.188E-08	0.0003
Pu-239	3.192E-10	0.0000	3.357E-09	0.0001	0.000E+00	0.0000	2.412E-08	0.0006	5.084E-10	0.0000	1.380E-11	0.0000	3.962E-08	0.0010
Pu-240	2.937E-11	0.0000	8.587E-10	0.0000	0.000E+00	0.0000	6.169E-09	0.0001	1.301E-10	0.0000	3.530E-12	0.0000	1.017E-08	0.0002
Sr-90	1.018E-07	0.0025	3.778E-11	0.0000	0.000E+00	0.0000	1.309E-05	0.3175	2.708E-06	0.0657	1.530E-06	0.0371	6.845E-08	0.0017
Total	1.698E-05	0.4121	2.073E-08	0.0005	0.000E+00	0.0000	1.671E-05	0.4055	3.751E-06	0.0910	2.591E-06	0.0629	1.748E-07	0.0042

Attachment 3 Sheet No. 11 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 12
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.272E-06	0.0551
Am-241	5.257E-16	0.0000	3.027E-18	0.0000	0.000E+00	0.0000	7.807E-17	0.0000	3.506E-18	0.0000	1.805E-17	0.0000	7.323E-08	0.0018
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.892E-06	0.0944
Co-60	5.770E-11	0.0000	8.463E-12	0.0000	0.000E+00	0.0000	9.191E-12	0.0000	2.337E-11	0.0000	6.883E-12	0.0000	2.309E-06	0.0560
Cs-137	3.443E-09	0.0001	2.841E-09	0.0001	0.000E+00	0.0000	4.708E-10	0.0000	1.835E-09	0.0000	1.432E-09	0.0000	8.323E-06	0.2019
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.792E-06	0.0677
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.282E-06	0.0554
H-3	5.180E-07	0.0126	2.357E-10	0.0000	0.000E+00	0.0000	2.002E-07	0.0049	2.026E-08	0.0005	6.061E-08	0.0015	1.083E-06	0.0263
Ni-63	5.204E-09	0.0001	2.587E-10	0.0000	0.000E+00	0.0000	8.255E-10	0.0000	5.406E-10	0.0000	6.290E-09	0.0002	4.316E-07	0.0105
Pu-238	5.940E-11	0.0000	3.424E-13	0.0000	0.000E+00	0.0000	8.840E-12	0.0000	3.989E-13	0.0000	2.048E-12	0.0000	2.029E-08	0.0005
Pu-239	6.501E-14	0.0000	3.772E-16	0.0000	0.000E+00	0.0000	9.738E-15	0.0000	4.394E-16	0.0000	2.256E-15	0.0000	6.793E-08	0.0016
Pu-240	4.666E-13	0.0000	2.684E-15	0.0000	0.000E+00	0.0000	6.928E-14	0.0000	3.125E-15	0.0000	1.605E-14	0.0000	1.736E-08	0.0004
Sr-90	1.091E-07	0.0026	3.039E-09	0.0001	0.000E+00	0.0000	1.689E-08	0.0004	1.657E-08	0.0004	1.203E-08	0.0003	1.765E-05	0.4283
Total	6.359E-07	0.0154	6.383E-09	0.0002	0.000E+00	0.0000	2.184E-07	0.0053	3.923E-08	0.0010	8.037E-08	0.0020	4.121E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 12 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 13
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Ac-227	3.686E-19	1.665E-15	1.495E-16	7.855E-18	5.249E-16	3.518E-13	6.002E-15	2.638E-14	1.209E-16	1.838E-16	3.868E-13
Ag-108m	6.934E-04	1.429E+02	1.135E+01	2.149E+02	9.873E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.702E+02
Am-241	2.580E-03	3.547E+00	3.739E-02	4.059E-03	3.673E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.262E+00
C-14	6.650E+01	2.570E+05	6.507E+04	5.060E+04	2.220E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.727E+05
Co-60	1.366E-03	1.502E+02	8.280E+01	1.897E+01	1.946E+00	6.215E-02	6.159E-03	6.375E-03	1.022E-02	4.054E-03	2.540E+02
Cs-137	8.415E-03	4.625E+02	4.147E+02	2.576E+02	1.198E+01	3.828E-01	2.460E-01	3.880E-02	9.428E-02	9.980E-02	1.148E+03
Eu-152	2.102E-03	7.224E+00	1.438E+00	9.499E-02	2.994E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.175E+01
Eu-154	2.009E-03	6.903E+00	1.374E+00	9.077E-02	2.861E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.123E+01
Gd-152	3.867E-18	1.329E-14	2.644E-15	7.017E-17	5.506E-15	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.151E-14
H-3	1.133E+04	2.927E+05	4.584E+04	7.520E+04	4.504E+01	4.272E+05	1.480E+02	1.223E+05	1.068E+04	3.636E+04	1.011E+06
Ni-63	9.363E-02	6.433E+03	9.315E+02	8.625E+03	1.333E+02	1.973E+01	6.737E-01	2.089E+00	1.075E+00	1.451E+01	1.616E+04
Np-237	8.362E-10	2.216E-05	6.829E-07	8.696E-09	1.191E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.404E-05
Pa-231	3.501E-17	4.545E-13	8.453E-14	3.371E-16	4.985E-14	1.799E-13	9.247E-16	2.210E-14	2.234E-14	1.814E-16	8.146E-13
Pb-210	1.630E-20	3.129E-16	1.331E-17	1.123E-17	2.322E-17	9.772E-14	7.403E-15	5.673E-15	8.148E-16	1.048E-15	1.130E-13
Pu-238	1.139E-03	1.567E+00	3.303E-02	8.963E-04	1.622E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.223E+00
Pu-239	3.363E-03	4.624E+00	9.748E-02	2.646E-03	4.789E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.513E+00
Pu-240	8.612E-04	1.184E+00	2.496E-02	6.775E-04	1.226E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.436E+00
Ra-226	2.110E-18	1.038E-13	2.119E-15	5.941E-15	3.005E-15	1.405E-13	2.156E-15	8.323E-15	1.488E-15	5.075E-15	2.725E-13
Ra-228	2.451E-23	1.202E-18	2.429E-20	6.842E-20	3.490E-20	7.608E-22	1.818E-23	3.879E-22	3.844E-24	8.175E-22	1.332E-18
Sr-90	1.521E-02	6.271E+03	1.298E+03	7.330E+02	2.166E+01	5.069E+00	1.072E-01	5.800E-01	4.599E-01	3.804E-01	8.330E+03
Th-228	2.080E-24	1.861E-20	6.035E-22	8.676E-23	2.962E-21	9.231E-24	3.904E-25	2.996E-24	3.647E-26	8.704E-25	2.228E-20
Th-229	5.754E-20	9.772E-17	3.423E-18	5.886E-19	8.193E-17	3.057E-14	1.275E-15	3.442E-15	3.608E-17	6.061E-18	3.552E-14
Th-230	1.460E-14	2.225E-11	5.669E-13	1.014E-13	2.079E-11	5.811E-12	2.023E-13	3.769E-12	2.770E-13	6.634E-14	5.383E-11
Th-232	6.283E-22	9.574E-19	2.440E-20	4.367E-21	8.947E-19	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.881E-18
U-233	1.827E-15	9.444E-12	4.292E-13	1.306E-12	2.602E-12	3.575E-11	1.440E-13	3.487E-12	1.004E-13	6.958E-13	5.396E-11
U-234	3.238E-09	1.088E-05	3.540E-07	1.723E-06	4.611E-06	1.002E-04	4.140E-07	1.030E-05	3.489E-07	2.136E-06	1.309E-04
U-235	3.307E-12	1.111E-08	3.615E-10	1.760E-09	4.710E-09	1.022E-07	4.222E-10	1.051E-08	3.557E-10	2.178E-09	1.336E-07
U-236	2.546E-11	8.552E-08	2.783E-09	1.355E-08	3.625E-08	7.866E-07	3.250E-09	8.090E-08	2.738E-09	1.677E-08	1.028E-06

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0

	Radionuclides							
Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 13 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 14
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ac-227	1.612E-18	0.0000	1.458E-20	0.0000	1.595E-19	0.0000	1.466E-21	0.0000	8.344E-22	0.0000	1.156E-19	0.0000
Ag-108m	2.144E-06	0.0569	5.118E-13	0.0000	4.425E-08	0.0012	3.516E-09	0.0001	6.655E-08	0.0018	5.241E-10	0.0000
Am-241	3.357E-08	0.0009	2.122E-09	0.0001	1.392E-08	0.0004	1.467E-10	0.0000	1.592E-11	0.0000	2.334E-08	0.0006
C-14	5.024E-12	0.0000	1.189E-09	0.0000	1.300E-06	0.0345	3.291E-07	0.0087	2.559E-07	0.0068	1.566E-10	0.0000
Co-60	1.982E-06	0.0526	3.662E-13	0.0000	2.507E-08	0.0007	1.382E-08	0.0004	3.168E-09	0.0001	5.870E-10	0.0000
Cs-137	7.194E-06	0.1908	2.164E-12	0.0000	3.737E-07	0.0099	3.351E-07	0.0089	2.082E-07	0.0055	1.121E-08	0.0003
Eu-152	2.648E-06	0.0702	2.906E-12	0.0000	9.544E-10	0.0000	1.900E-10	0.0000	1.255E-11	0.0000	7.365E-10	0.0000
Eu-154	2.107E-06	0.0559	2.658E-12	0.0000	1.183E-09	0.0000	2.355E-10	0.0000	1.556E-11	0.0000	9.380E-10	0.0000
Gd-152	0.000E+00	0.0000	1.082E-23	0.0000	1.572E-22	0.0000	3.129E-23	0.0000	8.271E-25	0.0000	1.065E-22	0.0000
H-3	0.000E+00	0.0000	5.895E-09	0.0002	1.102E-07	0.0029	1.726E-08	0.0005	2.831E-08	0.0008	2.590E-11	0.0000
Ni-63	0.000E+00	0.0000	1.453E-11	0.0000	1.645E-07	0.0044	2.383E-08	0.0006	2.206E-07	0.0059	6.419E-09	0.0002
Np-237	4.950E-12	0.0000	6.996E-15	0.0000	9.858E-13	0.0000	3.382E-14	0.0000	4.055E-16	0.0000	9.104E-14	0.0000
Pa-231	7.423E-19	0.0000	1.547E-20	0.0000	1.053E-18	0.0000	2.290E-19	0.0000	5.800E-22	0.0000	1.811E-19	0.0000
Pb-210	5.106E-21	0.0000	1.060E-21	0.0000	3.687E-18	0.0000	1.345E-19	0.0000	1.219E-19	0.0000	2.893E-19	0.0000
Pu-238	3.603E-11	0.0000	1.022E-09	0.0000	7.068E-09	0.0002	1.490E-10	0.0000	4.044E-12	0.0000	1.178E-08	0.0003
Pu-239	3.192E-10	0.0000	3.357E-09	0.0001	2.412E-08	0.0006	5.084E-10	0.0000	1.380E-11	0.0000	3.961E-08	0.0011
Pu-240	2.937E-11	0.0000	8.585E-10	0.0000	6.168E-09	0.0002	1.300E-10	0.0000	3.529E-12	0.0000	1.017E-08	0.0003
Ra-226	6.043E-17	0.0000	5.272E-21	0.0000	1.284E-17	0.0000	3.779E-19	0.0000	8.864E-19	0.0000	4.740E-19	0.0000
Ra-228	2.230E-22	0.0000	1.646E-26	0.0000	2.458E-22	0.0000	7.146E-24	0.0000	1.686E-23	0.0000	1.024E-23	0.0000
Sr-90	9.934E-08	0.0026	3.688E-11	0.0000	1.278E-05	0.3389	2.644E-06	0.0701	1.493E-06	0.0396	6.682E-08	0.0018
Th-228	2.859E-22	0.0000	3.356E-25	0.0000	2.321E-24	0.0000	7.704E-26	0.0000	9.693E-27	0.0000	2.710E-24	0.0000
Th-229	2.368E-19	0.0000	2.905E-21	0.0000	1.282E-20	0.0000	2.752E-22	0.0000	3.829E-23	0.0000	2.371E-20	0.0000
Th-230	1.747E-18	0.0000	3.819E-18	0.0000	2.204E-17	0.0000	4.704E-19	0.0000	6.505E-20	0.0000	3.855E-17	0.0000
Th-232	3.340E-26	0.0000	2.644E-25	0.0000	1.123E-24	0.0000	2.395E-26	0.0000	3.312E-27	0.0000	2.008E-24	0.0000
U-233	2.732E-19	0.0000	2.037E-19	0.0000	5.998E-18	0.0000	2.096E-19	0.0000	9.391E-19	0.0000	4.001E-18	0.0000
U-234	5.650E-15	0.0000	1.597E-14	0.0000	4.590E-13	0.0000	1.550E-14	0.0000	7.245E-14	0.0000	3.151E-13	0.0000
U-235	1.325E-14	0.0000	1.560E-17	0.0000	5.174E-16	0.0000	1.747E-17	0.0000	8.166E-17	0.0000	3.592E-16	0.0000
U-236	2.396E-17	0.0000	1.247E-16	0.0000	3.680E-15	0.0000	1.242E-16	0.0000	5.809E-16	0.0000	2.520E-15	0.0000
Total	1.621E-05	0.4300	1.450E-08	0.0004	1.485E-05	0.3938	3.368E-06	0.0893	2.276E-06	0.0604	1.723E-07	0.0046

Attachment 3 Sheet No. 14 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 15
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	1.710E-18	0.0000	4.661E-20	0.0000	2.530E-19	0.0000	1.488E-21	0.0000	1.963E-21	0.0000	3.917E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.259E-06	0.0599
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.311E-08	0.0019
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.886E-06	0.0500
Co-60	5.793E-11	0.0000	8.486E-12	0.0000	9.202E-12	0.0000	2.313E-11	0.0000	6.860E-12	0.0000	2.024E-06	0.0537
Cs-137	3.618E-09	0.0001	2.984E-09	0.0001	4.945E-10	0.0000	1.925E-09	0.0001	1.504E-09	0.0000	8.133E-06	0.2157
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.650E-06	0.0703
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.109E-06	0.0560
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.066E-22	0.0000
H-3	4.051E-07	0.0107	1.832E-10	0.0000	1.544E-07	0.0041	1.501E-08	0.0004	4.649E-08	0.0012	7.828E-07	0.0208
Ni-63	5.524E-09	0.0001	2.746E-10	0.0000	8.761E-10	0.0000	5.735E-10	0.0000	6.674E-09	0.0002	4.293E-07	0.0114
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.068E-12	0.0000
Pa-231	1.314E-18	0.0000	8.951E-21	0.0000	2.073E-19	0.0000	1.647E-19	0.0000	7.852E-22	0.0000	3.917E-18	0.0000
Pb-210	9.368E-19	0.0000	2.416E-19	0.0000	2.480E-19	0.0000	2.976E-20	0.0000	3.314E-20	0.0000	5.728E-18	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.006E-08	0.0005
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.793E-08	0.0018
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.736E-08	0.0005
Ra-226	2.220E-18	0.0000	6.028E-20	0.0000	3.228E-19	0.0000	4.447E-20	0.0000	1.269E-19	0.0000	7.778E-17	0.0000
Ra-228	7.693E-23	0.0000	2.165E-24	0.0000	1.164E-23	0.0000	1.538E-24	0.0000	4.478E-24	0.0000	5.998E-22	0.0000
Sr-90	1.146E-07	0.0030	3.192E-09	0.0001	1.773E-08	0.0005	1.739E-08	0.0005	1.263E-08	0.0003	1.724E-05	0.4574
Th-228	6.456E-24	0.0000	3.727E-25	0.0000	1.019E-24	0.0000	2.320E-26	0.0000	3.372E-27	0.0000	2.993E-22	0.0000
Th-229	3.748E-20	0.0000	2.087E-21	0.0000	7.800E-21	0.0000	3.197E-22	0.0000	6.041E-23	0.0000	3.243E-19	0.0000
Th-230	6.804E-17	0.0000	3.628E-18	0.0000	1.356E-17	0.0000	5.603E-19	0.0000	1.063E-19	0.0000	1.526E-16	0.0000
Th-232	4.580E-24	0.0000	2.458E-25	0.0000	8.518E-25	0.0000	3.072E-26	0.0000	5.724E-27	0.0000	9.170E-24	0.0000
U-233	5.988E-16	0.0000	3.447E-18	0.0000	8.894E-17	0.0000	3.997E-18	0.0000	2.057E-17	0.0000	7.274E-16	0.0000
U-234	6.537E-11	0.0000	3.768E-13	0.0000	9.729E-12	0.0000	4.392E-13	0.0000	2.254E-12	0.0000	7.905E-11	0.0000
U-235	7.167E-14	0.0000	4.159E-16	0.0000	1.074E-14	0.0000	4.846E-16	0.0000	2.488E-15	0.0000	1.000E-13	0.0000
U-236	5.144E-13	0.0000	2.959E-15	0.0000	7.639E-14	0.0000	3.448E-15	0.0000	1.770E-14	0.0000	6.220E-13	0.0000
Total	5.289E-07	0.0140	6.642E-09	0.0002	1.735E-07	0.0046	3.492E-08	0.0009	6.730E-08	0.0018	3.770E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 15 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 16
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	2.144E-06	0.0569	5.118E-13	0.0000	0.000E+00	0.0000	4.425E-08	0.0012	3.516E-09	0.0001	6.655E-08	0.0018	5.241E-10	0.0000
Am-241	3.358E-08	0.0009	2.122E-09	0.0001	0.000E+00	0.0000	1.392E-08	0.0004	1.467E-10	0.0000	1.592E-11	0.0000	2.334E-08	0.0006
C-14	5.024E-12	0.0000	1.189E-09	0.0000	0.000E+00	0.0000	1.300E-06	0.0345	3.291E-07	0.0087	2.559E-07	0.0068	1.566E-10	0.0000
Co-60	1.982E-06	0.0526	3.662E-13	0.0000	0.000E+00	0.0000	2.507E-08	0.0007	1.382E-08	0.0004	3.168E-09	0.0001	5.870E-10	0.0000
Cs-137	7.194E-06	0.1908	2.164E-12	0.0000	0.000E+00	0.0000	3.737E-07	0.0099	3.351E-07	0.0089	2.082E-07	0.0055	1.121E-08	0.0003
Eu-152	2.648E-06	0.0702	2.906E-12	0.0000	0.000E+00	0.0000	9.544E-10	0.0000	1.900E-10	0.0000	1.255E-11	0.0000	7.365E-10	0.0000
Eu-154	2.107E-06	0.0559	2.658E-12	0.0000	0.000E+00	0.0000	1.183E-09	0.0000	2.355E-10	0.0000	1.556E-11	0.0000	9.380E-10	0.0000
H-3	0.000E+00	0.0000	5.895E-09	0.0002	0.000E+00	0.0000	1.102E-07	0.0029	1.726E-08	0.0005	2.831E-08	0.0008	2.590E-11	0.0000
Ni-63	0.000E+00	0.0000	1.453E-11	0.0000	0.000E+00	0.0000	1.645E-07	0.0044	2.383E-08	0.0006	2.206E-07	0.0059	6.419E-09	0.0002
Pu-238	3.604E-11	0.0000	1.022E-09	0.0000	0.000E+00	0.0000	7.069E-09	0.0002	1.490E-10	0.0000	4.117E-12	0.0000	1.178E-08	0.0003
Pu-239	3.192E-10	0.0000	3.357E-09	0.0001	0.000E+00	0.0000	2.412E-08	0.0006	5.084E-10	0.0000	1.380E-11	0.0000	3.961E-08	0.0011
Pu-240	2.937E-11	0.0000	8.585E-10	0.0000	0.000E+00	0.0000	6.168E-09	0.0002	1.300E-10	0.0000	3.530E-12	0.0000	1.017E-08	0.0003
Sr-90	9.934E-08	0.0026	3.688E-11	0.0000	0.000E+00	0.0000	1.278E-05	0.3389	2.644E-06	0.0701	1.493E-06	0.0396	6.682E-08	0.0018
Total	1.621E-05	0.4300	1.450E-08	0.0004	0.000E+00	0.0000	1.485E-05	0.3938	3.368E-06	0.0893	2.276E-06	0.0604	1.723E-07	0.0046

Attachment 3 Sheet No. 16 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 17
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.259E-06	0.0599
Am-241	5.988E-16	0.0000	3.449E-18	0.0000	0.000E+00	0.0000	8.895E-17	0.0000	3.997E-18	0.0000	2.057E-17	0.0000	7.312E-08	0.0019
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.886E-06	0.0500
Co-60	5.793E-11	0.0000	8.486E-12	0.0000	0.000E+00	0.0000	9.202E-12	0.0000	2.313E-11	0.0000	6.860E-12	0.0000	2.024E-06	0.0537
Cs-137	3.618E-09	0.0001	2.984E-09	0.0001	0.000E+00	0.0000	4.945E-10	0.0000	1.925E-09	0.0001	1.504E-09	0.0000	8.133E-06	0.2157
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.650E-06	0.0703
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.109E-06	0.0560
H-3	4.051E-07	0.0107	1.832E-10	0.0000	0.000E+00	0.0000	1.544E-07	0.0041	1.501E-08	0.0004	4.649E-08	0.0012	7.828E-07	0.0208
Ni-63	5.524E-09	0.0001	2.746E-10	0.0000	0.000E+00	0.0000	8.761E-10	0.0000	5.735E-10	0.0000	6.674E-09	0.0002	4.293E-07	0.0114
Pu-238	6.537E-11	0.0000	3.768E-13	0.0000	0.000E+00	0.0000	9.729E-12	0.0000	4.392E-13	0.0000	2.254E-12	0.0000	2.014E-08	0.0005
Pu-239	7.167E-14	0.0000	4.159E-16	0.0000	0.000E+00	0.0000	1.074E-14	0.0000	4.847E-16	0.0000	2.488E-15	0.0000	6.793E-08	0.0018
Pu-240	5.144E-13	0.0000	2.959E-15	0.0000	0.000E+00	0.0000	7.639E-14	0.0000	3.448E-15	0.0000	1.770E-14	0.0000	1.736E-08	0.0005
Sr-90	1.146E-07	0.0030	3.192E-09	0.0001	0.000E+00	0.0000	1.773E-08	0.0005	1.739E-08	0.0005	1.263E-08	0.0003	1.724E-05	0.4574
Total	5.289E-07	0.0140	6.642E-09	0.0002	0.000E+00	0.0000	1.735E-07	0.0046	3.492E-08	0.0009	6.730E-08	0.0018	3.770E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 17 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 18
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	9.780E-18	3.737E-14	1.603E-15	1.897E-16	1.393E-14	9.879E-13	2.092E-14	1.164E-13	7.074E-16	7.711E-16	1.180E-12
Ag-108m	6.858E-04	1.413E+02	1.123E+01	2.126E+02	9.765E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.661E+02
Am-241	2.571E-03	3.535E+00	3.727E-02	4.046E-03	3.661E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.238E+00
C-14	1.394E+01	5.388E+04	1.364E+04	1.061E+04	4.653E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.814E+04
Co-60	1.050E-03	1.154E+02	6.364E+01	1.458E+01	1.495E+00	1.440E-01	1.472E-02	1.579E-02	3.653E-02	1.139E-02	1.954E+02
Cs-137	8.033E-03	4.415E+02	3.959E+02	2.459E+02	1.144E+01	1.102E+00	7.301E-01	1.194E-01	4.188E-01	3.483E-01	1.097E+03
Eu-152	1.895E-03	6.510E+00	1.296E+00	8.560E-02	2.698E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.059E+01
Eu-154	1.716E-03	5.896E+00	1.173E+00	7.753E-02	2.444E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.591E+00
Gd-152	1.102E-17	3.787E-14	7.538E-15	1.995E-16	1.570E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.131E-14
H-3	3.437E+03	8.879E+04	1.391E+04	2.281E+04	1.366E+01	7.355E+05	2.574E+02	2.156E+05	2.030E+04	6.468E+04	1.162E+06
Ni-63	9.225E-02	6.338E+03	9.178E+02	8.498E+03	1.314E+02	5.849E+01	2.034E+00	6.439E+00	3.966E+00	4.785E+01	1.600E+04
Np-237	2.504E-09	6.801E-05	2.266E-06	2.761E-08	3.566E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.387E-05
Pa-231	3.144E-16	4.240E-12	8.813E-13	2.570E-15	4.477E-13	1.312E-12	7.935E-15	2.175E-13	2.348E-13	1.880E-15	7.346E-12
Pb-210	1.299E-18	2.045E-14	8.623E-16	7.252E-16	1.849E-15	4.398E-13	4.396E-14	4.658E-14	5.354E-15	5.269E-15	5.648E-13
Pu-238	1.121E-03	1.542E+00	3.251E-02	8.822E-04	1.597E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.172E+00
Pu-239	3.362E-03	4.623E+00	9.747E-02	2.645E-03	4.788E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.511E+00
Pu-240	8.609E-04	1.184E+00	2.496E-02	6.773E-04	1.226E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.435E+00
Ra-226	5.665E-17	3.002E-12	7.947E-14	1.959E-13	8.067E-14	6.702E-13	1.356E-14	7.224E-14	1.040E-14	2.770E-14	4.152E-12
Ra-228	6.234E-22	3.292E-17	8.622E-19	2.136E-18	8.877E-19	1.490E-16	2.848E-18	1.434E-17	1.924E-18	5.691E-18	2.106E-16
Sr-90	1.450E-02	5.977E+03	1.237E+03	6.986E+02	2.065E+01	1.453E+01	3.123E-01	1.723E+00	1.602E+00	1.201E+00	7.953E+03
Th-228	1.405E-22	6.262E-19	2.371E-20	3.031E-21	2.001E-19	5.222E-17	1.999E-18	5.092E-18	1.097E-19	1.619E-20	6.029E-17
Th-229	1.550E-18	2.267E-15	5.614E-17	8.806E-18	2.207E-15	9.208E-14	3.468E-15	9.361E-15	1.258E-16	3.563E-17	1.096E-13
Th-230	1.305E-13	1.860E-10	4.237E-12	6.459E-13	1.858E-10	1.118E-10	4.293E-12	4.210E-11	3.315E-12	6.960E-13	5.389E-10
Th-232	5.644E-21	8.047E-18	1.833E-19	2.796E-20	8.036E-18	5.583E-17	2.130E-18	6.652E-18	2.098E-19	3.984E-20	8.116E-17
U-233	1.640E-14	6.608E-11	2.642E-12	9.931E-12	2.335E-11	9.891E-10	4.164E-12	1.059E-10	4.210E-12	2.339E-11	1.229E-09
U-234	9.611E-09	3.278E-05	1.095E-06	5.179E-06	1.369E-05	8.985E-04	3.798E-06	9.701E-05	4.043E-06	2.176E-05	1.078E-03
U-235	9.894E-12	3.374E-08	1.127E-09	5.331E-09	1.409E-08	9.212E-07	3.894E-09	9.945E-08	4.143E-09	2.230E-08	1.105E-06
U-236	7.616E-11	2.597E-07	8.678E-09	4.103E-08	1.084E-07	7.091E-06	2.997E-08	7.655E-07	3.189E-08	1.717E-07	8.508E-06

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 18 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 19
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.045E-18	0.0000	1.849E-20	0.0000	2.021E-19	0.0000	1.786E-21	0.0000	1.058E-21	0.0000	1.465E-19	0.0000
Ag-108m	2.121E-06	0.0629	5.062E-13	0.0000	4.376E-08	0.0013	3.477E-09	0.0001	6.582E-08	0.0020	5.183E-10	0.0000
Am-241	3.346E-08	0.0010	2.115E-09	0.0001	1.387E-08	0.0004	1.462E-10	0.0000	1.587E-11	0.0000	2.326E-08	0.0007
C-14	1.053E-12	0.0000	2.492E-10	0.0000	2.725E-07	0.0081	6.898E-08	0.0020	5.364E-08	0.0016	3.283E-11	0.0000
Co-60	1.523E-06	0.0452	2.814E-13	0.0000	1.927E-08	0.0006	1.062E-08	0.0003	2.435E-09	0.0001	4.511E-10	0.0000
Cs-137	6.868E-06	0.2038	2.065E-12	0.0000	3.568E-07	0.0106	3.199E-07	0.0095	1.987E-07	0.0059	1.070E-08	0.0003
Eu-152	2.386E-06	0.0708	2.618E-12	0.0000	8.601E-10	0.0000	1.712E-10	0.0000	1.131E-11	0.0000	6.637E-10	0.0000
Eu-154	1.800E-06	0.0534	2.270E-12	0.0000	1.011E-09	0.0000	2.012E-10	0.0000	1.329E-11	0.0000	8.012E-10	0.0000
Gd-152	0.000E+00	0.0000	1.180E-23	0.0000	1.716E-22	0.0000	3.415E-23	0.0000	9.027E-25	0.0000	1.162E-22	0.0000
H-3	0.000E+00	0.0000	1.788E-09	0.0001	3.342E-08	0.0010	5.235E-09	0.0002	8.587E-09	0.0003	7.856E-12	0.0000
Ni-63	0.000E+00	0.0000	1.432E-11	0.0000	1.621E-07	0.0048	2.348E-08	0.0007	2.174E-07	0.0065	6.325E-09	0.0002
Np-237	5.562E-12	0.0000	7.861E-15	0.0000	1.108E-12	0.0000	3.804E-14	0.0000	4.559E-16	0.0000	1.023E-13	0.0000
Pa-231	8.934E-19	0.0000	1.862E-20	0.0000	1.268E-18	0.0000	2.759E-19	0.0000	6.975E-22	0.0000	2.180E-19	0.0000
Pb-210	6.887E-21	0.0000	1.430E-21	0.0000	4.967E-18	0.0000	1.808E-19	0.0000	1.641E-19	0.0000	3.902E-19	0.0000
Pu-238	3.546E-11	0.0000	1.006E-09	0.0000	6.957E-09	0.0002	1.467E-10	0.0000	3.981E-12	0.0000	1.160E-08	0.0003
Pu-239	3.192E-10	0.0000	3.356E-09	0.0001	2.411E-08	0.0007	5.083E-10	0.0000	1.380E-11	0.0000	3.961E-08	0.0012
Pu-240	2.936E-11	0.0000	8.583E-10	0.0000	6.167E-09	0.0002	1.300E-10	0.0000	3.528E-12	0.0000	1.017E-08	0.0003
Ra-226	7.725E-17	0.0000	6.740E-21	0.0000	1.642E-17	0.0000	4.837E-19	0.0000	1.134E-18	0.0000	6.060E-19	0.0000
Ra-228	2.774E-22	0.0000	2.048E-26	0.0000	3.059E-22	0.0000	8.902E-24	0.0000	2.099E-23	0.0000	1.275E-23	0.0000
Sr-90	9.467E-08	0.0028	3.515E-11	0.0000	1.218E-05	0.3613	2.520E-06	0.0748	1.423E-06	0.0422	6.369E-08	0.0019
Th-228	3.621E-22	0.0000	4.250E-25	0.0000	2.919E-24	0.0000	9.659E-26	0.0000	1.215E-26	0.0000	3.432E-24	0.0000
Th-229	3.035E-19	0.0000	3.723E-21	0.0000	1.643E-20	0.0000	3.521E-22	0.0000	4.893E-23	0.0000	3.039E-20	0.0000
Th-230	2.095E-18	0.0000	4.580E-18	0.0000	2.642E-17	0.0000	5.634E-19	0.0000	7.781E-20	0.0000	4.622E-17	0.0000
Th-232	4.021E-26	0.0000	3.182E-25	0.0000	1.351E-24	0.0000	2.879E-26	0.0000	3.977E-27	0.0000	2.417E-24	0.0000
U-233	3.286E-19	0.0000	2.450E-19	0.0000	7.202E-18	0.0000	2.512E-19	0.0000	1.128E-18	0.0000	4.812E-18	0.0000
U-234	6.307E-15	0.0000	1.782E-14	0.0000	5.125E-13	0.0000	1.731E-14	0.0000	8.088E-14	0.0000	3.518E-13	0.0000
U-235	1.487E-14	0.0000	1.751E-17	0.0000	5.810E-16	0.0000	1.962E-17	0.0000	9.169E-17	0.0000	4.033E-16	0.0000
U-236	2.689E-17	0.0000	1.400E-16	0.0000	4.132E-15	0.0000	1.395E-16	0.0000	6.522E-16	0.0000	2.829E-15	0.0000
Total	1.483E-05	0.4400	9.430E-09	0.0003	1.312E-05	0.3892	2.953E-06	0.0876	1.970E-06	0.0585	1.678E-07	0.0050

Attachment 3 Sheet No. 19 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 20
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	2.280E-18	0.0000	6.210E-20	0.0000	3.367E-19	0.0000	1.932E-21	0.0000	2.609E-21	0.0000	5.098E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.234E-06	0.0663
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.287E-08	0.0022
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.954E-07	0.0117
Co-60	5.585E-11	0.0000	8.190E-12	0.0000	8.893E-12	0.0000	2.257E-11	0.0000	6.655E-12	0.0000	1.556E-06	0.0462
Cs-137	3.938E-09	0.0001	3.250E-09	0.0001	5.387E-10	0.0000	2.104E-09	0.0001	1.640E-09	0.0000	7.765E-06	0.2304
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.388E-06	0.0709
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.802E-06	0.0535
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.346E-22	0.0000
H-3	2.926E-07	0.0087	1.321E-10	0.0000	1.111E-07	0.0033	1.070E-08	0.0003	3.342E-08	0.0010	4.970E-07	0.0147
Ni-63	6.148E-09	0.0002	3.057E-10	0.0000	9.756E-10	0.0000	6.396E-10	0.0000	7.437E-09	0.0002	4.248E-07	0.0126
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.818E-12	0.0000
Pa-231	1.680E-18	0.0000	1.143E-20	0.0000	2.640E-19	0.0000	2.080E-19	0.0000	9.730E-22	0.0000	4.839E-18	0.0000
Pb-210	1.243E-18	0.0000	3.147E-19	0.0000	3.184E-19	0.0000	4.053E-20	0.0000	4.552E-20	0.0000	7.673E-18	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.974E-08	0.0006
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.792E-08	0.0020
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.735E-08	0.0005
Ra-226	2.986E-18	0.0000	8.123E-20	0.0000	4.362E-19	0.0000	5.862E-20	0.0000	1.715E-19	0.0000	9.963E-17	0.0000
Ra-228	9.124E-23	0.0000	2.584E-24	0.0000	1.396E-23	0.0000	1.711E-24	0.0000	5.168E-24	0.0000	7.407E-22	0.0000
Sr-90	1.246E-07	0.0037	3.471E-09	0.0001	1.929E-08	0.0006	1.895E-08	0.0006	1.375E-08	0.0004	1.646E-05	0.4884
Th-228	7.508E-24	0.0000	4.369E-25	0.0000	1.202E-24	0.0000	2.530E-26	0.0000	3.834E-27	0.0000	3.782E-22	0.0000
Th-229	4.895E-20	0.0000	2.737E-21	0.0000	1.019E-20	0.0000	4.094E-22	0.0000	7.760E-23	0.0000	4.168E-19	0.0000
Th-230	8.684E-17	0.0000	4.633E-18	0.0000	1.702E-17	0.0000	6.827E-19	0.0000	1.290E-19	0.0000	1.893E-16	0.0000
Th-232	5.369E-24	0.0000	2.894E-25	0.0000	1.010E-24	0.0000	3.678E-26	0.0000	6.831E-27	0.0000	1.087E-23	0.0000
U-233	7.677E-16	0.0000	4.419E-18	0.0000	1.140E-16	0.0000	5.130E-18	0.0000	2.639E-17	0.0000	9.316E-16	0.0000
U-234	7.839E-11	0.0000	4.519E-13	0.0000	1.167E-11	0.0000	5.272E-13	0.0000	2.705E-12	0.0000	9.473E-11	0.0000
U-235	8.627E-14	0.0000	5.006E-16	0.0000	1.293E-14	0.0000	5.839E-16	0.0000	2.996E-15	0.0000	1.193E-13	0.0000
U-236	6.192E-13	0.0000	3.562E-15	0.0000	9.197E-14	0.0000	4.154E-15	0.0000	2.132E-14	0.0000	7.481E-13	0.0000
Total	4.274E-07	0.0127	7.167E-09	0.0002	1.319E-07	0.0039	3.242E-08	0.0010	5.626E-08	0.0017	3.370E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 20 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 21
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	2.121E-06	0.0629	5.062E-13	0.0000	0.000E+00	0.0000	4.376E-08	0.0013	3.477E-09	0.0001	6.582E-08	0.0020	5.183E-10	0.0000
Am-241	3.347E-08	0.0010	2.115E-09	0.0001	0.000E+00	0.0000	1.387E-08	0.0004	1.462E-10	0.0000	1.587E-11	0.0000	2.326E-08	0.0007
C-14	1.053E-12	0.0000	2.492E-10	0.0000	0.000E+00	0.0000	2.725E-07	0.0081	6.898E-08	0.0020	5.364E-08	0.0016	3.283E-11	0.0000
Co-60	1.523E-06	0.0452	2.814E-13	0.0000	0.000E+00	0.0000	1.927E-08	0.0006	1.062E-08	0.0003	2.435E-09	0.0001	4.511E-10	0.0000
Cs-137	6.868E-06	0.2038	2.065E-12	0.0000	0.000E+00	0.0000	3.568E-07	0.0106	3.199E-07	0.0095	1.987E-07	0.0059	1.070E-08	0.0003
Eu-152	2.386E-06	0.0708	2.618E-12	0.0000	0.000E+00	0.0000	8.601E-10	0.0000	1.712E-10	0.0000	1.131E-11	0.0000	6.637E-10	0.0000
Eu-154	1.800E-06	0.0534	2.270E-12	0.0000	0.000E+00	0.0000	1.011E-09	0.0000	2.012E-10	0.0000	1.329E-11	0.0000	8.012E-10	0.0000
H-3	0.000E+00	0.0000	1.788E-09	0.0001	0.000E+00	0.0000	3.342E-08	0.0010	5.235E-09	0.0002	8.587E-09	0.0003	7.856E-12	0.0000
Ni-63	0.000E+00	0.0000	1.432E-11	0.0000	0.000E+00	0.0000	1.621E-07	0.0048	2.348E-08	0.0007	2.174E-07	0.0065	6.325E-09	0.0002
Pu-238	3.547E-11	0.0000	1.006E-09	0.0000	0.000E+00	0.0000	6.958E-09	0.0002	1.467E-10	0.0000	4.061E-12	0.0000	1.160E-08	0.0003
Pu-239	3.192E-10	0.0000	3.356E-09	0.0001	0.000E+00	0.0000	2.411E-08	0.0007	5.083E-10	0.0000	1.380E-11	0.0000	3.961E-08	0.0012
Pu-240	2.936E-11	0.0000	8.583E-10	0.0000	0.000E+00	0.0000	6.167E-09	0.0002	1.300E-10	0.0000	3.529E-12	0.0000	1.017E-08	0.0003
Sr-90	9.467E-08	0.0028	3.515E-11	0.0000	0.000E+00	0.0000	1.218E-05	0.3613	2.520E-06	0.0748	1.423E-06	0.0422	6.369E-08	0.0019
Total	1.483E-05	0.4400	9.430E-09	0.0003	0.000E+00	0.0000	1.312E-05	0.3892	2.953E-06	0.0876	1.970E-06	0.0585	1.678E-07	0.0050

Attachment 3 Sheet No. 21 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 22
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.234E-06	0.0663
Am-241	7.677E-16	0.0000	4.422E-18	0.0000	0.000E+00	0.0000	1.140E-16	0.0000	5.130E-18	0.0000	2.639E-17	0.0000	7.288E-08	0.0022
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.954E-07	0.0117
Co-60	5.585E-11	0.0000	8.190E-12	0.0000	0.000E+00	0.0000	8.893E-12	0.0000	2.257E-11	0.0000	6.655E-12	0.0000	1.556E-06	0.0462
Cs-137	3.938E-09	0.0001	3.250E-09	0.0001	0.000E+00	0.0000	5.387E-10	0.0000	2.104E-09	0.0001	1.640E-09	0.0000	7.765E-06	0.2304
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.388E-06	0.0709
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.802E-06	0.0535
H-3	2.926E-07	0.0087	1.321E-10	0.0000	0.000E+00	0.0000	1.111E-07	0.0033	1.070E-08	0.0003	3.342E-08	0.0010	4.970E-07	0.0147
Ni-63	6.148E-09	0.0002	3.057E-10	0.0000	0.000E+00	0.0000	9.756E-10	0.0000	6.396E-10	0.0000	7.437E-09	0.0002	4.248E-07	0.0126
Pu-238	7.839E-11	0.0000	4.519E-13	0.0000	0.000E+00	0.0000	1.167E-11	0.0000	5.272E-13	0.0000	2.705E-12	0.0000	1.984E-08	0.0006
Pu-239	8.627E-14	0.0000	5.007E-16	0.0000	0.000E+00	0.0000	1.293E-14	0.0000	5.841E-16	0.0000	2.996E-15	0.0000	6.792E-08	0.0020
Pu-240	6.192E-13	0.0000	3.562E-15	0.0000	0.000E+00	0.0000	9.197E-14	0.0000	4.154E-15	0.0000	2.132E-14	0.0000	1.736E-08	0.0005
Sr-90	1.246E-07	0.0037	3.471E-09	0.0001	0.000E+00	0.0000	1.929E-08	0.0006	1.895E-08	0.0006	1.375E-08	0.0004	1.646E-05	0.4884
Total	4.274E-07	0.0127	7.167E-09	0.0002	0.000E+00	0.0000	1.319E-07	0.0039	3.242E-08	0.0010	5.626E-08	0.0017	3.370E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 22 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 23
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 7.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	1.200E-16	4.332E-13	9.504E-15	2.243E-15	1.709E-13	4.606E-12	8.815E-14	4.512E-13	4.165E-15	3.478E-15	5.769E-12
Ag-108m	6.708E-04	1.382E+02	1.098E+01	2.079E+02	9.551E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.581E+02
Am-241	2.554E-03	3.512E+00	3.702E-02	4.019E-03	3.637E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.191E+00
C-14	6.112E-01	2.363E+03	5.982E+02	4.651E+02	2.040E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.426E+03
Co-60	6.203E-04	6.818E+01	3.759E+01	8.614E+00	8.832E-01	1.988E-01	2.049E-02	2.220E-02	5.548E-02	1.651E-02	1.156E+02
Cs-137	7.321E-03	4.023E+02	3.608E+02	2.241E+02	1.042E+01	2.347E+00	1.568E+00	2.589E-01	9.811E-01	7.788E-01	1.004E+03
Eu-152	1.539E-03	5.287E+00	1.052E+00	6.952E-02	2.191E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.599E+00
Eu-154	1.252E-03	4.302E+00	8.562E-01	5.657E-02	1.783E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.998E+00
Gd-152	2.328E-17	8.000E-14	1.592E-14	4.210E-16	3.315E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.295E-13
H-3	3.157E+02	8.157E+03	1.278E+03	2.096E+03	1.255E+00	6.195E+05	2.193E+02	1.862E+05	1.884E+04	5.637E+04	8.927E+05
Ni-63	8.956E-02	6.153E+03	8.909E+02	8.249E+03	1.275E+02	1.327E+02	4.636E+00	1.476E+01	9.498E+00	1.116E+02	1.569E+04
Np-237	5.824E-09	1.592E-04	5.418E-06	6.526E-08	8.294E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.730E-04
Pa-231	1.705E-15	2.324E-11	4.980E-12	1.322E-14	2.428E-12	1.273E-11	7.030E-14	1.765E-12	1.728E-12	1.175E-14	4.697E-11
Pb-210	3.722E-17	5.450E-13	2.129E-14	1.861E-14	5.301E-14	1.555E-12	1.698E-13	1.957E-13	1.667E-14	2.182E-14	2.597E-12
Pu-238	1.086E-03	1.494E+00	3.149E-02	8.547E-04	1.547E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.073E+00
Pu-239	3.362E-03	4.622E+00	9.745E-02	2.645E-03	4.787E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.509E+00
Pu-240	8.605E-04	1.183E+00	2.494E-02	6.769E-04	1.225E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.434E+00
Ra-226	7.117E-16	3.851E-11	1.094E-12	2.608E-12	1.013E-12	4.033E-12	8.600E-14	4.796E-13	5.547E-14	1.772E-13	4.805E-11
Ra-228	7.071E-21	3.813E-16	1.071E-17	2.567E-17	1.007E-17	4.150E-16	8.653E-18	4.754E-17	6.549E-18	1.904E-17	9.245E-16
Sr-90	1.317E-02	5.429E+03	1.123E+03	6.346E+02	1.876E+01	3.084E+01	6.658E-01	3.691E+00	3.569E+00	2.614E+00	7.247E+03
Th-228	2.992E-21	9.134E-18	3.315E-19	4.162E-20	4.261E-18	1.428E-16	5.963E-18	1.660E-17	3.678E-19	5.372E-20	1.795E-16
Th-229	1.960E-17	2.764E-14	6.204E-16	9.081E-17	2.791E-14	2.741E-13	1.076E-14	3.261E-14	8.638E-16	1.661E-16	3.748E-13
Th-230	7.003E-13	9.781E-10	2.136E-11	3.059E-12	9.972E-10	1.247E-09	4.971E-11	3.002E-10	2.001E-11	4.022E-12	3.621E-09
Th-232	3.061E-20	4.275E-17	9.338E-19	1.338E-19	4.358E-17	1.979E-16	8.146E-18	2.937E-17	1.088E-18	2.087E-19	3.241E-16
U-233	8.875E-14	3.278E-10	1.209E-11	5.060E-11	1.264E-10	1.262E-08	5.354E-11	1.373E-09	5.922E-11	3.125E-10	1.494E-08
U-234	2.195E-08	7.520E-05	2.531E-06	1.187E-05	3.126E-05	4.828E-03	2.054E-05	5.284E-04	2.324E-05	1.211E-04	5.642E-03
U-235	2.296E-11	7.863E-08	2.646E-09	1.241E-08	3.269E-08	5.001E-06	2.127E-08	5.473E-07	2.407E-08	1.255E-07	5.846E-06
U-236	1.767E-10	6.051E-07	2.036E-08	9.553E-08	2.516E-07	3.849E-05	1.637E-07	4.212E-06	1.852E-07	9.655E-07	4.499E-05

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 7.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 23 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 24
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.148E-18	0.0000	2.847E-20	0.0000	3.107E-19	0.0000	2.553E-21	0.0000	1.627E-21	0.0000	2.256E-19	0.0000
Ag-108m	2.074E-06	0.0708	4.951E-13	0.0000	4.281E-08	0.0015	3.401E-09	0.0001	6.438E-08	0.0022	5.070E-10	0.0000
Am-241	3.325E-08	0.0011	2.101E-09	0.0001	1.378E-08	0.0005	1.452E-10	0.0000	1.577E-11	0.0000	2.311E-08	0.0008
C-14	4.617E-14	0.0000	1.092E-11	0.0000	1.195E-08	0.0004	3.025E-09	0.0001	2.352E-09	0.0001	1.439E-12	0.0000
Co-60	8.997E-07	0.0307	1.662E-13	0.0000	1.138E-08	0.0004	6.276E-09	0.0002	1.438E-09	0.0000	2.665E-10	0.0000
Cs-137	6.258E-06	0.2134	1.882E-12	0.0000	3.251E-07	0.0111	2.915E-07	0.0099	1.811E-07	0.0062	9.752E-09	0.0003
Eu-152	1.938E-06	0.0661	2.126E-12	0.0000	6.985E-10	0.0000	1.390E-10	0.0000	9.185E-12	0.0000	5.390E-10	0.0000
Eu-154	1.313E-06	0.0448	1.657E-12	0.0000	7.375E-10	0.0000	1.468E-10	0.0000	9.698E-12	0.0000	5.846E-10	0.0000
Gd-152	0.000E+00	0.0000	1.350E-23	0.0000	1.962E-22	0.0000	3.905E-23	0.0000	1.032E-24	0.0000	1.329E-22	0.0000
H-3	0.000E+00	0.0000	1.642E-10	0.0000	3.070E-09	0.0001	4.809E-10	0.0000	7.888E-10	0.0000	7.217E-13	0.0000
Ni-63	0.000E+00	0.0000	1.390E-11	0.0000	1.574E-07	0.0054	2.279E-08	0.0008	2.110E-07	0.0072	6.140E-09	0.0002
Np-237	6.780E-12	0.0000	9.582E-15	0.0000	1.351E-12	0.0000	4.644E-14	0.0000	5.562E-16	0.0000	1.247E-13	0.0000
Pa-231	1.248E-18	0.0000	2.601E-20	0.0000	1.772E-18	0.0000	3.858E-19	0.0000	9.726E-22	0.0000	3.045E-19	0.0000
Pb-210	1.188E-20	0.0000	2.467E-21	0.0000	8.553E-18	0.0000	3.104E-19	0.0000	2.822E-19	0.0000	6.731E-19	0.0000
Pu-238	3.436E-11	0.0000	9.745E-10	0.0000	6.740E-09	0.0002	1.421E-10	0.0000	3.856E-12	0.0000	1.123E-08	0.0004
Pu-239	3.191E-10	0.0000	3.355E-09	0.0001	2.411E-08	0.0008	5.082E-10	0.0000	1.379E-11	0.0000	3.960E-08	0.0014
Pu-240	2.934E-11	0.0000	8.579E-10	0.0000	6.163E-09	0.0002	1.299E-10	0.0000	3.526E-12	0.0000	1.016E-08	0.0003
Ra-226	1.209E-16	0.0000	1.055E-20	0.0000	2.570E-17	0.0000	7.584E-19	0.0000	1.777E-18	0.0000	9.482E-19	0.0000
Ra-228	4.117E-22	0.0000	3.040E-26	0.0000	4.542E-22	0.0000	1.324E-23	0.0000	3.120E-23	0.0000	1.892E-23	0.0000
Sr-90	8.600E-08	0.0029	3.193E-11	0.0000	1.106E-05	0.3772	2.289E-06	0.0781	1.293E-06	0.0441	5.785E-08	0.0020
Th-228	5.543E-22	0.0000	6.506E-25	0.0000	4.413E-24	0.0000	1.452E-25	0.0000	1.828E-26	0.0000	5.253E-24	0.0000
Th-229	4.774E-19	0.0000	5.856E-21	0.0000	2.582E-20	0.0000	5.523E-22	0.0000	7.654E-23	0.0000	4.780E-20	0.0000
Th-230	2.903E-18	0.0000	6.346E-18	0.0000	3.659E-17	0.0000	7.790E-19	0.0000	1.073E-19	0.0000	6.405E-17	0.0000
Th-232	5.616E-26	0.0000	4.445E-25	0.0000	1.885E-24	0.0000	4.013E-26	0.0000	5.533E-27	0.0000	3.376E-24	0.0000
U-233	4.582E-19	0.0000	3.417E-19	0.0000	1.001E-17	0.0000	3.480E-19	0.0000	1.570E-18	0.0000	6.711E-18	0.0000
U-234	7.578E-15	0.0000	2.142E-14	0.0000	6.159E-13	0.0000	2.081E-14	0.0000	9.720E-14	0.0000	4.227E-13	0.0000
U-235	1.810E-14	0.0000	2.131E-17	0.0000	7.070E-16	0.0000	2.388E-17	0.0000	1.116E-16	0.0000	4.907E-16	0.0000
U-236	3.272E-17	0.0000	1.703E-16	0.0000	5.028E-15	0.0000	1.698E-16	0.0000	7.936E-16	0.0000	3.442E-15	0.0000
Total	1.260E-05	0.4298	7.517E-09	0.0003	1.166E-05	0.3978	2.617E-06	0.0893	1.754E-06	0.0598	1.597E-07	0.0054

Attachment 3 Sheet No. 24 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 25
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	3.856E-18	0.0000	1.055E-19	0.0000	5.745E-19	0.0000	3.139E-21	0.0000	4.462E-21	0.0000	8.260E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.186E-06	0.0745
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.240E-08	0.0025
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.734E-08	0.0006
Co-60	4.638E-11	0.0000	6.810E-12	0.0000	7.404E-12	0.0000	1.900E-11	0.0000	5.566E-12	0.0000	9.191E-07	0.0313
Cs-137	4.473E-09	0.0002	3.692E-09	0.0001	6.125E-10	0.0000	2.403E-09	0.0001	1.869E-09	0.0001	7.079E-06	0.2414
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.939E-06	0.0661
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.315E-06	0.0448
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.827E-22	0.0000
H-3	1.814E-07	0.0062	8.256E-11	0.0000	7.012E-08	0.0024	7.095E-09	0.0002	2.122E-08	0.0007	2.845E-07	0.0097
Ni-63	7.340E-09	0.0003	3.650E-10	0.0000	1.165E-09	0.0000	7.658E-10	0.0000	8.892E-09	0.0003	4.159E-07	0.0142
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.312E-12	0.0000
Pa-231	2.628E-18	0.0000	1.784E-20	0.0000	4.105E-19	0.0000	3.196E-19	0.0000	1.441E-21	0.0000	7.114E-18	0.0000
Pb-210	2.283E-18	0.0000	6.498E-19	0.0000	7.162E-19	0.0000	6.984E-20	0.0000	6.927E-20	0.0000	1.362E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.913E-08	0.0007
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.790E-08	0.0023
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.735E-08	0.0006
Ra-226	5.239E-18	0.0000	1.456E-19	0.0000	7.942E-19	0.0000	1.013E-19	0.0000	2.912E-19	0.0000	1.566E-16	0.0000
Ra-228	1.403E-22	0.0000	3.918E-24	0.0000	2.094E-23	0.0000	2.774E-24	0.0000	8.164E-24	0.0000	1.105E-21	0.0000
Sr-90	1.412E-07	0.0048	3.934E-09	0.0001	2.186E-08	0.0007	2.154E-08	0.0007	1.560E-08	0.0005	1.499E-05	0.5112
Th-228	1.161E-23	0.0000	6.639E-25	0.0000	1.802E-24	0.0000	4.151E-26	0.0000	6.102E-27	0.0000	5.789E-22	0.0000
Th-229	8.146E-20	0.0000	4.512E-21	0.0000	1.652E-20	0.0000	6.557E-22	0.0000	1.242E-22	0.0000	6.607E-19	0.0000
Th-230	1.354E-16	0.0000	7.235E-18	0.0000	2.577E-17	0.0000	9.770E-19	0.0000	1.832E-19	0.0000	2.804E-16	0.0000
Th-232	8.246E-24	0.0000	4.406E-25	0.0000	1.501E-24	0.0000	5.273E-26	0.0000	9.791E-27	0.0000	1.606E-23	0.0000
U-233	1.207E-15	0.0000	6.952E-18	0.0000	1.795E-16	0.0000	8.087E-18	0.0000	4.155E-17	0.0000	1.463E-15	0.0000
U-234	1.086E-10	0.0000	6.264E-13	0.0000	1.618E-11	0.0000	7.321E-13	0.0000	3.752E-12	0.0000	1.311E-10	0.0000
U-235	1.205E-13	0.0000	6.994E-16	0.0000	1.806E-14	0.0000	8.172E-16	0.0000	4.189E-15	0.0000	1.637E-13	0.0000
U-236	8.648E-13	0.0000	4.975E-15	0.0000	1.285E-13	0.0000	5.814E-15	0.0000	2.980E-14	0.0000	1.044E-12	0.0000
Total	3.346E-07	0.0114	8.081E-09	0.0003	9.379E-08	0.0032	3.182E-08	0.0011	4.760E-08	0.0016	2.932E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 25 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 26
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 7.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	2.074E-06	0.0708	4.951E-13	0.0000	0.000E+00	0.0000	4.281E-08	0.0015	3.401E-09	0.0001	6.438E-08	0.0022	5.070E-10	0.0000
Am-241	3.325E-08	0.0011	2.102E-09	0.0001	0.000E+00	0.0000	1.378E-08	0.0005	1.453E-10	0.0000	1.577E-11	0.0000	2.311E-08	0.0008
C-14	4.617E-14	0.0000	1.092E-11	0.0000	0.000E+00	0.0000	1.195E-08	0.0004	3.025E-09	0.0001	2.352E-09	0.0001	1.439E-12	0.0000
Co-60	8.997E-07	0.0307	1.662E-13	0.0000	0.000E+00	0.0000	1.138E-08	0.0004	6.276E-09	0.0002	1.438E-09	0.0000	2.665E-10	0.0000
Cs-137	6.258E-06	0.2134	1.882E-12	0.0000	0.000E+00	0.0000	3.251E-07	0.0111	2.915E-07	0.0099	1.811E-07	0.0062	9.752E-09	0.0003
Eu-152	1.938E-06	0.0661	2.126E-12	0.0000	0.000E+00	0.0000	6.985E-10	0.0000	1.390E-10	0.0000	9.185E-12	0.0000	5.390E-10	0.0000
Eu-154	1.313E-06	0.0448	1.657E-12	0.0000	0.000E+00	0.0000	7.375E-10	0.0000	1.468E-10	0.0000	9.698E-12	0.0000	5.846E-10	0.0000
H-3	0.000E+00	0.0000	1.642E-10	0.0000	0.000E+00	0.0000	3.070E-09	0.0001	4.809E-10	0.0000	7.888E-10	0.0000	7.217E-13	0.0000
Ni-63	0.000E+00	0.0000	1.390E-11	0.0000	0.000E+00	0.0000	1.574E-07	0.0054	2.279E-08	0.0008	2.110E-07	0.0072	6.140E-09	0.0002
Pu-238	3.436E-11	0.0000	9.746E-10	0.0000	0.000E+00	0.0000	6.741E-09	0.0002	1.421E-10	0.0000	3.953E-12	0.0000	1.123E-08	0.0004
Pu-239	3.191E-10	0.0000	3.355E-09	0.0001	0.000E+00	0.0000	2.411E-08	0.0008	5.082E-10	0.0000	1.379E-11	0.0000	3.960E-08	0.0014
Pu-240	2.934E-11	0.0000	8.579E-10	0.0000	0.000E+00	0.0000	6.163E-09	0.0002	1.299E-10	0.0000	3.527E-12	0.0000	1.016E-08	0.0003
Sr-90	8.600E-08	0.0029	3.193E-11	0.0000	0.000E+00	0.0000	1.106E-05	0.3772	2.289E-06	0.0781	1.293E-06	0.0441	5.785E-08	0.0020
Total	1.260E-05	0.4298	7.517E-09	0.0003	0.000E+00	0.0000	1.166E-05	0.3978	2.617E-06	0.0893	1.754E-06	0.0598	1.597E-07	0.0054

Attachment 3 Sheet No. 26 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 27
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.186E-06	0.0745
Am-241	1.207E-15	0.0000	6.956E-18	0.0000	0.000E+00	0.0000	1.795E-16	0.0000	8.088E-18	0.0000	4.155E-17	0.0000	7.241E-08	0.0025
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.734E-08	0.0006
Co-60	4.638E-11	0.0000	6.810E-12	0.0000	0.000E+00	0.0000	7.404E-12	0.0000	1.900E-11	0.0000	5.566E-12	0.0000	9.191E-07	0.0313
Cs-137	4.473E-09	0.0002	3.692E-09	0.0001	0.000E+00	0.0000	6.125E-10	0.0000	2.403E-09	0.0001	1.869E-09	0.0001	7.079E-06	0.2414
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.939E-06	0.0661
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.315E-06	0.0448
H-3	1.814E-07	0.0062	8.256E-11	0.0000	0.000E+00	0.0000	7.012E-08	0.0024	7.095E-09	0.0002	2.122E-08	0.0007	2.845E-07	0.0097
Ni-63	7.340E-09	0.0003	3.650E-10	0.0000	0.000E+00	0.0000	1.165E-09	0.0000	7.658E-10	0.0000	8.892E-09	0.0003	4.159E-07	0.0142
Pu-238	1.086E-10	0.0000	6.264E-13	0.0000	0.000E+00	0.0000	1.618E-11	0.0000	7.321E-13	0.0000	3.752E-12	0.0000	1.926E-08	0.0007
Pu-239	1.205E-13	0.0000	6.995E-16	0.0000	0.000E+00	0.0000	1.806E-14	0.0000	8.175E-16	0.0000	4.189E-15	0.0000	6.790E-08	0.0023
Pu-240	8.648E-13	0.0000	4.975E-15	0.0000	0.000E+00	0.0000	1.285E-13	0.0000	5.814E-15	0.0000	2.980E-14	0.0000	1.735E-08	0.0006
Sr-90	1.412E-07	0.0048	3.934E-09	0.0001	0.000E+00	0.0000	2.186E-08	0.0007	2.154E-08	0.0007	1.560E-08	0.0005	1.499E-05	0.5112
Total	3.346E-07	0.0114	8.081E-09	0.0003	0.000E+00	0.0000	9.379E-08	0.0032	3.182E-08	0.0011	4.760E-08	0.0016	2.932E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 27 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 28
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.100E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	4.504E-16	1.599E-12	2.468E-14	8.323E-15	6.413E-13	1.261E-11	2.576E-13	1.409E-12	1.258E-14	1.072E-14	1.657E-11
Ag-108m	6.561E-04	1.352E+02	1.074E+01	2.034E+02	9.343E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.503E+02
Am-241	2.538E-03	3.489E+00	3.678E-02	3.993E-03	3.614E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.144E+00
C-14	2.672E-02	1.033E+02	2.615E+01	2.034E+01	8.919E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.498E+02
Co-60	3.664E-04	4.027E+01	2.220E+01	5.088E+00	5.217E-01	1.847E-01	1.908E-02	2.072E-02	5.280E-02	1.553E-02	6.838E+01
Cs-137	6.671E-03	3.666E+02	3.288E+02	2.042E+02	9.499E+00	3.363E+00	2.253E+00	3.729E-01	1.441E+00	1.130E+00	9.177E+02
Eu-152	1.250E-03	4.293E+00	8.545E-01	5.646E-02	1.779E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.984E+00
Eu-154	9.136E-04	3.139E+00	6.247E-01	4.128E-02	1.301E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.106E+00
Gd-152	3.324E-17	1.142E-13	2.273E-14	6.009E-16	4.733E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.849E-13
H-3	2.895E+01	7.481E+02	1.172E+02	1.922E+02	1.151E-01	5.708E+04	2.020E+01	1.716E+04	1.736E+03	5.194E+03	8.225E+04
Ni-63	8.694E-02	5.973E+03	8.649E+02	8.008E+03	1.238E+02	2.025E+02	7.087E+00	2.260E+01	1.471E+01	1.717E+02	1.539E+04
Np-237	9.123E-09	2.499E-04	8.548E-06	1.027E-07	1.299E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.715E-04
Pa-231	4.194E-15	5.734E-11	1.239E-11	3.204E-14	5.972E-12	4.540E-11	2.457E-13	5.981E-12	5.340E-12	3.230E-14	1.327E-10
Pb-210	2.196E-16	3.147E-12	1.191E-13	1.058E-13	3.127E-13	3.097E-12	3.465E-13	4.098E-13	4.780E-14	5.097E-14	7.636E-12
Pu-238	1.052E-03	1.447E+00	3.051E-02	8.280E-04	1.499E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.977E+00
Pu-239	3.361E-03	4.621E+00	9.742E-02	2.644E-03	4.786E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.507E+00
Pu-240	8.600E-04	1.182E+00	2.493E-02	6.766E-04	1.225E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.433E+00
Ra-226	2.731E-15	1.486E-10	4.301E-12	1.017E-11	3.889E-12	1.249E-11	2.793E-13	1.643E-12	2.512E-13	7.391E-13	1.824E-10
Ra-228	2.468E-20	1.338E-15	3.829E-17	9.100E-17	3.514E-17	7.891E-16	1.655E-17	9.094E-17	1.184E-17	3.409E-17	2.445E-15
Sr-90	1.196E-02	4.931E+03	1.020E+03	5.764E+02	1.704E+01	4.405E+01	9.522E-01	5.286E+00	5.165E+00	3.760E+00	6.605E+03
Th-228	1.361E-20	3.634E-17	1.271E-18	1.594E-19	1.938E-17	2.538E-16	1.068E-17	2.983E-17	6.418E-19	9.229E-20	3.522E-16
Th-229	7.572E-17	1.058E-13	2.317E-15	3.308E-16	1.078E-13	4.933E-13	2.056E-14	7.319E-14	2.723E-15	4.927E-16	8.065E-13
Th-230	1.705E-12	2.368E-09	5.105E-11	7.175E-12	2.428E-09	4.622E-09	1.864E-10	9.080E-10	5.193E-11	1.023E-11	1.063E-08
Th-232	7.529E-20	1.046E-16	2.256E-18	3.171E-19	1.072E-16	4.226E-16	1.745E-17	6.529E-17	2.627E-18	4.992E-19	7.228E-16
U-233	2.179E-13	7.845E-10	2.812E-11	1.220E-10	3.102E-10	4.880E-08	2.077E-10	5.345E-09	2.355E-10	1.226E-09	5.706E-08
U-234	3.377E-08	1.158E-04	3.906E-06	1.828E-05	4.808E-05	1.176E-02	5.010E-05	1.292E-03	5.764E-05	2.978E-04	1.364E-02
U-235	3.587E-11	1.230E-07	4.148E-09	1.942E-08	5.108E-08	1.231E-05	5.244E-08	1.352E-06	6.030E-08	3.116E-07	1.428E-05
U-236	2.760E-10	9.465E-07	3.192E-08	1.494E-07	3.930E-07	9.469E-05	4.035E-07	1.040E-05	4.640E-07	2.398E-06	1.099E-04

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.100E+01 years

0

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 28 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 29
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.610E-18	0.0000	4.169E-20	0.0000	4.545E-19	0.0000	3.498E-21	0.0000	2.380E-21	0.0000	3.305E-19	0.0000
Ag-108m	2.029E-06	0.0783	4.843E-13	0.0000	4.187E-08	0.0016	3.327E-09	0.0001	6.298E-08	0.0024	4.959E-10	0.0000
Am-241	3.303E-08	0.0013	2.088E-09	0.0001	1.369E-08	0.0005	1.443E-10	0.0000	1.567E-11	0.0000	2.296E-08	0.0009
C-14	2.018E-15	0.0000	4.775E-13	0.0000	5.222E-10	0.0000	1.322E-10	0.0000	1.028E-10	0.0000	6.291E-14	0.0000
Co-60	5.314E-07	0.0205	9.819E-14	0.0000	6.723E-09	0.0003	3.707E-09	0.0001	8.494E-10	0.0000	1.574E-10	0.0000
Cs-137	5.703E-06	0.2199	1.715E-12	0.0000	2.963E-07	0.0114	2.657E-07	0.0102	1.650E-07	0.0064	8.887E-09	0.0003
Eu-152	1.574E-06	0.0607	1.727E-12	0.0000	5.673E-10	0.0000	1.129E-10	0.0000	7.459E-12	0.0000	4.378E-10	0.0000
Eu-154	9.581E-07	0.0370	1.209E-12	0.0000	5.381E-10	0.0000	1.071E-10	0.0000	7.076E-12	0.0000	4.266E-10	0.0000
Gd-152	0.000E+00	0.0000	1.487E-23	0.0000	2.162E-22	0.0000	4.303E-23	0.0000	1.137E-24	0.0000	1.464E-22	0.0000
H-3	0.000E+00	0.0000	1.506E-11	0.0000	2.815E-10	0.0000	4.409E-11	0.0000	7.233E-11	0.0000	6.617E-14	0.0000
Ni-63	0.000E+00	0.0000	1.349E-11	0.0000	1.528E-07	0.0059	2.212E-08	0.0009	2.048E-07	0.0079	5.960E-09	0.0002
Np-237	7.989E-12	0.0000	1.129E-14	0.0000	1.593E-12	0.0000	5.478E-14	0.0000	6.559E-16	0.0000	1.470E-13	0.0000
Pa-231	1.671E-18	0.0000	3.484E-20	0.0000	2.373E-18	0.0000	5.171E-19	0.0000	1.301E-21	0.0000	4.077E-19	0.0000
Pb-210	1.931E-20	0.0000	4.010E-21	0.0000	1.388E-17	0.0000	5.025E-19	0.0000	4.575E-19	0.0000	1.094E-18	0.0000
Pu-238	3.328E-11	0.0000	9.441E-10	0.0000	6.529E-09	0.0003	1.377E-10	0.0000	3.736E-12	0.0000	1.088E-08	0.0004
Pu-239	3.190E-10	0.0000	3.355E-09	0.0001	2.410E-08	0.0009	5.081E-10	0.0000	1.379E-11	0.0000	3.959E-08	0.0015
Pu-240	2.933E-11	0.0000	8.574E-10	0.0000	6.160E-09	0.0002	1.299E-10	0.0000	3.525E-12	0.0000	1.016E-08	0.0004
Ra-226	1.799E-16	0.0000	1.570E-20	0.0000	3.826E-17	0.0000	1.131E-18	0.0000	2.648E-18	0.0000	1.411E-18	0.0000
Ra-228	5.819E-22	0.0000	4.296E-26	0.0000	6.422E-22	0.0000	1.874E-23	0.0000	4.414E-23	0.0000	2.674E-23	0.0000
Sr-90	7.811E-08	0.0030	2.900E-11	0.0000	1.005E-05	0.3874	2.079E-06	0.0802	1.174E-06	0.0453	5.255E-08	0.0020
Th-228	8.046E-22	0.0000	9.444E-25	0.0000	6.339E-24	0.0000	2.076E-25	0.0000	2.614E-26	0.0000	7.625E-24	0.0000
Th-229	7.143E-19	0.0000	8.762E-21	0.0000	3.861E-20	0.0000	8.245E-22	0.0000	1.140E-22	0.0000	7.152E-20	0.0000
Th-230	3.856E-18	0.0000	8.429E-18	0.0000	4.857E-17	0.0000	1.033E-18	0.0000	1.420E-19	0.0000	8.507E-17	0.0000
Th-232	7.521E-26	0.0000	5.952E-25	0.0000	2.524E-24	0.0000	5.367E-26	0.0000	7.382E-27	0.0000	4.522E-24	0.0000
U-233	6.126E-19	0.0000	4.568E-19	0.0000	1.336E-17	0.0000	4.628E-19	0.0000	2.096E-18	0.0000	8.972E-18	0.0000
U-234	8.793E-15	0.0000	2.485E-14	0.0000	7.148E-13	0.0000	2.415E-14	0.0000	1.128E-13	0.0000	4.904E-13	0.0000
U-235	2.128E-14	0.0000	2.506E-17	0.0000	8.316E-16	0.0000	2.810E-17	0.0000	1.312E-16	0.0000	5.771E-16	0.0000
U-236	3.847E-17	0.0000	2.003E-16	0.0000	5.914E-15	0.0000	1.998E-16	0.0000	9.333E-16	0.0000	4.047E-15	0.0000
Total	1.091E-05	0.4207	7.307E-09	0.0003	1.060E-05	0.4086	2.375E-06	0.0916	1.608E-06	0.0620	1.525E-07	0.0059

Attachment 3 Sheet No. 29 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 30
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	6.382E-18	0.0000	1.734E-19	0.0000	9.378E-19	0.0000	4.823E-21	0.0000	7.277E-21	0.0000	1.295E-17	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.138E-06	0.0824
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.193E-08	0.0028
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.578E-10	0.0000
Co-60	3.531E-11	0.0000	5.188E-12	0.0000	5.645E-12	0.0000	1.457E-11	0.0000	4.254E-12	0.0000	5.429E-07	0.0209
Cs-137	4.882E-09	0.0002	4.032E-09	0.0002	6.690E-10	0.0000	2.632E-09	0.0001	2.043E-09	0.0001	6.453E-06	0.2489
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.575E-06	0.0607
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.592E-07	0.0370
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.217E-22	0.0000
H-3	1.671E-08	0.0006	7.606E-12	0.0000	6.461E-09	0.0002	6.537E-10	0.0000	1.956E-09	0.0001	2.621E-08	0.0010
Ni-63	8.457E-09	0.0003	4.207E-10	0.0000	1.343E-09	0.0001	8.841E-10	0.0000	1.026E-08	0.0004	4.071E-07	0.0157
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.796E-12	0.0000
Pa-231	3.955E-18	0.0000	2.670E-20	0.0000	6.103E-19	0.0000	4.676E-19	0.0000	2.049E-21	0.0000	1.007E-17	0.0000
Pb-210	3.928E-18	0.0000	1.120E-18	0.0000	1.245E-18	0.0000	1.281E-19	0.0000	1.334E-19	0.0000	2.252E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.853E-08	0.0007
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.789E-08	0.0026
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.734E-08	0.0007
Ra-226	8.660E-18	0.0000	2.399E-19	0.0000	1.307E-18	0.0000	1.691E-19	0.0000	4.900E-19	0.0000	2.342E-16	0.0000
Ra-228	1.832E-22	0.0000	5.177E-24	0.0000	2.793E-23	0.0000	3.647E-24	0.0000	1.060E-23	0.0000	1.544E-21	0.0000
Sr-90	1.537E-07	0.0059	4.283E-09	0.0002	2.381E-08	0.0009	2.349E-08	0.0009	1.700E-08	0.0007	1.365E-05	0.5265
Th-228	1.475E-23	0.0000	8.431E-25	0.0000	2.291E-24	0.0000	5.379E-26	0.0000	7.809E-27	0.0000	8.376E-22	0.0000
Th-229	1.308E-19	0.0000	7.245E-21	0.0000	2.602E-20	0.0000	9.979E-22	0.0000	1.881E-22	0.0000	9.993E-19	0.0000
Th-230	2.011E-16	0.0000	1.075E-17	0.0000	3.730E-17	0.0000	1.341E-18	0.0000	2.494E-19	0.0000	3.978E-16	0.0000
Th-232	1.112E-23	0.0000	6.002E-25	0.0000	2.049E-24	0.0000	7.089E-26	0.0000	1.310E-26	0.0000	2.163E-23	0.0000
U-233	1.806E-15	0.0000	1.040E-17	0.0000	2.686E-16	0.0000	1.212E-17	0.0000	6.224E-17	0.0000	2.186E-15	0.0000
U-234	1.443E-10	0.0000	8.321E-13	0.0000	2.150E-11	0.0000	9.740E-13	0.0000	4.988E-12	0.0000	1.739E-10	0.0000
U-235	1.614E-13	0.0000	9.368E-16	0.0000	2.420E-14	0.0000	1.096E-15	0.0000	5.615E-15	0.0000	2.161E-13	0.0000
U-236	1.158E-12	0.0000	6.664E-15	0.0000	1.721E-13	0.0000	7.798E-15	0.0000	3.994E-14	0.0000	1.396E-12	0.0000
Total	1.839E-07	0.0071	8.749E-09	0.0003	3.231E-08	0.0012	2.768E-08	0.0011	3.127E-08	0.0012	2.593E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 30 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 31
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.100E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	2.029E-06	0.0783	4.843E-13	0.0000	0.000E+00	0.0000	4.187E-08	0.0016	3.327E-09	0.0001	6.298E-08	0.0024	4.959E-10	0.0000
Am-241	3.304E-08	0.0013	2.088E-09	0.0001	0.000E+00	0.0000	1.369E-08	0.0005	1.444E-10	0.0000	1.567E-11	0.0000	2.296E-08	0.0009
C-14	2.018E-15	0.0000	4.775E-13	0.0000	0.000E+00	0.0000	5.222E-10	0.0000	1.322E-10	0.0000	1.028E-10	0.0000	6.291E-14	0.0000
Co-60	5.314E-07	0.0205	9.819E-14	0.0000	0.000E+00	0.0000	6.723E-09	0.0003	3.707E-09	0.0001	8.494E-10	0.0000	1.574E-10	0.0000
Cs-137	5.703E-06	0.2199	1.715E-12	0.0000	0.000E+00	0.0000	2.963E-07	0.0114	2.657E-07	0.0102	1.650E-07	0.0064	8.887E-09	0.0003
Eu-152	1.574E-06	0.0607	1.727E-12	0.0000	0.000E+00	0.0000	5.673E-10	0.0000	1.129E-10	0.0000	7.459E-12	0.0000	4.378E-10	0.0000
Eu-154	9.581E-07	0.0370	1.209E-12	0.0000	0.000E+00	0.0000	5.381E-10	0.0000	1.071E-10	0.0000	7.076E-12	0.0000	4.266E-10	0.0000
H-3	0.000E+00	0.0000	1.506E-11	0.0000	0.000E+00	0.0000	2.815E-10	0.0000	4.409E-11	0.0000	7.233E-11	0.0000	6.617E-14	0.0000
Ni-63	0.000E+00	0.0000	1.349E-11	0.0000	0.000E+00	0.0000	1.528E-07	0.0059	2.212E-08	0.0009	2.048E-07	0.0079	5.960E-09	0.0002
Pu-238	3.329E-11	0.0000	9.441E-10	0.0000	0.000E+00	0.0000	6.530E-09	0.0003	1.377E-10	0.0000	3.849E-12	0.0000	1.088E-08	0.0004
Pu-239	3.191E-10	0.0000	3.355E-09	0.0001	0.000E+00	0.0000	2.410E-08	0.0009	5.081E-10	0.0000	1.379E-11	0.0000	3.959E-08	0.0015
Pu-240	2.933E-11	0.0000	8.574E-10	0.0000	0.000E+00	0.0000	6.160E-09	0.0002	1.299E-10	0.0000	3.525E-12	0.0000	1.016E-08	0.0004
Sr-90	7.811E-08	0.0030	2.900E-11	0.0000	0.000E+00	0.0000	1.005E-05	0.3874	2.079E-06	0.0802	1.174E-06	0.0453	5.255E-08	0.0020
Total	1.091E-05	0.4207	7.307E-09	0.0003	0.000E+00	0.0000	1.060E-05	0.4086	2.375E-06	0.0916	1.608E-06	0.0620	1.525E-07	0.0059

Attachment 3 Sheet No. 31 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 32
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.138E-06	0.0824
Am-241	1.807E-15	0.0000	1.041E-17	0.0000	0.000E+00	0.0000	2.687E-16	0.0000	1.212E-17	0.0000	6.224E-17	0.0000	7.194E-08	0.0028
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.578E-10	0.0000
Co-60	3.531E-11	0.0000	5.188E-12	0.0000	0.000E+00	0.0000	5.645E-12	0.0000	1.457E-11	0.0000	4.254E-12	0.0000	5.429E-07	0.0209
Cs-137	4.882E-09	0.0002	4.032E-09	0.0002	0.000E+00	0.0000	6.690E-10	0.0000	2.632E-09	0.0001	2.043E-09	0.0001	6.453E-06	0.2489
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.575E-06	0.0607
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.592E-07	0.0370
H-3	1.671E-08	0.0006	7.606E-12	0.0000	0.000E+00	0.0000	6.461E-09	0.0002	6.537E-10	0.0000	1.956E-09	0.0001	2.621E-08	0.0010
Ni-63	8.457E-09	0.0003	4.207E-10	0.0000	0.000E+00	0.0000	1.343E-09	0.0001	8.841E-10	0.0000	1.026E-08	0.0004	4.071E-07	0.0157
Pu-238	1.443E-10	0.0000	8.321E-13	0.0000	0.000E+00	0.0000	2.150E-11	0.0000	9.740E-13	0.0000	4.988E-12	0.0000	1.871E-08	0.0007
Pu-239	1.614E-13	0.0000	9.370E-16	0.0000	0.000E+00	0.0000	2.420E-14	0.0000	1.097E-15	0.0000	5.615E-15	0.0000	6.789E-08	0.0026
Pu-240	1.158E-12	0.0000	6.664E-15	0.0000	0.000E+00	0.0000	1.721E-13	0.0000	7.798E-15	0.0000	3.994E-14	0.0000	1.734E-08	0.0007
Sr-90	1.537E-07	0.0059	4.283E-09	0.0002	0.000E+00	0.0000	2.381E-08	0.0009	2.349E-08	0.0009	1.700E-08	0.0007	1.365E-05	0.5265
Total	1.839E-07	0.0071	8.749E-09	0.0003	0.000E+00	0.0000	3.231E-08	0.0012	2.768E-08	0.0011	3.127E-08	0.0012	2.593E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 32 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 33
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 4.300E+01 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Ac-227	2.092E-14	7.264E-11	4.676E-13	3.808E-13	2.979E-11	1.801E-09	3.652E-11	1.978E-10	9.118E-13	1.533E-12	2.141E-09
Ag-108m	5.498E-04	1.133E+02	9.004E+00	1.704E+02	7.829E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.935E+02
Am-241	2.409E-03	3.312E+00	3.491E-02	3.790E-03	3.430E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.780E+00
C-14	3.203E-13	1.239E-09	3.139E-10	2.440E-10	1.069E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.797E-09
Co-60	5.429E-06	5.968E-01	3.291E-01	7.540E-02	7.731E-03	1.073E-02	1.112E-03	1.212E-03	3.164E-03	9.174E-04	1.026E+00
Cs-137	3.173E-03	1.744E+02	1.564E+02	9.713E+01	4.518E+00	6.271E+00	4.213E+00	6.997E-01	2.771E+00	2.143E+00	4.485E+02
Eu-152	2.364E-04	8.124E-01	1.617E-01	1.068E-02	3.367E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.321E+00
Eu-154	7.340E-05	2.522E-01	5.019E-02	3.316E-03	1.045E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.102E-01
Gd-152	6.812E-17	2.341E-13	4.658E-14	1.231E-15	9.700E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.789E-13
H-3	1.354E-07	3.498E-06	5.482E-07	8.991E-07	5.381E-10	2.775E-04	9.824E-08	8.344E-05	8.444E-06	2.526E-05	3.997E-04
Ni-63	6.858E-02	4.711E+03	6.822E+02	6.317E+03	9.765E+01	6.265E+02	2.196E+01	7.017E+01	4.634E+01	5.365E+02	1.311E+04
Np-237	3.473E-08	9.538E-04	3.286E-05	3.931E-07	4.946E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.036E-03
Pa-231	6.211E-14	8.524E-10	1.861E-10	4.653E-13	8.845E-11	2.555E-09	1.312E-11	2.968E-10	2.205E-10	8.865E-13	4.214E-09
Pb-210	3.982E-14	5.542E-10	1.994E-11	1.821E-11	5.670E-11	5.188E-10	5.202E-11	5.567E-11	6.315E-12	6.449E-12	1.288E-09
Pu-238	8.166E-04	1.123E+00	2.367E-02	6.424E-04	1.163E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.310E+00
Pu-239	3.355E-03	4.613E+00	9.724E-02	2.639E-03	4.777E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.489E+00
Pu-240	8.563E-04	1.177E+00	2.482E-02	6.736E-04	1.219E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.422E+00
Ra-226	1.493E-13	8.187E-09	2.427E-10	5.675E-10	2.126E-10	3.260E-09	6.668E-11	3.589E-10	4.810E-11	1.383E-10	1.308E-08
Ra-228	7.712E-19	4.212E-14	1.233E-15	2.900E-15	1.098E-15	2.153E-14	4.444E-16	2.410E-15	3.227E-16	9.296E-16	7.298E-14
Sr-90	5.544E-03	2.285E+03	4.729E+02	2.671E+02	7.894E+00	8.011E+01	1.734E+00	9.647E+00	9.550E+00	6.898E+00	3.141E+03
Th-228	6.655E-19	1.470E-15	4.754E-17	5.994E-18	9.476E-16	6.333E-15	2.621E-16	7.239E-16	1.667E-17	2.395E-18	9.809E-15
Th-229	4.362E-15	6.021E-12	1.281E-13	1.763E-14	6.211E-12	3.320E-11	1.361E-12	4.686E-12	1.653E-13	3.059E-14	5.182E-11
Th-230	2.328E-11	3.209E-08	6.804E-10	9.314E-11	3.316E-08	2.419E-07	9.913E-09	3.219E-08	9.905E-10	1.799E-10	3.512E-07
Th-232	1.115E-18	1.538E-15	3.261E-17	4.466E-18	1.588E-15	1.206E-14	4.950E-16	1.598E-15	4.841E-17	8.732E-18	1.737E-14
U-233	3.176E-12	1.105E-08	3.801E-10	1.737E-09	4.523E-09	2.814E-06	1.201E-08	3.103E-07	1.406E-08	7.201E-08	3.240E-06
U-234	1.114E-07	3.828E-04	1.294E-05	6.040E-05	1.587E-04	1.607E-01	6.864E-04	1.774E-02	8.063E-04	4.122E-03	1.847E-01
U-235	1.341E-10	4.605E-07	1.557E-08	7.267E-08	1.909E-07	1.823E-04	7.788E-07	2.013E-05	9.145E-07	4.676E-06	2.096E-04
U-236	1.030E-09	3.539E-06	1.196E-07	5.585E-07	1.467E-06	1.402E-03	5.988E-06	1.548E-04	7.032E-06	3.595E-05	1.611E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 4.300E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 33 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 34
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.328E-17	0.0000	3.009E-19	0.0000	3.263E-18	0.0000	1.808E-20	0.0000	1.712E-20	0.0000	2.385E-18	0.0000
Ag-108m	1.700E-06	0.1391	4.059E-13	0.0000	3.509E-08	0.0029	2.788E-09	0.0002	5.277E-08	0.0043	4.156E-10	0.0000
Am-241	3.135E-08	0.0026	1.982E-09	0.0002	1.299E-08	0.0011	1.370E-10	0.0000	1.487E-11	0.0000	2.179E-08	0.0018
C-14	2.418E-26	0.0000	5.723E-24	0.0000	6.260E-21	0.0000	1.586E-21	0.0000	1.233E-21	0.0000	7.539E-25	0.0000
Co-60	7.875E-09	0.0006	1.455E-15	0.0000	9.963E-11	0.0000	5.493E-11	0.0000	1.259E-11	0.0000	2.333E-12	0.0000
Cs-137	2.713E-06	0.2219	8.159E-13	0.0000	1.409E-07	0.0115	1.264E-07	0.0103	7.849E-08	0.0064	4.227E-09	0.0003
Eu-152	2.978E-07	0.0244	3.267E-13	0.0000	1.073E-10	0.0000	2.136E-11	0.0000	1.411E-12	0.0000	8.283E-11	0.0000
Eu-154	7.698E-08	0.0063	9.711E-14	0.0000	4.323E-11	0.0000	8.604E-12	0.0000	5.685E-13	0.0000	3.427E-11	0.0000
Gd-152	0.000E+00	0.0000	1.969E-23	0.0000	2.863E-22	0.0000	5.697E-23	0.0000	1.506E-24	0.0000	1.938E-22	0.0000
H-3	0.000E+00	0.0000	7.032E-20	0.0000	1.315E-18	0.0000	2.061E-19	0.0000	3.380E-19	0.0000	3.090E-22	0.0000
Ni-63	0.000E+00	0.0000	1.064E-11	0.0000	1.205E-07	0.0099	1.745E-08	0.0014	1.616E-07	0.0132	4.701E-09	0.0004
Np-237	1.738E-11	0.0000	2.457E-14	0.0000	3.468E-12	0.0000	1.196E-13	0.0000	1.430E-15	0.0000	3.198E-13	0.0000
Pa-231	7.437E-18	0.0000	1.550E-19	0.0000	1.057E-17	0.0000	2.310E-18	0.0000	5.758E-21	0.0000	1.815E-18	0.0000
Pb-210	2.598E-19	0.0000	5.393E-20	0.0000	1.856E-16	0.0000	6.637E-18	0.0000	6.083E-18	0.0000	1.472E-17	0.0000
Pu-238	2.583E-11	0.0000	7.325E-10	0.0001	5.066E-09	0.0004	1.068E-10	0.0000	2.899E-12	0.0000	8.444E-09	0.0007
Pu-239	3.184E-10	0.0000	3.348E-09	0.0003	2.406E-08	0.0020	5.072E-10	0.0000	1.376E-11	0.0000	3.952E-08	0.0032
Pu-240	2.920E-11	0.0000	8.537E-10	0.0001	6.133E-09	0.0005	1.293E-10	0.0000	3.509E-12	0.0000	1.011E-08	0.0008
Ra-226	1.478E-15	0.0000	1.290E-19	0.0000	3.149E-16	0.0000	9.361E-18	0.0000	2.186E-17	0.0000	1.160E-17	0.0000
Ra-228	3.312E-21	0.0000	2.445E-25	0.0000	3.661E-21	0.0000	1.074E-22	0.0000	2.523E-22	0.0000	1.522E-22	0.0000
Sr-90	3.620E-08	0.0030	1.344E-11	0.0000	4.655E-06	0.3807	9.633E-07	0.0788	5.441E-07	0.0445	2.435E-08	0.0020
Th-228	5.129E-21	0.0000	6.021E-24	0.0000	3.873E-23	0.0000	1.242E-24	0.0000	1.567E-25	0.0000	4.861E-23	0.0000
Th-229	6.145E-18	0.0000	7.538E-20	0.0000	3.312E-19	0.0000	7.029E-21	0.0000	9.632E-22	0.0000	6.153E-19	0.0000
Th-230	1.595E-17	0.0000	3.488E-17	0.0000	2.006E-16	0.0000	4.245E-18	0.0000	5.797E-19	0.0000	3.520E-16	0.0000
Th-232	3.348E-25	0.0000	2.650E-24	0.0000	1.121E-23	0.0000	2.374E-25	0.0000	3.242E-26	0.0000	2.013E-23	0.0000
U-233	2.688E-18	0.0000	2.004E-18	0.0000	5.806E-17	0.0000	1.988E-18	0.0000	9.135E-18	0.0000	3.936E-17	0.0000
U-234	1.672E-14	0.0000	4.725E-14	0.0000	1.360E-12	0.0000	4.599E-14	0.0000	2.146E-13	0.0000	9.326E-13	0.0000
U-235	4.551E-14	0.0000	5.360E-17	0.0000	1.779E-15	0.0000	6.017E-17	0.0000	2.808E-16	0.0000	1.234E-15	0.0000
U-236	8.218E-17	0.0000	4.278E-16	0.0000	1.264E-14	0.0000	4.273E-16	0.0000	1.994E-15	0.0000	8.645E-15	0.0000
Total	4.864E-06	0.3978	6.942E-09	0.0006	5.000E-06	0.4089	1.111E-06	0.0909	8.370E-07	0.0685	1.137E-07	0.0093

Attachment 3 Sheet No. 34 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 35
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	8.731E-17	0.0000	2.385E-18	0.0000	1.295E-17	0.0000	5.307E-20	0.0000	1.002E-19	0.0000	1.421E-16	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.791E-06	0.1465
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.826E-08	0.0056
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.086E-21	0.0000
Co-60	1.464E-12	0.0000	2.154E-13	0.0000	2.348E-13	0.0000	6.139E-13	0.0000	1.779E-13	0.0000	8.047E-09	0.0007
Cs-137	5.396E-09	0.0004	4.461E-09	0.0004	7.411E-10	0.0001	2.940E-09	0.0002	2.272E-09	0.0002	3.078E-06	0.2518
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.980E-07	0.0244
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.706E-08	0.0063
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.582E-22	0.0000
H-3	8.117E-17	0.0000	3.694E-20	0.0000	3.138E-17	0.0000	3.175E-18	0.0000	9.497E-18	0.0000	1.272E-16	0.0000
Ni-63	1.511E-08	0.0012	7.518E-10	0.0001	2.402E-09	0.0002	1.589E-09	0.0001	1.838E-08	0.0015	3.425E-07	0.0280
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.132E-11	0.0000
Pa-231	3.415E-17	0.0000	2.280E-19	0.0000	5.120E-18	0.0000	3.696E-18	0.0000	1.377E-20	0.0000	6.551E-17	0.0000
Pb-210	9.238E-17	0.0000	2.564E-17	0.0000	2.791E-17	0.0000	3.011E-18	0.0000	3.228E-18	0.0000	3.655E-16	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.438E-08	0.0012
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.776E-08	0.0055
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.726E-08	0.0014
Ra-226	1.349E-16	0.0000	3.713E-18	0.0000	2.013E-17	0.0000	2.661E-18	0.0000	7.696E-18	0.0000	2.005E-15	0.0000
Ra-228	1.817E-21	0.0000	5.145E-23	0.0000	2.784E-22	0.0000	3.723E-23	0.0000	1.069E-22	0.0000	9.776E-21	0.0000
Sr-90	1.659E-07	0.0136	4.627E-09	0.0004	2.574E-08	0.0021	2.551E-08	0.0021	1.841E-08	0.0015	6.463E-06	0.5286
Th-228	1.616E-22	0.0000	9.397E-24	0.0000	2.583E-23	0.0000	5.790E-25	0.0000	8.347E-26	0.0000	5.421E-21	0.0000
Th-229	1.912E-18	0.0000	1.064E-19	0.0000	3.420E-19	0.0000	1.024E-20	0.0000	1.849E-21	0.0000	9.547E-18	0.0000
Th-230	1.638E-15	0.0000	8.794E-17	0.0000	2.707E-16	0.0000	7.123E-18	0.0000	1.258E-18	0.0000	2.614E-15	0.0000
Th-232	8.934E-23	0.0000	4.830E-24	0.0000	1.490E-23	0.0000	3.960E-25	0.0000	6.986E-26	0.0000	1.441E-22	0.0000
U-233	1.553E-14	0.0000	8.950E-17	0.0000	2.313E-15	0.0000	1.051E-16	0.0000	5.373E-16	0.0000	1.868E-14	0.0000
U-234	5.944E-10	0.0000	3.430E-12	0.0000	8.868E-11	0.0000	4.039E-12	0.0000	2.062E-11	0.0000	7.138E-10	0.0001
U-235	7.155E-13	0.0000	4.156E-15	0.0000	1.074E-13	0.0000	4.891E-15	0.0000	2.498E-14	0.0000	9.058E-13	0.0000
U-236	5.130E-12	0.0000	2.954E-14	0.0000	7.636E-13	0.0000	3.476E-14	0.0000	1.775E-13	0.0000	6.160E-12	0.0000
Total	1.870E-07	0.0153	9.843E-09	0.0008	2.897E-08	0.0024	3.004E-08	0.0025	3.908E-08	0.0032	1.223E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 35 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 36
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 4.300E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	1.700E-06	0.1391	4.059E-13	0.0000	0.000E+00	0.0000	3.509E-08	0.0029	2.788E-09	0.0002	5.277E-08	0.0043	4.156E-10	0.0000
Am-241	3.137E-08	0.0026	1.982E-09	0.0002	0.000E+00	0.0000	1.300E-08	0.0011	1.371E-10	0.0000	1.487E-11	0.0000	2.179E-08	0.0018
C-14	2.418E-26	0.0000	5.723E-24	0.0000	0.000E+00	0.0000	6.260E-21	0.0000	1.586E-21	0.0000	1.233E-21	0.0000	7.539E-25	0.0000
Co-60	7.875E-09	0.0006	1.455E-15	0.0000	0.000E+00	0.0000	9.963E-11	0.0000	5.493E-11	0.0000	1.259E-11	0.0000	2.333E-12	0.0000
Cs-137	2.713E-06	0.2219	8.159E-13	0.0000	0.000E+00	0.0000	1.409E-07	0.0115	1.264E-07	0.0103	7.849E-08	0.0064	4.227E-09	0.0003
Eu-152	2.978E-07	0.0244	3.267E-13	0.0000	0.000E+00	0.0000	1.073E-10	0.0000	2.136E-11	0.0000	1.411E-12	0.0000	8.283E-11	0.0000
Eu-154	7.698E-08	0.0063	9.711E-14	0.0000	0.000E+00	0.0000	4.323E-11	0.0000	8.604E-12	0.0000	5.685E-13	0.0000	3.427E-11	0.0000
H-3	0.000E+00	0.0000	7.032E-20	0.0000	0.000E+00	0.0000	1.315E-18	0.0000	2.061E-19	0.0000	3.380E-19	0.0000	3.090E-22	0.0000
Ni-63	0.000E+00	0.0000	1.064E-11	0.0000	0.000E+00	0.0000	1.205E-07	0.0099	1.745E-08	0.0014	1.616E-07	0.0132	4.701E-09	0.0004
Pu-238	2.584E-11	0.0000	7.326E-10	0.0001	0.000E+00	0.0000	5.068E-09	0.0004	1.068E-10	0.0000	3.113E-12	0.0000	8.445E-09	0.0007
Pu-239	3.185E-10	0.0000	3.348E-09	0.0003	0.000E+00	0.0000	2.406E-08	0.0020	5.072E-10	0.0000	1.376E-11	0.0000	3.952E-08	0.0032
Pu-240	2.920E-11	0.0000	8.537E-10	0.0001	0.000E+00	0.0000	6.133E-09	0.0005	1.293E-10	0.0000	3.511E-12	0.0000	1.011E-08	0.0008
Sr-90	3.620E-08	0.0030	1.344E-11	0.0000	0.000E+00	0.0000	4.655E-06	0.3807	9.633E-07	0.0788	5.441E-07	0.0445	2.435E-08	0.0020
Total	4.864E-06	0.3978	6.942E-09	0.0006	0.000E+00	0.0000	5.000E-06	0.4089	1.111E-06	0.0909	8.370E-07	0.0685	1.137E-07	0.0093

Attachment 3 Sheet No. 36 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 37
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.791E-06	0.1465
Am-241	1.553E-14	0.0000	8.960E-17	0.0000	0.000E+00	0.0000	2.313E-15	0.0000	1.051E-16	0.0000	5.373E-16	0.0000	6.828E-08	0.0056
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.086E-21	0.0000
Co-60	1.464E-12	0.0000	2.154E-13	0.0000	0.000E+00	0.0000	2.348E-13	0.0000	6.139E-13	0.0000	1.779E-13	0.0000	8.047E-09	0.0007
Cs-137	5.396E-09	0.0004	4.461E-09	0.0004	0.000E+00	0.0000	7.411E-10	0.0001	2.940E-09	0.0002	2.272E-09	0.0002	3.078E-06	0.2518
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.980E-07	0.0244
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.706E-08	0.0063
H-3	8.117E-17	0.0000	3.694E-20	0.0000	0.000E+00	0.0000	3.138E-17	0.0000	3.175E-18	0.0000	9.497E-18	0.0000	1.272E-16	0.0000
Ni-63	1.511E-08	0.0012	7.518E-10	0.0001	0.000E+00	0.0000	2.402E-09	0.0002	1.589E-09	0.0001	1.838E-08	0.0015	3.425E-07	0.0280
Pu-238	5.944E-10	0.0000	3.431E-12	0.0000	0.000E+00	0.0000	8.868E-11	0.0000	4.039E-12	0.0000	2.062E-11	0.0000	1.509E-08	0.0012
Pu-239	7.156E-13	0.0000	4.158E-15	0.0000	0.000E+00	0.0000	1.074E-13	0.0000	4.894E-15	0.0000	2.498E-14	0.0000	6.776E-08	0.0055
Pu-240	5.130E-12	0.0000	2.954E-14	0.0000	0.000E+00	0.0000	7.636E-13	0.0000	3.476E-14	0.0000	1.775E-13	0.0000	1.727E-08	0.0014
Sr-90	1.659E-07	0.0136	4.627E-09	0.0004	0.000E+00	0.0000	2.574E-08	0.0021	2.551E-08	0.0021	1.841E-08	0.0015	6.463E-06	0.5286
Total	1.870E-07	0.0153	9.843E-09	0.0008	0.000E+00	0.0000	2.897E-08	0.0024	3.004E-08	0.0025	3.908E-08	0.0032	1.223E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 37 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 38
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.350E+02 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	3.642E-13	1.258E-09	5.431E-12	6.606E-12	5.185E-10	9.339E-08	1.899E-09	1.031E-08	3.587E-11	7.994E-11	1.075E-07
Ag-108m	3.308E-04	6.817E+01	5.417E+00	1.025E+02	4.710E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.766E+02
Am-241	2.073E-03	2.850E+00	3.004E-02	3.261E-03	2.951E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.834E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	2.992E-11	3.288E-06	1.813E-06	4.154E-07	4.260E-08	1.869E-07	1.938E-08	2.113E-08	5.550E-08	1.604E-08	5.858E-06
Cs-137	3.747E-04	2.059E+01	1.846E+01	1.147E+01	5.335E-01	2.341E+00	1.574E+00	2.615E-01	1.042E+00	8.029E-01	5.708E+01
Eu-152	1.972E-06	6.776E-03	1.348E-03	8.910E-05	2.808E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.102E-02
Eu-154	5.217E-08	1.792E-04	3.567E-05	2.357E-06	7.428E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.916E-04
Gd-152	7.615E-17	2.616E-13	5.207E-14	1.376E-15	1.084E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.235E-13
H-3	0.000E+00	2.004E-30	0.000E+00	0.000E+00	0.000E+00	1.783E-28	0.000E+00	5.363E-29	5.430E-30	1.623E-29	2.556E-28
Ni-63	3.466E-02	2.381E+03	3.449E+02	3.193E+03	4.936E+01	1.003E+03	3.519E+01	1.125E+02	7.453E+01	8.612E+02	8.055E+03
Np-237	1.012E-07	2.781E-03	9.597E-05	1.147E-06	1.441E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.022E-03
Pa-231	5.608E-13	7.702E-09	1.686E-09	4.181E-12	7.985E-10	6.149E-08	3.115E-10	6.901E-09	4.763E-09	1.532E-11	8.367E-08
Pb-210	2.062E-12	2.851E-08	1.012E-09	9.314E-10	2.937E-09	8.394E-08	8.558E-09	9.288E-09	1.004E-09	1.085E-09	1.373E-07
Pu-238	3.937E-04	5.414E-01	1.141E-02	3.097E-04	5.606E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.114E+00
Pu-239	3.337E-03	4.588E+00	9.672E-02	2.625E-03	4.751E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.439E+00
Pu-240	8.457E-04	1.163E+00	2.451E-02	6.653E-04	1.204E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.392E+00
Ra-226	3.622E-12	1.989E-07	5.931E-09	1.383E-08	5.158E-09	2.341E-07	4.819E-09	2.612E-08	3.472E-09	1.004E-08	5.024E-07
Ra-228	8.972E-18	4.907E-13	1.443E-14	3.387E-14	1.278E-14	6.488E-13	1.336E-14	7.234E-14	9.507E-15	2.767E-14	1.323E-12
Sr-90	6.073E-04	2.503E+02	5.180E+01	2.926E+01	8.648E-01	2.784E+01	6.030E-01	3.355E+00	3.332E+00	2.403E+00	3.698E+02
Th-228	8.612E-18	1.831E-14	5.804E-16	7.332E-17	1.226E-14	2.161E-13	8.916E-15	2.447E-14	5.264E-16	7.655E-17	2.813E-13
Th-229	1.218E-13	1.677E-10	3.545E-12	4.832E-13	1.735E-10	2.605E-09	1.071E-10	3.112E-10	6.576E-12	1.106E-12	3.376E-09
Th-230	1.687E-10	2.321E-07	4.900E-09	6.665E-10	2.402E-07	4.785E-06	1.969E-07	5.542E-07	1.007E-08	1.626E-09	6.026E-06
Th-232	1.008E-17	1.387E-14	2.930E-16	3.987E-17	1.435E-14	2.650E-13	1.090E-14	3.091E-14	5.834E-16	9.514E-17	3.360E-13
U-233	2.740E-11	9.456E-08	3.218E-09	1.490E-08	3.902E-08	6.526E-05	2.789E-07	7.211E-06	3.289E-07	1.678E-06	7.491E-05
U-234	2.177E-07	7.481E-04	2.531E-05	1.181E-04	3.101E-04	7.490E-01	3.201E-03	8.279E-02	3.783E-03	1.928E-02	8.592E-01
U-235	3.715E-10	1.276E-06	4.317E-08	2.014E-07	5.290E-07	1.139E-03	4.867E-06	1.259E-04	5.749E-06	2.931E-05	1.307E-03
U-236	2.844E-09	9.770E-06	3.305E-07	1.542E-06	4.049E-06	8.730E-03	3.731E-05	9.648E-04	4.406E-05	2.246E-04	1.002E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.350E+02 years

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 38 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 39
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ac-227	3.210E-16	0.0000	2.903E-18	0.0000	3.138E-17	0.0000	1.324E-19	0.0000	1.648E-19	0.0000	2.301E-17	0.0000
Ag-108m	1.023E-06	0.4003	2.442E-13	0.0000	2.111E-08	0.0083	1.677E-09	0.0007	3.175E-08	0.0124	2.500E-10	0.0001
Am-241	2.697E-08	0.0106	1.705E-09	0.0007	1.118E-08	0.0044	1.178E-10	0.0000	1.279E-11	0.0000	1.875E-08	0.0073
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	4.339E-14	0.0000	8.018E-21	0.0000	5.490E-16	0.0000	3.027E-16	0.0000	6.936E-17	0.0000	1.285E-17	0.0000
Cs-137	3.203E-07	0.1253	9.633E-14	0.0000	1.664E-08	0.0065	1.492E-08	0.0058	9.267E-09	0.0036	4.991E-10	0.0002
Eu-152	2.484E-09	0.0010	2.725E-15	0.0000	8.952E-13	0.0000	1.782E-13	0.0000	1.177E-14	0.0000	6.908E-13	0.0000
Eu-154	5.471E-11	0.0000	6.902E-17	0.0000	3.073E-14	0.0000	6.115E-15	0.0000	4.040E-16	0.0000	2.436E-14	0.0000
Gd-152	0.000E+00	0.0000	2.079E-23	0.0000	3.023E-22	0.0000	6.016E-23	0.0000	1.590E-24	0.0000	2.047E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	5.380E-12	0.0000	6.092E-08	0.0238	8.821E-09	0.0035	8.168E-08	0.0320	2.377E-09	0.0009
Np-237	4.177E-11	0.0000	5.904E-14	0.0000	8.337E-12	0.0000	2.877E-13	0.0000	3.438E-15	0.0000	7.684E-13	0.0000
Pa-231	4.481E-17	0.0000	9.341E-19	0.0000	6.373E-17	0.0000	1.395E-17	0.0000	3.459E-20	0.0000	1.093E-17	0.0000
Pb-210	5.813E-18	0.0000	1.207E-18	0.0000	4.135E-15	0.0000	1.467E-16	0.0000	1.351E-16	0.0000	3.294E-16	0.0000
Pu-238	1.245E-11	0.0000	3.532E-10	0.0001	2.443E-09	0.0010	5.150E-11	0.0000	1.398E-12	0.0000	4.071E-09	0.0016
Pu-239	3.167E-10	0.0001	3.331E-09	0.0013	2.393E-08	0.0094	5.045E-10	0.0002	1.369E-11	0.0000	3.931E-08	0.0154
Pu-240	2.884E-11	0.0000	8.431E-10	0.0003	6.058E-09	0.0024	1.277E-10	0.0000	3.466E-12	0.0000	9.986E-09	0.0039
Ra-226	1.914E-14	0.0000	1.670E-18	0.0000	4.082E-15	0.0000	1.218E-16	0.0000	2.839E-16	0.0000	1.501E-16	0.0000
Ra-228	2.357E-20	0.0000	1.740E-24	0.0000	2.607E-20	0.0000	7.671E-22	0.0000	1.800E-21	0.0000	1.083E-21	0.0000
Sr-90	3.965E-09	0.0016	1.472E-12	0.0000	5.099E-07	0.1995	1.055E-07	0.0413	5.960E-08	0.0233	2.667E-09	0.0010
Th-228	3.899E-20	0.0000	4.577E-23	0.0000	2.876E-22	0.0000	9.111E-24	0.0000	1.151E-24	0.0000	3.695E-22	0.0000
Th-229	9.107E-17	0.0000	1.117E-18	0.0000	4.901E-18	0.0000	1.036E-19	0.0000	1.411E-20	0.0000	9.119E-18	0.0000
Th-230	7.765E-17	0.0000	1.698E-16	0.0000	9.752E-16	0.0000	2.059E-17	0.0000	2.799E-18	0.0000	1.713E-15	0.0000
Th-232	2.019E-24	0.0000	1.598E-23	0.0000	6.755E-23	0.0000	1.426E-24	0.0000	1.940E-25	0.0000	1.214E-22	0.0000
U-233	1.548E-17	0.0000	1.155E-17	0.0000	3.327E-16	0.0000	1.131E-17	0.0000	5.243E-17	0.0000	2.268E-16	0.0000
U-234	2.710E-14	0.0000	7.661E-14	0.0000	2.205E-12	0.0000	7.460E-14	0.0000	3.479E-13	0.0000	1.512E-12	0.0000
U-235	1.041E-13	0.0000	1.226E-16	0.0000	4.070E-15	0.0000	1.377E-16	0.0000	6.422E-16	0.0000	2.822E-15	0.0000
U-236	1.872E-16	0.0000	9.745E-16	0.0000	2.879E-14	0.0000	9.740E-16	0.0000	4.544E-15	0.0000	1.969E-14	0.0000
Total	1.377E-06	0.5389	6.239E-09	0.0024	6.522E-07	0.2552	1.317E-07	0.0516	1.823E-07	0.0713	7.791E-08	0.0305

Attachment 3 Sheet No. 39 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 40
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	1.856E-15	0.0000	5.070E-17	0.0000	2.753E-16	0.0000	9.446E-19	0.0000	2.134E-18	0.0000	2.564E-15	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.078E-06	0.4217
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.874E-08	0.0230
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	2.310E-17	0.0000	3.401E-18	0.0000	3.710E-18	0.0000	9.744E-18	0.0000	2.816E-18	0.0000	4.437E-14	0.0000
Cs-137	1.690E-09	0.0007	1.398E-09	0.0005	2.324E-10	0.0001	9.256E-10	0.0004	7.134E-10	0.0003	3.666E-07	0.1434
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.486E-09	0.0010
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.477E-11	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.895E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.005E-08	0.0078	9.979E-10	0.0004	3.190E-09	0.0012	2.114E-09	0.0008	2.442E-08	0.0096	2.046E-07	0.0800
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.123E-11	0.0000
Pa-231	4.108E-16	0.0000	2.717E-18	0.0000	6.014E-17	0.0000	4.136E-17	0.0000	1.313E-19	0.0000	6.496E-16	0.0000
Pb-210	4.908E-15	0.0000	1.361E-15	0.0000	1.479E-15	0.0000	1.594E-16	0.0000	1.721E-16	0.0000	1.283E-14	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.932E-09	0.0027
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.740E-08	0.0264
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.705E-08	0.0067
Ra-226	3.878E-15	0.0000	1.067E-16	0.0000	5.786E-16	0.0000	7.684E-17	0.0000	2.221E-16	0.0000	2.864E-14	0.0000
Ra-228	2.652E-20	0.0000	7.512E-22	0.0000	4.067E-21	0.0000	5.343E-22	0.0000	1.555E-21	0.0000	8.672E-20	0.0000
Sr-90	4.843E-08	0.0190	1.351E-09	0.0005	7.516E-09	0.0029	7.464E-09	0.0029	5.382E-09	0.0021	7.518E-07	0.2942
Th-228	2.560E-21	0.0000	1.489E-22	0.0000	4.086E-22	0.0000	8.760E-24	0.0000	1.274E-24	0.0000	4.283E-20	0.0000
Th-229	6.034E-17	0.0000	3.367E-18	0.0000	9.684E-18	0.0000	1.958E-19	0.0000	3.258E-20	0.0000	1.799E-16	0.0000
Th-230	1.622E-14	0.0000	8.734E-16	0.0000	2.441E-15	0.0000	4.275E-17	0.0000	6.819E-18	0.0000	2.255E-14	0.0000
Th-232	1.030E-21	0.0000	5.581E-23	0.0000	1.571E-22	0.0000	2.862E-24	0.0000	4.619E-25	0.0000	1.455E-21	0.0000
U-233	1.796E-13	0.0000	1.036E-15	0.0000	2.678E-14	0.0000	1.222E-15	0.0000	6.232E-15	0.0000	2.155E-13	0.0000
U-234	1.683E-09	0.0007	9.718E-12	0.0000	2.514E-10	0.0001	1.149E-11	0.0000	5.854E-11	0.0000	2.019E-09	0.0008
U-235	2.748E-12	0.0000	1.597E-14	0.0000	4.130E-13	0.0000	1.887E-14	0.0000	9.616E-14	0.0000	3.404E-12	0.0000
U-236	1.964E-11	0.0000	1.131E-13	0.0000	2.926E-12	0.0000	1.336E-13	0.0000	6.813E-13	0.0000	2.355E-11	0.0000
Total	7.187E-08	0.0281	3.756E-09	0.0015	1.119E-08	0.0044	1.052E-08	0.0041	3.058E-08	0.0120	2.556E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 40 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 41
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.350E+02 years

Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.023E-06	0.4003	2.442E-13	0.0000	0.000E+00	0.0000	2.111E-08	0.0083	1.677E-09	0.0007	3.175E-08	0.0124	2.500E-10	0.0001
Am-241	2.702E-08	0.0106	1.705E-09	0.0007	0.000E+00	0.0000	1.119E-08	0.0044	1.181E-10	0.0000	1.280E-11	0.0000	1.875E-08	0.0073
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	4.339E-14	0.0000	8.018E-21	0.0000	0.000E+00	0.0000	5.490E-16	0.0000	3.027E-16	0.0000	6.936E-17	0.0000	1.285E-17	0.0000
Cs-137	3.203E-07	0.1253	9.633E-14	0.0000	0.000E+00	0.0000	1.664E-08	0.0065	1.492E-08	0.0058	9.267E-09	0.0036	4.991E-10	0.0002
Eu-152	2.484E-09	0.0010	2.725E-15	0.0000	0.000E+00	0.0000	8.952E-13	0.0000	1.782E-13	0.0000	1.177E-14	0.0000	6.908E-13	0.0000
Eu-154	5.471E-11	0.0000	6.902E-17	0.0000	0.000E+00	0.0000	3.073E-14	0.0000	6.115E-15	0.0000	4.040E-16	0.0000	2.436E-14	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	5.380E-12	0.0000	0.000E+00	0.0000	6.092E-08	0.0238	8.821E-09	0.0035	8.168E-08	0.0320	2.377E-09	0.0009
Pu-238	1.250E-11	0.0000	3.533E-10	0.0001	0.000E+00	0.0000	2.445E-09	0.0010	5.157E-11	0.0000	1.746E-12	0.0000	4.073E-09	0.0016
Pu-239	3.168E-10	0.0001	3.331E-09	0.0013	0.000E+00	0.0000	2.393E-08	0.0094	5.045E-10	0.0002	1.369E-11	0.0000	3.931E-08	0.0154
Pu-240	2.884E-11	0.0000	8.431E-10	0.0003	0.000E+00	0.0000	6.058E-09	0.0024	1.277E-10	0.0000	3.470E-12	0.0000	9.987E-09	0.0039
Sr-90	3.965E-09	0.0016	1.472E-12	0.0000	0.000E+00	0.0000	5.099E-07	0.1995	1.055E-07	0.0413	5.960E-08	0.0233	2.667E-09	0.0010
Total	1.377E-06	0.5389	6.239E-09	0.0024	0.000E+00	0.0000	6.522E-07	0.2552	1.317E-07	0.0516	1.823E-07	0.0713	7.791E-08	0.0305

Attachment 3 Sheet No. 41 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 42
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.078E-06	0.4217
Am-241	1.796E-13	0.0000	1.039E-15	0.0000	0.000E+00	0.0000	2.679E-14	0.0000	1.222E-15	0.0000	6.232E-15	0.0000	5.879E-08	0.0230
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	2.310E-17	0.0000	3.401E-18	0.0000	0.000E+00	0.0000	3.710E-18	0.0000	9.744E-18	0.0000	2.816E-18	0.0000	4.437E-14	0.0000
Cs-137	1.690E-09	0.0007	1.398E-09	0.0005	0.000E+00	0.0000	2.324E-10	0.0001	9.256E-10	0.0004	7.134E-10	0.0003	3.666E-07	0.1434
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.486E-09	0.0010
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.477E-11	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.005E-08	0.0078	9.979E-10	0.0004	0.000E+00	0.0000	3.190E-09	0.0012	2.114E-09	0.0008	2.442E-08	0.0096	2.046E-07	0.0800
Pu-238	1.683E-09	0.0007	9.721E-12	0.0000	0.000E+00	0.0000	2.514E-10	0.0001	1.149E-11	0.0000	5.854E-11	0.0000	8.951E-09	0.0035
Pu-239	2.750E-12	0.0000	1.602E-14	0.0000	0.000E+00	0.0000	4.133E-13	0.0000	1.891E-14	0.0000	9.617E-14	0.0000	6.740E-08	0.0264
Pu-240	1.964E-11	0.0000	1.131E-13	0.0000	0.000E+00	0.0000	2.926E-12	0.0000	1.336E-13	0.0000	6.813E-13	0.0000	1.707E-08	0.0067
Sr-90	4.843E-08	0.0190	1.351E-09	0.0005	0.000E+00	0.0000	7.516E-09	0.0029	7.464E-09	0.0029	5.382E-09	0.0021	7.518E-07	0.2942
Total	7.187E-08	0.0281	3.756E-09	0.0015	0.000E+00	0.0000	1.119E-08	0.0044	1.052E-08	0.0041	3.058E-08	0.0120	2.556E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 42 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 43
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Ac-227	1.967E-12	6.787E-09	2.596E-11	3.565E-11	2.800E-09	7.034E-07	1.431E-08	7.770E-08	2.534E-10	6.025E-10	8.059E-07
Ag-108m	1.330E-04	2.741E+01	2.178E+00	4.122E+01	1.894E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.099E+01
Am-241	1.583E-03	2.177E+00	2.294E-02	2.491E-03	2.254E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.456E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	1.107E-20	1.217E-15	6.711E-16	1.538E-16	1.577E-17	1.556E-16	1.613E-17	1.760E-17	4.629E-17	1.337E-17	2.307E-15
Cs-137	8.120E-06	4.463E-01	4.002E-01	2.486E-01	1.156E-02	1.141E-01	7.673E-02	1.276E-02	5.087E-02	3.918E-02	1.400E+00
Eu-152	3.687E-10	1.267E-06	2.521E-07	1.666E-08	5.249E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.060E-06
Eu-154	1.178E-13	4.046E-10	8.052E-11	5.320E-12	1.677E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.581E-10
Gd-152	7.612E-17	2.616E-13	5.205E-14	1.376E-15	1.084E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.234E-13
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.020E-02	7.006E+02	1.015E+02	9.394E+02	1.452E+01	6.666E+02	2.338E+01	7.475E+01	4.957E+01	5.725E+02	3.143E+03
Np-237	1.977E-07	5.434E-03	1.876E-04	2.241E-06	2.816E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.905E-03
Pa-231	2.385E-12	3.276E-08	7.174E-09	1.776E-11	3.396E-09	3.445E-07	1.740E-09	3.836E-08	2.601E-08	7.834E-11	4.540E-07
Pb-210	2.079E-11	2.870E-07	1.015E-08	9.361E-09	2.961E-08	1.344E-06	1.373E-07	1.491E-07	1.606E-08	1.735E-08	2.000E-06
Pu-238	1.064E-04	1.463E-01	3.084E-03	8.371E-05	1.515E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.010E-01
Pu-239	3.305E-03	4.544E+00	9.580E-02	2.600E-03	4.706E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.349E+00
Pu-240	8.270E-04	1.137E+00	2.397E-02	6.506E-04	1.178E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.339E+00
Ra-226	2.662E-11	1.462E-06	4.367E-08	1.018E-07	3.790E-08	2.534E-06	5.220E-08	2.832E-07	3.764E-08	1.087E-07	4.661E-06
Ra-228	4.089E-17	2.237E-12	6.586E-14	1.545E-13	5.822E-14	3.940E-12	8.115E-14	4.393E-13	5.773E-14	1.680E-13	7.202E-12
Sr-90	1.151E-05	4.743E+00	9.815E-01	5.544E-01	1.639E-02	1.195E+00	2.587E-02	1.440E-01	1.431E-01	1.031E-01	7.906E+00
Th-228	4.021E-17	8.476E-14	2.675E-15	3.381E-16	5.726E-14	1.358E-12	5.602E-14	1.536E-13	3.262E-15	4.744E-16	1.716E-12
Th-229	1.118E-12	1.538E-09	3.246E-11	4.414E-12	1.592E-09	3.469E-08	1.428E-09	3.953E-09	6.548E-11	1.026E-11	4.331E-08
Th-230	5.047E-10	6.942E-07	1.464E-08	1.988E-09	7.187E-07	1.884E-05	7.763E-07	2.112E-06	3.143E-08	4.734E-09	2.320E-05
Th-232	4.295E-17	5.907E-14	1.246E-15	1.693E-16	6.115E-14	1.464E-12	6.032E-14	1.652E-13	2.566E-15	3.929E-16	1.815E-12
U-233	1.073E-10	3.694E-07	1.254E-08	5.825E-08	1.528E-07	3.355E-04	1.434E-06	3.709E-05	1.694E-06	8.636E-06	3.850E-04
U-234	2.163E-07	7.431E-04	2.514E-05	1.173E-04	3.080E-04	8.631E-01	3.689E-03	9.542E-02	4.363E-03	2.223E-02	9.900E-01
U-235	6.682E-10	2.296E-06	7.767E-08	3.622E-07	9.514E-07	2.358E-03	1.008E-05	2.607E-04	1.191E-05	6.071E-05	2.705E-03
U-236	5.076E-09	1.744E-05	5.901E-07	2.752E-06	7.228E-06	1.794E-02	7.669E-05	1.984E-03	9.066E-05	4.620E-04	2.058E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 43 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 44
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years
0
Water Independent Pathways (Inhalation excludes radon)
0

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.497E-15	0.0000	1.353E-17	0.0000	1.462E-16	0.0000	5.565E-19	0.0000	7.677E-19	0.0000	1.073E-16	0.0000
Ag-108m	4.112E-07	0.6168	9.816E-14	0.0000	8.486E-09	0.0127	6.743E-10	0.0010	1.276E-08	0.0191	1.005E-10	0.0002
Am-241	2.060E-08	0.0309	1.302E-09	0.0020	8.539E-09	0.0128	9.001E-11	0.0001	9.772E-12	0.0000	1.432E-08	0.0215
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	1.606E-23	0.0000	0.000E+00	0.0000	2.032E-25	0.0000	1.120E-25	0.0000	2.567E-26	0.0000	4.757E-27	0.0000
Cs-137	6.942E-09	0.0104	2.088E-15	0.0000	3.606E-10	0.0005	3.234E-10	0.0005	2.009E-10	0.0003	1.082E-11	0.0000
Eu-152	4.643E-13	0.0000	5.095E-19	0.0000	1.674E-16	0.0000	3.331E-17	0.0000	2.201E-18	0.0000	1.291E-16	0.0000
Eu-154	1.235E-16	0.0000	1.558E-22	0.0000	6.936E-20	0.0000	1.380E-20	0.0000	9.120E-22	0.0000	5.498E-20	0.0000
Gd-152	0.000E+00	0.0000	2.078E-23	0.0000	3.021E-22	0.0000	6.012E-23	0.0000	1.589E-24	0.0000	2.045E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	1.583E-12	0.0000	1.792E-08	0.0269	2.595E-09	0.0039	2.403E-08	0.0360	6.991E-10	0.0010
Np-237	7.717E-11	0.0001	1.091E-13	0.0000	1.540E-11	0.0000	5.318E-13	0.0000	6.354E-15	0.0000	1.419E-12	0.0000
Pa-231	1.700E-16	0.0000	3.543E-18	0.0000	2.418E-16	0.0000	5.295E-17	0.0000	1.311E-19	0.0000	4.147E-17	0.0000
Pb-210	4.736E-17	0.0000	9.833E-18	0.0000	3.365E-14	0.0000	1.190E-15	0.0000	1.098E-15	0.0000	2.684E-15	0.0000
Pu-238	3.365E-12	0.0000	9.546E-11	0.0001	6.602E-10	0.0010	1.392E-11	0.0000	3.777E-13	0.0000	1.100E-09	0.0017
Pu-239	3.137E-10	0.0005	3.299E-09	0.0049	2.370E-08	0.0355	4.996E-10	0.0007	1.356E-11	0.0000	3.893E-08	0.0584
Pu-240	2.820E-11	0.0000	8.245E-10	0.0012	5.924E-09	0.0089	1.249E-10	0.0002	3.389E-12	0.0000	9.766E-09	0.0146
Ra-226	1.185E-13	0.0000	1.034E-17	0.0000	2.528E-14	0.0000	7.550E-16	0.0000	1.759E-15	0.0000	9.296E-16	0.0000
Ra-228	9.484E-20	0.0000	7.002E-24	0.0000	1.050E-19	0.0000	3.091E-21	0.0000	7.249E-21	0.0000	4.358E-21	0.0000
Sr-90	7.513E-11	0.0001	2.789E-14	0.0000	9.662E-09	0.0145	1.999E-09	0.0030	1.129E-09	0.0017	5.054E-11	0.0001
Th-228	1.602E-19	0.0000	1.880E-22	0.0000	1.173E-21	0.0000	3.702E-23	0.0000	4.679E-24	0.0000	1.518E-21	0.0000
Th-229	7.010E-16	0.0000	8.599E-18	0.0000	3.770E-17	0.0000	7.957E-19	0.0000	1.082E-19	0.0000	7.019E-17	0.0000
Th-230	2.085E-16	0.0000	4.559E-16	0.0000	2.618E-15	0.0000	5.522E-17	0.0000	7.498E-18	0.0000	4.601E-15	0.0000
Th-232	7.674E-24	0.0000	6.074E-23	0.0000	2.566E-22	0.0000	5.413E-24	0.0000	7.354E-25	0.0000	4.614E-22	0.0000
U-233	5.408E-17	0.0000	4.032E-17	0.0000	1.160E-15	0.0000	3.935E-17	0.0000	1.829E-16	0.0000	7.920E-16	0.0000
U-234	2.560E-14	0.0000	7.236E-14	0.0000	2.083E-12	0.0000	7.048E-14	0.0000	3.287E-13	0.0000	1.428E-12	0.0000
U-235	1.772E-13	0.0000	2.087E-16	0.0000	6.931E-15	0.0000	2.345E-16	0.0000	1.094E-15	0.0000	4.805E-15	0.0000
U-236	3.163E-16	0.0000	1.647E-15	0.0000	4.866E-14	0.0000	1.646E-15	0.0000	7.678E-15	0.0000	3.327E-14	0.0000
Total	4.393E-07	0.6588	5.523E-09	0.0083	7.527E-08	0.1129	6.321E-09	0.0095	3.815E-08	0.0572	6.498E-08	0.0975

Attachment 3 Sheet No. 44 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 45
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.141E-14	0.0000	3.118E-16	0.0000	1.693E-15	0.0000	5.513E-18	0.0000	1.313E-17	0.0000	1.520E-14	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.333E-07	0.6498
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.486E-08	0.0673
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	1.872E-26	0.0000	2.757E-27	0.0000	3.002E-27	0.0000	7.898E-27	0.0000	2.280E-27	0.0000	1.644E-23	0.0000
Cs-137	7.835E-11	0.0001	6.481E-11	0.0001	1.077E-11	0.0000	4.297E-11	0.0001	3.310E-11	0.0000	8.068E-09	0.0121
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.647E-13	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.236E-16	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.891E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	1.261E-08	0.0189	6.278E-10	0.0009	2.007E-09	0.0030	1.331E-09	0.0020	1.537E-08	0.0231	7.719E-08	0.1158
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.464E-11	0.0001
Pa-231	1.971E-15	0.0000	1.300E-17	0.0000	2.866E-16	0.0000	1.943E-16	0.0000	5.836E-19	0.0000	2.976E-15	0.0000
Pb-210	5.909E-14	0.0000	1.640E-14	0.0000	1.781E-14	0.0000	1.917E-15	0.0000	2.072E-15	0.0000	1.360E-13	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.874E-09	0.0028
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.676E-08	0.1001
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.667E-08	0.0250
Ra-226	3.332E-14	0.0000	9.167E-16	0.0000	4.973E-15	0.0000	6.612E-16	0.0000	1.910E-15	0.0000	1.890E-13	0.0000
Ra-228	1.369E-19	0.0000	3.877E-21	0.0000	2.099E-20	0.0000	2.758E-21	0.0000	8.027E-21	0.0000	3.870E-19	0.0000
Sr-90	1.976E-09	0.0030	5.511E-11	0.0001	3.067E-10	0.0005	3.048E-10	0.0005	2.197E-10	0.0003	1.578E-08	0.0237
Th-228	1.358E-20	0.0000	7.896E-22	0.0000	2.165E-21	0.0000	4.597E-23	0.0000	6.685E-24	0.0000	1.797E-19	0.0000
Th-229	6.383E-16	0.0000	3.566E-17	0.0000	9.851E-17	0.0000	1.613E-18	0.0000	2.518E-19	0.0000	1.593E-15	0.0000
Th-230	5.498E-14	0.0000	2.962E-15	0.0000	8.049E-15	0.0000	1.189E-16	0.0000	1.785E-17	0.0000	7.408E-14	0.0000
Th-232	4.921E-21	0.0000	2.669E-22	0.0000	7.300E-22	0.0000	1.124E-23	0.0000	1.715E-24	0.0000	6.724E-21	0.0000
U-233	7.882E-13	0.0000	4.546E-15	0.0000	1.176E-13	0.0000	5.372E-15	0.0000	2.738E-14	0.0000	9.454E-13	0.0000
U-234	1.799E-09	0.0027	1.039E-11	0.0000	2.686E-10	0.0004	1.228E-11	0.0000	6.258E-11	0.0001	2.157E-09	0.0032
U-235	5.257E-12	0.0000	3.055E-14	0.0000	7.902E-13	0.0000	3.612E-14	0.0000	1.840E-13	0.0000	6.489E-12	0.0000
U-236	3.730E-11	0.0001	2.149E-13	0.0000	5.557E-12	0.0000	2.540E-13	0.0000	1.294E-12	0.0000	4.471E-11	0.0001
Total	1.651E-08	0.0248	7.584E-10	0.0011	2.600E-09	0.0039	1.691E-09	0.0025	1.569E-08	0.0235	6.668E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 45 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 46
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	4.112E-07	0.6168	9.816E-14	0.0000	0.000E+00	0.0000	8.486E-09	0.0127	6.743E-10	0.0010	1.276E-08	0.0191	1.005E-10	0.0002
Am-241	2.068E-08	0.0310	1.302E-09	0.0020	0.000E+00	0.0000	8.555E-09	0.0128	9.054E-11	0.0001	9.778E-12	0.0000	1.432E-08	0.0215
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	1.606E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.032E-25	0.0000	1.120E-25	0.0000	2.567E-26	0.0000	4.757E-27	0.0000
Cs-137	6.942E-09	0.0104	2.088E-15	0.0000	0.000E+00	0.0000	3.606E-10	0.0005	3.234E-10	0.0005	2.009E-10	0.0003	1.082E-11	0.0000
Eu-152	4.643E-13	0.0000	5.095E-19	0.0000	0.000E+00	0.0000	1.674E-16	0.0000	3.331E-17	0.0000	2.201E-18	0.0000	1.291E-16	0.0000
Eu-154	1.235E-16	0.0000	1.558E-22	0.0000	0.000E+00	0.0000	6.936E-20	0.0000	1.380E-20	0.0000	9.120E-22	0.0000	5.498E-20	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	1.583E-12	0.0000	0.000E+00	0.0000	1.792E-08	0.0269	2.595E-09	0.0039	2.403E-08	0.0360	6.991E-10	0.0010
Pu-238	3.510E-12	0.0000	9.553E-11	0.0001	0.000E+00	0.0000	6.623E-10	0.0010	1.399E-11	0.0000	7.093E-13	0.0000	1.102E-09	0.0017
Pu-239	3.139E-10	0.0005	3.299E-09	0.0049	0.000E+00	0.0000	2.370E-08	0.0355	4.996E-10	0.0007	1.356E-11	0.0000	3.893E-08	0.0584
Pu-240	2.820E-11	0.0000	8.245E-10	0.0012	0.000E+00	0.0000	5.924E-09	0.0089	1.249E-10	0.0002	3.397E-12	0.0000	9.766E-09	0.0146
Sr-90	7.513E-11	0.0001	2.789E-14	0.0000	0.000E+00	0.0000	9.662E-09	0.0145	1.999E-09	0.0030	1.129E-09	0.0017	5.054E-11	0.0001
Total	4.393E-07	0.6588	5.523E-09	0.0083	0.000E+00	0.0000	7.527E-08	0.1129	6.321E-09	0.0095	3.815E-08	0.0572	6.498E-08	0.0975

Attachment 3 Sheet No. 46 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 47
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.333E-07	0.6498
Am-241	7.888E-13	0.0000	4.582E-15	0.0000	0.000E+00	0.0000	1.177E-13	0.0000	5.373E-15	0.0000	2.738E-14	0.0000	4.496E-08	0.0674
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	1.872E-26	0.0000	2.757E-27	0.0000	0.000E+00	0.0000	3.002E-27	0.0000	7.898E-27	0.0000	2.280E-27	0.0000	1.644E-23	0.0000
Cs-137	7.835E-11	0.0001	6.481E-11	0.0001	0.000E+00	0.0000	1.077E-11	0.0000	4.297E-11	0.0001	3.310E-11	0.0000	8.068E-09	0.0121
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.647E-13	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.236E-16	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	1.261E-08	0.0189	6.278E-10	0.0009	0.000E+00	0.0000	2.007E-09	0.0030	1.331E-09	0.0020	1.537E-08	0.0231	7.719E-08	0.1158
Pu-238	1.799E-09	0.0027	1.041E-11	0.0000	0.000E+00	0.0000	2.687E-10	0.0004	1.229E-11	0.0000	6.258E-11	0.0001	4.031E-09	0.0060
Pu-239	5.271E-12	0.0000	3.088E-14	0.0000	0.000E+00	0.0000	7.922E-13	0.0000	3.632E-14	0.0000	1.841E-13	0.0000	6.676E-08	0.1001
Pu-240	3.730E-11	0.0001	2.149E-13	0.0000	0.000E+00	0.0000	5.557E-12	0.0000	2.540E-13	0.0000	1.294E-12	0.0000	1.672E-08	0.0251
Sr-90	1.976E-09	0.0030	5.511E-11	0.0001	0.000E+00	0.0000	3.067E-10	0.0005	3.048E-10	0.0005	2.197E-10	0.0003	1.578E-08	0.0237
Total	1.651E-08	0.0248	7.584E-10	0.0011	0.000E+00	0.0000	2.600E-09	0.0039	1.691E-09	0.0025	1.569E-08	0.0235	6.668E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 47 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 48
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	1.472E-11	5.076E-08	1.820E-10	2.667E-10	2.096E-08	6.077E-06	1.236E-07	6.713E-07	2.136E-09	5.207E-09	6.951E-06
Ag-108m	2.784E-06	5.739E-01	4.560E-02	8.631E-01	3.965E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.487E+00
Am-241	5.047E-04	6.939E-01	7.314E-03	7.941E-04	7.186E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.421E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cs-137	7.078E-13	3.890E-08	3.488E-08	2.166E-08	1.008E-09	3.490E-08	2.347E-08	3.902E-09	1.558E-08	1.199E-08	1.863E-07
Eu-152	5.619E-26	1.931E-22	3.842E-23	2.539E-24	8.001E-23	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.140E-22
Eu-154	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Gd-152	7.575E-17	2.603E-13	5.180E-14	1.369E-15	1.079E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.213E-13
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	5.678E-05	3.901E+00	5.649E-01	5.230E+00	8.085E-02	1.326E+01	4.650E-01	1.487E+00	9.863E-01	1.139E+01	3.736E+01
Np-237	4.064E-07	1.117E-02	3.856E-04	4.607E-06	5.787E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.214E-02
Pa-231	1.549E-11	2.129E-07	4.663E-08	1.153E-10	2.206E-08	2.587E-06	1.305E-08	2.870E-07	1.930E-07	5.624E-10	3.362E-06
Pb-210	2.494E-10	3.440E-06	1.215E-07	1.121E-07	3.552E-07	2.057E-05	2.101E-06	2.281E-06	2.455E-07	2.654E-07	2.950E-05
Pu-238	4.134E-07	5.685E-04	1.198E-05	3.252E-07	5.887E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.169E-03
Pu-239	3.173E-03	4.363E+00	9.198E-02	2.496E-03	4.518E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.976E+00
Pu-240	7.522E-04	1.034E+00	2.180E-02	5.918E-04	1.071E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.128E+00
Ra-226	2.620E-10	1.440E-05	4.302E-07	1.002E-06	3.730E-07	3.090E-05	6.368E-07	3.455E-06	4.598E-07	1.327E-06	5.298E-05
Ra-228	2.783E-16	1.523E-11	4.485E-13	1.052E-12	3.962E-13	3.069E-11	6.322E-13	3.423E-12	4.499E-13	1.309E-12	5.363E-11
Sr-90	5.669E-13	2.337E-07	4.836E-08	2.732E-08	8.073E-10	2.104E-07	4.557E-09	2.536E-08	2.522E-08	1.817E-08	5.938E-07
Th-228	2.772E-16	5.817E-13	1.832E-14	2.315E-15	3.947E-13	1.072E-11	4.425E-13	1.213E-12	2.563E-14	3.728E-15	1.341E-11
Th-229	2.086E-11	2.868E-08	6.049E-10	8.212E-11	2.970E-08	7.892E-07	3.252E-08	8.782E-08	1.243E-09	1.835E-10	9.701E-07
Th-230	1.177E-09	1.619E-06	3.413E-08	4.631E-09	1.676E-06	4.941E-05	2.036E-06	5.465E-06	7.408E-08	1.073E-08	6.033E-05
Th-232	2.816E-16	3.872E-13	8.165E-15	1.108E-15	4.010E-13	1.094E-11	4.508E-13	1.214E-12	1.687E-14	2.471E-15	1.342E-11
U-233	4.910E-10	1.689E-06	5.721E-08	2.664E-07	6.991E-07	1.685E-03	7.201E-06	1.862E-04	8.514E-06	4.338E-05	1.933E-03
U-234	3.921E-08	1.347E-04	4.559E-06	2.126E-05	5.583E-05	1.598E-01	6.832E-04	1.767E-02	8.083E-04	4.117E-03	1.833E-01
U-235	1.076E-09	3.696E-06	1.251E-07	5.832E-07	1.532E-06	3.840E-03	1.641E-05	4.245E-04	1.941E-05	9.888E-05	4.405E-03
U-236	7.844E-09	2.695E-05	9.119E-07	4.253E-06	1.117E-05	2.808E-02	1.200E-04	3.105E-03	1.420E-04	7.232E-04	3.222E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 3 Sheet No. 48 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 49
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years
0 Water Independent Pathways (Inhalation excludes radon)
0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ac-227	1.040E-14	0.0000	9.403E-17	0.0000	1.015E-15	0.0000	3.638E-18	0.0000	5.332E-18	0.0000	7.453E-16	0.0000
Ag-108m	8.611E-09	0.0827	2.055E-15	0.0000	1.777E-10	0.0017	1.412E-11	0.0001	2.673E-10	0.0026	2.105E-12	0.0000
Am-241	6.568E-09	0.0631	4.152E-10	0.0040	2.722E-09	0.0261	2.870E-11	0.0003	3.115E-12	0.0000	4.565E-09	0.0438
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	6.051E-16	0.0000	1.820E-22	0.0000	3.143E-17	0.0000	2.819E-17	0.0000	1.751E-17	0.0000	9.429E-19	0.0000
Eu-152	5.251E-29	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Gd-152	0.000E+00	0.0000	2.068E-23	0.0000	3.006E-22	0.0000	5.982E-23	0.0000	1.581E-24	0.0000	2.035E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	8.812E-15	0.0000	9.978E-11	0.0010	1.445E-11	0.0001	1.338E-10	0.0013	3.893E-12	0.0000
Np-237	1.537E-10	0.0015	2.172E-13	0.0000	3.067E-11	0.0003	1.059E-12	0.0000	1.265E-14	0.0000	2.826E-12	0.0000
Pa-231	1.035E-15	0.0000	2.157E-17	0.0000	1.472E-15	0.0000	3.225E-16	0.0000	7.973E-19	0.0000	2.525E-16	0.0000
Pb-210	5.118E-16	0.0000	1.063E-16	0.0000	3.633E-13	0.0000	1.283E-14	0.0000	1.184E-14	0.0000	2.900E-14	0.0000
Pu-238	1.307E-14	0.0000	3.709E-13	0.0000	2.565E-12	0.0000	5.407E-14	0.0000	1.468E-15	0.0000	4.275E-12	0.0000
Pu-239	3.012E-10	0.0029	3.167E-09	0.0304	2.275E-08	0.2184	4.797E-10	0.0046	1.302E-11	0.0001	3.738E-08	0.3588
Pu-240	2.565E-11	0.0002	7.499E-10	0.0072	5.388E-09	0.0517	1.136E-10	0.0011	3.083E-12	0.0000	8.883E-09	0.0853
Ra-226	1.064E-12	0.0000	9.284E-17	0.0000	2.271E-13	0.0000	6.786E-15	0.0000	1.581E-14	0.0000	8.348E-15	0.0000
Ra-228	6.033E-19	0.0000	4.454E-23	0.0000	6.678E-19	0.0000	1.968E-20	0.0000	4.613E-20	0.0000	2.772E-20	0.0000
Sr-90	3.702E-18	0.0000	1.374E-21	0.0000	4.760E-16	0.0000	9.851E-17	0.0000	5.564E-17	0.0000	2.490E-18	0.0000
Th-228	1.031E-18	0.0000	1.211E-21	0.0000	7.523E-21	0.0000	2.368E-22	0.0000	2.994E-23	0.0000	9.773E-21	0.0000
Th-229	1.182E-14	0.0000	1.450E-16	0.0000	6.357E-16	0.0000	1.341E-17	0.0000	1.820E-18	0.0000	1.184E-15	0.0000
Th-230	4.622E-16	0.0000	1.010E-15	0.0000	5.801E-15	0.0000	1.223E-16	0.0000	1.660E-17	0.0000	1.020E-14	0.0000
Th-232	4.715E-23	0.0000	3.732E-22	0.0000	1.576E-21	0.0000	3.324E-23	0.0000	4.511E-24	0.0000	2.835E-21	0.0000
U-233	2.320E-16	0.0000	1.730E-16	0.0000	4.971E-15	0.0000	1.684E-16	0.0000	7.841E-16	0.0000	3.398E-15	0.0000
U-234	4.554E-15	0.0000	1.287E-14	0.0000	3.705E-13	0.0000	1.254E-14	0.0000	5.846E-14	0.0000	2.540E-13	0.0000
U-235	2.774E-13	0.0000	3.266E-16	0.0000	1.085E-14	0.0000	3.670E-16	0.0000	1.712E-15	0.0000	7.521E-15	0.0000
U-236	4.750E-16	0.0000	2.473E-15	0.0000	7.308E-14	0.0000	2.473E-15	0.0000	1.153E-14	0.0000	4.998E-14	0.0000
Total	1.566E-08	0.1503	4.333E-09	0.0416	3.118E-08	0.2993	6.517E-10	0.0063	4.204E-10	0.0040	5.084E-08	0.4880

Attachment 3 Sheet No. 49 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 50
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	9.060E-14	0.0000	2.475E-15	0.0000	1.344E-14	0.0000	4.274E-17	0.0000	1.042E-16	0.0000	1.189E-13	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.072E-09	0.0871
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.430E-08	0.1373
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	2.325E-17	0.0000	1.924E-17	0.0000	3.198E-18	0.0000	1.277E-17	0.0000	9.828E-18	0.0000	7.514E-16	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.251E-29	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.861E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.427E-10	0.0023	1.208E-11	0.0001	3.863E-11	0.0004	2.563E-11	0.0002	2.959E-10	0.0028	8.669E-10	0.0083
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.885E-10	0.0018
Pa-231	1.369E-14	0.0000	9.020E-17	0.0000	1.984E-15	0.0000	1.334E-15	0.0000	3.888E-18	0.0000	2.021E-14	0.0000
Pb-210	8.008E-13	0.0000	2.222E-13	0.0000	2.413E-13	0.0000	2.596E-14	0.0000	2.807E-14	0.0000	1.736E-12	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.279E-12	0.0001
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.409E-08	0.6153
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.516E-08	0.1456
Ra-226	3.656E-13	0.0000	1.006E-14	0.0000	5.458E-14	0.0000	7.262E-15	0.0000	2.096E-14	0.0000	1.781E-12	0.0000
Ra-228	9.800E-19	0.0000	2.776E-20	0.0000	1.503E-19	0.0000	1.975E-20	0.0000	5.748E-20	0.0000	2.600E-18	0.0000
Sr-90	3.327E-16	0.0000	9.281E-18	0.0000	5.165E-17	0.0000	5.136E-17	0.0000	3.701E-17	0.0000	1.118E-15	0.0000
Th-228	9.851E-20	0.0000	5.728E-21	0.0000	1.570E-20	0.0000	3.318E-22	0.0000	4.825E-23	0.0000	1.170E-18	0.0000
Th-229	1.288E-14	0.0000	7.203E-16	0.0000	1.945E-15	0.0000	2.751E-17	0.0000	4.059E-18	0.0000	2.938E-14	0.0000
Th-230	1.354E-13	0.0000	7.297E-15	0.0000	1.959E-14	0.0000	2.654E-16	0.0000	3.844E-17	0.0000	1.802E-13	0.0000
Th-232	3.380E-20	0.0000	1.834E-21	0.0000	4.939E-21	0.0000	6.860E-23	0.0000	1.004E-23	0.0000	4.552E-20	0.0000
U-233	3.672E-12	0.0000	2.118E-14	0.0000	5.479E-13	0.0000	2.505E-14	0.0000	1.276E-13	0.0000	4.404E-12	0.0000
U-234	3.252E-10	0.0031	1.878E-12	0.0000	4.857E-11	0.0005	2.221E-12	0.0000	1.131E-11	0.0001	3.899E-10	0.0037
U-235	8.279E-12	0.0001	4.811E-14	0.0000	1.244E-12	0.0000	5.690E-14	0.0000	2.899E-13	0.0000	1.022E-11	0.0001
U-236	5.644E-11	0.0005	3.252E-13	0.0000	8.410E-12	0.0001	3.845E-13	0.0000	1.959E-12	0.0000	6.766E-11	0.0006
Total	6.377E-10	0.0061	1.460E-11	0.0001	9.773E-11	0.0009	2.835E-11	0.0003	3.097E-10	0.0030	1.042E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 3 Sheet No. 50 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 51
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	8.611E-09	0.0827	2.055E-15	0.0000	0.000E+00	0.0000	1.777E-10	0.0017	1.412E-11	0.0001	2.673E-10	0.0026	2.105E-12	0.0000
Am-241	6.722E-09	0.0645	4.154E-10	0.0040	0.000E+00	0.0000	2.753E-09	0.0264	2.975E-11	0.0003	3.129E-12	0.0000	4.568E-09	0.0439
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	6.051E-16	0.0000	1.820E-22	0.0000	0.000E+00	0.0000	3.143E-17	0.0000	2.819E-17	0.0000	1.751E-17	0.0000	9.429E-19	0.0000
Eu-152	5.251E-29	0.0000	2.068E-23	0.0000	0.000E+00	0.0000	3.006E-22	0.0000	5.982E-23	0.0000	1.581E-24	0.0000	2.035E-22	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	8.812E-15	0.0000	0.000E+00	0.0000	9.978E-11	0.0010	1.445E-11	0.0001	1.338E-10	0.0013	3.893E-12	0.0000
Pu-238	1.083E-12	0.0000	3.850E-13	0.0000	0.000E+00	0.0000	3.532E-12	0.0000	8.635E-14	0.0000	8.760E-14	0.0000	4.577E-12	0.0000
Pu-239	3.015E-10	0.0029	3.167E-09	0.0304	0.000E+00	0.0000	2.275E-08	0.2184	4.797E-10	0.0046	1.302E-11	0.0001	3.738E-08	0.3588
Pu-240	2.565E-11	0.0002	7.499E-10	0.0072	0.000E+00	0.0000	5.388E-09	0.0517	1.136E-10	0.0011	3.094E-12	0.0000	8.883E-09	0.0853
Sr-90	3.702E-18	0.0000	1.374E-21	0.0000	0.000E+00	0.0000	4.760E-16	0.0000	9.851E-17	0.0000	5.564E-17	0.0000	2.490E-18	0.0000
Total	1.566E-08	0.1503	4.333E-09	0.0416	0.000E+00	0.0000	3.118E-08	0.2993	6.517E-10	0.0063	4.204E-10	0.0040	5.084E-08	0.4880

Attachment 3 Sheet No. 51 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 3

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 52
Intrisk : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-														
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.072E-09	0.0871
Am-241	3.685E-12	0.0000	2.190E-14	0.0000	0.000E+00	0.0000	5.499E-13	0.0000	2.508E-14	0.0000	1.276E-13	0.0000	1.450E-08	0.1392
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	2.325E-17	0.0000	1.924E-17	0.0000	0.000E+00	0.0000	3.198E-18	0.0000	1.277E-17	0.0000	9.828E-18	0.0000	7.514E-16	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.861E-22	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.427E-10	0.0023	1.208E-11	0.0001	0.000E+00	0.0000	3.863E-11	0.0004	2.563E-11	0.0002	2.959E-10	0.0028	8.669E-10	0.0083
Pu-238	3.265E-10	0.0031	2.117E-12	0.0000	0.000E+00	0.0000	4.888E-11	0.0005	2.255E-12	0.0000	1.136E-11	0.0001	4.009E-10	0.0038
Pu-239	8.383E-12	0.0001	5.068E-14	0.0000	0.000E+00	0.0000	1.260E-12	0.0000	5.827E-14	0.0000	2.900E-13	0.0000	6.410E-08	0.6154
Pu-240	5.644E-11	0.0005	3.252E-13	0.0000	0.000E+00	0.0000	8.410E-12	0.0001	3.845E-13	0.0000	1.959E-12	0.0000	1.523E-08	0.1462
Sr-90	3.327E-16	0.0000	9.281E-18	0.0000	0.000E+00	0.0000	5.165E-17	0.0000	5.136E-17	0.0000	3.701E-17	0.0000	1.118E-15	0.0000
Total	6.377E-10	0.0061	1.460E-11	0.0001	0.000E+00	0.0000	9.773E-11	0.0009	2.835E-11	0.0003	3.097E-10	0.0030	1.042E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 3 Sheet No. 52 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

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1RESRAD, Version 6.3      T« Limit = 180 days        07/11/2007  14:08  Page   1
 Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
 File    : 118-F-1_Excavation_SZ.RAD

                     Table of Contents
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           Part IV: Concentration of Radionuclides
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ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 2
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 0.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	1.700E-02	1.700E-02	2.171E-07	0.000E+00	0.000E+00
Am-241	6.300E-02	6.300E-02	8.044E-07	0.000E+00	0.000E+00
C-14	8.300E-01	8.300E-01	1.060E-05	0.000E+00	0.000E+00
Co-60	3.800E-02	3.800E-02	4.852E-07	0.000E+00	0.000E+00
Cs-137	2.100E-01	2.100E-01	2.681E-06	0.000E+00	0.000E+00
Eu-152	5.400E-02	5.400E-02	6.895E-07	0.000E+00	0.000E+00
Eu-154	5.300E-02	5.300E-02	6.767E-07	0.000E+00	0.000E+00
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	1.400E+00	1.400E+00	1.788E-05	0.000E+00	0.000E+00
Ni-63	2.300E+00	2.300E+00	2.937E-05	0.000E+00	0.000E+00
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	2.800E-02	2.800E-02	3.575E-07	0.000E+00	0.000E+00
Pu-239	8.200E-02	8.200E-02	1.047E-06	0.000E+00	0.000E+00
Pu-240	2.100E-02	2.100E-02	2.681E-07	0.000E+00	0.000E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Sr-90	3.800E-01	3.800E-01	4.852E-06	0.000E+00	0.000E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.156E+01 pCi/ml
Concentration of gaseous H-3 in air = 2.348E+00 pCi/m**3
Concentration of gaseous C-14 in air = 4.421E+00 pCi/m**3

Attachment 4 Sheet No. 2 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 3
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 0.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	0.000E+00	2.550E+00	2.550E+00	2.550E+00	2.550E+00	5.457E-01	3.719E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	6.304E-02	6.321E-02	6.323E-02	6.323E-02	1.790E-03	6.996E-05	0.000E+00	0.000E+00
C-14	0.000E+00	9.850E+03	2.216E+03	8.324E+03	3.743E+03	5.910E+03	1.724E+03	0.000E+00	0.000E+00
Co-60	0.000E+00	3.040E+00	3.040E+00	3.040E+00	3.040E+00	4.515E+00	3.724E-01	0.000E+00	0.000E+00
Cs-137	0.000E+00	8.400E+00	8.401E+00	8.401E+00	8.401E+00	2.029E+01	4.536E+00	0.000E+00	0.000E+00
Eu-152	0.000E+00	1.350E-01	1.352E-01	1.352E-01	1.352E-01	7.239E-02	1.722E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.325E-01	1.327E-01	1.327E-01	1.327E-01	7.105E-02	1.690E-03	0.000E+00	0.000E+00
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	0.000E+00	9.241E+03	9.241E+03	9.241E+03	9.241E+03	3.613E+03	2.195E+03	0.000E+00	0.000E+00
Ni-63	0.000E+00	1.150E+02	1.150E+02	1.150E+02	1.150E+02	4.485E+01	1.495E+02	0.000E+00	0.000E+00
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	0.000E+00	2.802E-02	2.809E-02	2.810E-02	2.810E-02	1.591E-03	1.555E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.206E-02	8.227E-02	8.230E-02	8.230E-02	4.660E-03	4.553E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.101E-02	2.107E-02	2.108E-02	2.108E-02	1.193E-03	1.166E-05	0.000E+00	0.000E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Sr-90	0.000E+00	1.140E+02	1.140E+02	1.140E+02	1.140E+02	6.354E+01	1.292E+01	0.000E+00	0.000E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 4
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	8.987E-18	8.987E-18	1.148E-22	4.951E-16	1.231E-17
Ag-108m	1.691E-02	1.691E-02	2.159E-07	0.000E+00	0.000E+00
Am-241	6.290E-02	6.290E-02	8.031E-07	0.000E+00	0.000E+00
C-14	3.801E-01	3.801E-01	4.854E-06	0.000E+00	0.000E+00
Co-60	3.331E-02	3.331E-02	4.254E-07	8.577E-05	2.132E-06
Cs-137	2.052E-01	2.052E-01	2.620E-06	5.283E-04	1.313E-05
Eu-152	5.126E-02	5.126E-02	6.546E-07	0.000E+00	0.000E+00
Eu-154	4.898E-02	4.898E-02	6.255E-07	0.000E+00	0.000E+00
Gd-152	9.429E-17	9.429E-17	1.204E-21	0.000E+00	0.000E+00
H-3	7.712E-01	7.712E-01	9.847E-06	5.865E+02	1.458E+01
Ni-63	2.283E+00	2.283E+00	2.915E-05	2.714E-02	6.748E-04
Np-237	2.039E-08	2.039E-08	2.603E-13	0.000E+00	0.000E+00
Pa-231	8.535E-16	8.535E-16	1.090E-20	2.440E-16	6.066E-18
Pb-210	3.975E-19	3.975E-19	5.076E-24	1.398E-16	3.477E-18
Pu-238	2.778E-02	2.778E-02	3.547E-07	0.000E+00	0.000E+00
Pu-239	8.200E-02	8.200E-02	1.047E-06	0.000E+00	0.000E+00
Pu-240	2.100E-02	2.100E-02	2.681E-07	0.000E+00	0.000E+00
Ra-226	5.145E-17	5.145E-17	6.569E-22	2.010E-16	4.997E-18
Ra-228	5.976E-22	5.976E-22	7.630E-27	1.025E-24	2.548E-26
Sr-90	3.710E-01	3.710E-01	4.737E-06	6.971E-03	1.733E-04
Th-228	5.073E-23	5.073E-23	6.477E-28	1.202E-26	2.987E-28
Th-229	1.403E-18	1.403E-18	1.791E-23	4.178E-17	1.039E-18
Th-230	3.560E-13	3.560E-13	4.546E-18	4.616E-15	1.148E-16
Th-232	1.532E-20	1.532E-20	1.956E-25	0.000E+00	0.000E+00
U-233	4.455E-14	4.455E-14	5.689E-19	4.945E-14	1.229E-15
U-234	7.896E-08	7.896E-08	1.008E-12	1.380E-07	3.431E-09
U-235	8.064E-11	8.064E-11	1.030E-15	1.408E-10	3.500E-12
U-236	6.208E-10	6.208E-10	7.926E-15	1.083E-09	2.694E-11

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 6.369E+00 pCi/ml
Concentration of gaseous H-3 in air = 1.293E+00 pCi/m**3
Concentration of gaseous C-14 in air = 2.025E+00 pCi/m**3

Attachment 4 Sheet No. 4 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 5
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	4.819E-16	4.369E-16	2.972E-15	2.747E-15	1.554E-15	1.292E-17	3.298E-18	1.506E-16	1.004E-14
Ag-108m	0.000E+00	2.536E+00	2.536E+00	2.537E+00	2.536E+00	5.427E-01	3.698E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	6.294E-02	6.311E-02	6.313E-02	6.313E-02	1.787E-03	6.984E-05	0.000E+00	0.000E+00
C-14	0.000E+00	4.649E+03	1.017E+03	4.380E+03	1.891E+03	3.110E+03	8.707E+02	0.000E+00	0.000E+00
Co-60	8.514E-05	2.665E+00	2.666E+00	2.685E+00	2.667E+00	3.958E+00	3.266E-01	6.068E-04	4.045E-04
Cs-137	5.244E-04	8.208E+00	8.211E+00	8.220E+00	8.211E+00	1.983E+01	4.434E+00	2.492E-02	1.246E-03
Eu-152	0.000E+00	1.282E-01	1.283E-01	1.287E-01	1.284E-01	6.872E-02	1.635E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.225E-01	1.226E-01	1.232E-01	1.227E-01	6.566E-02	1.562E-03	0.000E+00	0.000E+00
Gd-152	0.000E+00	2.358E-16	2.360E-16	2.235E-16	2.354E-16	1.264E-16	1.207E-18	0.000E+00	0.000E+00
H-3	5.852E+02	7.341E+03	8.334E+03	6.519E+03	6.389E+03	2.701E+03	1.920E+03	1.437E+01	1.437E+01
Ni-63	2.702E-02	1.142E+02	1.143E+02	1.143E+02	1.143E+02	4.457E+01	1.487E+02	6.541E-02	6.541E-02
Np-237	0.000E+00	3.930E-07	4.068E-07	3.378E-07	3.590E-07	3.264E-08	1.496E-10	0.000E+00	0.000E+00
Pa-231	2.464E-16	8.418E-15	1.007E-14	9.192E-15	9.754E-15	5.108E-15	8.923E-18	6.455E-17	6.419E-16
Pb-210	1.339E-16	8.896E-17	8.095E-16	6.841E-16	7.279E-16	3.958E-17	1.822E-17	7.403E-16	2.473E-16
Pu-238	0.000E+00	2.780E-02	2.787E-02	2.789E-02	2.788E-02	1.579E-03	1.542E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.205E-02	8.227E-02	8.230E-02	8.230E-02	4.659E-03	4.552E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.101E-02	2.107E-02	2.107E-02	2.107E-02	1.193E-03	1.166E-05	0.000E+00	0.000E+00
Ra-226	1.925E-16	1.961E-15	3.204E-15	2.151E-15	2.447E-15	1.724E-16	1.896E-16	1.782E-16	8.909E-16
Ra-228	1.042E-24	2.128E-20	2.372E-20	1.359E-20	1.628E-20	1.161E-21	1.191E-21	1.492E-24	7.744E-24
Sr-90	6.944E-03	1.113E+02	1.113E+02	1.115E+02	1.113E+02	6.205E+01	1.262E+01	1.011E-02	1.685E-02
Th-228	1.264E-26	3.367E-22	7.393E-23	6.089E-22	7.316E-22	2.885E-23	1.508E-24	3.224E-26	1.618E-25
Th-229	4.188E-17	5.784E-17	2.656E-16	2.216E-16	2.489E-16	1.888E-18	1.144E-19	1.053E-16	5.267E-16
Th-230	7.960E-15	4.624E-13	4.310E-13	1.160E-12	1.304E-12	4.033E-14	2.887E-15	1.651E-14	8.823E-14
Th-232	0.000E+00	1.703E-20	1.550E-20	4.851E-20	5.444E-20	1.166E-21	7.514E-23	0.000E+00	0.000E+00
U-233	4.897E-14	2.248E-13	4.210E-13	4.347E-13	4.997E-13	2.531E-14	3.444E-14	1.147E-14	6.885E-14
U-234	1.372E-07	3.592E-07	1.056E-06	8.038E-07	8.994E-07	3.360E-08	6.641E-08	3.299E-08	1.979E-07
U-235	1.400E-10	3.666E-10	1.077E-09	8.197E-10	9.174E-10	3.428E-11	6.776E-11	3.364E-11	2.019E-10
U-236	1.077E-09	2.822E-09	8.294E-09	6.310E-09	7.062E-09	2.639E-10	5.216E-10	2.590E-10	1.554E-09

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 5 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 6
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 3.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	2.385E-16	2.385E-16	3.045E-21	1.343E-15	3.340E-17
Ag-108m	1.672E-02	1.672E-02	2.135E-07	0.000E+00	0.000E+00
Am-241	6.269E-02	6.269E-02	8.005E-07	0.000E+00	0.000E+00
C-14	7.968E-02	7.968E-02	1.017E-06	0.000E+00	0.000E+00
Co-60	2.560E-02	2.560E-02	3.269E-07	1.978E-04	4.917E-06
Cs-137	1.959E-01	1.959E-01	2.501E-06	1.513E-03	3.762E-05
Eu-152	4.620E-02	4.620E-02	5.899E-07	0.000E+00	0.000E+00
Eu-154	4.184E-02	4.184E-02	5.343E-07	0.000E+00	0.000E+00
Gd-152	2.688E-16	2.688E-16	3.432E-21	0.000E+00	0.000E+00
H-3	2.339E-01	2.339E-01	2.987E-06	1.008E+03	2.506E+01
Ni-63	2.249E+00	2.249E+00	2.872E-05	8.025E-02	1.995E-03
Np-237	6.107E-08	6.107E-08	7.797E-13	0.000E+00	0.000E+00
Pa-231	7.666E-15	7.666E-15	9.789E-20	1.723E-15	4.284E-17
Pb-210	3.166E-17	3.166E-17	4.043E-22	6.046E-16	1.503E-17
Pu-238	2.734E-02	2.734E-02	3.491E-07	0.000E+00	0.000E+00
Pu-239	8.199E-02	8.199E-02	1.047E-06	0.000E+00	0.000E+00
Pu-240	2.099E-02	2.099E-02	2.680E-07	0.000E+00	0.000E+00
Ra-226	1.381E-15	1.381E-15	1.764E-20	9.209E-16	2.290E-17
Ra-228	1.520E-20	1.520E-20	1.941E-25	2.067E-19	5.139E-21
Sr-90	3.536E-01	3.536E-01	4.515E-06	1.994E-02	4.957E-04
Th-228	3.426E-21	3.426E-21	4.374E-26	7.228E-20	1.797E-21
Th-229	3.779E-17	3.779E-17	4.826E-22	1.278E-16	3.177E-18
Th-230	3.181E-12	3.181E-12	4.062E-17	1.232E-13	3.062E-15
Th-232	1.376E-19	1.376E-19	1.757E-24	7.608E-20	1.892E-21
U-233	3.998E-13	3.998E-13	5.105E-18	1.358E-12	3.377E-14
U-234	2.343E-07	2.343E-07	2.992E-12	1.233E-06	3.066E-08
U-235	2.413E-10	2.413E-10	3.080E-15	1.264E-09	3.143E-11
U-236	1.857E-09	1.857E-09	2.371E-14	9.731E-09	2.419E-10

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.932E+00 pCi/ml
Concentration of gaseous H-3 in air = 3.923E-01 pCi/m**3
Concentration of gaseous C-14 in air = 4.245E-01 pCi/m**3

Attachment 4 Sheet No. 6 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 7
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 3.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.353E-15	2.570E-15	9.178E-15	1.036E-14	8.899E-15	1.104E-16	1.653E-17	5.251E-16	3.499E-14
Ag-108m	0.000E+00	2.508E+00	2.508E+00	2.509E+00	2.508E+00	5.368E-01	3.658E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	6.274E-02	6.290E-02	6.293E-02	6.292E-02	1.781E-03	6.961E-05	0.000E+00	0.000E+00
C-14	0.000E+00	9.745E+02	2.132E+02	9.183E+02	3.965E+02	6.520E+02	1.825E+02	0.000E+00	0.000E+00
Co-60	1.973E-04	2.049E+00	2.050E+00	2.064E+00	2.050E+00	3.044E+00	2.511E-01	1.450E-03	9.666E-04
Cs-137	1.509E-03	7.837E+00	7.845E+00	7.854E+00	7.845E+00	1.894E+01	4.237E+00	7.395E-02	3.697E-03
Eu-152	0.000E+00	1.155E-01	1.156E-01	1.160E-01	1.157E-01	6.193E-02	1.473E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.046E-01	1.047E-01	1.052E-01	1.048E-01	5.609E-02	1.334E-03	0.000E+00	0.000E+00
Gd-152	0.000E+00	6.721E-16	6.728E-16	6.615E-16	6.723E-16	3.603E-16	3.432E-18	0.000E+00	0.000E+00
H-3	1.008E+03	5.360E+03	7.126E+03	3.459E+03	3.416E+03	1.635E+03	1.505E+03	2.499E+01	2.499E+01
Ni-63	8.013E-02	1.126E+02	1.130E+02	1.130E+02	1.130E+02	4.406E+01	1.470E+02	1.975E-01	1.975E-01
Np-237	0.000E+00	1.207E-06	1.220E-06	1.152E-06	1.173E-06	1.083E-07	4.751E-10	0.000E+00	0.000E+00
Pa-231	1.797E-15	7.888E-14	8.837E-14	1.004E-13	1.035E-13	5.334E-14	7.658E-17	5.552E-16	5.479E-15
Pb-210	6.025E-16	1.118E-15	4.101E-15	4.709E-15	4.198E-15	2.971E-16	1.031E-16	4.396E-15	1.468E-15
Pu-238	0.000E+00	2.736E-02	2.743E-02	2.745E-02	2.744E-02	1.554E-03	1.518E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.204E-02	8.226E-02	8.229E-02	8.229E-02	4.659E-03	4.552E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.101E-02	2.106E-02	2.107E-02	2.107E-02	1.193E-03	1.165E-05	0.000E+00	0.000E+00
Ra-226	9.180E-16	5.440E-14	6.089E-14	5.282E-14	5.478E-14	4.296E-15	3.848E-15	1.121E-15	5.605E-15
Ra-228	2.041E-19	8.131E-19	1.879E-18	1.743E-18	1.725E-18	1.332E-19	1.347E-19	2.354E-19	1.177E-18
Sr-90	1.991E-02	1.061E+02	1.062E+02	1.063E+02	1.062E+02	5.920E+01	1.204E+01	2.946E-02	4.911E-02
Th-228	7.153E-20	9.294E-20	4.493E-19	4.968E-19	4.811E-19	6.377E-21	3.307E-22	1.652E-19	8.260E-19
Th-229	1.261E-16	1.913E-16	8.214E-16	6.886E-16	1.538E-15	8.695E-18	7.646E-19	2.866E-16	1.434E-15
Th-230	1.532E-13	4.040E-12	4.352E-12	1.263E-11	1.311E-11	3.610E-13	2.309E-14	3.529E-13	1.817E-12
Th-232	7.648E-20	2.520E-19	6.221E-19	9.722E-19	9.765E-19	1.879E-20	1.167E-21	1.759E-19	8.819E-19
U-233	1.355E-12	2.893E-12	9.517E-12	9.262E-12	9.816E-12	3.275E-13	5.734E-13	3.318E-13	1.991E-12
U-234	1.231E-06	2.156E-06	8.317E-06	8.048E-06	8.344E-06	2.456E-07	4.635E-07	3.026E-07	1.816E-06
U-235	1.262E-09	2.212E-09	8.529E-09	8.250E-09	8.554E-09	2.519E-10	4.755E-10	3.102E-10	1.861E-09
U-236	9.713E-09	1.703E-08	6.565E-08	6.350E-08	6.584E-08	1.939E-09	3.660E-09	2.388E-09	1.433E-08

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 7 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 8
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 7.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	2.927E-15	2.927E-15	3.737E-20	6.373E-15	1.585E-16
Ag-108m	1.636E-02	1.636E-02	2.088E-07	0.000E+00	0.000E+00
Am-241	6.228E-02	6.228E-02	7.953E-07	0.000E+00	0.000E+00
C-14	3.494E-03	3.494E-03	4.461E-08	0.000E+00	0.000E+00
Co-60	1.512E-02	1.512E-02	1.931E-07	2.727E-04	6.780E-06
Cs-137	1.785E-01	1.785E-01	2.279E-06	3.218E-03	8.001E-05
Eu-152	3.752E-02	3.752E-02	4.790E-07	0.000E+00	0.000E+00
Eu-154	3.053E-02	3.053E-02	3.898E-07	0.000E+00	0.000E+00
Gd-152	5.677E-16	5.677E-16	7.249E-21	0.000E+00	0.000E+00
H-3	2.149E-02	2.149E-02	2.744E-07	8.473E+02	2.107E+01
Ni-63	2.184E+00	2.184E+00	2.788E-05	1.818E-01	4.521E-03
Np-237	1.420E-07	1.420E-07	1.813E-12	0.000E+00	0.000E+00
Pa-231	4.158E-14	4.158E-14	5.309E-19	1.708E-14	4.248E-16
Pb-210	9.076E-16	9.076E-16	1.159E-20	2.104E-15	5.232E-17
Pu-238	2.649E-02	2.649E-02	3.382E-07	0.000E+00	0.000E+00
Pu-239	8.197E-02	8.197E-02	1.047E-06	0.000E+00	0.000E+00
Pu-240	2.098E-02	2.098E-02	2.679E-07	0.000E+00	0.000E+00
Ra-226	1.735E-14	1.735E-14	2.216E-19	5.493E-15	1.366E-16
Ra-228	1.724E-19	1.724E-19	2.201E-24	5.675E-19	1.411E-20
Sr-90	3.212E-01	3.212E-01	4.101E-06	4.227E-02	1.051E-03
Th-228	7.296E-20	7.296E-20	9.316E-25	1.949E-19	4.844E-21
Th-229	4.779E-16	4.779E-16	6.102E-21	3.740E-16	9.298E-18
Th-230	1.707E-11	1.707E-11	2.180E-16	1.547E-12	3.846E-14
Th-232	7.463E-19	7.463E-19	9.529E-24	2.637E-19	6.556E-21
U-233	2.164E-12	2.164E-12	2.763E-17	1.732E-11	4.305E-13
U-234	5.353E-07	5.353E-07	6.834E-12	6.619E-06	1.646E-07
U-235	5.598E-10	5.598E-10	7.147E-15	6.856E-09	1.705E-10
U-236	4.308E-09	4.308E-09	5.500E-14	5.277E-08	1.312E-09

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.775E-01 pCi/ml
Concentration of gaseous H-3 in air = 3.604E-02 pCi/m**3
Concentration of gaseous C-14 in air = 1.861E-02 pCi/m**3

Attachment 4 Sheet No. 8 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 9
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 7.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	6.310E-15	1.493E-14	4.666E-14	4.601E-14	4.473E-14	6.534E-16	9.845E-17	2.214E-15	1.474E-13
Ag-108m	0.000E+00	2.453E+00	2.453E+00	2.454E+00	2.453E+00	5.250E-01	3.578E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	6.233E-02	6.249E-02	6.252E-02	6.251E-02	1.770E-03	6.916E-05	0.000E+00	0.000E+00
C-14	0.000E+00	4.273E+01	9.349E+00	4.027E+01	1.739E+01	2.859E+01	8.004E+00	0.000E+00	0.000E+00
Co-60	2.724E-04	1.210E+00	1.212E+00	1.220E+00	1.212E+00	1.799E+00	1.485E-01	2.019E-03	1.346E-03
Cs-137	3.215E-03	7.144E+00	7.161E+00	7.170E+00	7.162E+00	1.729E+01	3.869E+00	1.589E-01	7.943E-03
Eu-152	0.000E+00	9.382E-02	9.392E-02	9.420E-02	9.394E-02	5.029E-02	1.196E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	7.635E-02	7.643E-02	7.677E-02	7.645E-02	4.093E-02	9.735E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.420E-15	1.421E-15	1.412E-15	1.421E-15	7.610E-16	7.244E-18	0.000E+00	0.000E+00
H-3	8.486E+02	3.415E+03	4.851E+03	1.825E+03	1.769E+03	9.617E+02	1.006E+03	2.129E+01	2.129E+01
Ni-63	1.817E-01	1.094E+02	1.103E+02	1.104E+02	1.104E+02	4.304E+01	1.439E+02	4.501E-01	4.501E-01
Np-237	0.000E+00	2.826E-06	2.840E-06	2.772E-06	2.792E-06	2.589E-07	1.123E-09	0.000E+00	0.000E+00
Pa-231	1.743E-14	4.417E-13	5.276E-13	6.254E-13	6.349E-13	3.206E-13	4.298E-16	4.855E-15	4.996E-14
Pb-210	2.130E-15	1.291E-14	2.270E-14	2.336E-14	2.740E-14	1.814E-15	6.956E-16	1.698E-14	5.679E-15
Pu-238	0.000E+00	2.651E-02	2.658E-02	2.660E-02	2.659E-02	1.505E-03	1.471E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.202E-02	8.224E-02	8.227E-02	8.227E-02	4.658E-03	4.551E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.099E-02	2.105E-02	2.106E-02	2.106E-02	1.192E-03	1.165E-05	0.000E+00	0.000E+00
Ra-226	5.524E-15	6.910E-13	7.284E-13	6.781E-13	6.978E-13	5.492E-14	4.793E-14	7.107E-15	3.554E-14
Ra-228	5.685E-19	7.539E-18	1.048E-17	1.052E-17	1.077E-17	8.248E-19	7.694E-19	7.151E-19	3.576E-18
Sr-90	4.225E-02	9.641E+01	9.662E+01	9.676E+01	9.664E+01	5.387E+01	1.096E+01	6.281E-02	1.047E-01
Th-228	1.956E-19	4.355E-19	1.315E-18	1.904E-18	1.962E-18	3.343E-20	1.641E-21	4.928E-19	2.464E-18
Th-229	3.755E-16	1.025E-15	2.852E-15	4.175E-15	4.779E-15	7.094E-17	4.421E-18	8.887E-16	4.451E-15
Th-230	1.708E-12	2.253E-11	2.891E-11	7.664E-11	7.789E-11	1.977E-12	1.218E-13	4.098E-12	2.077E-11
Th-232	2.711E-19	1.250E-18	2.502E-18	4.699E-18	4.899E-18	9.662E-20	5.895E-21	6.728E-19	3.376E-18
U-233	1.729E-11	2.813E-11	1.141E-10	1.167E-10	1.194E-10	3.408E-12	6.248E-12	4.267E-12	2.560E-11
U-234	6.614E-06	9.921E-06	4.292E-05	4.458E-05	4.527E-05	1.232E-06	2.289E-06	1.636E-06	9.819E-06
U-235	6.851E-09	1.029E-08	4.447E-08	4.617E-08	4.689E-08	1.277E-09	2.372E-09	1.695E-09	1.017E-08
U-236	5.273E-08	7.919E-08	3.423E-07	3.554E-07	3.609E-07	9.827E-09	1.826E-08	1.305E-08	7.828E-08

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 9 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 10
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.100E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	1.098E-14	1.098E-14	1.402E-19	1.725E-14	4.290E-16
Ag-108m	1.600E-02	1.600E-02	2.043E-07	0.000E+00	0.000E+00
Am-241	6.188E-02	6.188E-02	7.901E-07	0.000E+00	0.000E+00
C-14	1.527E-04	1.527E-04	1.950E-09	0.000E+00	0.000E+00
Co-60	8.933E-03	8.933E-03	1.141E-07	2.532E-04	6.295E-06
Cs-137	1.627E-01	1.627E-01	2.077E-06	4.610E-03	1.146E-04
Eu-152	3.047E-02	3.047E-02	3.890E-07	0.000E+00	0.000E+00
Eu-154	2.228E-02	2.228E-02	2.844E-07	0.000E+00	0.000E+00
Gd-152	8.104E-16	8.104E-16	1.035E-20	0.000E+00	0.000E+00
H-3	1.971E-03	1.971E-03	2.516E-08	7.808E+01	1.941E+00
Ni-63	2.120E+00	2.120E+00	2.707E-05	2.775E-01	6.899E-03
Np-237	2.224E-07	2.224E-07	2.840E-12	0.000E+00	0.000E+00
Pa-231	1.023E-13	1.023E-13	1.306E-18	6.125E-14	1.523E-15
Pb-210	5.354E-15	5.354E-15	6.837E-20	4.173E-15	1.037E-16
Pu-238	2.566E-02	2.566E-02	3.277E-07	0.000E+00	0.000E+00
Pu-239	8.195E-02	8.195E-02	1.046E-06	0.000E+00	0.000E+00
Pu-240	2.097E-02	2.097E-02	2.677E-07	0.000E+00	0.000E+00
Ra-226	6.659E-14	6.659E-14	8.502E-19	1.687E-14	4.194E-16
Ra-228	6.017E-19	6.017E-19	7.683E-24	1.078E-18	2.680E-20
Sr-90	2.917E-01	2.917E-01	3.725E-06	6.037E-02	1.501E-03
Th-228	3.319E-19	3.319E-19	4.238E-24	3.458E-19	8.597E-21
Th-229	1.846E-15	1.846E-15	2.357E-20	6.561E-16	1.631E-17
Th-230	4.157E-11	4.157E-11	5.308E-16	5.939E-12	1.477E-13
Th-232	1.836E-18	1.836E-18	2.344E-23	5.604E-19	1.393E-20
U-233	5.312E-12	5.312E-12	6.783E-17	6.689E-11	1.663E-12
U-234	8.234E-07	8.234E-07	1.051E-11	1.611E-05	4.006E-07
U-235	8.747E-10	8.747E-10	1.117E-14	1.686E-08	4.193E-10
U-236	6.730E-09	6.730E-09	8.593E-14	1.298E-07	3.227E-09

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.628E-02 pCi/ml
Concentration of gaseous H-3 in air = 3.305E-03 pCi/m**3
Concentration of gaseous C-14 in air = 8.136E-04 pCi/m**3

Attachment 4 Sheet No. 10 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 11
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.100E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.727E-14	5.134E-14	1.363E-13	1.347E-13	1.478E-13	1.781E-15	3.277E-16	6.472E-15	4.309E-13
Ag-108m	0.000E+00	2.400E+00	2.400E+00	2.400E+00	2.400E+00	5.136E-01	3.500E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	6.192E-02	6.209E-02	6.211E-02	6.211E-02	1.758E-03	6.871E-05	0.000E+00	0.000E+00
C-14	0.000E+00	1.868E+00	4.087E-01	1.761E+00	7.601E-01	1.250E+00	3.499E-01	0.000E+00	0.000E+00
Co-60	2.530E-04	7.150E-01	7.163E-01	7.216E-01	7.167E-01	1.064E+00	8.782E-02	1.880E-03	1.253E-03
Cs-137	4.607E-03	6.513E+00	6.536E+00	6.546E+00	6.538E+00	1.578E+01	3.533E+00	2.282E-01	1.141E-02
Eu-152	0.000E+00	7.619E-02	7.627E-02	7.650E-02	7.629E-02	4.084E-02	9.715E-04	0.000E+00	0.000E+00
Eu-154	0.000E+00	5.571E-02	5.577E-02	5.601E-02	5.579E-02	2.986E-02	7.103E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	2.027E-15	2.029E-15	2.022E-15	2.029E-15	1.086E-15	1.034E-17	0.000E+00	0.000E+00
H-3	7.819E+01	3.146E+02	4.469E+02	1.681E+02	1.630E+02	8.859E+01	9.268E+01	1.962E+00	1.962E+00
Ni-63	2.774E-01	1.064E+02	1.078E+02	1.079E+02	1.079E+02	4.204E+01	1.408E+02	6.880E-01	6.880E-01
Np-237	0.000E+00	4.434E-06	4.448E-06	4.381E-06	4.401E-06	4.086E-07	1.766E-09	0.000E+00	0.000E+00
Pa-231	6.219E-14	1.116E-12	1.420E-12	1.692E-12	1.716E-12	8.472E-13	1.107E-15	1.686E-14	1.770E-13
Pb-210	4.242E-15	6.268E-14	8.088E-14	9.747E-14	1.014E-13	7.977E-15	2.698E-15	3.465E-14	1.161E-14
Pu-238	0.000E+00	2.568E-02	2.575E-02	2.577E-02	2.576E-02	1.458E-03	1.425E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.200E-02	8.222E-02	8.225E-02	8.225E-02	4.657E-03	4.550E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.098E-02	2.104E-02	2.105E-02	2.105E-02	1.192E-03	1.164E-05	0.000E+00	0.000E+00
Ra-226	1.710E-14	2.664E-12	2.771E-12	2.700E-12	2.757E-12	2.176E-13	1.877E-13	2.308E-14	1.154E-13
Ra-228	1.081E-18	2.523E-17	3.090E-17	3.026E-17	3.053E-17	2.396E-18	2.152E-18	1.368E-18	6.839E-18
Sr-90	6.035E-02	8.760E+01	8.791E+01	8.804E+01	8.794E+01	4.902E+01	9.983E+00	8.983E-02	1.497E-01
Th-228	3.477E-19	1.140E-18	2.556E-18	3.962E-18	3.967E-18	9.141E-20	4.331E-21	8.830E-19	4.415E-18
Th-229	6.757E-16	3.101E-15	6.229E-15	1.201E-14	1.099E-14	2.409E-16	1.417E-17	1.698E-15	8.522E-15
Th-230	6.332E-12	5.749E-11	8.404E-11	2.034E-10	2.056E-10	4.922E-12	2.995E-13	1.538E-11	7.758E-11
Th-232	5.789E-19	2.951E-18	5.602E-18	1.111E-17	1.118E-17	2.334E-19	1.405E-20	1.441E-18	7.235E-18
U-233	6.685E-11	1.008E-10	4.337E-10	4.537E-10	4.601E-10	1.260E-11	2.319E-11	1.655E-11	9.929E-11
U-234	1.611E-05	2.305E-05	1.034E-04	1.095E-04	1.105E-04	2.942E-06	5.440E-06	3.992E-06	2.395E-05
U-235	1.686E-08	2.416E-08	1.082E-07	1.145E-07	1.157E-07	3.080E-09	5.697E-09	4.178E-09	2.507E-08
U-236	1.297E-07	1.859E-07	8.327E-07	8.815E-07	8.901E-07	2.370E-08	4.384E-08	3.215E-08	1.929E-07

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 11 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 12
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 4.300E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	5.101E-13	5.101E-13	6.513E-18	2.469E-12	6.138E-14
Ag-108m	1.341E-02	1.341E-02	1.712E-07	0.000E+00	0.000E+00
Am-241	5.873E-02	5.873E-02	7.499E-07	0.000E+00	0.000E+00
C-14	1.831E-15	1.831E-15	2.338E-20	0.000E+00	0.000E+00
Co-60	1.324E-04	1.324E-04	1.690E-09	1.470E-05	3.655E-07
Cs-137	7.737E-02	7.737E-02	9.879E-07	8.592E-03	2.136E-04
Eu-152	5.765E-03	5.765E-03	7.361E-08	0.000E+00	0.000E+00
Eu-154	1.790E-03	1.790E-03	2.285E-08	0.000E+00	0.000E+00
Gd-152	1.661E-15	1.661E-15	2.121E-20	0.000E+00	0.000E+00
H-3	9.214E-12	9.214E-12	1.177E-16	3.796E-07	9.438E-09
Ni-63	1.672E+00	1.672E+00	2.135E-05	8.583E-01	2.134E-02
Np-237	8.469E-07	8.469E-07	1.081E-11	0.000E+00	0.000E+00
Pa-231	1.514E-12	1.514E-12	1.934E-17	3.486E-12	8.668E-14
Pb-210	9.708E-13	9.708E-13	1.240E-17	7.126E-13	1.772E-14
Pu-238	1.991E-02	1.991E-02	2.542E-07	0.000E+00	0.000E+00
Pu-239	8.180E-02	8.180E-02	1.044E-06	0.000E+00	0.000E+00
Pu-240	2.088E-02	2.088E-02	2.666E-07	0.000E+00	0.000E+00
Ra-226	3.641E-12	3.641E-12	4.649E-17	4.473E-12	1.112E-13
Ra-228	1.880E-17	1.880E-17	2.401E-22	2.949E-17	7.331E-19
Sr-90	1.352E-01	1.352E-01	1.726E-06	1.098E-01	2.729E-03
Th-228	1.623E-17	1.623E-17	2.072E-22	8.652E-18	2.151E-19
Th-229	1.064E-13	1.064E-13	1.358E-18	4.448E-14	1.106E-15
Th-230	5.677E-10	5.677E-10	7.249E-15	3.260E-10	8.105E-12
Th-232	2.720E-17	2.720E-17	3.472E-22	1.626E-17	4.041E-19
U-233	7.745E-11	7.745E-11	9.889E-16	3.855E-09	9.585E-11
U-234	2.717E-06	2.717E-06	3.470E-11	2.202E-04	5.474E-06
U-235	3.270E-09	3.270E-09	4.175E-14	2.498E-07	6.211E-09
U-236	2.513E-08	2.513E-08	3.208E-13	1.921E-06	4.776E-08

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 7.610E-11 pCi/ml
Concentration of gaseous H-3 in air = 1.545E-11 pCi/m**3
Concentration of gaseous C-14 in air = 9.755E-15 pCi/m**3

Attachment 4 Sheet No. 12 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 13
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 4.300E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	2.467E-12	4.505E-12	1.679E-11	1.814E-11	1.814E-11	6.594E-14	3.294E-14	9.168E-13	6.109E-11
Ag-108m	0.000E+00	2.011E+00	2.011E+00	2.012E+00	2.011E+00	4.304E-01	2.933E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	5.877E-02	5.892E-02	5.895E-02	5.894E-02	1.669E-03	6.521E-05	0.000E+00	0.000E+00
C-14	0.000E+00	2.240E-11	4.900E-12	2.113E-11	9.120E-12	1.500E-11	4.199E-12	0.000E+00	0.000E+00
Co-60	1.470E-05	1.061E-02	1.068E-02	1.077E-02	1.070E-02	1.588E-02	1.313E-03	1.095E-04	7.302E-05
Cs-137	8.590E-03	3.106E+00	3.149E+00	3.158E+00	3.154E+00	7.607E+00	1.708E+00	4.267E-01	2.134E-02
Eu-152	0.000E+00	1.442E-02	1.443E-02	1.447E-02	1.444E-02	7.728E-03	1.838E-04	0.000E+00	0.000E+00
Eu-154	0.000E+00	4.476E-03	4.480E-03	4.500E-03	4.482E-03	2.399E-03	5.707E-05	0.000E+00	0.000E+00
Gd-152	0.000E+00	4.153E-15	4.158E-15	4.157E-15	4.158E-15	2.226E-15	2.118E-17	0.000E+00	0.000E+00
H-3	3.802E-07	1.527E-06	2.171E-06	8.149E-07	7.899E-07	4.298E-07	4.501E-07	9.538E-09	9.538E-09
Ni-63	8.582E-01	8.475E+01	8.903E+01	8.953E+01	8.951E+01	3.482E+01	1.179E+02	2.132E+00	2.132E+00
Np-237	0.000E+00	1.693E-05	1.694E-05	1.688E-05	1.690E-05	1.571E-06	6.764E-09	0.000E+00	0.000E+00
Pa-231	3.500E-12	1.998E-11	3.727E-11	4.334E-11	4.343E-11	1.943E-11	2.326E-14	8.902E-13	9.667E-12
Pb-210	7.107E-13	1.074E-11	1.418E-11	1.507E-11	1.478E-11	1.255E-12	4.244E-13	5.201E-12	1.749E-12
Pu-238	0.000E+00	1.992E-02	1.998E-02	1.999E-02	1.998E-02	1.131E-03	1.105E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.185E-02	8.207E-02	8.210E-02	8.209E-02	4.648E-03	4.541E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.089E-02	2.095E-02	2.095E-02	2.095E-02	1.186E-03	1.159E-05	0.000E+00	0.000E+00
Ra-226	4.466E-12	1.511E-10	1.738E-10	1.745E-10	1.747E-10	1.390E-11	1.214E-11	5.510E-12	2.755E-11
Ra-228	2.949E-17	7.866E-16	9.382E-16	9.409E-16	9.417E-16	7.437E-17	6.589E-17	3.672E-17	1.836E-16
Sr-90	1.097E-01	4.071E+01	4.126E+01	4.137E+01	4.132E+01	2.306E+01	4.715E+00	1.636E-01	2.727E-01
Th-228	8.676E-18	3.813E-17	7.174E-17	1.152E-16	1.149E-16	3.069E-18	1.444E-19	2.166E-17	1.083E-16
Th-229	4.548E-14	1.849E-13	3.992E-13	7.255E-13	7.251E-13	1.403E-14	8.297E-16	1.124E-13	5.638E-13
Th-230	3.314E-10	1.103E-09	2.688E-09	4.499E-09	4.512E-09	7.987E-11	4.699E-12	8.189E-10	4.104E-09
Th-232	1.652E-17	5.375E-17	1.328E-16	2.221E-16	2.220E-16	3.872E-18	2.271E-19	4.089E-17	2.049E-16
U-233	3.855E-09	5.244E-09	2.444E-08	2.644E-08	2.654E-08	6.901E-10	1.269E-09	9.573E-10	5.744E-09
U-234	2.201E-04	2.953E-04	1.392E-03	1.512E-03	1.516E-03	3.916E-05	7.197E-05	5.469E-05	3.282E-04
U-235	2.498E-07	3.355E-07	1.580E-06	1.716E-06	1.720E-06	4.446E-08	8.171E-08	6.205E-08	3.723E-07
U-236	1.921E-06	2.580E-06	1.215E-05	1.319E-05	1.322E-05	3.418E-07	6.283E-07	4.771E-07	2.863E-06

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 13 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 14
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.350E+02 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	8.879E-12	8.879E-12	1.134E-16	1.279E-10	3.181E-12
Ag-108m	8.066E-03	8.066E-03	1.030E-07	0.000E+00	0.000E+00
Am-241	5.053E-02	5.053E-02	6.453E-07	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	7.294E-10	7.294E-10	9.314E-15	2.560E-10	6.366E-12
Cs-137	9.135E-03	9.135E-03	1.166E-07	3.207E-03	7.972E-05
Eu-152	4.808E-05	4.808E-05	6.139E-10	0.000E+00	0.000E+00
Eu-154	1.272E-06	1.272E-06	1.624E-11	0.000E+00	0.000E+00
Gd-152	1.857E-15	1.857E-15	2.371E-20	0.000E+00	0.000E+00
H-3	5.276E-36	5.276E-36	6.736E-41	2.439E-31	6.065E-33
Ni-63	8.452E-01	8.452E-01	1.079E-05	1.374E+00	3.417E-02
Np-237	2.468E-06	2.468E-06	3.152E-11	0.000E+00	0.000E+00
Pa-231	1.367E-11	1.367E-11	1.746E-16	8.415E-11	2.092E-12
Pb-210	5.028E-11	5.028E-11	6.421E-16	1.150E-10	2.859E-12
Pu-238	9.600E-03	9.600E-03	1.226E-07	0.000E+00	0.000E+00
Pu-239	8.136E-02	8.136E-02	1.039E-06	0.000E+00	0.000E+00
Pu-240	2.062E-02	2.062E-02	2.633E-07	0.000E+00	0.000E+00
Ra-226	8.831E-11	8.831E-11	1.128E-15	3.207E-10	7.973E-12
Ra-228	2.188E-16	2.188E-16	2.793E-21	8.889E-16	2.210E-17
Sr-90	1.481E-02	1.481E-02	1.891E-07	3.814E-02	9.483E-04
Th-228	2.100E-16	2.100E-16	2.681E-21	2.954E-16	7.345E-18
Th-229	2.970E-12	2.970E-12	3.793E-17	3.545E-12	8.814E-14
Th-230	4.113E-09	4.113E-09	5.251E-14	6.530E-09	1.623E-10
Th-232	2.458E-16	2.458E-16	3.138E-21	3.614E-16	8.984E-18
U-233	6.681E-10	6.681E-10	8.531E-15	8.941E-08	2.223E-09
U-234	5.309E-06	5.309E-06	6.779E-11	1.026E-03	2.551E-05
U-235	9.058E-09	9.058E-09	1.157E-13	1.560E-06	3.879E-08
U-236	6.934E-08	6.934E-08	8.854E-13	1.196E-05	2.973E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 4.357E-35 pCi/ml
Concentration of gaseous H-3 in air = 8.848E-36 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 4 Sheet No. 14 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 15
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.350E+02 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.279E-10	1.900E-10	8.271E-10	8.996E-10	9.011E-10	1.974E-12	1.489E-12	4.767E-11	3.177E-09
Ag-108m	0.000E+00	1.210E+00	1.210E+00	1.210E+00	1.210E+00	2.589E-01	1.764E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	5.057E-02	5.070E-02	5.072E-02	5.072E-02	1.436E-03	5.611E-05	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	2.560E-10	5.870E-08	5.998E-08	6.055E-08	6.014E-08	8.931E-08	7.425E-09	1.909E-09	1.273E-09
Cs-137	3.206E-03	3.697E-01	3.857E-01	3.880E-01	3.875E-01	9.323E-01	2.111E-01	1.594E-01	7.969E-03
Eu-152	0.000E+00	1.202E-04	1.204E-04	1.207E-04	1.204E-04	6.445E-05	1.533E-06	0.000E+00	0.000E+00
Eu-154	0.000E+00	3.181E-06	3.184E-06	3.198E-06	3.185E-06	1.705E-06	4.056E-08	0.000E+00	0.000E+00
Gd-152	0.000E+00	4.643E-15	4.648E-15	4.648E-15	4.648E-15	2.489E-15	2.368E-17	0.000E+00	0.000E+00
H-3	2.443E-31	9.774E-31	1.390E-30	5.195E-31	5.034E-31	2.746E-31	2.882E-31	6.129E-33	6.129E-33
Ni-63	1.374E+00	4.409E+01	5.095E+01	5.175E+01	5.174E+01	2.005E+01	6.976E+01	3.416E+00	3.416E+00
Np-237	0.000E+00	4.935E-05	4.937E-05	4.932E-05	4.933E-05	4.587E-06	1.974E-08	0.000E+00	0.000E+00
Pa-231	8.424E-11	2.491E-10	6.678E-10	7.433E-10	7.441E-10	3.082E-10	3.356E-13	2.107E-11	2.310E-10
Pb-210	1.150E-10	6.571E-10	1.227E-09	1.307E-09	1.309E-09	9.634E-11	3.469E-11	8.557E-10	2.864E-10
Pu-238	0.000E+00	9.606E-03	9.632E-03	9.639E-03	9.635E-03	5.455E-04	5.330E-06	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.142E-02	8.163E-02	8.166E-02	8.166E-02	4.623E-03	4.517E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.063E-02	2.069E-02	2.070E-02	2.070E-02	1.172E-03	1.145E-05	0.000E+00	0.000E+00
Ra-226	3.206E-10	3.955E-09	5.557E-09	5.726E-09	5.734E-09	4.495E-10	4.108E-10	3.982E-10	1.991E-09
Ra-228	8.887E-16	9.884E-15	1.436E-14	1.468E-14	1.469E-14	1.144E-15	1.059E-15	1.104E-15	5.522E-15
Sr-90	3.814E-02	4.497E+00	4.690E+00	4.714E+00	4.708E+00	2.635E+00	5.448E-01	5.689E-02	9.481E-02
Th-228	2.960E-16	7.266E-16	2.085E-15	2.793E-15	2.795E-15	5.290E-17	2.579E-18	7.369E-16	3.684E-15
Th-229	3.568E-12	8.080E-12	2.557E-11	3.464E-11	3.468E-11	4.838E-13	2.735E-14	8.851E-12	4.430E-11
Th-230	6.555E-09	1.318E-08	4.552E-08	5.702E-08	5.706E-08	7.157E-10	3.944E-11	1.627E-08	8.141E-08
Th-232	3.630E-16	7.519E-16	2.540E-15	3.244E-15	3.246E-15	4.189E-17	2.323E-18	9.010E-16	4.508E-15
U-233	8.940E-08	1.190E-07	5.642E-07	6.160E-07	6.166E-07	1.588E-08	2.913E-08	2.222E-08	1.333E-07
U-234	1.026E-03	1.360E-03	6.469E-03	7.080E-03	7.081E-03	1.820E-04	3.338E-04	2.551E-04	1.530E-03
U-235	1.560E-06	2.070E-06	9.839E-06	1.076E-05	1.077E-05	2.768E-07	5.077E-07	3.878E-07	2.327E-06
U-236	1.196E-05	1.587E-05	7.542E-05	8.248E-05	8.252E-05	2.122E-06	3.892E-06	2.973E-06	1.784E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 15 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 16
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 3.000E+02 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	4.795E-11	4.795E-11	6.123E-16	9.636E-10	2.396E-11
Ag-108m	3.242E-03	3.242E-03	4.140E-08	0.000E+00	0.000E+00
Am-241	3.860E-02	3.860E-02	4.928E-07	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	2.700E-19	2.700E-19	3.447E-24	2.132E-19	5.300E-21
Cs-137	1.980E-04	1.980E-04	2.528E-09	1.563E-04	3.886E-06
Eu-152	8.989E-09	8.989E-09	1.148E-13	0.000E+00	0.000E+00
Eu-154	2.871E-12	2.871E-12	3.666E-17	0.000E+00	0.000E+00
Gd-152	1.856E-15	1.856E-15	2.370E-20	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	2.487E-01	2.487E-01	3.175E-06	9.132E-01	2.270E-02
Np-237	4.822E-06	4.822E-06	6.157E-11	0.000E+00	0.000E+00
Pa-231	5.814E-11	5.814E-11	7.424E-16	4.717E-10	1.173E-11
Pb-210	5.070E-10	5.070E-10	6.473E-15	1.841E-09	4.578E-11
Pu-238	2.594E-03	2.594E-03	3.313E-08	0.000E+00	0.000E+00
Pu-239	8.058E-02	8.058E-02	1.029E-06	0.000E+00	0.000E+00
Pu-240	2.016E-02	2.016E-02	2.575E-07	0.000E+00	0.000E+00
Ra-226	6.490E-10	6.490E-10	8.287E-15	3.471E-09	8.629E-11
Ra-228	9.969E-16	9.969E-16	1.273E-20	5.399E-15	1.342E-16
Sr-90	2.806E-04	2.806E-04	3.582E-09	1.636E-03	4.069E-05
Th-228	9.805E-16	9.805E-16	1.252E-20	1.857E-15	4.616E-17
Th-229	2.726E-11	2.726E-11	3.481E-16	4.740E-11	1.178E-12
Th-230	1.231E-08	1.231E-08	1.571E-13	2.579E-08	6.411E-10
Th-232	1.047E-15	1.047E-15	1.337E-20	2.003E-15	4.979E-17
U-233	2.616E-09	2.616E-09	3.340E-14	4.596E-07	1.143E-08
U-234	5.273E-06	5.273E-06	6.733E-11	1.182E-03	2.939E-05
U-235	1.629E-08	1.629E-08	2.080E-13	3.230E-06	8.031E-08
U-236	1.238E-07	1.238E-07	1.580E-12	2.458E-05	6.111E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 0.000E+00 pCi/ml
Concentration of gaseous H-3 in air = 0.000E+00 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 4 Sheet No. 16 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 17
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 3.000E+02 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	9.635E-10	1.384E-09	6.183E-09	6.741E-09	6.744E-09	1.335E-11	1.098E-11	3.592E-10	2.394E-08
Ag-108m	0.000E+00	4.864E-01	4.864E-01	4.865E-01	4.864E-01	1.041E-01	7.093E-01	0.000E+00	0.000E+00
Am-241	0.000E+00	3.862E-02	3.873E-02	3.874E-02	3.874E-02	1.097E-03	4.286E-05	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	2.132E-19	2.189E-17	2.295E-17	2.324E-17	2.308E-17	3.429E-17	2.876E-18	1.590E-18	1.060E-18
Cs-137	1.563E-04	8.127E-03	8.908E-03	9.009E-03	8.999E-03	2.156E-02	4.951E-03	7.772E-03	3.886E-04
Eu-152	0.000E+00	2.248E-08	2.250E-08	2.257E-08	2.251E-08	1.205E-08	2.866E-10	0.000E+00	0.000E+00
Eu-154	0.000E+00	7.180E-12	7.188E-12	7.220E-12	7.190E-12	3.849E-12	9.155E-14	0.000E+00	0.000E+00
Gd-152	0.000E+00	4.642E-15	4.646E-15	4.647E-15	4.647E-15	2.488E-15	2.367E-17	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	9.132E-01	1.365E+01	1.821E+01	1.874E+01	1.873E+01	7.219E+00	2.602E+01	2.270E+00	2.270E+00
Np-237	0.000E+00	9.643E-05	9.645E-05	9.641E-05	9.642E-05	8.966E-06	3.857E-08	0.000E+00	0.000E+00
Pa-231	4.719E-10	1.206E-09	3.554E-09	3.889E-09	3.890E-09	1.586E-09	1.654E-12	1.176E-10	1.292E-09
Pb-210	1.841E-09	7.519E-09	1.667E-08	1.787E-08	1.787E-08	1.253E-09	4.596E-10	1.373E-08	4.588E-09
Pu-238	0.000E+00	2.596E-03	2.603E-03	2.605E-03	2.604E-03	1.474E-04	1.440E-06	0.000E+00	0.000E+00
Pu-239	0.000E+00	8.064E-02	8.085E-02	8.088E-02	8.088E-02	4.579E-03	4.474E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.018E-02	2.023E-02	2.024E-02	2.024E-02	1.146E-03	1.120E-05	0.000E+00	0.000E+00
Ra-226	3.471E-09	3.056E-08	4.788E-08	4.984E-08	4.986E-08	3.887E-09	3.622E-09	4.314E-09	2.157E-08
Ra-228	5.398E-15	4.684E-14	7.395E-14	7.614E-14	7.616E-14	5.907E-15	5.549E-15	6.707E-15	3.353E-14
Sr-90	1.636E-03	8.653E-02	9.478E-02	9.567E-02	9.555E-02	5.375E-02	1.131E-02	2.441E-03	4.068E-03
Th-228	1.860E-15	4.022E-15	1.275E-14	1.653E-14	1.654E-14	2.838E-16	1.398E-17	4.630E-15	2.315E-14
Th-229	4.752E-11	9.182E-11	3.270E-10	3.912E-10	3.914E-10	4.682E-12	2.525E-13	1.180E-10	5.904E-10
Th-230	2.581E-08	4.672E-08	1.749E-07	1.992E-07	1.992E-07	2.202E-09	1.157E-10	6.415E-08	3.208E-07
Th-232	2.006E-15	3.741E-15	1.369E-14	1.589E-14	1.590E-14	1.822E-16	9.675E-18	4.985E-15	2.493E-14
U-233	4.596E-07	6.099E-07	2.899E-06	3.172E-06	3.173E-06	8.158E-08	1.496E-07	1.143E-07	6.856E-07
U-234	1.182E-03	1.566E-03	7.453E-03	8.165E-03	8.164E-03	2.098E-04	3.845E-04	2.940E-04	1.764E-03
U-235	3.230E-06	4.281E-06	2.036E-05	2.230E-05	2.230E-05	5.732E-07	1.051E-06	8.030E-07	4.818E-06
U-236	2.458E-05	3.258E-05	1.550E-04	1.697E-04	1.697E-04	4.362E-06	7.997E-06	6.111E-06	3.667E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 17 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 18
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.000E+03 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	3.588E-10	3.588E-10	4.582E-15	8.325E-09	2.070E-10
Ag-108m	6.789E-05	6.789E-05	8.669E-10	0.000E+00	0.000E+00
Am-241	1.230E-02	1.230E-02	1.571E-07	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cs-137	1.726E-11	1.726E-11	2.203E-16	4.781E-11	1.189E-12
Eu-152	1.370E-24	1.370E-24	1.749E-29	0.000E+00	0.000E+00
Eu-154	3.188E-36	3.188E-36	4.071E-41	0.000E+00	0.000E+00
Gd-152	1.847E-15	1.847E-15	2.358E-20	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.384E-03	1.384E-03	1.768E-08	1.816E-02	4.515E-04
Np-237	9.909E-06	9.909E-06	1.265E-10	0.000E+00	0.000E+00
Pa-231	3.777E-10	3.777E-10	4.823E-15	3.544E-09	8.810E-11
Pb-210	6.082E-09	6.082E-09	7.765E-14	2.818E-08	7.007E-10
Pu-238	1.008E-05	1.008E-05	1.287E-10	0.000E+00	0.000E+00
Pu-239	7.737E-02	7.737E-02	9.879E-07	0.000E+00	0.000E+00
Pu-240	1.834E-02	1.834E-02	2.342E-07	0.000E+00	0.000E+00
Ra-226	6.388E-09	6.388E-09	8.156E-14	4.233E-08	1.052E-09
Ra-228	6.785E-15	6.785E-15	8.663E-20	4.206E-14	1.046E-15
Sr-90	1.382E-11	1.382E-11	1.765E-16	2.882E-10	7.164E-12
Th-228	6.759E-15	6.759E-15	8.630E-20	1.466E-14	3.646E-16
Th-229	5.086E-10	5.086E-10	6.494E-15	1.081E-09	2.687E-11
Th-230	2.870E-08	2.870E-08	3.665E-13	6.767E-08	1.683E-09
Th-232	6.866E-15	6.866E-15	8.767E-20	1.498E-14	3.725E-16
U-233	1.197E-08	1.197E-08	1.529E-13	2.308E-06	5.738E-08
U-234	9.559E-07	9.559E-07	1.221E-11	2.190E-04	5.444E-06
U-235	2.623E-08	2.623E-08	3.349E-13	5.260E-06	1.308E-07
U-236	1.913E-07	1.913E-07	2.442E-12	3.847E-05	9.565E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 0.000E+00 pCi/ml
Concentration of gaseous H-3 in air = 0.000E+00 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 4 Sheet No. 18 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 4

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 14:08 Page 19
Concent : 118-F-1 Excavation Shallow Zone RESRAD Calculation
File : 118-F-1_Excavation_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.000E+03 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	8.324E-09	1.182E-08	5.327E-08	5.815E-08	5.815E-08	1.108E-10	9.418E-11	3.103E-09	2.068E-07
Ag-108m	0.000E+00	1.018E-02	1.018E-02	1.019E-02	1.018E-02	2.179E-03	1.485E-02	0.000E+00	0.000E+00
Am-241	0.000E+00	1.231E-02	1.235E-02	1.235E-02	1.235E-02	3.496E-04	1.366E-05	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cs-137	4.781E-11	7.538E-10	9.923E-10	1.021E-09	1.020E-09	2.412E-09	5.791E-10	2.377E-09	1.189E-10
Eu-152	0.000E+00	3.426E-24	3.430E-24	3.440E-24	3.431E-24	1.837E-24	4.369E-26	0.000E+00	0.000E+00
Eu-154	0.000E+00	7.973E-36	7.982E-36	8.017E-36	7.984E-36	4.274E-36	1.017E-37	0.000E+00	0.000E+00
Gd-152	0.000E+00	4.618E-15	4.623E-15	4.624E-15	4.624E-15	2.476E-15	2.356E-17	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.816E-02	9.343E-02	1.840E-01	1.946E-01	1.946E-01	7.414E-02	2.860E-01	4.514E-02	4.514E-02
Np-237	0.000E+00	1.982E-04	1.982E-04	1.982E-04	1.982E-04	1.843E-05	7.928E-08	0.000E+00	0.000E+00
Pa-231	3.544E-09	8.447E-09	2.610E-08	2.830E-08	2.830E-08	1.145E-08	1.166E-11	8.815E-10	9.694E-09
Pb-210	2.818E-08	9.816E-08	2.383E-07	2.562E-07	2.562E-07	1.754E-08	6.496E-09	2.101E-07	7.018E-08
Pu-238	0.000E+00	1.009E-05	1.011E-05	1.012E-05	1.012E-05	5.728E-07	5.597E-09	0.000E+00	0.000E+00
Pu-239	0.000E+00	7.742E-02	7.762E-02	7.765E-02	7.765E-02	4.396E-03	4.295E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	1.835E-02	1.840E-02	1.841E-02	1.841E-02	1.042E-03	1.018E-05	0.000E+00	0.000E+00
Ra-226	4.233E-08	3.118E-07	5.229E-07	5.475E-07	5.475E-07	4.254E-08	4.008E-08	5.262E-08	2.631E-07
Ra-228	4.205E-14	3.259E-13	5.368E-13	5.548E-13	5.548E-13	4.294E-14	4.062E-14	5.224E-14	2.612E-13
Sr-90	2.882E-10	4.562E-09	6.015E-09	6.159E-09	6.152E-09	3.517E-09	7.827E-10	4.299E-10	7.165E-10
Th-228	1.469E-14	3.019E-14	9.964E-14	1.277E-13	1.277E-13	2.101E-15	1.040E-16	3.657E-14	1.828E-13
Th-229	1.081E-09	1.939E-09	7.316E-09	8.145E-09	8.146E-09	8.834E-11	4.571E-12	2.687E-09	1.344E-08
Th-230	6.768E-08	1.176E-07	4.546E-07	4.970E-07	4.970E-07	5.172E-09	2.643E-10	1.683E-07	8.413E-07
Th-232	1.499E-14	2.663E-14	1.012E-13	1.118E-13	1.118E-13	1.197E-15	6.159E-17	3.726E-14	1.863E-13
U-233	2.308E-06	3.060E-06	1.455E-05	1.594E-05	1.594E-05	4.097E-07	7.510E-07	5.738E-07	3.443E-06
U-234	2.190E-04	2.899E-04	1.380E-03	1.512E-03	1.512E-03	3.885E-05	7.121E-05	5.444E-05	3.266E-04
U-235	5.260E-06	6.971E-06	3.316E-05	3.632E-05	3.632E-05	9.336E-07	1.711E-06	1.308E-06	7.846E-06
U-236	3.847E-05	5.099E-05	2.426E-04	2.657E-04	2.657E-04	6.829E-06	1.252E-05	9.565E-06	5.739E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 4 Sheet No. 19 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 1
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

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Attachment 5 Sheet No. 1 of 32
Originator: S. W. Clark Date 7/11/07
Chk'd By M. W. Perrott Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 2
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Ag-108m+D	2.830E-04	2.830E-04	DCF2(2)
B-1	Am-241	4.440E-01	4.440E-01	DCF2(3)
B-1	C-14	2.090E-06	2.090E-06	DCF2(4)
B-1	Co-60	2.190E-04	2.190E-04	DCF2(5)
B-1	Cs-137+D	3.190E-05	3.190E-05	DCF2(6)
B-1	Eu-152	2.210E-04	2.210E-04	DCF2(7)
B-1	Eu-154	2.860E-04	2.860E-04	DCF2(9)
B-1	Gd-152	2.430E-01	2.430E-01	DCF2(10)
B-1	H-3	6.400E-08	6.400E-08	DCF2(11)
B-1	Ni-63	6.290E-06	6.290E-06	DCF2(12)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(13)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(14)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(15)
B-1	Pu-238	3.920E-01	3.920E-01	DCF2(16)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(18)
B-1	Pu-240	4.290E-01	4.290E-01	DCF2(19)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(21)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(22)
B-1	Sr-90+D	1.308E-03	1.300E-03	DCF2(23)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(24)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(25)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(26)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(27)
B-1	U-233	1.350E-01	1.350E-01	DCF2(28)
B-1	U-234	1.320E-01	1.320E-01	DCF2(29)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(30)
B-1	U-236	1.250E-01	1.250E-01	DCF2(31)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Ag-108m+D	7.620E-06	7.620E-06	DCF3(2)
D-1	Am-241	3.640E-03	3.640E-03	DCF3(3)
D-1	C-14	2.090E-06	2.090E-06	DCF3(4)
D-1	Co-60	2.690E-05	2.690E-05	DCF3(5)
D-1	Cs-137+D	5.000E-05	5.000E-05	DCF3(6)
D-1	Eu-152	6.480E-06	6.480E-06	DCF3(7)
D-1	Eu-154	9.550E-06	9.550E-06	DCF3(9)
D-1	Gd-152	1.610E-04	1.610E-04	DCF3(10)
D-1	H-3	6.400E-08	6.400E-08	DCF3(11)
D-1	Ni-63	5.770E-07	5.770E-07	DCF3(12)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(13)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(14)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(15)
D-1	Pu-238	3.200E-03	3.200E-03	DCF3(16)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(18)
D-1	Pu-240	3.540E-03	3.540E-03	DCF3(19)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(21)

Attachment 5 Sheet No. 2 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(22)
D-1	Sr-90+D	1.528E-04	1.420E-04	DCF3(23)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(24)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(25)
D-1	Th-230	5.480E-04	5.480E-04	DCF3(26)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(27)
D-1	U-233	2.890E-04	2.890E-04	DCF3(28)
D-1	U-234	2.830E-04	2.830E-04	DCF3(29)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(30)
D-1	U-236	2.690E-04	2.690E-04	DCF3(31)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Ag-108m+D , plant/soil concentration ratio, dimensionless	1.500E-01	1.500E-01	RTF(2,1)
D-34	Ag-108m+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-03	3.000E-03	RTF(2,2)
D-34	Ag-108m+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.500E-02	2.500E-02	RTF(2,3)
D-34				
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(3,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(3,3)
D-34				
D-34	C-14 , plant/soil concentration ratio, dimensionless	5.500E+00	5.500E+00	RTF(4,1)
D-34	C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.100E-02	3.100E-02	RTF(4,2)
D-34	C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.200E-02	1.200E-02	RTF(4,3)
D-34				
D-34	Co-60 , plant/soil concentration ratio, dimensionless	8.000E-02	8.000E-02	RTF(5,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(5,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(5,3)
D-34				
D-34	Cs-137+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(6,1)
D-34	Cs-137+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-02	3.000E-02	RTF(6,2)
D-34	Cs-137+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	8.000E-03	8.000E-03	RTF(6,3)
D-34				
D-34	Eu-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(7,1)
D-34	Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(7,2)
D-34	Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-05	5.000E-05	RTF(7,3)
D-34				
D-34	Eu-154 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(9,2)
D-34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-05	5.000E-05	RTF(9,3)
D-34				
D-34	Gd-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(10,1)
D-34	Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(10,2)
D-34	Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(10,3)
D-34				

Attachment 5 Sheet No. 3 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 4
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	H-3 , plant/soil concentration ratio, dimensionless	4.800E+00	4.800E+00	RTF(11,1)
D-34	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(11,2)
D-34	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(11,3)
D-34				
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(12,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(12,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(12,3)
D-34				
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(13,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(13,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(13,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(14,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(14,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(14,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(15,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(15,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(15,3)
D-34				
D-34	Pu-238 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(16,1)
D-34	Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(16,2)
D-34	Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(16,3)
D-34				
D-34	Pu-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(18,1)
D-34	Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(18,2)
D-34	Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(18,3)
D-34				
D-34	Pu-240 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(19,1)
D-34	Pu-240 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(19,2)
D-34	Pu-240 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(19,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(21,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(22,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(22,3)
D-34				
D-34	Sr-90+D , plant/soil concentration ratio, dimensionless	3.000E-01	3.000E-01	RTF(23,1)
D-34	Sr-90+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-03	8.000E-03	RTF(23,2)
D-34	Sr-90+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(23,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(24,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(24,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(24,3)
D-34				

Attachment 5 Sheet No. 4 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 5
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(25,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(25,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(25,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(26,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(26,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(26,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(27,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(27,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(27,3)
D-34				
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(28,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(28,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(28,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(29,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(29,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(29,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(30,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(30,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(30,3)
D-34				
D-34	U-236 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(31,1)
D-34	U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(31,2)
D-34	U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(31,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Ag-108m+D , fish	5.000E+00	5.000E+00	BIOFAC(2,1)
D-5	Ag-108m+D , crustacea and mollusks	7.700E+02	7.700E+02	BIOFAC(2,2)
D-5				
D-5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(3,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
D-5				
D-5	C-14 , fish	5.000E+04	5.000E+04	BIOFAC(4,1)
D-5	C-14 , crustacea and mollusks	9.100E+03	9.100E+03	BIOFAC(4,2)
D-5				
D-5	Co-60 , fish	3.000E+02	3.000E+02	BIOFAC(5,1)
D-5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(5,2)
D-5				
D-5	Cs-137+D , fish	2.000E+03	2.000E+03	BIOFAC(6,1)
D-5	Cs-137+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(6,2)
D-5				
D-5	Eu-152 , fish	5.000E+01	5.000E+01	BIOFAC(7,1)
D-5	Eu-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(7,2)
D-5				

Attachment 5 Sheet No. 5 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 6
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	Eu-154 , fish	5.000E+01	5.000E+01	BIOFAC(9,1)
D-5	Eu-154 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(9,2)
D-5	Gd-152 , fish	2.500E+01	2.500E+01	BIOFAC(10,1)
D-5	Gd-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(10,2)
D-5	H-3 , fish	1.000E+00	1.000E+00	BIOFAC(11,1)
D-5	H-3 , crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(11,2)
D-5	Ni-63 , fish	1.000E+02	1.000E+02	BIOFAC(12,1)
D-5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(12,2)
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(13,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(13,2)
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(14,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(14,2)
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(15,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(15,2)
D-5	Pu-238 , fish	3.000E+01	3.000E+01	BIOFAC(16,1)
D-5	Pu-238 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(16,2)
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(18,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(18,2)
D-5	Pu-240 , fish	3.000E+01	3.000E+01	BIOFAC(19,1)
D-5	Pu-240 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(19,2)
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(21,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(21,2)
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(22,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(22,2)
D-5	Sr-90+D , fish	6.000E+01	6.000E+01	BIOFAC(23,1)
D-5	Sr-90+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(23,2)
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(24,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(24,2)
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(25,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(25,2)
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(26,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(26,2)
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(27,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(27,2)

Attachment 5 Sheet No. 6 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 7
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(28,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(28,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(29,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(29,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(30,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(30,2)
D-5				
D-5	U-236 , fish	1.000E+01	1.000E+01	BIOFAC(31,1)
D-5	U-236 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(31,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Attachment 5 Sheet No. 7 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 8
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	5.478E+03	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	8.500E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	1.640E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	7.000E+00	1.000E+01	---	T(4)
R011	Times for calculations (yr)	1.100E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	4.300E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	1.350E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	3.000E+02	1.000E+03	---	T(8)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ag-108m	1.300E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Am-241	8.900E-02	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): C-14	3.200E-01	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Co-60	7.400E-02	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Cs-137	4.500E-01	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Eu-152	1.400E-01	0.000E+00	---	S1(7)
R012	Initial principal radionuclide (pCi/g): Eu-154	6.300E-02	0.000E+00	---	S1(9)
R012	Initial principal radionuclide (pCi/g): H-3	2.000E+00	0.000E+00	---	S1(11)
R012	Initial principal radionuclide (pCi/g): Ni-63	4.400E+00	0.000E+00	---	S1(12)
R012	Initial principal radionuclide (pCi/g): Pu-238	1.000E-01	0.000E+00	---	S1(16)
R012	Initial principal radionuclide (pCi/g): Pu-239	1.050E-01	0.000E+00	---	S1(18)
R012	Initial principal radionuclide (pCi/g): Pu-240	2.500E-02	0.000E+00	---	S1(19)
R012	Initial principal radionuclide (pCi/g): Sr-90	2.200E-01	0.000E+00	---	S1(23)
R012	Concentration in groundwater (pCi/L): Ag-108m	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): C-14	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Cs-137	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Eu-152	not used	0.000E+00	---	W1(7)
R012	Concentration in groundwater (pCi/L): Eu-154	not used	0.000E+00	---	W1(9)
R012	Concentration in groundwater (pCi/L): H-3	not used	0.000E+00	---	W1(11)
R012	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(12)
R012	Concentration in groundwater (pCi/L): Pu-238	not used	0.000E+00	---	W1(16)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(18)
R012	Concentration in groundwater (pCi/L): Pu-240	not used	0.000E+00	---	W1(19)
R012	Concentration in groundwater (pCi/L): Sr-90	not used	0.000E+00	---	W1(23)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	1.500E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	2.500E+02	1.000E+01	---	HCCZ

Attachment 5 Sheet No. 8 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	3.400E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	8.000E+00	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.100E-01	5.000E-01	---	EVAPTR
R013	Precipitation (m/yr)	1.600E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	7.600E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.500E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	1.500E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	5.530E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.250E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	4.600E+00	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	0	1	---	NS
R016	Distribution coefficients for Ag-108m				
R016	Contaminated zone (cm**3/g)	9.000E+01	0.000E+00	---	DCNUCC(2)
R016	Saturated zone (cm**3/g)	9.000E+01	0.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.521E-05	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Am-241				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+01	---	DCNUCC(3)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for C-14				
R016	Contaminated zone (cm**3/g)	2.000E+02	0.000E+00	---	DCNUCC(4)
R016	Saturated zone (cm**3/g)	2.000E+02	0.000E+00	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm**3/g)	5.000E+01	1.000E+03	---	DCNUCC(5)
R016	Saturated zone (cm**3/g)	5.000E+01	1.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)

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Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Cs-137				
R016	Contaminated zone (cm**3/g)	5.000E+01	4.600E+03	---	DCNUCC(6)
R016	Saturated zone (cm**3/g)	5.000E+01	4.600E+03	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)
R016	Distribution coefficients for Eu-152				
R016	Contaminated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCC(7)
R016	Saturated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCS(7)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(7)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(7)
R016	Distribution coefficients for Eu-154				
R016	Contaminated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCC(9)
R016	Saturated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)
R016	Distribution coefficients for H-3				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(11)
R016	Saturated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.854E-02	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for Ni-63				
R016	Contaminated zone (cm**3/g)	3.000E+01	1.000E+03	---	DCNUCC(12)
R016	Saturated zone (cm**3/g)	3.000E+01	1.000E+03	---	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.951E-04	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for Pu-238				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(16)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(16)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(16)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(16)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(18)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(18)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(18)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)
R016	Distribution coefficients for Pu-240				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(19)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(19)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(19)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(19)

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Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Sr-90				
R016	Contaminated zone (cm**3/g)	2.500E+01	3.000E+01	---	DCNUCC(23)
R016	Saturated zone (cm**3/g)	2.500E+01	3.000E+01	---	DCNUCS(23)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.339E-04	ALEACH(23)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(23)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.921E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Gd-152				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCC(10)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.123E-06	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for daughter Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(13)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.282E-05	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(14)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(15)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.869E-05	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(21)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(21)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.380E-05	ALEACH(21)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(21)
R016	Distribution coefficients for daughter Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(22)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(22)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.380E-05	ALEACH(22)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(22)

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Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

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Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Th-228				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(24)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(24)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(24)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(24)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(25)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(25)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(25)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(25)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(26)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(26)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(26)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(26)
R016	Distribution coefficients for daughter Th-232				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(27)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(27)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(27)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(27)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(28)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(28)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(28)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(28)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(29)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(29)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(29)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(29)
R016	Distribution coefficients for daughter U-235				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(30)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(30)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(30)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(30)
R016	Distribution coefficients for daughter U-236				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(31)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(31)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(31)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(31)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH

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Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
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Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	8.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.000E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.100E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	2.700E+00	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	1.000E+02	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	3.600E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	1.970E+01	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	7.300E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	7.300E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.274E+00	FMEAT
R018	Contamination fraction of milk	-1	-1	0.274E+00	FMILK

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Chk'd By M. W. Perrott Date
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Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	2.000E-05	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	3.000E-02	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	2.000E-02	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	9.800E-01	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	3.000E-01	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	7.000E-07	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	1.000E-10	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	8.000E-01	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	2.000E-01	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	8.894E+01	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 15
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	1	---	---	LYMAX
TITL	Maximum number of integration points for risk	5	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Attachment 5 Sheet No. 15 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

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1RESRAD, Version 6.3      T« Limit = 180 days        07/11/2007  15:00  Page  16
 Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
 File    : 118-F-1_Process_Trench_SZ.RAD

     Contaminated Zone Dimensions           Initial Soil Concentrations, pCi/g
     ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ           ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
       Area:   5478.00 square meters              Ag-108m    1.300E-02
  Thickness:      8.50 meters                     Am-241     8.900E-02
Cover Depth:      0.00 meters                     C-14       3.200E-01
                                                  Co-60      7.400E-02
                                                  Cs-137     4.500E-01
                                                  Eu-152     1.400E-01
                                                  Eu-154     6.300E-02
                                                  H-3        2.000E+00
                                                  Ni-63      4.400E+00
                                                  Pu-238     1.000E-01
                                                  Pu-239     1.050E-01
                                                  Pu-240     2.500E-02
                                                  Sr-90      2.200E-01
0
                                   Total Dose TDOSE(t), mrem/yr
                               Basic Radiation Dose Limit = 1.500E+01 mrem/yr
                Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)
                ÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄÄ
   t (years):  0.000E+00  1.000E+00  3.000E+00  7.000E+00  1.100E+01  4.300E+01  1.350E+02  3.000E+02  1.000E+03
    TDOSE(t):  4.055E+00  3.703E+00  3.248E+00  2.641E+00  2.208E+00  9.054E-01  2.216E-01  1.032E-01  6.005E-02
       M(t):  2.703E-01  2.469E-01  2.166E-01  1.761E-01  1.472E-01  6.036E-02  1.477E-02  6.883E-03  4.004E-03
OMaximum TDOSE(t):  4.055E+00 mrem/yr   at t = 0.000E+00 years
```

Attachment 5 Sheet No. 16 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 17
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	7.879E-02	0.0194	1.396E-07	0.0000	0.000E+00	0.0000	8.373E-04	0.0002	3.136E-05	0.0000	5.935E-04	0.0001	5.785E-06	0.0000
Am-241	2.532E-03	0.0006	1.499E-03	0.0004	0.000E+00	0.0000	1.827E-02	0.0045	9.076E-05	0.0000	9.853E-06	0.0000	1.892E-02	0.0047
C-14	2.832E-06	0.0000	8.033E-05	0.0000	0.000E+00	0.0000	3.044E-01	0.0751	3.258E-02	0.0080	2.641E-02	0.0065	3.906E-05	0.0000
Co-60	7.576E-01	0.1868	6.148E-07	0.0000	0.000E+00	0.0000	8.974E-03	0.0022	2.332E-03	0.0006	5.343E-04	0.0001	1.163E-04	0.0000
Cs-137	9.632E-01	0.2375	5.446E-07	0.0000	0.000E+00	0.0000	5.072E-02	0.0125	2.143E-02	0.0053	1.331E-02	0.0033	1.314E-03	0.0003
Eu-152	6.204E-01	0.1530	1.174E-06	0.0000	0.000E+00	0.0000	1.278E-04	0.0000	1.199E-05	0.0000	7.923E-07	0.0000	5.298E-05	0.0000
Eu-154	3.056E-01	0.0754	6.835E-07	0.0000	0.000E+00	0.0000	8.478E-05	0.0000	7.952E-06	0.0000	5.254E-07	0.0000	3.514E-05	0.0000
H-3	0.000E+00	0.0000	1.291E-03	0.0003	0.000E+00	0.0000	4.761E-02	0.0117	3.258E-03	0.0008	5.497E-03	0.0014	7.475E-06	0.0000
Ni-63	0.000E+00	0.0000	1.050E-06	0.0000	0.000E+00	0.0000	7.153E-03	0.0018	4.882E-04	0.0001	4.520E-03	0.0011	1.483E-04	0.0000
Pu-238	1.013E-05	0.0000	1.487E-03	0.0004	0.000E+00	0.0000	1.804E-02	0.0044	1.793E-04	0.0000	4.866E-06	0.0000	1.869E-02	0.0046
Pu-239	1.988E-05	0.0000	1.709E-03	0.0004	0.000E+00	0.0000	2.096E-02	0.0052	2.083E-04	0.0001	5.652E-06	0.0000	2.171E-02	0.0054
Pu-240	2.439E-06	0.0000	4.069E-04	0.0001	0.000E+00	0.0000	4.990E-03	0.0012	4.959E-05	0.0000	1.346E-06	0.0000	5.168E-03	0.0013
Sr-90	3.417E-03	0.0008	1.092E-05	0.0000	0.000E+00	0.0000	5.683E-01	0.1401	5.542E-02	0.0137	3.131E-02	0.0077	1.963E-03	0.0005
Total	2.732E+00	0.6736	6.488E-03	0.0016	0.000E+00	0.0000	1.050E+00	0.2591	1.161E-01	0.0286	8.219E-02	0.0203	6.817E-02	0.0168

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.026E-02	0.0198
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.132E-02	0.0102
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.636E-01	0.0897
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.696E-01	0.1898
Cs-137	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.050E+00	0.2589
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.206E-01	0.1530
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.058E-01	0.0754
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.766E-02	0.0142
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.231E-02	0.0030
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.841E-02	0.0095
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.461E-02	0.0110
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.062E-02	0.0026
Sr-90	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.604E-01	0.1629
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.055E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 17 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 18
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	7.836E-02	0.0212	1.388E-07	0.0000	0.000E+00	0.0000	8.327E-04	0.0002	3.118E-05	0.0000	5.903E-04	0.0002	5.753E-06	0.0000
Am-241	2.528E-03	0.0007	1.497E-03	0.0004	0.000E+00	0.0000	1.824E-02	0.0049	9.061E-05	0.0000	9.837E-06	0.0000	1.889E-02	0.0051
C-14	1.297E-06	0.0000	3.679E-05	0.0000	0.000E+00	0.0000	1.437E-01	0.0388	1.714E-02	0.0046	1.334E-02	0.0036	1.789E-05	0.0000
Co-60	6.642E-01	0.1793	5.390E-07	0.0000	0.000E+00	0.0000	7.867E-03	0.0021	2.044E-03	0.0006	4.684E-04	0.0001	1.019E-04	0.0000
Cs-137	9.411E-01	0.2541	5.321E-07	0.0000	0.000E+00	0.0000	4.955E-02	0.0134	2.094E-02	0.0057	1.301E-02	0.0035	1.284E-03	0.0003
Eu-152	5.889E-01	0.1590	1.114E-06	0.0000	0.000E+00	0.0000	1.214E-04	0.0000	1.138E-05	0.0000	7.521E-07	0.0000	5.029E-05	0.0000
Eu-154	2.825E-01	0.0763	6.317E-07	0.0000	0.000E+00	0.0000	7.836E-05	0.0000	7.350E-06	0.0000	4.856E-07	0.0000	3.247E-05	0.0000
H-3	0.000E+00	0.0000	7.112E-04	0.0002	0.000E+00	0.0000	2.676E-02	0.0072	1.975E-03	0.0005	3.241E-03	0.0009	4.118E-06	0.0000
Ni-63	0.000E+00	0.0000	1.042E-06	0.0000	0.000E+00	0.0000	7.100E-03	0.0019	4.846E-04	0.0001	4.487E-03	0.0012	1.472E-04	0.0000
Pu-238	1.005E-05	0.0000	1.475E-03	0.0004	0.000E+00	0.0000	1.790E-02	0.0048	1.779E-04	0.0000	4.828E-06	0.0000	1.854E-02	0.0050
Pu-239	1.987E-05	0.0000	1.709E-03	0.0005	0.000E+00	0.0000	2.096E-02	0.0057	2.083E-04	0.0001	5.652E-06	0.0000	2.171E-02	0.0059
Pu-240	2.438E-06	0.0000	4.068E-04	0.0001	0.000E+00	0.0000	4.990E-03	0.0013	4.958E-05	0.0000	1.346E-06	0.0000	5.168E-03	0.0014
Sr-90	3.336E-03	0.0009	1.066E-05	0.0000	0.000E+00	0.0000	5.548E-01	0.1498	5.411E-02	0.0146	3.056E-02	0.0083	1.917E-03	0.0005
Total	2.561E+00	0.6915	5.850E-03	0.0016	0.000E+00	0.0000	8.528E-01	0.2303	9.727E-02	0.0263	6.572E-02	0.0177	6.786E-02	0.0183

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.982E-02	0.0216
Am-241	1.477E-14	0.0000	3.530E-17	0.0000	0.000E+00	0.0000	1.443E-15	0.0000	1.941E-17	0.0000	1.339E-16	0.0000	4.125E-02	0.0111
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.742E-01	0.0470
Co-60	3.256E-06	0.0000	1.725E-07	0.0000	0.000E+00	0.0000	3.339E-07	0.0000	2.522E-07	0.0000	1.001E-07	0.0000	6.747E-01	0.1822
Cs-137	4.101E-05	0.0000	1.409E-05	0.0000	0.000E+00	0.0000	4.158E-06	0.0000	4.761E-06	0.0000	5.039E-06	0.0000	1.026E+00	0.2770
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.891E-01	0.1591
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.826E-01	0.0763
H-3	3.906E-02	0.0105	7.232E-06	0.0000	0.000E+00	0.0000	1.118E-02	0.0030	4.601E-04	0.0001	1.567E-03	0.0004	8.497E-02	0.0229
Ni-63	2.178E-05	0.0000	3.975E-07	0.0000	0.000E+00	0.0000	2.306E-06	0.0000	5.595E-07	0.0000	7.548E-06	0.0000	1.225E-02	0.0033
Pu-238	1.013E-07	0.0000	2.237E-10	0.0000	0.000E+00	0.0000	1.042E-08	0.0000	1.662E-10	0.0000	1.018E-09	0.0000	3.811E-02	0.0103
Pu-239	3.499E-11	0.0000	7.733E-14	0.0000	0.000E+00	0.0000	3.599E-12	0.0000	5.753E-14	0.0000	3.515E-13	0.0000	4.461E-02	0.0120
Pu-240	2.519E-10	0.0000	5.564E-13	0.0000	0.000E+00	0.0000	2.591E-11	0.0000	4.132E-13	0.0000	2.531E-12	0.0000	1.062E-02	0.0029
Sr-90	4.484E-04	0.0001	5.067E-06	0.0000	0.000E+00	0.0000	5.130E-05	0.0000	1.917E-05	0.0000	1.586E-05	0.0000	6.453E-01	0.1742
Total	3.957E-02	0.0107	2.696E-05	0.0000	0.000E+00	0.0000	1.124E-02	0.0030	4.848E-04	0.0001	1.595E-03	0.0004	3.703E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 18 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 19
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	7.750E-02	0.0239	1.373E-07	0.0000	0.000E+00	0.0000	8.236E-04	0.0003	3.084E-05	0.0000	5.838E-04	0.0002	5.690E-06	0.0000
Am-241	2.520E-03	0.0008	1.492E-03	0.0005	0.000E+00	0.0000	1.818E-02	0.0056	9.032E-05	0.0000	9.805E-06	0.0000	1.883E-02	0.0058
C-14	2.719E-07	0.0000	7.711E-06	0.0000	0.000E+00	0.0000	3.011E-02	0.0093	3.594E-03	0.0011	2.796E-03	0.0009	3.750E-06	0.0000
Co-60	5.105E-01	0.1571	4.142E-07	0.0000	0.000E+00	0.0000	6.046E-03	0.0019	1.571E-03	0.0005	3.600E-04	0.0001	7.833E-05	0.0000
Cs-137	8.984E-01	0.2766	5.079E-07	0.0000	0.000E+00	0.0000	4.730E-02	0.0146	1.999E-02	0.0062	1.242E-02	0.0038	1.226E-03	0.0004
Eu-152	5.307E-01	0.1634	1.004E-06	0.0000	0.000E+00	0.0000	1.094E-04	0.0000	1.026E-05	0.0000	6.778E-07	0.0000	4.532E-05	0.0000
Eu-154	2.413E-01	0.0743	5.396E-07	0.0000	0.000E+00	0.0000	6.693E-05	0.0000	6.278E-06	0.0000	4.148E-07	0.0000	2.774E-05	0.0000
H-3	0.000E+00	0.0000	2.157E-04	0.0001	0.000E+00	0.0000	8.118E-03	0.0025	5.992E-04	0.0002	9.829E-04	0.0003	1.249E-06	0.0000
Ni-63	0.000E+00	0.0000	1.027E-06	0.0000	0.000E+00	0.0000	6.996E-03	0.0022	4.775E-04	0.0001	4.421E-03	0.0014	1.450E-04	0.0000
Pu-238	9.890E-06	0.0000	1.452E-03	0.0004	0.000E+00	0.0000	1.762E-02	0.0054	1.751E-04	0.0001	4.754E-06	0.0000	1.825E-02	0.0056
Pu-239	1.987E-05	0.0000	1.708E-03	0.0005	0.000E+00	0.0000	2.096E-02	0.0065	2.082E-04	0.0001	5.651E-06	0.0000	2.170E-02	0.0067
Pu-240	2.438E-06	0.0000	4.067E-04	0.0001	0.000E+00	0.0000	4.988E-03	0.0015	4.957E-05	0.0000	1.345E-06	0.0000	5.166E-03	0.0016
Sr-90	3.179E-03	0.0010	1.016E-05	0.0000	0.000E+00	0.0000	5.287E-01	0.1628	5.157E-02	0.0159	2.913E-02	0.0090	1.827E-03	0.0006
Total	2.264E+00	0.6970	5.296E-03	0.0016	0.000E+00	0.0000	6.901E-01	0.2124	7.837E-02	0.0241	5.071E-02	0.0156	6.730E-02	0.0207

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.894E-02	0.0243
Am-241	4.043E-13	0.0000	9.192E-16	0.0000	0.000E+00	0.0000	4.328E-14	0.0000	8.104E-16	0.0000	4.501E-15	0.0000	4.112E-02	0.0127
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.652E-02	0.0112
Co-60	7.545E-06	0.0000	4.121E-07	0.0000	0.000E+00	0.0000	8.273E-07	0.0000	9.019E-07	0.0000	2.813E-07	0.0000	5.185E-01	0.1596
Cs-137	1.181E-04	0.0000	4.181E-05	0.0000	0.000E+00	0.0000	1.279E-05	0.0000	2.115E-05	0.0000	1.759E-05	0.0000	9.795E-01	0.3015
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.309E-01	0.1634
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.414E-01	0.0743
H-3	6.725E-02	0.0207	1.258E-05	0.0000	0.000E+00	0.0000	1.971E-02	0.0061	8.747E-04	0.0003	2.787E-03	0.0009	1.006E-01	0.0310
Ni-63	6.457E-05	0.0000	1.200E-06	0.0000	0.000E+00	0.0000	7.107E-06	0.0000	2.064E-06	0.0000	2.490E-05	0.0000	1.214E-02	0.0037
Pu-238	9.081E-07	0.0000	2.052E-09	0.0000	0.000E+00	0.0000	9.805E-08	0.0000	1.926E-09	0.0000	1.036E-08	0.0000	3.751E-02	0.0115
Pu-239	3.154E-10	0.0000	7.128E-13	0.0000	0.000E+00	0.0000	3.405E-11	0.0000	6.700E-13	0.0000	3.599E-12	0.0000	4.460E-02	0.0137
Pu-240	2.271E-09	0.0000	5.130E-12	0.0000	0.000E+00	0.0000	2.451E-10	0.0000	4.813E-12	0.0000	2.591E-11	0.0000	1.061E-02	0.0033
Sr-90	1.286E-03	0.0004	1.477E-05	0.0000	0.000E+00	0.0000	1.524E-04	0.0000	6.677E-05	0.0000	5.006E-05	0.0000	6.160E-01	0.1896
Total	6.872E-02	0.0212	7.078E-05	0.0000	0.000E+00	0.0000	1.989E-02	0.0061	9.656E-04	0.0003	2.880E-03	0.0009	3.248E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 19 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 20
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	7.580E-02	0.0287	1.343E-07	0.0000	0.000E+00	0.0000	8.056E-04	0.0003	3.017E-05	0.0000	5.710E-04	0.0002	5.566E-06	0.0000
Am-241	2.504E-03	0.0009	1.482E-03	0.0006	0.000E+00	0.0000	1.806E-02	0.0068	8.974E-05	0.0000	9.741E-06	0.0000	1.870E-02	0.0071
C-14	1.192E-08	0.0000	3.381E-07	0.0000	0.000E+00	0.0000	1.320E-03	0.0005	1.576E-04	0.0001	1.226E-04	0.0000	1.644E-07	0.0000
Co-60	3.015E-01	0.1142	2.447E-07	0.0000	0.000E+00	0.0000	3.571E-03	0.0014	9.281E-04	0.0004	2.127E-04	0.0001	4.627E-05	0.0000
Cs-137	8.187E-01	0.3100	4.629E-07	0.0000	0.000E+00	0.0000	4.311E-02	0.0163	1.822E-02	0.0069	1.132E-02	0.0043	1.117E-03	0.0004
Eu-152	4.310E-01	0.1632	8.154E-07	0.0000	0.000E+00	0.0000	8.882E-05	0.0000	8.331E-06	0.0000	5.504E-07	0.0000	3.681E-05	0.0000
Eu-154	1.761E-01	0.0667	3.937E-07	0.0000	0.000E+00	0.0000	4.884E-05	0.0000	4.581E-06	0.0000	3.027E-07	0.0000	2.024E-05	0.0000
H-3	0.000E+00	0.0000	1.982E-05	0.0000	0.000E+00	0.0000	7.458E-04	0.0003	5.505E-05	0.0000	9.031E-05	0.0000	1.147E-07	0.0000
Ni-63	0.000E+00	0.0000	9.968E-07	0.0000	0.000E+00	0.0000	6.791E-03	0.0026	4.635E-04	0.0002	4.292E-03	0.0016	1.408E-04	0.0001
Pu-238	9.581E-06	0.0000	1.407E-03	0.0005	0.000E+00	0.0000	1.707E-02	0.0065	1.696E-04	0.0001	4.609E-06	0.0000	1.768E-02	0.0067
Pu-239	1.987E-05	0.0000	1.708E-03	0.0006	0.000E+00	0.0000	2.095E-02	0.0079	2.082E-04	0.0001	5.650E-06	0.0000	2.170E-02	0.0082
Pu-240	2.436E-06	0.0000	4.065E-04	0.0002	0.000E+00	0.0000	4.986E-03	0.0019	4.954E-05	0.0000	1.345E-06	0.0000	5.164E-03	0.0020
Sr-90	2.888E-03	0.0011	9.229E-06	0.0000	0.000E+00	0.0000	4.803E-01	0.1818	4.684E-02	0.0177	2.646E-02	0.0100	1.659E-03	0.0006
Total	1.809E+00	0.6847	5.036E-03	0.0019	0.000E+00	0.0000	5.978E-01	0.2263	6.722E-02	0.0255	4.308E-02	0.0163	6.627E-02	0.0251

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+00 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.722E-02	0.0292
Am-241	5.156E-12	0.0000	1.172E-14	0.0000	0.000E+00	0.0000	5.609E-13	0.0000	1.140E-14	0.0000	6.013E-14	0.0000	4.085E-02	0.0155
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.601E-03	0.0006
Co-60	1.042E-05	0.0000	5.738E-07	0.0000	0.000E+00	0.0000	1.163E-06	0.0000	1.370E-06	0.0000	4.076E-07	0.0000	3.063E-01	0.1160
Cs-137	2.515E-04	0.0001	8.982E-05	0.0000	0.000E+00	0.0000	2.774E-05	0.0000	4.954E-05	0.0000	3.933E-05	0.0000	8.929E-01	0.3380
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.312E-01	0.1632
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.761E-01	0.0667
H-3	3.631E-02	0.0137	6.869E-06	0.0000	0.000E+00	0.0000	1.091E-02	0.0041	5.205E-04	0.0002	1.557E-03	0.0006	5.022E-02	0.0190
Ni-63	1.464E-04	0.0001	2.735E-06	0.0000	0.000E+00	0.0000	1.629E-05	0.0000	4.941E-06	0.0000	5.808E-05	0.0000	1.192E-02	0.0045
Pu-238	4.880E-06	0.0000	1.110E-08	0.0000	0.000E+00	0.0000	5.341E-07	0.0000	1.107E-08	0.0000	5.770E-08	0.0000	3.635E-02	0.0138
Pu-239	1.712E-09	0.0000	3.894E-12	0.0000	0.000E+00	0.0000	1.874E-10	0.0000	3.894E-12	0.0000	2.024E-11	0.0000	4.459E-02	0.0169
Pu-240	1.233E-08	0.0000	2.803E-11	0.0000	0.000E+00	0.0000	1.349E-09	0.0000	2.796E-11	0.0000	1.457E-10	0.0000	1.061E-02	0.0040
Sr-90	2.728E-03	0.0010	3.148E-05	0.0000	0.000E+00	0.0000	3.265E-04	0.0001	1.488E-04	0.0001	1.090E-04	0.0000	5.615E-01	0.2126
Total	3.945E-02	0.0149	1.315E-04	0.0000	0.000E+00	0.0000	1.129E-02	0.0043	7.252E-04	0.0003	1.764E-03	0.0007	2.641E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 20 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 21
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.100E+01 years
0
Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	7.415E-02	0.0336	1.313E-07	0.0000	0.000E+00	0.0000	7.880E-04	0.0004	2.951E-05	0.0000	5.586E-04	0.0003	5.444E-06	0.0000
Am-241	2.488E-03	0.0011	1.472E-03	0.0007	0.000E+00	0.0000	1.794E-02	0.0081	8.917E-05	0.0000	9.678E-06	0.0000	1.858E-02	0.0084
C-14	5.211E-10	0.0000	1.478E-08	0.0000	0.000E+00	0.0000	5.772E-05	0.0000	6.891E-06	0.0000	5.361E-06	0.0000	7.187E-09	0.0000
Co-60	1.781E-01	0.0807	1.445E-07	0.0000	0.000E+00	0.0000	2.110E-03	0.0010	5.482E-04	0.0002	1.256E-04	0.0001	2.733E-05	0.0000
Cs-137	7.461E-01	0.3379	4.218E-07	0.0000	0.000E+00	0.0000	3.928E-02	0.0178	1.660E-02	0.0075	1.031E-02	0.0047	1.018E-03	0.0005
Eu-152	3.500E-01	0.1585	6.622E-07	0.0000	0.000E+00	0.0000	7.213E-05	0.0000	6.766E-06	0.0000	4.470E-07	0.0000	2.989E-05	0.0000
Eu-154	1.285E-01	0.0582	2.873E-07	0.0000	0.000E+00	0.0000	3.563E-05	0.0000	3.342E-06	0.0000	2.208E-07	0.0000	1.477E-05	0.0000
H-3	0.000E+00	0.0000	1.817E-06	0.0000	0.000E+00	0.0000	6.839E-05	0.0000	5.049E-06	0.0000	8.282E-06	0.0000	1.052E-08	0.0000
Ni-63	0.000E+00	0.0000	9.677E-07	0.0000	0.000E+00	0.0000	6.593E-03	0.0030	4.500E-04	0.0002	4.166E-03	0.0019	1.367E-04	0.0001
Pu-238	9.283E-06	0.0000	1.363E-03	0.0006	0.000E+00	0.0000	1.654E-02	0.0075	1.643E-04	0.0001	4.468E-06	0.0000	1.713E-02	0.0078
Pu-239	1.986E-05	0.0000	1.708E-03	0.0008	0.000E+00	0.0000	2.095E-02	0.0095	2.081E-04	0.0001	5.649E-06	0.0000	2.169E-02	0.0098
Pu-240	2.435E-06	0.0000	4.063E-04	0.0002	0.000E+00	0.0000	4.983E-03	0.0023	4.951E-05	0.0000	1.344E-06	0.0000	5.161E-03	0.0023
Sr-90	2.623E-03	0.0012	8.383E-06	0.0000	0.000E+00	0.0000	4.362E-01	0.1976	4.255E-02	0.0193	2.403E-02	0.0109	1.507E-03	0.0007
Total	1.482E+00	0.6711	4.962E-03	0.0022	0.000E+00	0.0000	5.457E-01	0.2471	6.071E-02	0.0275	3.923E-02	0.0178	6.530E-02	0.0296

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.100E+01 years
0
Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.553E-02	0.0342
Am-241	1.993E-11	0.0000	4.538E-14	0.0000	0.000E+00	0.0000	2.183E-12	0.0000	4.533E-14	0.0000	2.358E-13	0.0000	4.059E-02	0.0184
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.000E-05	0.0000
Co-60	9.675E-06	0.0000	5.342E-07	0.0000	0.000E+00	0.0000	1.086E-06	0.0000	1.304E-06	0.0000	3.835E-07	0.0000	1.809E-01	0.0819
Cs-137	3.603E-04	0.0002	1.290E-04	0.0001	0.000E+00	0.0000	3.995E-05	0.0000	7.275E-05	0.0000	5.709E-05	0.0000	8.139E-01	0.3686
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.501E-01	0.1586
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.285E-01	0.0582
H-3	3.344E-03	0.0015	6.327E-07	0.0000	0.000E+00	0.0000	1.005E-03	0.0005	4.795E-05	0.0000	1.434E-04	0.0001	4.625E-03	0.0021
Ni-63	2.235E-04	0.0001	4.181E-06	0.0000	0.000E+00	0.0000	2.494E-05	0.0000	7.651E-06	0.0000	8.934E-05	0.0000	1.170E-02	0.0053
Pu-238	1.188E-05	0.0000	2.707E-08	0.0000	0.000E+00	0.0000	1.305E-06	0.0000	2.746E-08	0.0000	1.419E-07	0.0000	3.522E-02	0.0159
Pu-239	4.213E-09	0.0000	9.600E-12	0.0000	0.000E+00	0.0000	4.628E-10	0.0000	9.763E-12	0.0000	5.028E-11	0.0000	4.458E-02	0.0202
Pu-240	3.032E-08	0.0000	6.907E-11	0.0000	0.000E+00	0.0000	3.331E-09	0.0000	7.003E-11	0.0000	3.620E-10	0.0000	1.060E-02	0.0048
Sr-90	3.897E-03	0.0018	4.502E-05	0.0000	0.000E+00	0.0000	4.677E-04	0.0002	2.153E-04	0.0001	1.568E-04	0.0001	5.117E-01	0.2318
Total	7.847E-03	0.0036	1.794E-04	0.0001	0.000E+00	0.0000	1.540E-03	0.0007	3.450E-04	0.0002	4.471E-04	0.0002	2.208E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 21 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 22
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.300E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	6.214E-02	0.0686	1.101E-07	0.0000	0.000E+00	0.0000	6.603E-04	0.0007	2.473E-05	0.0000	4.681E-04	0.0005	4.562E-06	0.0000
Am-241	2.362E-03	0.0026	1.397E-03	0.0015	0.000E+00	0.0000	1.704E-02	0.0188	8.470E-05	0.0001	9.186E-06	0.0000	1.764E-02	0.0195
C-14	6.248E-21	0.0000	1.772E-19	0.0000	0.000E+00	0.0000	6.922E-16	0.0000	8.270E-17	0.0000	6.432E-17	0.0000	8.617E-20	0.0000
Co-60	2.639E-03	0.0029	2.142E-09	0.0000	0.000E+00	0.0000	3.126E-05	0.0000	8.124E-06	0.0000	1.862E-06	0.0000	4.050E-07	0.0000
Cs-137	3.548E-01	0.3919	2.006E-07	0.0000	0.000E+00	0.0000	1.868E-02	0.0206	7.896E-03	0.0087	4.905E-03	0.0054	4.841E-04	0.0005
Eu-152	6.623E-02	0.0732	1.253E-07	0.0000	0.000E+00	0.0000	1.365E-05	0.0000	1.280E-06	0.0000	8.458E-08	0.0000	5.656E-06	0.0000
Eu-154	1.032E-02	0.0114	2.308E-08	0.0000	0.000E+00	0.0000	2.863E-06	0.0000	2.685E-07	0.0000	1.774E-08	0.0000	1.186E-06	0.0000
H-3	0.000E+00	0.0000	8.497E-15	0.0000	0.000E+00	0.0000	3.198E-13	0.0000	2.362E-14	0.0000	3.874E-14	0.0000	4.920E-17	0.0000
Ni-63	0.000E+00	0.0000	7.632E-07	0.0000	0.000E+00	0.0000	5.200E-03	0.0057	3.549E-04	0.0004	3.286E-03	0.0036	1.078E-04	0.0001
Pu-238	7.204E-06	0.0000	1.057E-03	0.0012	0.000E+00	0.0000	1.283E-02	0.0142	1.275E-04	0.0001	3.489E-06	0.0000	1.329E-02	0.0147
Pu-239	1.983E-05	0.0000	1.705E-03	0.0019	0.000E+00	0.0000	2.091E-02	0.0231	2.077E-04	0.0002	5.638E-06	0.0000	2.165E-02	0.0239
Pu-240	2.425E-06	0.0000	4.045E-04	0.0004	0.000E+00	0.0000	4.962E-03	0.0055	4.930E-05	0.0001	1.338E-06	0.0000	5.138E-03	0.0057
Sr-90	1.215E-03	0.0013	3.885E-06	0.0000	0.000E+00	0.0000	2.022E-01	0.2233	1.972E-02	0.0218	1.114E-02	0.0123	6.984E-04	0.0008
Total	4.998E-01	0.5520	4.569E-03	0.0050	0.000E+00	0.0000	2.825E-01	0.3120	2.847E-02	0.0314	1.982E-02	0.0219	5.902E-02	0.0652

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.300E+01 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.329E-02	0.0699
Am-241	1.149E-09	0.0000	2.626E-12	0.0000	0.000E+00	0.0000	1.267E-10	0.0000	2.705E-12	0.0000	1.386E-11	0.0000	3.852E-02	0.0426
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.395E-16	0.0000
Co-60	5.621E-07	0.0000	3.113E-08	0.0000	0.000E+00	0.0000	6.347E-08	0.0000	7.812E-08	0.0000	2.265E-08	0.0000	2.682E-03	0.0030
Cs-137	6.719E-04	0.0007	2.413E-04	0.0003	0.000E+00	0.0000	7.496E-05	0.0001	1.399E-04	0.0002	1.082E-04	0.0001	3.881E-01	0.4286
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.625E-02	0.0732
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.033E-02	0.0114
H-3	1.621E-11	0.0000	3.068E-15	0.0000	0.000E+00	0.0000	4.875E-12	0.0000	2.325E-13	0.0000	6.955E-13	0.0000	2.241E-11	0.0000
Ni-63	6.915E-04	0.0008	1.296E-05	0.0000	0.000E+00	0.0000	7.746E-05	0.0001	2.411E-05	0.0000	2.791E-04	0.0003	1.004E-02	0.0111
Pu-238	1.624E-04	0.0002	3.708E-07	0.0000	0.000E+00	0.0000	1.793E-05	0.0000	3.841E-07	0.0000	1.964E-06	0.0000	2.750E-02	0.0304
Pu-239	6.249E-08	0.0000	1.430E-10	0.0000	0.000E+00	0.0000	6.898E-09	0.0000	1.490E-10	0.0000	7.545E-10	0.0000	4.450E-02	0.0492
Pu-240	4.490E-07	0.0000	1.025E-09	0.0000	0.000E+00	0.0000	4.956E-08	0.0000	1.061E-09	0.0000	5.427E-09	0.0000	1.056E-02	0.0117
Sr-90	7.087E-03	0.0078	8.201E-05	0.0001	0.000E+00	0.0000	8.534E-04	0.0009	3.982E-04	0.0004	2.876E-04	0.0003	2.436E-01	0.2691
Total	8.614E-03	0.0095	3.366E-04	0.0004	0.000E+00	0.0000	1.024E-03	0.0011	5.626E-04	0.0006	6.769E-04	0.0007	9.054E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 22 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 23
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.350E+02 years
0
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	3.738E-02	0.1687	6.622E-08	0.0000	0.000E+00	0.0000	3.973E-04	0.0018	1.488E-05	0.0001	2.816E-04	0.0013	2.745E-06	0.0000
Am-241	2.034E-03	0.0092	1.203E-03	0.0054	0.000E+00	0.0000	1.467E-02	0.0662	7.308E-05	0.0003	7.907E-06	0.0000	1.518E-02	0.0685
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	1.454E-08	0.0000	1.180E-14	0.0000	0.000E+00	0.0000	1.723E-10	0.0000	4.476E-11	0.0000	1.026E-11	0.0000	2.231E-12	0.0000
Cs-137	4.190E-02	0.1891	2.369E-08	0.0000	0.000E+00	0.0000	2.206E-03	0.0100	9.324E-04	0.0042	5.791E-04	0.0026	5.716E-05	0.0003
Eu-152	5.524E-04	0.0025	1.045E-09	0.0000	0.000E+00	0.0000	1.138E-07	0.0000	1.068E-08	0.0000	7.054E-10	0.0000	4.717E-08	0.0000
Eu-154	7.335E-06	0.0000	1.640E-11	0.0000	0.000E+00	0.0000	2.035E-09	0.0000	1.909E-10	0.0000	1.261E-11	0.0000	8.433E-10	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	3.858E-07	0.0000	0.000E+00	0.0000	2.629E-03	0.0119	1.794E-04	0.0008	1.661E-03	0.0075	5.449E-05	0.0002
Pu-238	3.479E-06	0.0000	5.099E-04	0.0023	0.000E+00	0.0000	6.187E-03	0.0279	6.148E-05	0.0003	1.725E-06	0.0000	6.407E-03	0.0289
Pu-239	1.973E-05	0.0001	1.695E-03	0.0077	0.000E+00	0.0000	2.080E-02	0.0938	2.066E-04	0.0009	5.608E-06	0.0000	2.154E-02	0.0972
Pu-240	2.395E-06	0.0000	3.995E-04	0.0018	0.000E+00	0.0000	4.900E-03	0.0221	4.869E-05	0.0002	1.322E-06	0.0000	5.075E-03	0.0229
Sr-90	1.331E-04	0.0006	4.255E-07	0.0000	0.000E+00	0.0000	2.215E-02	0.0999	2.160E-03	0.0097	1.220E-03	0.0055	7.650E-05	0.0003
Total	8.203E-02	0.3702	3.808E-03	0.0172	0.000E+00	0.0000	7.393E-02	0.3336	3.676E-03	0.0166	3.758E-03	0.0170	4.839E-02	0.2184

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.350E+02 years
0
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.808E-02	0.1718
Am-241	2.491E-08	0.0000	5.718E-11	0.0000	0.000E+00	0.0000	2.753E-09	0.0000	5.917E-11	0.0000	3.017E-10	0.0000	3.317E-02	0.1497
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	9.790E-12	0.0000	5.426E-13	0.0000	0.000E+00	0.0000	1.107E-12	0.0000	1.370E-12	0.0000	3.960E-13	0.0000	1.479E-08	0.0000
Cs-137	2.508E-04	0.0011	9.012E-05	0.0004	0.000E+00	0.0000	2.802E-05	0.0001	5.259E-05	0.0002	4.054E-05	0.0002	4.614E-02	0.2082
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.526E-04	0.0025
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.338E-06	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	1.107E-03	0.0050	2.076E-05	0.0001	0.000E+00	0.0000	1.242E-04	0.0006	3.877E-05	0.0002	4.480E-04	0.0020	6.263E-03	0.0283
Pu-238	6.802E-04	0.0031	1.554E-06	0.0000	0.000E+00	0.0000	7.519E-05	0.0003	1.619E-06	0.0000	8.252E-06	0.0000	1.394E-02	0.0629
Pu-239	3.569E-07	0.0000	8.299E-10	0.0000	0.000E+00	0.0000	3.945E-08	0.0000	8.720E-10	0.0000	4.299E-09	0.0000	4.426E-02	0.1997
Pu-240	2.541E-06	0.0000	5.805E-09	0.0000	0.000E+00	0.0000	2.809E-07	0.0000	6.045E-09	0.0000	3.082E-08	0.0000	1.043E-02	0.0471
Sr-90	2.463E-03	0.0111	2.851E-05	0.0001	0.000E+00	0.0000	2.968E-04	0.0013	1.389E-04	0.0006	1.002E-04	0.0005	2.876E-02	0.1298
Total	4.505E-03	0.0203	1.410E-04	0.0006	0.000E+00	0.0000	5.245E-04	0.0024	2.319E-04	0.0010	5.970E-04	0.0027	2.216E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 23 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 24
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	1.503E-02	0.1456	2.662E-08	0.0000	0.000E+00	0.0000	1.597E-04	0.0015	5.980E-06	0.0001	1.132E-04	0.0011	1.103E-06	0.0000
Am-241	1.556E-03	0.0151	9.186E-04	0.0089	0.000E+00	0.0000	1.123E-02	0.1087	5.616E-05	0.0005	6.043E-06	0.0001	1.159E-02	0.1123
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	5.383E-18	0.0000	4.368E-24	0.0000	0.000E+00	0.0000	6.376E-20	0.0000	1.657E-20	0.0000	3.796E-21	0.0000	8.259E-22	0.0000
Cs-137	9.081E-04	0.0088	5.134E-10	0.0000	0.000E+00	0.0000	4.782E-05	0.0005	2.021E-05	0.0002	1.255E-05	0.0001	1.239E-06	0.0000
Eu-152	1.033E-07	0.0000	1.954E-13	0.0000	0.000E+00	0.0000	2.128E-11	0.0000	1.996E-12	0.0000	1.319E-13	0.0000	8.819E-12	0.0000
Eu-154	1.656E-11	0.0000	3.703E-17	0.0000	0.000E+00	0.0000	4.593E-15	0.0000	4.308E-16	0.0000	2.846E-17	0.0000	1.903E-15	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	1.135E-07	0.0000	0.000E+00	0.0000	7.733E-04	0.0075	5.278E-05	0.0005	4.887E-04	0.0047	1.603E-05	0.0002
Pu-238	9.598E-07	0.0000	1.379E-04	0.0013	0.000E+00	0.0000	1.673E-03	0.0162	1.663E-05	0.0002	5.071E-07	0.0000	1.732E-03	0.0168
Pu-239	1.954E-05	0.0002	1.679E-03	0.0163	0.000E+00	0.0000	2.060E-02	0.1995	2.047E-04	0.0020	5.555E-06	0.0001	2.133E-02	0.2066
Pu-240	2.342E-06	0.0000	3.907E-04	0.0038	0.000E+00	0.0000	4.792E-03	0.0464	4.761E-05	0.0005	1.293E-06	0.0000	4.963E-03	0.0481
Sr-90	2.523E-06	0.0000	8.063E-09	0.0000	0.000E+00	0.0000	4.196E-04	0.0041	4.092E-05	0.0004	2.311E-05	0.0002	1.449E-06	0.0000
Total	1.752E-02	0.1697	3.126E-03	0.0303	0.000E+00	0.0000	3.969E-02	0.3844	4.449E-04	0.0043	6.510E-04	0.0063	3.964E-02	0.3839

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.531E-02	0.1483
Am-241	1.236E-07	0.0000	2.859E-10	0.0000	0.000E+00	0.0000	1.366E-08	0.0000	2.939E-10	0.0000	1.497E-09	0.0000	2.536E-02	0.2456
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	8.151E-21	0.0000	4.518E-22	0.0000	0.000E+00	0.0000	9.221E-22	0.0000	1.143E-21	0.0000	3.300E-22	0.0000	5.479E-18	0.0000
Cs-137	1.223E-05	0.0001	4.394E-06	0.0000	0.000E+00	0.0000	1.367E-06	0.0000	2.569E-06	0.0000	1.978E-06	0.0000	1.012E-03	0.0098
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.033E-07	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.656E-11	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	7.358E-04	0.0071	1.380E-05	0.0001	0.000E+00	0.0000	8.251E-05	0.0008	2.579E-05	0.0002	2.978E-04	0.0029	2.487E-03	0.0241
Pu-238	7.665E-04	0.0074	1.754E-06	0.0000	0.000E+00	0.0000	8.474E-05	0.0008	1.826E-06	0.0000	9.303E-06	0.0001	4.425E-03	0.0429
Pu-239	7.345E-07	0.0000	1.783E-09	0.0000	0.000E+00	0.0000	8.120E-08	0.0000	1.863E-09	0.0000	8.720E-09	0.0000	4.384E-02	0.4246
Pu-240	5.112E-06	0.0000	1.168E-08	0.0000	0.000E+00	0.0000	5.651E-07	0.0000	1.217E-08	0.0000	6.203E-08	0.0000	1.020E-02	0.0988
Sr-90	1.057E-04	0.0010	1.223E-06	0.0000	0.000E+00	0.0000	1.274E-05	0.0001	5.966E-06	0.0001	4.300E-06	0.0000	6.175E-04	0.0060
Total	1.626E-03	0.0158	2.118E-05	0.0002	0.000E+00	0.0000	1.820E-04	0.0018	3.616E-05	0.0004	3.135E-04	0.0030	1.032E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 24 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 25
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	3.147E-04	0.0052	5.574E-10	0.0000	0.000E+00	0.0000	3.344E-06	0.0001	1.252E-07	0.0000	2.370E-06	0.0000	2.310E-08	0.0000
Am-241	5.044E-04	0.0084	2.931E-04	0.0049	0.000E+00	0.0000	3.638E-03	0.0606	1.887E-05	0.0003	1.938E-06	0.0000	3.699E-03	0.0616
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	7.915E-11	0.0000	4.475E-17	0.0000	0.000E+00	0.0000	4.168E-12	0.0000	1.761E-12	0.0000	1.094E-12	0.0000	1.080E-13	0.0000
Eu-152	1.574E-23	0.0000	4.414E-17	0.0000	0.000E+00	0.0000	1.086E-16	0.0000	1.019E-17	0.0000	2.693E-19	0.0000	4.502E-17	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	6.320E-10	0.0000	0.000E+00	0.0000	4.306E-06	0.0001	2.939E-07	0.0000	2.721E-06	0.0000	8.924E-08	0.0000
Pu-238	1.659E-07	0.0000	5.537E-07	0.0000	0.000E+00	0.0000	6.793E-06	0.0001	6.920E-08	0.0000	1.548E-08	0.0000	6.799E-06	0.0001
Pu-239	1.877E-05	0.0003	1.612E-03	0.0268	0.000E+00	0.0000	1.978E-02	0.3293	1.965E-04	0.0033	5.333E-06	0.0001	2.048E-02	0.3410
Pu-240	2.130E-06	0.0000	3.553E-04	0.0059	0.000E+00	0.0000	4.359E-03	0.0726	4.331E-05	0.0007	1.176E-06	0.0000	4.514E-03	0.0752
Sr-90	1.243E-13	0.0000	3.972E-16	0.0000	0.000E+00	0.0000	2.067E-11	0.0000	2.016E-12	0.0000	1.139E-12	0.0000	7.142E-14	0.0000
Total	8.402E-04	0.0140	2.261E-03	0.0377	0.000E+00	0.0000	2.779E-02	0.4627	2.592E-04	0.0043	1.355E-05	0.0002	2.870E-02	0.4779

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.205E-04	0.0053
Am-241	6.122E-07	0.0000	1.477E-09	0.0000	0.000E+00	0.0000	6.768E-08	0.0000	1.452E-09	0.0000	7.382E-09	0.0000	8.156E-03	0.1358
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	3.740E-12	0.0000	1.344E-12	0.0000	0.000E+00	0.0000	4.181E-13	0.0000	7.865E-13	0.0000	6.055E-13	0.0000	9.318E-11	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.082E-16	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	1.463E-05	0.0002	2.744E-07	0.0000	0.000E+00	0.0000	1.641E-06	0.0000	5.131E-07	0.0000	5.924E-06	0.0001	3.039E-05	0.0005
Pu-238	1.416E-04	0.0024	3.512E-07	0.0000	0.000E+00	0.0000	1.566E-05	0.0003	3.396E-07	0.0000	1.717E-06	0.0000	1.741E-04	0.0029
Pu-239	1.292E-06	0.0000	3.842E-09	0.0000	0.000E+00	0.0000	1.429E-07	0.0000	3.864E-09	0.0000	1.411E-08	0.0000	4.209E-02	0.7009
Pu-240	7.929E-06	0.0001	1.812E-08	0.0000	0.000E+00	0.0000	8.766E-07	0.0000	1.889E-08	0.0000	9.624E-08	0.0000	9.283E-03	0.1546
Sr-90	1.617E-11	0.0000	1.872E-13	0.0000	0.000E+00	0.0000	1.949E-12	0.0000	9.134E-13	0.0000	6.581E-13	0.0000	4.390E-11	0.0000
Total	1.661E-04	0.0028	6.490E-07	0.0000	0.000E+00	0.0000	1.839E-05	0.0003	8.769E-07	0.0000	7.759E-06	0.0001	6.005E-02	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 5 Sheet No. 25 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 26
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m+D	Ag-108m+D	1.000E+00	6.174E+00	6.140E+00	6.072E+00	5.940E+00	5.810E+00	4.869E+00	2.929E+00	1.178E+00	2.466E-02
OAm-241	Am-241	1.000E+00	4.643E-01	4.635E-01	4.620E-01	4.590E-01	4.560E-01	4.328E-01	3.724E-01	2.844E-01	9.068E-02
Am-241	Np-237+D	1.000E+00	0.000E+00	1.903E-06	5.822E-06	1.362E-05	2.137E-05	8.153E-05	2.377E-04	4.645E-04	9.546E-04
Am-241	U-233	1.000E+00	0.000E+00	2.453E-13	5.568E-12	6.757E-11	2.579E-10	1.463E-08	3.161E-07	1.566E-06	7.717E-06
Am-241	Th-229+D	1.000E+00	0.000E+00	2.255E-15	7.553E-15	3.189E-14	8.287E-14	5.112E-12	2.545E-10	2.989E-09	6.295E-08
Am-241	äDSR(j)		4.643E-01	4.635E-01	4.620E-01	4.590E-01	4.560E-01	4.329E-01	3.726E-01	2.849E-01	9.164E-02
OC-14	C-14	1.000E+00	1.136E+00	5.444E-01	1.141E-01	5.003E-03	2.187E-04	2.624E-15	0.000E+00	0.000E+00	0.000E+00
OCo-60	Co-60	1.000E+00	1.040E+01	9.117E+00	7.007E+00	4.139E+00	2.445E+00	3.624E-02	1.998E-07	7.404E-17	0.000E+00
OCs-137+D	Cs-137+D	1.000E+00	2.333E+00	2.280E+00	2.177E+00	1.984E+00	1.809E+00	8.623E-01	1.025E-01	2.250E-03	2.071E-10
OEu-152	Eu-152	7.208E-01	3.195E+00	3.033E+00	2.733E+00	2.220E+00	1.803E+00	3.411E-01	2.845E-03	5.319E-07	8.107E-23
OEu-152	Eu-152	2.792E-01	1.238E+00	1.175E+00	1.059E+00	8.598E-01	6.983E-01	1.321E-01	1.102E-03	2.060E-07	3.140E-23
Eu-152	Gd-152	2.792E-01	0.000E+00	7.594E-17	2.165E-16	4.572E-16	6.527E-16	1.338E-15	1.495E-15	1.495E-15	1.487E-15
Eu-152	äDSR(j)		1.238E+00	1.175E+00	1.059E+00	8.598E-01	6.983E-01	1.321E-01	1.102E-03	2.060E-07	1.487E-15
OEu-154	Eu-154	1.000E+00	4.853E+00	4.486E+00	3.832E+00	2.796E+00	2.040E+00	1.639E-01	1.165E-04	2.629E-10	2.920E-34
OH-3	H-3	1.000E+00	2.883E-02	4.249E-02	5.028E-02	2.511E-02	2.313E-03	1.121E-11	7.129E-36	0.000E+00	0.000E+00
ONi-63	Ni-63	1.000E+00	2.798E-03	2.785E-03	2.759E-03	2.708E-03	2.658E-03	2.281E-03	1.423E-03	5.652E-04	6.908E-06
OPu-238	Pu-238	1.840E-09	7.068E-10	7.012E-10	6.902E-10	6.687E-10	6.478E-10	5.026E-10	2.423E-10	6.549E-11	2.545E-13
OPu-238	Pu-238	1.000E+00	3.841E-01	3.811E-01	3.751E-01	3.634E-01	3.521E-01	2.732E-01	1.317E-01	3.559E-02	1.383E-04
Pu-238	U-234	1.000E+00	0.000E+00	1.312E-06	1.075E-05	5.618E-05	1.358E-04	1.837E-03	7.680E-03	8.653E-03	1.591E-03
Pu-238	Th-230	1.000E+00	0.000E+00	1.208E-12	1.191E-11	7.792E-11	2.247E-10	7.028E-09	1.103E-07	4.098E-07	1.043E-06
Pu-238	Ra-226+D	1.000E+00	0.000E+00	2.542E-14	5.363E-13	6.545E-12	2.501E-11	1.510E-09	4.446E-08	3.627E-07	3.824E-06
Pu-238	Pb-210+D	1.000E+00	0.000E+00	2.821E-14	1.398E-13	6.435E-13	1.899E-12	3.216E-10	3.313E-08	4.596E-07	6.587E-06
Pu-238	äDSR(j)		3.841E-01	3.811E-01	3.751E-01	3.635E-01	3.522E-01	2.750E-01	1.394E-01	4.425E-02	1.741E-03
OPu-239	Pu-239	1.000E+00	4.249E-01	4.248E-01	4.248E-01	4.247E-01	4.246E-01	4.238E-01	4.215E-01	4.175E-01	4.008E-01
Pu-239	U-235+D	1.000E+00	0.000E+00	9.085E-10	4.982E-09	2.209E-08	5.102E-08	6.918E-07	3.866E-06	7.820E-06	1.262E-05
Pu-239	Pa-231	1.000E+00	0.000E+00	9.968E-14	8.884E-13	5.693E-12	1.613E-11	5.193E-10	9.775E-09	5.158E-08	3.719E-07
Pu-239	Ac-227+D	1.000E+00	0.000E+00	6.943E-14	2.154E-13	1.088E-12	3.340E-12	3.928E-10	1.833E-08	1.314E-07	1.111E-06
Pu-239	äDSR(j)		4.249E-01	4.248E-01	4.248E-01	4.247E-01	4.246E-01	4.238E-01	4.215E-01	4.175E-01	4.009E-01
OPu-240	Pu-240	4.950E-08	2.103E-08	2.102E-08	2.102E-08	2.101E-08	2.099E-08	2.090E-08	2.065E-08	2.019E-08	1.836E-08

Attachment 5 Sheet No. 26 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 27
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Pu-240	Pu-240	1.000E+00	4.248E-01	4.247E-01	4.246E-01	4.244E-01	4.241E-01	4.223E-01	4.171E-01	4.079E-01	3.710E-01
Pu-240	U-236	1.000E+00	0.000E+00	1.305E-08	1.075E-07	5.678E-07	1.386E-06	2.032E-05	1.148E-04	2.309E-04	3.581E-04
Pu-240	Th-232	1.000E+00	0.000E+00	2.882E-19	1.080E-17	4.370E-17	9.798E-17	2.302E-15	4.226E-14	2.216E-13	1.584E-12
Pu-240	Ra-228+D	1.000E+00	0.000E+00	1.956E-19	1.672E-17	9.198E-17	2.693E-16	8.185E-15	1.254E-13	6.363E-13	4.555E-12
Pu-240	Th-228+D	1.000E+00	0.000E+00	1.648E-20	3.338E-18	2.928E-17	1.156E-16	5.372E-15	7.514E-14	3.635E-13	2.550E-12
Pu-240	äDSR(j)		4.248E-01	4.247E-01	4.246E-01	4.244E-01	4.241E-01	4.223E-01	4.172E-01	4.081E-01	3.713E-01
Sr-90+D	Sr-90+D	1.000E+00	3.002E+00	2.933E+00	2.800E+00	2.552E+00	2.326E+00	1.107E+00	1.307E-01	2.807E-03	1.995E-10

The DSR includes contributions from associated (half-life ó 180 days) daughters.

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.500E+01 mrem/yr

Nuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	2.430E+00	2.443E+00	2.470E+00	2.525E+00	2.582E+00	3.081E+00	5.121E+00	1.274E+01	6.084E+02
Am-241	3.231E+01	3.236E+01	3.247E+01	3.268E+01	3.289E+01	3.465E+01	4.025E+01	5.265E+01	1.637E+02
C-14	1.320E+01	2.756E+01	1.315E+02	2.998E+03	6.858E+04	*4.455E+12	*4.455E+12	*4.455E+12	*4.455E+12
Co-60	1.442E+00	1.645E+00	2.141E+00	3.624E+00	6.135E+00	4.139E+02	7.507E+07	*1.132E+15	*1.132E+15
Cs-137	6.429E+00	6.579E+00	6.891E+00	7.560E+00	8.293E+00	1.739E+01	1.463E+02	6.667E+03	7.244E+10
Eu-152	3.384E+00	3.565E+00	3.956E+00	4.871E+00	5.998E+00	3.170E+01	3.800E+03	2.033E+07	*1.765E+14
Eu-154	3.091E+00	3.344E+00	3.915E+00	5.365E+00	7.353E+00	9.152E+01	1.288E+05	5.705E+10	*2.639E+14
H-3	5.203E+02	3.531E+02	2.984E+02	5.974E+02	6.486E+03	1.339E+12	*9.597E+15	*9.597E+15	*9.597E+15
Ni-63	5.361E+03	5.387E+03	5.437E+03	5.538E+03	5.643E+03	6.577E+03	1.054E+04	2.654E+04	2.171E+06
Pu-238	3.905E+01	3.936E+01	3.999E+01	4.127E+01	4.259E+01	5.455E+01	1.076E+02	3.390E+02	8.616E+03
Pu-239	3.531E+01	3.531E+01	3.531E+01	3.532E+01	3.533E+01	3.539E+01	3.558E+01	3.593E+01	3.742E+01
Pu-240	3.531E+01	3.532E+01	3.533E+01	3.535E+01	3.537E+01	3.552E+01	3.596E+01	3.676E+01	4.039E+01
Sr-90	4.997E+00	5.114E+00	5.357E+00	5.877E+00	6.448E+00	1.355E+01	1.147E+02	5.344E+03	7.517E+10

*At specific activity limit

Attachment 5 Sheet No. 27 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 28
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ag-108m	1.300E-02	0.000E+00	6.174E+00	2.430E+00	6.174E+00	2.430E+00
Am-241	8.900E-02	0.000E+00	4.643E-01	3.231E+01	4.643E-01	3.231E+01
C-14	3.200E-01	0.000E+00	1.136E+00	1.320E+01	1.136E+00	1.320E+01
Co-60	7.400E-02	0.000E+00	1.040E+01	1.442E+00	1.040E+01	1.442E+00
Cs-137	4.500E-01	0.000E+00	2.333E+00	6.429E+00	2.333E+00	6.429E+00
Eu-152	1.400E-01	0.000E+00	4.433E+00	3.384E+00	4.433E+00	3.384E+00
Eu-154	6.300E-02	0.000E+00	4.853E+00	3.091E+00	4.853E+00	3.091E+00
H-3	2.000E+00	3.321 ñ 0.007	5.037E-02	2.978E+02	2.883E-02	5.203E+02
Ni-63	4.400E+00	0.000E+00	2.798E-03	5.361E+03	2.798E-03	5.361E+03
Pu-238	1.000E-01	0.000E+00	3.841E-01	3.905E+01	3.841E-01	3.905E+01
Pu-239	1.050E-01	0.000E+00	4.249E-01	3.531E+01	4.249E-01	3.531E+01
Pu-240	2.500E-02	0.000E+00	4.248E-01	3.531E+01	4.248E-01	3.531E+01
Sr-90	2.200E-01	0.000E+00	3.002E+00	4.997E+00	3.002E+00	4.997E+00

Attachment 5 Sheet No. 28 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 29
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	Ag-108m	1.000E+00	8.026E-02	7.982E-02	7.894E-02	7.722E-02	7.553E-02	6.329E-02	3.808E-02	1.531E-02	3.205E-04
0Am-241	Am-241	1.000E+00	4.132E-02	4.125E-02	4.112E-02	4.085E-02	4.058E-02	3.852E-02	3.314E-02	2.531E-02	8.070E-03
0Np-237	Am-241	1.000E+00	0.000E+00	1.694E-07	5.181E-07	1.212E-06	1.902E-06	7.257E-06	2.116E-05	4.134E-05	8.496E-05
0U-233	Am-241	1.000E+00	0.000E+00	2.183E-14	4.956E-13	6.014E-12	2.295E-11	1.302E-09	2.813E-08	1.394E-07	6.868E-07
0Th-229	Am-241	1.000E+00	0.000E+00	2.007E-16	6.722E-16	2.838E-15	7.375E-15	4.549E-13	2.265E-11	2.660E-10	5.602E-09
0C-14	C-14	1.000E+00	3.636E-01	1.742E-01	3.652E-02	1.601E-03	7.000E-05	8.395E-16	0.000E+00	0.000E+00	0.000E+00
0Co-60	Co-60	1.000E+00	7.696E-01	6.747E-01	5.185E-01	3.063E-01	1.809E-01	2.682E-03	1.479E-08	5.479E-18	0.000E+00
0Cs-137	Cs-137	1.000E+00	1.050E+00	1.026E+00	9.795E-01	8.929E-01	8.139E-01	3.881E-01	4.614E-02	1.012E-03	9.318E-11
0Eu-152	Eu-152	7.208E-01	4.473E-01	4.246E-01	3.827E-01	3.108E-01	2.524E-01	4.775E-02	3.983E-04	7.446E-08	1.135E-23
Eu-152	Eu-152	2.792E-01	1.733E-01	1.645E-01	1.482E-01	1.204E-01	9.776E-02	1.850E-02	1.543E-04	2.884E-08	4.396E-24
Eu-152	äDOSE(j)		6.206E-01	5.891E-01	5.309E-01	4.312E-01	3.501E-01	6.625E-02	5.526E-04	1.033E-07	1.575E-23
0Gd-152	Eu-152	2.792E-01	0.000E+00	1.063E-17	3.031E-17	6.401E-17	9.138E-17	1.873E-16	2.093E-16	2.093E-16	2.082E-16
0Eu-154	Eu-154	1.000E+00	3.058E-01	2.826E-01	2.414E-01	1.761E-01	1.285E-01	1.033E-02	7.338E-06	1.656E-11	0.000E+00
0H-3	H-3	1.000E+00	5.766E-02	8.497E-02	1.006E-01	5.022E-02	4.625E-03	2.241E-11	0.000E+00	0.000E+00	0.000E+00
0Ni-63	Ni-63	1.000E+00	1.231E-02	1.225E-02	1.214E-02	1.192E-02	1.170E-02	1.004E-02	6.263E-03	2.487E-03	3.039E-05
0Pu-238	Pu-238	1.840E-09	7.068E-11	7.012E-11	6.902E-11	6.687E-11	6.478E-11	5.026E-11	2.423E-11	6.549E-12	2.545E-14
Pu-238	Pu-238	1.000E+00	3.841E-02	3.811E-02	3.751E-02	3.634E-02	3.521E-02	2.732E-02	1.317E-02	3.559E-03	1.383E-05
Pu-238	äDOSE(j)		3.841E-02	3.811E-02	3.751E-02	3.634E-02	3.521E-02	2.732E-02	1.317E-02	3.559E-03	1.383E-05
0U-234	Pu-238	1.000E+00	0.000E+00	1.312E-07	1.075E-06	5.618E-06	1.358E-05	1.837E-04	7.681E-04	8.653E-04	1.591E-04
0Th-230	Pu-238	1.000E+00	0.000E+00	1.208E-13	1.191E-12	7.792E-12	2.247E-11	7.028E-10	1.103E-08	4.098E-08	1.043E-07
0Ra-226	Pu-238	1.000E+00	0.000E+00	2.542E-15	5.363E-14	6.545E-13	2.501E-12	1.510E-10	4.446E-09	3.627E-08	3.824E-07
0Pb-210	Pu-238	1.000E+00	0.000E+00	2.821E-15	1.398E-14	6.435E-14	1.899E-13	3.216E-11	3.313E-09	4.596E-08	6.587E-07
0Pu-239	Pu-239	1.000E+00	4.461E-02	4.461E-02	4.460E-02	4.459E-02	4.458E-02	4.450E-02	4.426E-02	4.384E-02	4.209E-02
0U-235	Pu-239	1.000E+00	0.000E+00	9.539E-11	5.231E-10	2.319E-09	5.357E-09	7.264E-08	4.059E-07	8.210E-07	1.325E-06
0Pa-231	Pu-239	1.000E+00	0.000E+00	1.047E-14	9.328E-14	5.978E-13	1.694E-12	5.453E-11	1.026E-09	5.416E-09	3.905E-08
0Ac-227	Pu-239	1.000E+00	0.000E+00	7.290E-15	2.262E-14	1.143E-13	3.507E-13	4.125E-11	1.925E-09	1.380E-08	1.166E-07
0Pu-240	Pu-240	4.950E-08	5.256E-10	5.256E-10	5.254E-10	5.251E-10	5.249E-10	5.226E-10	5.161E-10	5.047E-10	4.591E-10

Attachment 5 Sheet No. 29 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 30
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Pu-240	Pu-240	1.000E+00	1.062E-02	1.062E-02	1.061E-02	1.061E-02	1.060E-02	1.056E-02	1.043E-02	1.020E-02	9.274E-03
Pu-240	äDOSE(j)		1.062E-02	1.062E-02	1.061E-02	1.061E-02	1.060E-02	1.056E-02	1.043E-02	1.020E-02	9.274E-03
OU-236	Pu-240	1.000E+00	0.000E+00	3.264E-10	2.688E-09	1.419E-08	3.465E-08	5.079E-07	2.870E-06	5.772E-06	8.953E-06
OTh-232	Pu-240	1.000E+00	0.000E+00	7.204E-21	2.700E-19	1.093E-18	2.450E-18	5.756E-17	1.057E-15	5.541E-15	3.959E-14
ORa-228	Pu-240	1.000E+00	0.000E+00	4.889E-21	4.181E-19	2.299E-18	6.732E-18	2.046E-16	3.134E-15	1.591E-14	1.139E-13
OTh-228	Pu-240	1.000E+00	0.000E+00	4.119E-22	8.345E-20	7.319E-19	2.890E-18	1.343E-16	1.878E-15	9.088E-15	6.376E-14
OSr-90	Sr-90	1.000E+00	6.604E-01	6.453E-01	6.160E-01	5.615E-01	5.117E-01	2.436E-01	2.876E-02	6.175E-04	4.390E-11

THF(i) is the thread fraction of the parent nuclide.

Attachment 5 Sheet No. 30 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 31
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	Ag-108m	1.000E+00		1.300E-02	1.293E-02	1.279E-02	1.251E-02	1.223E-02	1.025E-02	6.168E-03	2.479E-03	5.192E-05
OAm-241	Am-241	1.000E+00		8.900E-02	8.885E-02	8.857E-02	8.799E-02	8.742E-02	8.296E-02	7.139E-02	5.453E-02	1.738E-02
ONp-237	Am-241	1.000E+00		0.000E+00	2.880E-08	8.627E-08	2.006E-07	3.142E-07	1.196E-06	3.487E-06	6.811E-06	1.400E-05
OU-233	Am-241	1.000E+00		0.000E+00	6.294E-14	5.648E-13	3.057E-12	7.504E-12	1.094E-10	9.438E-10	3.695E-09	1.691E-08
OTh-229	Am-241	1.000E+00		0.000E+00	1.982E-18	5.339E-17	6.752E-16	2.608E-15	1.503E-13	4.196E-12	3.851E-11	7.185E-10
OC-14	C-14	1.000E+00		3.200E-01	1.466E-01	3.072E-02	1.347E-03	5.888E-05	7.060E-16	0.000E+00	0.000E+00	0.000E+00
OCo-60	Co-60	1.000E+00		7.400E-02	6.487E-02	4.986E-02	2.945E-02	1.740E-02	2.578E-04	1.420E-09	5.257E-19	0.000E+00
OCs-137	Cs-137	1.000E+00		4.500E-01	4.397E-01	4.197E-01	3.825E-01	3.486E-01	1.658E-01	1.958E-02	4.243E-04	3.698E-11
OEu-152	Eu-152	7.208E-01		1.009E-01	9.580E-02	8.633E-02	7.011E-02	5.694E-02	1.077E-02	8.985E-05	1.680E-08	2.560E-24
Eu-152	Eu-152	2.792E-01		3.909E-02	3.711E-02	3.344E-02	2.716E-02	2.205E-02	4.173E-03	3.480E-05	6.507E-09	9.917E-25
Eu-152	äS(j):			1.400E-01	1.329E-01	1.198E-01	9.727E-02	7.899E-02	1.495E-02	1.247E-04	2.330E-08	3.552E-24
OGd-152	Eu-152	2.792E-01		0.000E+00	2.445E-16	6.968E-16	1.472E-15	2.101E-15	4.306E-15	4.813E-15	4.812E-15	4.788E-15
OEu-154	Eu-154	1.000E+00		6.300E-02	5.823E-02	4.974E-02	3.629E-02	2.648E-02	2.127E-03	1.512E-06	3.413E-12	3.790E-36
OH-3	H-3	1.000E+00		2.000E+00	1.102E+00	3.342E-01	3.070E-02	2.815E-03	1.316E-11	7.537E-36	0.000E+00	0.000E+00
ONi-63	Ni-63	1.000E+00		4.400E+00	4.367E+00	4.303E+00	4.177E+00	4.055E+00	3.199E+00	1.617E+00	4.757E-01	2.648E-03
OPu-238	Pu-238	1.840E-09		1.840E-10	1.825E-10	1.797E-10	1.741E-10	1.686E-10	1.308E-10	6.308E-11	1.705E-11	6.624E-14
Pu-238	Pu-238	1.000E+00		1.000E-01	9.921E-02	9.765E-02	9.460E-02	9.165E-02	7.111E-02	3.428E-02	9.266E-03	3.600E-05
Pu-238	äS(j):			1.000E-01	9.921E-02	9.765E-02	9.460E-02	9.165E-02	7.111E-02	3.428E-02	9.266E-03	3.600E-05
OU-234	Pu-238	1.000E+00		0.000E+00	2.820E-07	8.370E-07	1.912E-06	2.941E-06	9.704E-06	1.896E-05	1.883E-05	3.414E-06
OTh-230	Pu-238	1.000E+00		0.000E+00	1.271E-12	1.136E-11	6.098E-11	1.485E-10	2.028E-09	1.469E-08	4.395E-08	1.025E-07
ORa-226	Pu-238	1.000E+00		0.000E+00	1.837E-16	4.933E-15	6.197E-14	2.378E-13	1.300E-11	3.154E-10	2.318E-09	2.281E-08
OPb-210	Pu-238	1.000E+00		0.000E+00	1.420E-18	1.131E-16	3.242E-15	1.912E-14	3.467E-12	1.796E-10	1.811E-09	2.172E-08
OPu-239	Pu-239	1.000E+00		1.050E-01	1.050E-01	1.050E-01	1.050E-01	1.049E-01	1.047E-01	1.042E-01	1.032E-01	9.907E-02
OU-235	Pu-239	1.000E+00		0.000E+00	1.033E-10	3.089E-10	7.168E-10	1.120E-09	4.187E-09	1.160E-08	2.086E-08	3.358E-08
OPa-231	Pu-239	1.000E+00		0.000E+00	1.093E-15	9.817E-15	5.324E-14	1.309E-13	1.939E-12	1.751E-11	7.445E-11	4.837E-10
OAc-227	Pu-239	1.000E+00		0.000E+00	1.151E-17	3.054E-16	3.748E-15	1.406E-14	6.531E-13	1.137E-11	6.140E-11	4.595E-10
OPu-240	Pu-240	4.950E-08		1.237E-09	1.237E-09	1.237E-09	1.236E-09	1.236E-09	1.230E-09	1.215E-09	1.188E-09	1.081E-09

Attachment 5 Sheet No. 31 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 5

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 32
Summary : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

Nuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Pu-240	Pu-240	1.000E+00	2.500E-02	2.500E-02	2.499E-02	2.498E-02	2.496E-02	2.485E-02	2.455E-02	2.400E-02	2.183E-02
Pu-240	äS(j):		2.500E-02	2.500E-02	2.499E-02	2.498E-02	2.496E-02	2.485E-02	2.455E-02	2.400E-02	2.183E-02
U-236	Pu-240	1.000E+00	0.000E+00	7.390E-10	2.211E-09	5.128E-09	8.012E-09	2.991E-08	8.255E-08	1.473E-07	2.277E-07
Th-232	Pu-240	1.000E+00	0.000E+00	1.824E-20	1.638E-19	8.884E-19	2.185E-18	3.238E-17	2.926E-16	1.247E-15	8.174E-15
Ra-228	Pu-240	1.000E+00	0.000E+00	7.114E-22	1.810E-20	2.052E-19	7.164E-19	2.239E-17	2.604E-16	1.187E-15	8.077E-15
Th-228	Pu-240	1.000E+00	0.000E+00	6.039E-23	4.078E-21	8.686E-20	3.951E-19	1.932E-17	2.500E-16	1.167E-15	8.046E-15
Sr-90	Sr-90	1.000E+00	2.200E-01	2.148E-01	2.047E-01	1.859E-01	1.689E-01	7.826E-02	8.573E-03	1.624E-04	8.003E-12

THF(i) is the thread fraction of the parent nuclide.
RESCALC.EXE execution time = 7.61 seconds

Attachment 5 Sheet No. 32 of 32
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 1
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

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Part III: Intake Quantities and Health Risk Factors

Cancer Risk Slope Factors 2
Risk Slope and ETFG for the Ground Pathway 6
Amount of Intake Quantities and Excess Cancer Risks
Time= 0.000E+00 8
Time= 1.000E+00 13
Time= 3.000E+00 18
Time= 7.000E+00 23
Time= 1.100E+01 28
Time= 4.300E+01 33
Time= 1.350E+02 38
Time= 3.000E+02 43
Time= 1.000E+03 48

Attachment 6 Sheet No. 1 of 52
Originator: S. W. Clark Date 7/11/07
Chk'd By M. W. Perrott Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 2
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Cancer Risk Slope Factors Summary Table
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Ac-227+D	1.47E-06	3.48E-10	SLPF(1,1)
Sf-1	Ag-108m+D	7.19E-06	7.18E-06	SLPF(2,1)
Sf-1	Am-241	2.76E-08	2.76E-08	SLPF(3,1)
Sf-1	C-14	7.83E-12	7.83E-12	SLPF(4,1)
Sf-1	Co-60	1.24E-05	1.24E-05	SLPF(5,1)
Sf-1	Cs-137+D	2.55E-06	5.32E-10	SLPF(6,1)
Sf-1	Eu-152	5.30E-06	5.30E-06	SLPF(7,1)
Sf-1	Eu-154	5.83E-06	5.83E-06	SLPF(9,1)
Sf-1	Gd-152	0.00E+00	0.00E+00	SLPF(10,1)
Sf-1	H-3	0.00E+00	0.00E+00	SLPF(11,1)
Sf-1	Ni-63	0.00E+00	0.00E+00	SLPF(12,1)
Sf-1	Np-237+D	7.97E-07	5.36E-08	SLPF(13,1)
Sf-1	Pa-231	1.39E-07	1.39E-07	SLPF(14,1)
Sf-1	Pb-210+D	4.21E-09	1.41E-09	SLPF(15,1)
Sf-1	Pu-238	7.22E-11	7.22E-11	SLPF(16,1)
Sf-1	Pu-239	2.00E-10	2.00E-10	SLPF(18,1)
Sf-1	Pu-240	6.98E-11	6.98E-11	SLPF(19,1)
Sf-1	Ra-226+D	8.49E-06	2.29E-08	SLPF(21,1)
Sf-1	Ra-228+D	4.53E-06	0.00E+00	SLPF(22,1)
Sf-1	Sr-90+D	1.96E-08	4.82E-10	SLPF(23,1)
Sf-1	Th-228+D	7.76E-06	5.59E-09	SLPF(24,1)
Sf-1	Th-229+D	1.17E-06	2.25E-07	SLPF(25,1)
Sf-1	Th-230	8.19E-10	8.19E-10	SLPF(26,1)
Sf-1	Th-232	3.42E-10	3.42E-10	SLPF(27,1)
Sf-1	U-233	9.82E-10	9.82E-10	SLPF(28,1)
Sf-1	U-234	2.52E-10	2.52E-10	SLPF(29,1)
Sf-1	U-235+D	5.43E-07	5.18E-07	SLPF(30,1)
Sf-1	U-236	1.25E-10	1.25E-10	SLPF(31,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Ac-227+D	2.09E-07	1.49E-07	SLPF(1,2)
Sf-2	Ag-108m+D	2.67E-11	2.67E-11	SLPF(2,2)
Sf-2	Am-241	2.81E-08	2.81E-08	SLPF(3,2)
Sf-2	C-14	7.07E-12	7.07E-12	SLPF(4,2)
Sf-2	Co-60	3.58E-11	3.58E-11	SLPF(5,2)
Sf-2	Cs-137+D	1.19E-11	1.19E-11	SLPF(6,2)
Sf-2	Eu-152	9.10E-11	9.10E-11	SLPF(7,2)
Sf-2	Eu-154	1.15E-10	1.15E-10	SLPF(9,2)
Sf-2	Gd-152	9.10E-09	9.10E-09	SLPF(10,2)
Sf-2	H-3	1.99E-13	1.99E-13	SLPF(11,2)
Sf-2	Ni-63	5.77E-12	5.77E-12	SLPF(12,2)
Sf-2	Np-237+D	1.77E-08	1.77E-08	SLPF(13,2)
Sf-2	Pa-231	4.55E-08	4.55E-08	SLPF(14,2)
Sf-2	Pb-210+D	1.39E-08	2.77E-09	SLPF(15,2)
Sf-2	Pu-238	3.36E-08	3.36E-08	SLPF(16,2)
Sf-2	Pu-239	3.33E-08	3.33E-08	SLPF(18,2)
Sf-2	Pu-240	3.33E-08	3.33E-08	SLPF(19,2)
Sf-2	Ra-226+D	1.16E-08	1.15E-08	SLPF(21,2)
Sf-2	Ra-228+D	5.23E-09	5.18E-09	SLPF(22,2)

Attachment 6 Sheet No. 2 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 3
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-2	Sr-90+D	1.13E-10	1.05E-10	SLPF(23,2)
Sf-2	Th-228+D	1.43E-07	1.32E-07	SLPF(24,2)
Sf-2	Th-229+D	2.25E-07	1.75E-07	SLPF(25,2)
Sf-2	Th-230	2.85E-08	2.85E-08	SLPF(26,2)
Sf-2	Th-232	4.33E-08	4.33E-08	SLPF(27,2)
Sf-2	U-233	1.16E-08	1.16E-08	SLPF(28,2)
Sf-2	U-234	1.14E-08	1.14E-08	SLPF(29,2)
Sf-2	U-235+D	1.01E-08	1.01E-08	SLPF(30,2)
Sf-2	U-236	1.05E-08	1.05E-08	SLPF(31,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,3)
Sf-3	Ag-108m+D	1.12E-11	1.12E-11	SLPF(2,3)
Sf-3	Am-241	1.34E-10	1.34E-10	SLPF(3,3)
Sf-3	C-14	2.00E-12	2.00E-12	SLPF(4,3)
Sf-3	Co-60	2.23E-11	2.23E-11	SLPF(5,3)
Sf-3	Cs-137+D	3.74E-11	3.74E-11	SLPF(6,3)
Sf-3	Eu-152	8.70E-12	8.70E-12	SLPF(7,3)
Sf-3	Eu-154	1.49E-11	1.49E-11	SLPF(9,3)
Sf-3	Gd-152	3.85E-11	3.85E-11	SLPF(10,3)
Sf-3	H-3	1.44E-13	1.44E-13	SLPF(11,3)
Sf-3	Ni-63	9.51E-13	9.51E-13	SLPF(12,3)
Sf-3	Np-237+D	9.10E-11	8.29E-11	SLPF(13,3)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(14,3)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(15,3)
Sf-3	Pu-238	1.69E-10	1.69E-10	SLPF(16,3)
Sf-3	Pu-239	1.74E-10	1.74E-10	SLPF(18,3)
Sf-3	Pu-240	1.74E-10	1.74E-10	SLPF(19,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(21,3)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(22,3)
Sf-3	Sr-90+D	9.53E-11	6.88E-11	SLPF(23,3)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(24,3)
Sf-3	Th-229+D	7.16E-10	2.90E-10	SLPF(25,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(26,3)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(27,3)
Sf-3	U-233	9.69E-11	9.69E-11	SLPF(28,3)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(29,3)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(30,3)
Sf-3	U-236	9.03E-11	9.03E-11	SLPF(31,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	4.86E-10	2.01E-10	SLPF(1,4)
Sf-3	Ag-108m+D	8.14E-12	8.14E-12	SLPF(2,4)
Sf-3	Am-241	1.04E-10	1.04E-10	SLPF(3,4)
Sf-3	C-14	1.55E-12	1.55E-12	SLPF(4,4)
Sf-3	Co-60	1.57E-11	1.57E-11	SLPF(5,4)
Sf-3	Cs-137+D	3.04E-11	3.04E-11	SLPF(6,4)
Sf-3	Eu-152	6.07E-12	6.07E-12	SLPF(7,4)
Sf-3	Eu-154	1.03E-11	1.03E-11	SLPF(9,4)
Sf-3	Gd-152	2.97E-11	2.97E-11	SLPF(10,4)

Attachment 6 Sheet No. 3 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 4
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

0 Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-3	H-3	1.12E-13	1.12E-13	SLPF(11,4)
Sf-3	Ni-63	6.70E-13	6.70E-13	SLPF(12,4)
Sf-3	Np-237+D	6.74E-11	6.18E-11	SLPF(13,4)
Sf-3	Pa-231	1.73E-10	1.73E-10	SLPF(14,4)
Sf-3	Pb-210+D	1.27E-09	8.81E-10	SLPF(15,4)
Sf-3	Pu-238	1.31E-10	1.31E-10	SLPF(16,4)
Sf-3	Pu-239	1.35E-10	1.35E-10	SLPF(18,4)
Sf-3	Pu-240	1.35E-10	1.35E-10	SLPF(19,4)
Sf-3	Ra-226+D	3.86E-10	3.85E-10	SLPF(21,4)
Sf-3	Ra-228+D	1.04E-09	1.04E-09	SLPF(22,4)
Sf-3	Sr-90+D	7.40E-11	5.59E-11	SLPF(23,4)
Sf-3	Th-228+D	3.00E-10	1.07E-10	SLPF(24,4)
Sf-3	Th-229+D	5.28E-10	2.24E-10	SLPF(25,4)
Sf-3	Th-230	9.10E-11	9.10E-11	SLPF(26,4)
Sf-3	Th-232	1.01E-10	1.01E-10	SLPF(27,4)
Sf-3	U-233	7.18E-11	7.18E-11	SLPF(28,4)
Sf-3	U-234	7.07E-11	7.07E-11	SLPF(29,4)
Sf-3	U-235+D	7.18E-11	6.96E-11	SLPF(30,4)
Sf-3	U-236	6.70E-11	6.70E-11	SLPF(31,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	1.16E-09	3.81E-10	SLPF(1,5)
Sf-3	Ag-108m+D	1.92E-11	1.92E-11	SLPF(2,5)
Sf-3	Am-241	2.17E-10	2.17E-10	SLPF(3,5)
Sf-3	C-14	2.79E-12	2.79E-12	SLPF(4,5)
Sf-3	Co-60	4.03E-11	4.03E-11	SLPF(5,5)
Sf-3	Cs-137+D	4.33E-11	4.33E-11	SLPF(6,5)
Sf-3	Eu-152	1.62E-11	1.62E-11	SLPF(7,5)
Sf-3	Eu-154	2.85E-11	2.85E-11	SLPF(9,5)
Sf-3	Gd-152	6.29E-11	6.29E-11	SLPF(10,5)
Sf-3	H-3	2.20E-13	2.20E-13	SLPF(11,5)
Sf-3	Ni-63	1.79E-12	1.79E-12	SLPF(12,5)
Sf-3	Np-237+D	1.62E-10	1.46E-10	SLPF(13,5)
Sf-3	Pa-231	3.74E-10	3.74E-10	SLPF(14,5)
Sf-3	Pb-210+D	2.66E-09	1.84E-09	SLPF(15,5)
Sf-3	Pu-238	2.72E-10	2.72E-10	SLPF(16,5)
Sf-3	Pu-239	2.76E-10	2.76E-10	SLPF(18,5)
Sf-3	Pu-240	2.77E-10	2.77E-10	SLPF(19,5)
Sf-3	Ra-226+D	7.30E-10	7.29E-10	SLPF(21,5)
Sf-3	Ra-228+D	2.29E-09	2.28E-09	SLPF(22,5)
Sf-3	Sr-90+D	1.44E-10	9.18E-11	SLPF(23,5)
Sf-3	Th-228+D	8.09E-10	2.89E-10	SLPF(24,5)
Sf-3	Th-229+D	1.29E-09	4.96E-10	SLPF(25,5)
Sf-3	Th-230	2.02E-10	2.02E-10	SLPF(26,5)
Sf-3	Th-232	2.31E-10	2.31E-10	SLPF(27,5)
Sf-3	U-233	1.60E-10	1.60E-10	SLPF(28,5)
Sf-3	U-234	1.58E-10	1.58E-10	SLPF(29,5)
Sf-3	U-235+D	1.63E-10	1.57E-10	SLPF(30,5)
Sf-3	U-236	1.49E-10	1.49E-10	SLPF(31,5)

Attachment 6 Sheet No. 4 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 5
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	7.60E+02	7.60E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.50E+02	1.50E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	2.50E+02	2.50E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Attachment 6 Sheet No. 5 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 6
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Risk Slope and Environmental Transport Factors for the Ground Pathway

ONuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)								
	t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ac-225	4.500E-08	6.423E-01	6.423E-01	6.423E-01	6.423E-01	6.423E-01	6.423E-01	6.423E-01	6.423E-01	6.423E-01
Ac-227	3.480E-10	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01	6.434E-01
Ac-228	4.530E-06	6.320E-01	6.320E-01	6.320E-01	6.320E-01	6.320E-01	6.320E-01	6.320E-01	6.320E-01	6.320E-01
Ag-108	8.560E-08	6.280E-01	6.280E-01	6.280E-01	6.280E-01	6.280E-01	6.280E-01	6.280E-01	6.280E-01	6.280E-01
Ag-108m	7.180E-06	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01
Am-241	2.760E-08	6.510E-01	6.510E-01	6.510E-01	6.510E-01	6.510E-01	6.510E-01	6.510E-01	6.510E-01	6.510E-01
At-217	1.320E-09	6.303E-01	6.303E-01	6.303E-01	6.303E-01	6.303E-01	6.303E-01	6.303E-01	6.303E-01	6.303E-01
At-218	3.570E-09	6.508E-01	6.508E-01	6.508E-01	6.508E-01	6.508E-01	6.508E-01	6.508E-01	6.508E-01	6.508E-01
Ba-137m	2.690E-06	6.274E-01	6.274E-01	6.274E-01	6.274E-01	6.274E-01	6.274E-01	6.274E-01	6.274E-01	6.274E-01
Bi-210	2.760E-09	6.348E-01	6.348E-01	6.348E-01	6.348E-01	6.348E-01	6.348E-01	6.348E-01	6.348E-01	6.348E-01
Bi-211	1.880E-07	6.350E-01	6.350E-01	6.350E-01	6.350E-01	6.350E-01	6.350E-01	6.350E-01	6.350E-01	6.350E-01
Bi-212	8.870E-07	6.290E-01	6.290E-01	6.290E-01	6.290E-01	6.290E-01	6.290E-01	6.290E-01	6.290E-01	6.290E-01
Bi-213	5.650E-07	6.310E-01	6.310E-01	6.310E-01	6.310E-01	6.310E-01	6.310E-01	6.310E-01	6.310E-01	6.310E-01
Bi-214	7.480E-06	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01
C-14	7.830E-12	6.580E-01	6.580E-01	6.580E-01	6.580E-01	6.580E-01	6.580E-01	6.580E-01	6.580E-01	6.580E-01
Co-60	1.240E-05	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01	6.314E-01
Cs-137	5.320E-10	6.387E-01	6.387E-01	6.387E-01	6.387E-01	6.387E-01	6.387E-01	6.387E-01	6.387E-01	6.387E-01
Eu-152	5.300E-06	6.326E-01	6.326E-01	6.326E-01	6.326E-01	6.326E-01	6.326E-01	6.326E-01	6.326E-01	6.326E-01
Eu-154	5.830E-06	6.319E-01	6.319E-01	6.319E-01	6.319E-01	6.319E-01	6.319E-01	6.319E-01	6.319E-01	6.319E-01
Fr-221	1.110E-07	6.389E-01	6.389E-01	6.389E-01	6.389E-01	6.389E-01	6.389E-01	6.389E-01	6.389E-01	6.389E-01
Fr-223	1.400E-07	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	0.000E+00	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01
Ni-63	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Np-237	5.360E-08	6.445E-01	6.445E-01	6.445E-01	6.445E-01	6.445E-01	6.445E-01	6.445E-01	6.445E-01	6.445E-01
Pa-231	1.390E-07	6.352E-01	6.352E-01	6.352E-01	6.352E-01	6.352E-01	6.352E-01	6.352E-01	6.352E-01	6.352E-01
Pa-233	7.430E-07	6.359E-01	6.359E-01	6.359E-01	6.359E-01	6.359E-01	6.359E-01	6.359E-01	6.359E-01	6.359E-01
Pb-209	5.370E-10	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01
Pb-210	1.410E-09	6.584E-01	6.584E-01	6.584E-01	6.584E-01	6.584E-01	6.584E-01	6.584E-01	6.584E-01	6.584E-01
Pb-211	2.290E-07	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01
Pb-212	5.090E-07	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01
Pb-214	9.820E-07	6.344E-01	6.344E-01	6.344E-01	6.344E-01	6.344E-01	6.344E-01	6.344E-01	6.344E-01	6.344E-01
Po-210	3.950E-11	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01
Po-211	3.580E-08	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-213	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.860E-10	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01	6.275E-01
Po-215	7.480E-10	6.309E-01	6.309E-01	6.309E-01	6.309E-01	6.309E-01	6.309E-01	6.309E-01	6.309E-01	6.309E-01
Po-216	7.870E-11	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01
Po-218	4.260E-11	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01
Pu-238	7.220E-11	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01	6.693E-01
Pu-239	2.000E-10	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01
Pu-240	6.980E-11	6.652E-01	6.652E-01	6.652E-01	6.652E-01	6.652E-01	6.652E-01	6.652E-01	6.652E-01	6.652E-01
Ra-223	4.340E-07	6.379E-01	6.379E-01	6.379E-01	6.379E-01	6.379E-01	6.379E-01	6.379E-01	6.379E-01	6.379E-01
Ra-224	3.720E-08	6.388E-01	6.388E-01	6.388E-01	6.388E-01	6.388E-01	6.388E-01	6.388E-01	6.388E-01	6.388E-01
Ra-225	5.910E-09	6.572E-01	6.572E-01	6.572E-01	6.572E-01	6.572E-01	6.572E-01	6.572E-01	6.572E-01	6.572E-01
Ra-226	2.290E-08	6.403E-01	6.403E-01	6.403E-01	6.403E-01	6.403E-01	6.403E-01	6.403E-01	6.403E-01	6.403E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rn-219	2.250E-07	6.349E-01	6.349E-01	6.349E-01	6.349E-01	6.349E-01	6.349E-01	6.349E-01	6.349E-01	6.349E-01
Rn-220	1.700E-09	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 7
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Risk Slope and Environmental Transport Factors for the Ground Pathway

ONuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)								
	t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Rn-222	1.740E-09	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01	6.281E-01
Sr-90	4.820E-10	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01
Th-227	3.780E-07	6.393E-01	6.393E-01	6.393E-01	6.393E-01	6.393E-01	6.393E-01	6.393E-01	6.393E-01	6.393E-01
Th-228	5.590E-09	6.420E-01	6.420E-01	6.420E-01	6.420E-01	6.420E-01	6.420E-01	6.420E-01	6.420E-01	6.420E-01
Th-229	2.250E-07	6.428E-01	6.428E-01	6.428E-01	6.428E-01	6.428E-01	6.428E-01	6.428E-01	6.428E-01	6.428E-01
Th-230	8.190E-10	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01
Th-231	2.450E-08	6.451E-01	6.451E-01	6.451E-01	6.451E-01	6.451E-01	6.451E-01	6.451E-01	6.451E-01	6.451E-01
Th-232	3.420E-10	6.477E-01	6.477E-01	6.477E-01	6.477E-01	6.477E-01	6.477E-01	6.477E-01	6.477E-01	6.477E-01
Tl-207	1.520E-08	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01	6.308E-01
Tl-208	1.760E-05	6.338E-01	6.338E-01	6.338E-01	6.338E-01	6.338E-01	6.338E-01	6.338E-01	6.338E-01	6.338E-01
Tl-209	9.830E-06	6.331E-01	6.331E-01	6.331E-01	6.331E-01	6.331E-01	6.331E-01	6.331E-01	6.331E-01	6.331E-01
Tl-210	0.000E+00	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01
U-233	9.820E-10	6.416E-01	6.416E-01	6.416E-01	6.416E-01	6.416E-01	6.416E-01	6.416E-01	6.416E-01	6.416E-01
U-234	2.520E-10	6.488E-01	6.488E-01	6.488E-01	6.488E-01	6.488E-01	6.488E-01	6.488E-01	6.488E-01	6.488E-01
U-235	5.180E-07	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01	6.401E-01
U-236	1.250E-10	6.553E-01	6.553E-01	6.553E-01	6.553E-01	6.553E-01	6.553E-01	6.553E-01	6.553E-01	6.553E-01
Y-90	1.910E-08	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01	6.307E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Attachment 6 Sheet No. 7 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 8
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	4.932E-04	1.099E+02	4.115E+00	7.789E+01	7.592E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.926E+02
Am-241	3.376E-03	5.019E+00	2.493E-02	2.707E-03	5.198E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.024E+01
C-14	3.843E+01	1.457E+05	1.559E+04	1.263E+04	1.869E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.739E+05
Co-60	2.807E-03	3.336E+02	8.669E+01	1.986E+01	4.322E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.445E+02
Cs-137	1.707E-02	1.014E+03	4.287E+02	2.662E+02	2.628E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.736E+03
Eu-152	5.311E-03	1.973E+01	1.850E+00	1.223E-01	8.176E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.988E+01
Eu-154	2.390E-03	8.878E+00	8.327E-01	5.502E-02	3.679E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.344E+01
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	2.017E+04	7.439E+05	5.090E+04	8.588E+04	1.168E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.808E+05
Ni-63	1.669E-01	1.240E+04	8.461E+02	7.834E+03	2.570E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.133E+04
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	3.794E-03	5.639E+00	5.603E-02	1.521E-03	5.840E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.154E+01
Pu-239	3.983E-03	5.921E+00	5.883E-02	1.597E-03	6.132E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.211E+01
Pu-240	9.484E-04	1.410E+00	1.401E-02	3.802E-04	1.460E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.884E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Sr-90	8.346E-03	3.719E+03	3.627E+02	2.049E+02	1.285E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.300E+03
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 8 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 9
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.797E-18	0.0000	1.524E-20	0.0000	1.803E-19	0.0000	7.977E-22	0.0000	4.445E-22	0.0000	1.306E-19	0.0000
Ag-108m	1.623E-06	0.0364	3.640E-13	0.0000	3.402E-08	0.0008	1.274E-09	0.0000	2.412E-08	0.0005	4.030E-10	0.0000
Am-241	4.682E-08	0.0011	2.778E-09	0.0001	1.969E-08	0.0004	9.782E-11	0.0000	1.062E-11	0.0000	3.302E-08	0.0007
C-14	4.169E-12	0.0000	6.871E-10	0.0000	7.369E-07	0.0165	7.897E-08	0.0018	6.397E-08	0.0014	1.318E-10	0.0000
Co-60	4.338E-06	0.0974	7.524E-13	0.0000	5.569E-08	0.0013	1.447E-08	0.0003	3.316E-09	0.0001	1.304E-09	0.0000
Cs-137	1.553E-05	0.3487	4.389E-12	0.0000	8.197E-07	0.0184	3.464E-07	0.0078	2.152E-07	0.0048	2.459E-08	0.0006
Eu-152	7.128E-06	0.1601	7.340E-12	0.0000	2.607E-09	0.0001	2.445E-10	0.0000	1.615E-11	0.0000	2.012E-09	0.0000
Eu-154	2.670E-06	0.0600	3.162E-12	0.0000	1.522E-09	0.0000	1.427E-10	0.0000	9.431E-12	0.0000	1.206E-09	0.0000
Gd-152	0.000E+00	0.0000	2.465E-23	0.0000	3.875E-22	0.0000	3.634E-23	0.0000	9.607E-25	0.0000	2.624E-22	0.0000
H-3	0.000E+00	0.0000	1.050E-08	0.0002	2.803E-07	0.0063	1.925E-08	0.0004	3.243E-08	0.0007	6.718E-11	0.0000
Ni-63	0.000E+00	0.0000	2.590E-11	0.0000	3.171E-07	0.0071	2.164E-08	0.0005	2.004E-07	0.0045	1.237E-08	0.0003
Np-237	6.470E-12	0.0000	8.575E-15	0.0000	1.306E-12	0.0000	2.113E-14	0.0000	2.533E-16	0.0000	1.206E-13	0.0000
Pa-231	8.503E-19	0.0000	1.662E-20	0.0000	1.223E-18	0.0000	1.253E-19	0.0000	3.176E-22	0.0000	2.103E-19	0.0000
Pb-210	1.537E-20	0.0000	2.993E-21	0.0000	1.126E-17	0.0000	1.938E-19	0.0000	1.756E-19	0.0000	8.832E-19	0.0000
Pu-238	1.290E-10	0.0000	3.403E-09	0.0001	2.544E-08	0.0006	2.528E-10	0.0000	6.861E-12	0.0000	4.241E-08	0.0010
Pu-239	4.037E-10	0.0000	3.976E-09	0.0001	3.088E-08	0.0007	3.068E-10	0.0000	8.327E-12	0.0000	5.073E-08	0.0011
Pu-240	3.476E-11	0.0000	9.455E-10	0.0000	7.344E-09	0.0002	7.297E-11	0.0000	1.980E-12	0.0000	1.211E-08	0.0003
Ra-226	1.871E-16	0.0000	1.531E-20	0.0000	4.029E-17	0.0000	5.588E-19	0.0000	1.311E-18	0.0000	1.488E-18	0.0000
Ra-228	2.331E-22	0.0000	1.615E-26	0.0000	2.607E-22	0.0000	3.571E-24	0.0000	8.426E-24	0.0000	1.087E-23	0.0000
Sr-90	5.810E-08	0.0013	2.023E-11	0.0000	7.576E-06	0.1701	7.389E-07	0.0166	4.174E-07	0.0094	3.963E-08	0.0009
Th-228	2.967E-22	0.0000	3.263E-25	0.0000	2.449E-24	0.0000	3.837E-26	0.0000	4.827E-27	0.0000	2.848E-24	0.0000
Th-229	2.895E-19	0.0000	3.332E-21	0.0000	1.591E-20	0.0000	1.610E-22	0.0000	2.242E-23	0.0000	2.941E-20	0.0000
Th-230	5.596E-18	0.0000	1.147E-17	0.0000	7.155E-17	0.0000	7.199E-19	0.0000	9.962E-20	0.0000	1.251E-16	0.0000
Th-232	3.560E-26	0.0000	2.640E-25	0.0000	1.212E-24	0.0000	1.219E-26	0.0000	1.688E-27	0.0000	2.168E-24	0.0000
U-233	3.458E-19	0.0000	2.415E-19	0.0000	7.694E-18	0.0000	1.269E-19	0.0000	5.677E-19	0.0000	5.128E-18	0.0000
U-234	1.876E-14	0.0000	4.963E-14	0.0000	1.542E-12	0.0000	2.454E-14	0.0000	1.147E-13	0.0000	1.059E-12	0.0000
U-235	1.572E-14	0.0000	1.734E-17	0.0000	6.217E-16	0.0000	9.892E-18	0.0000	4.625E-17	0.0000	4.317E-16	0.0000
U-236	2.650E-17	0.0000	1.289E-16	0.0000	4.112E-15	0.0000	6.542E-17	0.0000	3.058E-16	0.0000	2.815E-15	0.0000
Total	3.139E-05	0.7050	2.235E-08	0.0005	9.907E-06	0.2225	1.222E-06	0.0274	9.568E-07	0.0215	2.200E-07	0.0049

Attachment 6 Sheet No. 9 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 10
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Plant		Meat		Milk		All Pathways**	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.867E-18	0.0000	2.737E-20	0.0000	2.793E-19	0.0000	7.858E-22	0.0000	1.010E-21	0.0000	4.300E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.682E-06	0.0378
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.024E-07	0.0023
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.806E-07	0.0198
Co-60	1.124E-10	0.0000	8.810E-12	0.0000	1.790E-11	0.0000	2.145E-11	0.0000	6.317E-12	0.0000	4.413E-06	0.0991
Cs-137	7.379E-09	0.0002	3.254E-09	0.0001	1.009E-09	0.0000	1.853E-09	0.0000	1.447E-09	0.0000	1.695E-05	0.3806
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.133E-06	0.1602
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.673E-06	0.0600
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.118E-22	0.0000
H-3	4.744E-07	0.0107	1.154E-10	0.0000	1.834E-07	0.0041	8.744E-09	0.0002	2.616E-08	0.0006	1.035E-06	0.0233
Ni-63	9.956E-09	0.0002	2.645E-10	0.0000	1.579E-09	0.0000	4.874E-10	0.0000	5.671E-09	0.0001	5.695E-07	0.0128
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.927E-12	0.0000
Pa-231	1.476E-18	0.0000	5.389E-21	0.0000	2.341E-19	0.0000	8.809E-20	0.0000	4.234E-22	0.0000	4.230E-18	0.0000
Pb-210	2.728E-18	0.0000	4.129E-19	0.0000	8.560E-19	0.0000	4.395E-20	0.0000	4.501E-20	0.0000	1.662E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.165E-08	0.0016
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.630E-08	0.0019
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.051E-08	0.0005
Ra-226	6.582E-18	0.0000	9.810E-20	0.0000	1.004E-18	0.0000	6.149E-20	0.0000	1.755E-19	0.0000	2.387E-16	0.0000
Ra-228	8.209E-23	0.0000	1.250E-24	0.0000	1.274E-23	0.0000	8.034E-25	0.0000	2.356E-24	0.0000	6.160E-22	0.0000
Sr-90	6.318E-08	0.0014	9.406E-10	0.0000	9.776E-09	0.0002	4.523E-09	0.0001	3.283E-09	0.0001	8.912E-06	0.2001
Th-228	6.906E-24	0.0000	2.163E-25	0.0000	1.124E-24	0.0000	1.220E-26	0.0000	1.788E-27	0.0000	3.106E-22	0.0000
Th-229	4.724E-20	0.0000	1.397E-21	0.0000	9.692E-21	0.0000	1.859E-22	0.0000	3.518E-23	0.0000	3.969E-19	0.0000
Th-230	2.137E-16	0.0000	6.090E-18	0.0000	4.299E-17	0.0000	8.502E-19	0.0000	1.616E-19	0.0000	4.783E-16	0.0000
Th-232	4.786E-24	0.0000	1.382E-25	0.0000	9.069E-25	0.0000	1.559E-26	0.0000	2.909E-27	0.0000	9.544E-24	0.0000
U-233	7.426E-16	0.0000	2.285E-18	0.0000	1.103E-16	0.0000	2.334E-18	0.0000	1.202E-17	0.0000	8.836E-16	0.0000
U-234	2.122E-10	0.0000	6.537E-13	0.0000	3.157E-11	0.0000	6.714E-13	0.0000	3.447E-12	0.0000	2.513E-10	0.0000
U-235	8.324E-14	0.0000	2.582E-16	0.0000	1.247E-14	0.0000	2.651E-16	0.0000	1.361E-15	0.0000	1.144E-13	0.0000
U-236	5.555E-13	0.0000	1.708E-15	0.0000	8.248E-14	0.0000	1.754E-15	0.0000	9.004E-15	0.0000	6.579E-13	0.0000
Total	5.552E-07	0.0125	4.584E-09	0.0001	1.958E-07	0.0044	1.563E-08	0.0004	3.657E-08	0.0008	4.453E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 10 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 11
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

0

Radon Pathway	Radionuclides Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0

Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.623E-06	0.0364	3.640E-13	0.0000	0.000E+00	0.0000	3.402E-08	0.0008	1.274E-09	0.0000	2.412E-08	0.0005	4.030E-10	0.0000
Am-241	4.682E-08	0.0011	2.778E-09	0.0001	0.000E+00	0.0000	1.969E-08	0.0004	9.784E-11	0.0000	1.062E-11	0.0000	3.302E-08	0.0007
C-14	4.169E-12	0.0000	6.871E-10	0.0000	0.000E+00	0.0000	7.369E-07	0.0165	7.897E-08	0.0018	6.397E-08	0.0014	1.318E-10	0.0000
Co-60	4.338E-06	0.0974	7.524E-13	0.0000	0.000E+00	0.0000	5.569E-08	0.0013	1.447E-08	0.0003	3.316E-09	0.0001	1.304E-09	0.0000
Cs-137	1.553E-05	0.3487	4.389E-12	0.0000	0.000E+00	0.0000	8.197E-07	0.0184	3.464E-07	0.0078	2.152E-07	0.0048	2.459E-08	0.0006
Eu-152	7.128E-06	0.1601	7.340E-12	0.0000	0.000E+00	0.0000	2.607E-09	0.0001	2.445E-10	0.0000	1.615E-11	0.0000	2.012E-09	0.0000
Eu-154	2.670E-06	0.0600	3.162E-12	0.0000	0.000E+00	0.0000	1.522E-09	0.0000	1.427E-10	0.0000	9.431E-12	0.0000	1.206E-09	0.0000
H-3	0.000E+00	0.0000	1.050E-08	0.0002	0.000E+00	0.0000	2.803E-07	0.0063	1.925E-08	0.0004	3.243E-08	0.0007	6.718E-11	0.0000
Ni-63	0.000E+00	0.0000	2.590E-11	0.0000	0.000E+00	0.0000	3.171E-07	0.0071	2.164E-08	0.0005	2.004E-07	0.0045	1.237E-08	0.0003
Pu-238	1.290E-10	0.0000	3.403E-09	0.0001	0.000E+00	0.0000	2.544E-08	0.0006	2.528E-10	0.0000	6.976E-12	0.0000	4.241E-08	0.0010
Pu-239	4.037E-10	0.0000	3.976E-09	0.0001	0.000E+00	0.0000	3.088E-08	0.0007	3.068E-10	0.0000	8.327E-12	0.0000	5.073E-08	0.0011
Pu-240	3.476E-11	0.0000	9.455E-10	0.0000	0.000E+00	0.0000	7.344E-09	0.0002	7.297E-11	0.0000	1.981E-12	0.0000	1.211E-08	0.0003
Sr-90	5.810E-08	0.0013	2.023E-11	0.0000	0.000E+00	0.0000	7.576E-06	0.1701	7.389E-07	0.0166	4.174E-07	0.0094	3.963E-08	0.0009
Total	3.139E-05	0.7050	2.235E-08	0.0005	0.000E+00	0.0000	9.907E-06	0.2225	1.222E-06	0.0274	9.568E-07	0.0215	2.200E-07	0.0049

Attachment 6 Sheet No. 11 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 12
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.682E-06	0.0378
Am-241	7.427E-16	0.0000	2.286E-18	0.0000	0.000E+00	0.0000	1.103E-16	0.0000	2.335E-18	0.0000	1.202E-17	0.0000	1.024E-07	0.0023
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.806E-07	0.0198
Co-60	1.124E-10	0.0000	8.810E-12	0.0000	0.000E+00	0.0000	1.790E-11	0.0000	2.145E-11	0.0000	6.317E-12	0.0000	4.413E-06	0.0991
Cs-137	7.379E-09	0.0002	3.254E-09	0.0001	0.000E+00	0.0000	1.009E-09	0.0000	1.853E-09	0.0000	1.447E-09	0.0000	1.695E-05	0.3806
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.133E-06	0.1602
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.673E-06	0.0600
H-3	4.744E-07	0.0107	1.154E-10	0.0000	0.000E+00	0.0000	1.834E-07	0.0041	8.744E-09	0.0002	2.616E-08	0.0006	1.035E-06	0.0233
Ni-63	9.956E-09	0.0002	2.645E-10	0.0000	0.000E+00	0.0000	1.579E-09	0.0000	4.874E-10	0.0000	5.671E-09	0.0001	5.695E-07	0.0128
Pu-238	2.122E-10	0.0000	6.537E-13	0.0000	0.000E+00	0.0000	3.157E-11	0.0000	6.714E-13	0.0000	3.447E-12	0.0000	7.190E-08	0.0016
Pu-239	8.324E-14	0.0000	2.582E-16	0.0000	0.000E+00	0.0000	1.247E-14	0.0000	2.652E-16	0.0000	1.361E-15	0.0000	8.630E-08	0.0019
Pu-240	5.555E-13	0.0000	1.708E-15	0.0000	0.000E+00	0.0000	8.248E-14	0.0000	1.754E-15	0.0000	9.004E-15	0.0000	2.051E-08	0.0005
Sr-90	6.318E-08	0.0014	9.406E-10	0.0000	0.000E+00	0.0000	9.776E-09	0.0002	4.523E-09	0.0001	3.283E-09	0.0001	8.912E-06	0.2001
Total	5.552E-07	0.0125	4.584E-09	0.0001	0.000E+00	0.0000	1.958E-07	0.0044	1.563E-08	0.0004	3.657E-08	0.0008	4.453E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 12 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 13
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	4.366E-19	2.132E-15	9.020E-17	4.740E-18	6.721E-16	4.505E-13	4.108E-15	3.378E-14	7.294E-17	1.109E-16	4.915E-13
Ag-108m	4.904E-04	1.093E+02	4.092E+00	7.746E+01	7.550E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.916E+02
Am-241	3.371E-03	5.010E+00	2.489E-02	2.702E-03	5.189E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.023E+01
C-14	1.760E+01	6.873E+04	8.203E+03	6.382E+03	8.559E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.333E+04
Co-60	2.461E-03	2.925E+02	7.600E+01	1.741E+01	3.789E+00	1.210E-01	6.411E-03	1.241E-02	9.376E-03	3.720E-03	3.898E+02
Cs-137	1.668E-02	9.910E+02	4.188E+02	2.601E+02	2.568E+01	8.203E-01	2.818E-01	8.315E-02	9.522E-02	1.008E-01	1.697E+03
Eu-152	5.042E-03	1.873E+01	1.757E+00	1.161E-01	7.761E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.836E+01
Eu-154	2.209E-03	8.205E+00	7.696E-01	5.085E-02	3.400E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.243E+01
Gd-152	9.273E-18	3.445E-14	3.231E-15	8.573E-17	1.428E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.204E-14
H-3	1.111E+04	4.182E+05	3.087E+04	5.063E+04	6.434E+01	6.103E+05	1.130E+02	1.747E+05	7.188E+03	2.448E+04	1.317E+06
Ni-63	1.657E-01	1.231E+04	8.398E+02	7.776E+03	2.551E+02	3.774E+01	6.889E-01	3.996E+00	9.696E-01	1.308E+01	2.123E+04
Np-237	1.093E-09	3.131E-05	4.547E-07	5.790E-09	1.682E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.345E-05
Pa-231	4.146E-17	5.820E-13	5.101E-14	2.034E-16	6.383E-14	2.303E-13	6.329E-16	2.830E-14	1.348E-14	1.095E-16	9.699E-13
Pb-210	5.386E-20	1.117E-15	2.241E-17	1.889E-17	8.291E-17	3.490E-13	1.413E-14	2.026E-14	1.372E-15	1.764E-15	3.877E-13
Pu-238	3.764E-03	5.594E+00	5.559E-02	1.509E-03	5.794E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.145E+01
Pu-239	3.983E-03	5.921E+00	5.883E-02	1.597E-03	6.132E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.211E+01
Pu-240	9.483E-04	1.410E+00	1.401E-02	3.801E-04	1.460E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.884E+00
Ra-226	6.970E-18	3.709E-13	3.567E-15	9.999E-15	1.073E-14	5.018E-13	4.116E-15	2.972E-14	2.504E-15	8.543E-15	9.419E-13
Ra-228	2.699E-23	1.431E-18	1.363E-20	3.839E-20	4.155E-20	9.057E-22	1.157E-23	4.617E-22	2.157E-24	4.587E-22	1.527E-18
Sr-90	8.148E-03	3.631E+03	3.541E+02	2.000E+02	1.254E+01	2.935E+00	3.316E-02	3.358E-01	1.255E-01	1.038E-01	4.201E+03
Th-228	2.291E-24	2.216E-20	3.386E-22	4.868E-23	3.527E-21	1.099E-23	2.484E-25	3.566E-24	2.046E-26	4.884E-25	2.609E-20
Th-229	7.518E-20	1.380E-16	2.279E-18	3.919E-19	1.157E-16	4.319E-14	9.624E-16	4.862E-15	2.402E-17	4.035E-18	4.930E-14
Th-230	4.823E-14	7.945E-11	9.542E-13	1.707E-13	7.425E-11	2.075E-11	3.862E-13	1.346E-11	4.662E-13	1.117E-13	1.900E-10
Th-232	6.918E-22	1.140E-18	1.369E-20	2.450E-21	1.065E-18	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.221E-18
U-233	2.388E-15	1.334E-11	2.858E-13	8.694E-13	3.676E-12	5.050E-11	1.087E-13	4.927E-12	6.682E-14	4.632E-13	7.424E-11
U-234	1.070E-08	3.885E-05	5.959E-07	2.900E-06	1.647E-05	3.578E-04	7.903E-07	3.680E-05	5.872E-07	3.595E-06	4.584E-04
U-235	3.917E-12	1.423E-08	2.182E-10	1.062E-09	6.031E-09	1.308E-07	2.890E-10	1.346E-08	2.147E-10	1.315E-09	1.677E-07
U-236	2.803E-11	1.018E-07	1.561E-09	7.600E-09	4.316E-08	9.364E-07	2.068E-09	9.631E-08	1.536E-09	9.408E-09	1.200E-06

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 13 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 14
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.036E-18	0.0000	1.727E-20	0.0000	2.042E-19	0.0000	8.848E-22	0.0000	5.035E-22	0.0000	1.480E-19	0.0000
Ag-108m	1.614E-06	0.0383	3.620E-13	0.0000	3.384E-08	0.0008	1.267E-09	0.0000	2.399E-08	0.0006	4.008E-10	0.0000
Am-241	4.674E-08	0.0011	2.773E-09	0.0001	1.966E-08	0.0005	9.766E-11	0.0000	1.060E-11	0.0000	3.297E-08	0.0008
C-14	1.909E-12	0.0000	3.147E-10	0.0000	3.476E-07	0.0082	4.148E-08	0.0010	3.228E-08	0.0008	6.038E-11	0.0000
Co-60	3.803E-06	0.0902	6.596E-13	0.0000	4.882E-08	0.0012	1.269E-08	0.0003	2.907E-09	0.0001	1.143E-09	0.0000
Cs-137	1.517E-05	0.3600	4.289E-12	0.0000	8.009E-07	0.0190	3.385E-07	0.0080	2.102E-07	0.0050	2.402E-08	0.0006
Eu-152	6.767E-06	0.1606	6.968E-12	0.0000	2.474E-09	0.0001	2.321E-10	0.0000	1.534E-11	0.0000	1.910E-09	0.0000
Eu-154	2.468E-06	0.0586	2.922E-12	0.0000	1.407E-09	0.0000	1.319E-10	0.0000	8.717E-12	0.0000	1.115E-09	0.0000
Gd-152	0.000E+00	0.0000	2.594E-23	0.0000	4.076E-22	0.0000	3.823E-23	0.0000	1.011E-24	0.0000	2.760E-22	0.0000
H-3	0.000E+00	0.0000	5.781E-09	0.0001	1.574E-07	0.0037	1.162E-08	0.0003	1.906E-08	0.0005	3.701E-11	0.0000
Ni-63	0.000E+00	0.0000	2.571E-11	0.0000	3.148E-07	0.0075	2.148E-08	0.0005	1.989E-07	0.0047	1.228E-08	0.0003
Np-237	6.897E-12	0.0000	9.141E-15	0.0000	1.393E-12	0.0000	2.252E-14	0.0000	2.700E-16	0.0000	1.286E-13	0.0000
Pa-231	9.374E-19	0.0000	1.833E-20	0.0000	1.349E-18	0.0000	1.382E-19	0.0000	3.500E-22	0.0000	2.319E-19	0.0000
Pb-210	1.799E-20	0.0000	3.502E-21	0.0000	1.317E-17	0.0000	2.264E-19	0.0000	2.052E-19	0.0000	1.033E-18	0.0000
Pu-238	1.280E-10	0.0000	3.376E-09	0.0001	2.524E-08	0.0006	2.508E-10	0.0000	6.807E-12	0.0000	4.208E-08	0.0010
Pu-239	4.037E-10	0.0000	3.976E-09	0.0001	3.088E-08	0.0007	3.068E-10	0.0000	8.327E-12	0.0000	5.073E-08	0.0012
Pu-240	3.475E-11	0.0000	9.454E-10	0.0000	7.343E-09	0.0002	7.296E-11	0.0000	1.980E-12	0.0000	1.211E-08	0.0003
Ra-226	2.128E-16	0.0000	1.742E-20	0.0000	4.585E-17	0.0000	6.361E-19	0.0000	1.492E-18	0.0000	1.693E-18	0.0000
Ra-228	2.616E-22	0.0000	1.813E-26	0.0000	2.926E-22	0.0000	4.009E-24	0.0000	9.459E-24	0.0000	1.220E-23	0.0000
Sr-90	5.672E-08	0.0013	1.975E-11	0.0000	7.396E-06	0.1755	7.213E-07	0.0171	4.074E-07	0.0097	3.869E-08	0.0009
Th-228	3.360E-22	0.0000	3.696E-25	0.0000	2.763E-24	0.0000	4.323E-26	0.0000	5.439E-27	0.0000	3.226E-24	0.0000
Th-229	3.298E-19	0.0000	3.796E-21	0.0000	1.812E-20	0.0000	1.832E-22	0.0000	2.549E-23	0.0000	3.350E-20	0.0000
Th-230	6.158E-18	0.0000	1.262E-17	0.0000	7.873E-17	0.0000	7.917E-19	0.0000	1.095E-19	0.0000	1.377E-16	0.0000
Th-232	3.926E-26	0.0000	2.911E-25	0.0000	1.336E-24	0.0000	1.344E-26	0.0000	1.858E-27	0.0000	2.391E-24	0.0000
U-233	3.811E-19	0.0000	2.662E-19	0.0000	8.473E-18	0.0000	1.396E-19	0.0000	6.253E-19	0.0000	5.652E-18	0.0000
U-234	1.994E-14	0.0000	5.275E-14	0.0000	1.639E-12	0.0000	2.608E-14	0.0000	1.219E-13	0.0000	1.125E-12	0.0000
U-235	1.675E-14	0.0000	1.848E-17	0.0000	6.625E-16	0.0000	1.054E-17	0.0000	4.928E-17	0.0000	4.600E-16	0.0000
U-236	2.824E-17	0.0000	1.373E-16	0.0000	4.381E-15	0.0000	6.970E-17	0.0000	3.259E-16	0.0000	3.000E-15	0.0000
Total	2.993E-05	0.7102	1.723E-08	0.0004	9.186E-06	0.2180	1.149E-06	0.0273	8.949E-07	0.0212	2.175E-07	0.0052

Attachment 6 Sheet No. 14 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 15
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.196E-18	0.0000	3.199E-20	0.0000	3.248E-19	0.0000	8.992E-22	0.0000	1.185E-21	0.0000	4.962E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.673E-06	0.0397
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.022E-07	0.0024
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.217E-07	0.0100
Co-60	1.128E-10	0.0000	8.833E-12	0.0000	1.792E-11	0.0000	2.123E-11	0.0000	6.296E-12	0.0000	3.868E-06	0.0918
Cs-137	7.753E-09	0.0002	3.418E-09	0.0001	1.060E-09	0.0000	1.944E-09	0.0000	1.519E-09	0.0000	1.656E-05	0.3930
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.772E-06	0.1607
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.471E-06	0.0586
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.488E-22	0.0000
H-3	4.323E-07	0.0103	1.043E-10	0.0000	1.639E-07	0.0039	7.405E-09	0.0002	2.323E-08	0.0006	8.209E-07	0.0195
Ni-63	1.057E-08	0.0003	2.808E-10	0.0000	1.676E-09	0.0000	5.171E-10	0.0000	6.018E-09	0.0001	5.665E-07	0.0134
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.450E-12	0.0000
Pa-231	1.682E-18	0.0000	6.130E-21	0.0000	2.657E-19	0.0000	9.942E-20	0.0000	4.738E-22	0.0000	4.729E-18	0.0000
Pb-210	3.348E-18	0.0000	4.619E-19	0.0000	8.872E-19	0.0000	5.109E-20	0.0000	5.577E-20	0.0000	1.946E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.108E-08	0.0017
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.630E-08	0.0020
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.050E-08	0.0005
Ra-226	7.930E-18	0.0000	1.151E-19	0.0000	1.153E-18	0.0000	7.508E-20	0.0000	2.136E-19	0.0000	2.720E-16	0.0000
Ra-228	9.157E-23	0.0000	1.377E-24	0.0000	1.386E-23	0.0000	8.630E-25	0.0000	2.512E-24	0.0000	6.901E-22	0.0000
Sr-90	6.635E-08	0.0016	9.877E-10	0.0000	1.026E-08	0.0002	4.746E-09	0.0001	3.446E-09	0.0001	8.706E-06	0.2066
Th-228	7.685E-24	0.0000	2.372E-25	0.0000	1.213E-24	0.0000	1.301E-26	0.0000	1.892E-27	0.0000	3.516E-22	0.0000
Th-229	5.304E-20	0.0000	1.578E-21	0.0000	1.102E-20	0.0000	2.129E-22	0.0000	4.022E-23	0.0000	4.513E-19	0.0000
Th-230	2.430E-16	0.0000	6.925E-18	0.0000	4.842E-17	0.0000	9.432E-19	0.0000	1.789E-19	0.0000	5.355E-16	0.0000
Th-232	5.452E-24	0.0000	1.564E-25	0.0000	1.014E-24	0.0000	1.723E-26	0.0000	3.211E-27	0.0000	1.072E-23	0.0000
U-233	8.459E-16	0.0000	2.603E-18	0.0000	1.256E-16	0.0000	2.661E-18	0.0000	1.370E-17	0.0000	1.006E-15	0.0000
U-234	2.335E-10	0.0000	7.194E-13	0.0000	3.475E-11	0.0000	7.393E-13	0.0000	3.795E-12	0.0000	2.764E-10	0.0000
U-235	9.177E-14	0.0000	2.846E-16	0.0000	1.375E-14	0.0000	2.924E-16	0.0000	1.501E-15	0.0000	1.256E-13	0.0000
U-236	6.124E-13	0.0000	1.883E-15	0.0000	9.094E-14	0.0000	1.934E-15	0.0000	9.930E-15	0.0000	7.251E-13	0.0000
Total	5.173E-07	0.0123	4.800E-09	0.0001	1.770E-07	0.0042	1.463E-08	0.0003	3.422E-08	0.0008	4.214E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 15 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 16
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.614E-06	0.0383	3.620E-13	0.0000	0.000E+00	0.0000	3.384E-08	0.0008	1.267E-09	0.0000	2.399E-08	0.0006	4.008E-10	0.0000
Am-241	4.675E-08	0.0011	2.773E-09	0.0001	0.000E+00	0.0000	1.966E-08	0.0005	9.768E-11	0.0000	1.060E-11	0.0000	3.297E-08	0.0008
C-14	1.909E-12	0.0000	3.147E-10	0.0000	0.000E+00	0.0000	3.476E-07	0.0082	4.148E-08	0.0010	3.228E-08	0.0008	6.038E-11	0.0000
Co-60	3.803E-06	0.0902	6.596E-13	0.0000	0.000E+00	0.0000	4.882E-08	0.0012	1.269E-08	0.0003	2.907E-09	0.0001	1.143E-09	0.0000
Cs-137	1.517E-05	0.3600	4.289E-12	0.0000	0.000E+00	0.0000	8.009E-07	0.0190	3.385E-07	0.0080	2.102E-07	0.0050	2.402E-08	0.0006
Eu-152	6.767E-06	0.1606	6.968E-12	0.0000	0.000E+00	0.0000	2.474E-09	0.0001	2.321E-10	0.0000	1.534E-11	0.0000	1.910E-09	0.0000
Eu-154	2.468E-06	0.0586	2.922E-12	0.0000	0.000E+00	0.0000	1.407E-09	0.0000	1.319E-10	0.0000	8.717E-12	0.0000	1.115E-09	0.0000
H-3	0.000E+00	0.0000	5.781E-09	0.0001	0.000E+00	0.0000	1.574E-07	0.0037	1.162E-08	0.0003	1.906E-08	0.0005	3.701E-11	0.0000
Ni-63	0.000E+00	0.0000	2.571E-11	0.0000	0.000E+00	0.0000	3.148E-07	0.0075	2.148E-08	0.0005	1.989E-07	0.0047	1.228E-08	0.0003
Pu-238	1.280E-10	0.0000	3.376E-09	0.0001	0.000E+00	0.0000	2.524E-08	0.0006	2.508E-10	0.0000	6.929E-12	0.0000	4.208E-08	0.0010
Pu-239	4.037E-10	0.0000	3.976E-09	0.0001	0.000E+00	0.0000	3.088E-08	0.0007	3.068E-10	0.0000	8.327E-12	0.0000	5.073E-08	0.0012
Pu-240	3.475E-11	0.0000	9.454E-10	0.0000	0.000E+00	0.0000	7.343E-09	0.0002	7.296E-11	0.0000	1.980E-12	0.0000	1.211E-08	0.0003
Sr-90	5.672E-08	0.0013	1.975E-11	0.0000	0.000E+00	0.0000	7.396E-06	0.1755	7.213E-07	0.0171	4.074E-07	0.0097	3.869E-08	0.0009
Total	2.993E-05	0.7102	1.723E-08	0.0004	0.000E+00	0.0000	9.186E-06	0.2180	1.149E-06	0.0273	8.949E-07	0.0212	2.175E-07	0.0052

Attachment 6 Sheet No. 16 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 17
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.673E-06	0.0397
Am-241	8.460E-16	0.0000	2.604E-18	0.0000	0.000E+00	0.0000	1.257E-16	0.0000	2.661E-18	0.0000	1.370E-17	0.0000	1.023E-07	0.0024
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.217E-07	0.0100
Co-60	1.128E-10	0.0000	8.833E-12	0.0000	0.000E+00	0.0000	1.792E-11	0.0000	2.123E-11	0.0000	6.296E-12	0.0000	3.868E-06	0.0918
Cs-137	7.753E-09	0.0002	3.418E-09	0.0001	0.000E+00	0.0000	1.060E-09	0.0000	1.944E-09	0.0000	1.519E-09	0.0000	1.656E-05	0.3930
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.772E-06	0.1607
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.471E-06	0.0586
H-3	4.323E-07	0.0103	1.043E-10	0.0000	0.000E+00	0.0000	1.639E-07	0.0039	7.405E-09	0.0002	2.323E-08	0.0006	8.209E-07	0.0195
Ni-63	1.057E-08	0.0003	2.808E-10	0.0000	0.000E+00	0.0000	1.676E-09	0.0000	5.171E-10	0.0000	6.018E-09	0.0001	5.665E-07	0.0134
Pu-238	2.335E-10	0.0000	7.194E-13	0.0000	0.000E+00	0.0000	3.475E-11	0.0000	7.393E-13	0.0000	3.795E-12	0.0000	7.136E-08	0.0017
Pu-239	9.178E-14	0.0000	2.847E-16	0.0000	0.000E+00	0.0000	1.375E-14	0.0000	2.925E-16	0.0000	1.501E-15	0.0000	8.630E-08	0.0020
Pu-240	6.124E-13	0.0000	1.883E-15	0.0000	0.000E+00	0.0000	9.094E-14	0.0000	1.934E-15	0.0000	9.930E-15	0.0000	2.051E-08	0.0005
Sr-90	6.635E-08	0.0016	9.877E-10	0.0000	0.000E+00	0.0000	1.026E-08	0.0002	4.746E-09	0.0001	3.446E-09	0.0001	8.706E-06	0.2066
Total	5.173E-07	0.0123	4.800E-09	0.0001	0.000E+00	0.0000	1.770E-07	0.0042	1.463E-08	0.0003	3.422E-08	0.0008	4.214E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 17 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 18
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	1.158E-17	4.785E-14	9.672E-16	1.145E-16	1.783E-14	1.266E-12	1.432E-14	1.491E-13	4.270E-16	4.656E-16	1.497E-12
Ag-108m	4.851E-04	1.081E+02	4.047E+00	7.661E+01	7.467E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.895E+02
Am-241	3.360E-03	4.994E+00	2.481E-02	2.694E-03	5.172E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.019E+01
C-14	3.690E+00	1.441E+04	1.720E+03	1.338E+03	1.794E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.747E+04
Co-60	1.891E-03	2.248E+02	5.841E+01	1.338E+01	2.912E+00	2.805E-01	1.532E-02	3.075E-02	3.353E-02	1.046E-02	2.998E+02
Cs-137	1.592E-02	9.461E+02	3.998E+02	2.483E+02	2.451E+01	2.361E+00	8.362E-01	2.558E-01	4.229E-01	3.518E-01	1.623E+03
Eu-152	4.543E-03	1.688E+01	1.583E+00	1.046E-01	6.994E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.556E+01
Eu-154	1.887E-03	7.009E+00	6.574E-01	4.344E-02	2.905E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.061E+01
Gd-152	2.643E-17	9.819E-14	9.210E-15	2.437E-16	4.069E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.483E-13
H-3	3.370E+03	1.268E+05	9.362E+03	1.536E+04	1.951E+01	1.051E+06	1.966E+02	3.080E+05	1.367E+04	4.355E+04	1.568E+06
Ni-63	1.632E-01	1.212E+04	8.275E+02	7.662E+03	2.513E+02	1.119E+02	2.080E+00	1.232E+01	3.576E+00	4.315E+01	2.104E+04
Np-237	3.273E-09	9.608E-05	1.509E-06	1.838E-08	5.038E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.026E-04
Pa-231	3.724E-16	5.429E-12	5.318E-13	1.551E-15	5.733E-13	1.680E-12	5.432E-15	2.785E-13	1.417E-13	1.135E-15	8.643E-12
Pb-210	4.290E-18	7.302E-14	1.451E-15	1.221E-15	6.604E-15	1.570E-12	8.392E-14	1.664E-13	9.012E-15	8.867E-15	1.921E-12
Pu-238	3.704E-03	5.506E+00	5.471E-02	1.485E-03	5.703E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.127E+01
Pu-239	3.983E-03	5.920E+00	5.882E-02	1.596E-03	6.131E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.211E+01
Pu-240	9.480E-04	1.409E+00	1.400E-02	3.800E-04	1.459E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.883E+00
Ra-226	1.871E-16	1.072E-11	1.338E-13	3.298E-13	2.881E-13	2.393E-12	2.589E-14	2.580E-13	1.750E-14	4.662E-14	1.421E-11
Ra-228	6.865E-22	3.919E-17	4.837E-19	1.199E-18	1.057E-18	1.774E-16	1.813E-18	1.707E-17	1.080E-18	3.193E-18	2.425E-16
Sr-90	7.765E-03	3.460E+03	3.375E+02	1.906E+02	1.195E+01	8.415E+00	9.665E-02	9.973E-01	4.370E-01	3.276E-01	4.011E+03
Th-228	1.547E-22	7.454E-19	1.330E-20	1.700E-21	2.382E-19	6.216E-17	1.272E-18	6.062E-18	6.156E-20	9.083E-21	7.057E-17
Th-229	2.025E-18	3.203E-15	3.738E-17	5.863E-18	3.118E-15	1.301E-13	2.619E-15	1.322E-14	8.373E-17	2.372E-17	1.524E-13
Th-230	4.310E-13	6.643E-10	7.131E-12	1.087E-12	6.635E-10	3.994E-10	8.196E-12	1.504E-10	5.580E-12	1.172E-12	1.901E-09
Th-232	6.214E-21	9.579E-18	1.029E-19	1.569E-20	9.567E-18	6.646E-17	1.355E-18	7.919E-18	1.177E-19	2.236E-20	9.514E-17
U-233	2.143E-14	9.335E-11	1.759E-12	6.612E-12	3.298E-11	1.397E-09	3.144E-12	1.496E-10	2.803E-12	1.557E-11	1.703E-09
U-234	3.175E-08	1.171E-04	1.844E-06	8.718E-06	4.888E-05	3.209E-03	7.250E-06	3.465E-04	6.805E-06	3.662E-05	3.783E-03
U-235	1.172E-11	4.321E-08	6.804E-10	3.217E-09	1.804E-08	1.180E-06	2.665E-09	1.273E-07	2.500E-09	1.346E-08	1.391E-06
U-236	8.386E-11	3.092E-07	4.869E-09	2.302E-08	1.291E-07	8.441E-06	1.907E-08	9.113E-07	1.789E-08	9.632E-08	9.952E-06

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 18 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 19
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.582E-18	0.0000	2.190E-20	0.0000	2.588E-19	0.0000	1.078E-21	0.0000	6.382E-22	0.0000	1.876E-19	0.0000
Ag-108m	1.596E-06	0.0415	3.580E-13	0.0000	3.347E-08	0.0009	1.253E-09	0.0000	2.372E-08	0.0006	3.964E-10	0.0000
Am-241	4.659E-08	0.0012	2.764E-09	0.0001	1.959E-08	0.0005	9.734E-11	0.0000	1.057E-11	0.0000	3.286E-08	0.0009
C-14	4.002E-13	0.0000	6.596E-11	0.0000	7.286E-08	0.0019	8.696E-09	0.0002	6.766E-09	0.0002	1.266E-11	0.0000
Co-60	2.923E-06	0.0759	5.069E-13	0.0000	3.752E-08	0.0010	9.751E-09	0.0003	2.234E-09	0.0001	8.785E-10	0.0000
Cs-137	1.448E-05	0.3763	4.094E-12	0.0000	7.645E-07	0.0199	3.231E-07	0.0084	2.007E-07	0.0052	2.293E-08	0.0006
Eu-152	6.098E-06	0.1584	6.279E-12	0.0000	2.230E-09	0.0001	2.092E-10	0.0000	1.382E-11	0.0000	1.721E-09	0.0000
Eu-154	2.108E-06	0.0548	2.496E-12	0.0000	1.201E-09	0.0000	1.127E-10	0.0000	7.446E-12	0.0000	9.524E-10	0.0000
Gd-152	0.000E+00	0.0000	2.831E-23	0.0000	4.449E-22	0.0000	4.173E-23	0.0000	1.103E-24	0.0000	3.012E-22	0.0000
H-3	0.000E+00	0.0000	1.753E-09	0.0000	4.775E-08	0.0012	3.524E-09	0.0001	5.782E-09	0.0002	1.122E-11	0.0000
Ni-63	0.000E+00	0.0000	2.533E-11	0.0000	3.101E-07	0.0081	2.117E-08	0.0005	1.960E-07	0.0051	1.210E-08	0.0003
Np-237	7.750E-12	0.0000	1.027E-14	0.0000	1.565E-12	0.0000	2.533E-14	0.0000	3.036E-16	0.0000	1.445E-13	0.0000
Pa-231	1.128E-18	0.0000	2.206E-20	0.0000	1.624E-18	0.0000	1.665E-19	0.0000	4.209E-22	0.0000	2.791E-19	0.0000
Pb-210	2.425E-20	0.0000	4.723E-21	0.0000	1.774E-17	0.0000	3.044E-19	0.0000	2.762E-19	0.0000	1.394E-18	0.0000
Pu-238	1.260E-10	0.0000	3.323E-09	0.0001	2.485E-08	0.0006	2.469E-10	0.0000	6.700E-12	0.0000	4.141E-08	0.0011
Pu-239	4.036E-10	0.0000	3.975E-09	0.0001	3.087E-08	0.0008	3.068E-10	0.0000	8.326E-12	0.0000	5.072E-08	0.0013
Pu-240	3.474E-11	0.0000	9.451E-10	0.0000	7.341E-09	0.0002	7.294E-11	0.0000	1.980E-12	0.0000	1.210E-08	0.0003
Ra-226	2.721E-16	0.0000	2.227E-20	0.0000	5.863E-17	0.0000	8.142E-19	0.0000	1.909E-18	0.0000	2.164E-18	0.0000
Ra-228	3.255E-22	0.0000	2.255E-26	0.0000	3.642E-22	0.0000	4.995E-24	0.0000	1.178E-23	0.0000	1.518E-23	0.0000
Sr-90	5.406E-08	0.0014	1.882E-11	0.0000	7.049E-06	0.1831	6.875E-07	0.0179	3.883E-07	0.0101	3.687E-08	0.0010
Th-228	4.256E-22	0.0000	4.680E-25	0.0000	3.474E-24	0.0000	5.419E-26	0.0000	6.817E-27	0.0000	4.085E-24	0.0000
Th-229	4.227E-19	0.0000	4.865E-21	0.0000	2.321E-20	0.0000	2.344E-22	0.0000	3.258E-23	0.0000	4.294E-20	0.0000
Th-230	7.384E-18	0.0000	1.513E-17	0.0000	9.436E-17	0.0000	9.482E-19	0.0000	1.310E-19	0.0000	1.651E-16	0.0000
Th-232	4.725E-26	0.0000	3.504E-25	0.0000	1.608E-24	0.0000	1.615E-26	0.0000	2.231E-27	0.0000	2.878E-24	0.0000
U-233	4.584E-19	0.0000	3.201E-19	0.0000	1.017E-17	0.0000	1.673E-19	0.0000	7.512E-19	0.0000	6.798E-18	0.0000
U-234	2.226E-14	0.0000	5.888E-14	0.0000	1.830E-12	0.0000	2.913E-14	0.0000	1.361E-13	0.0000	1.256E-12	0.0000
U-235	1.880E-14	0.0000	2.074E-17	0.0000	7.439E-16	0.0000	1.184E-17	0.0000	5.533E-17	0.0000	5.164E-16	0.0000
U-236	3.170E-17	0.0000	1.542E-16	0.0000	4.919E-15	0.0000	7.828E-17	0.0000	3.659E-16	0.0000	3.368E-15	0.0000
Total	2.731E-05	0.7095	1.288E-08	0.0003	8.401E-06	0.2183	1.056E-06	0.0274	8.235E-07	0.0214	2.130E-07	0.0055

Attachment 6 Sheet No. 19 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 20
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	2.908E-18	0.0000	4.240E-20	0.0000	4.307E-19	0.0000	1.166E-21	0.0000	1.574E-21	0.0000	6.437E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.655E-06	0.0430
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.019E-07	0.0026
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.840E-08	0.0023
Co-60	1.088E-10	0.0000	8.526E-12	0.0000	1.732E-11	0.0000	2.072E-11	0.0000	6.108E-12	0.0000	2.973E-06	0.0772
Cs-137	8.440E-09	0.0002	3.722E-09	0.0001	1.154E-09	0.0000	2.125E-09	0.0001	1.657E-09	0.0000	1.581E-05	0.4108
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.103E-06	0.1585
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.110E-06	0.0548
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.172E-22	0.0000
H-3	3.735E-07	0.0097	9.007E-11	0.0000	1.416E-07	0.0037	6.382E-09	0.0002	2.005E-08	0.0005	6.004E-07	0.0156
Ni-63	1.176E-08	0.0003	3.126E-10	0.0000	1.866E-09	0.0000	5.767E-10	0.0000	6.705E-09	0.0002	5.606E-07	0.0146
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.495E-12	0.0000
Pa-231	2.148E-18	0.0000	7.816E-21	0.0000	3.379E-19	0.0000	1.255E-19	0.0000	5.872E-22	0.0000	5.840E-18	0.0000
Pb-210	4.468E-18	0.0000	6.036E-19	0.0000	1.141E-18	0.0000	6.681E-20	0.0000	7.653E-20	0.0000	2.610E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.996E-08	0.0018
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.629E-08	0.0022
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.050E-08	0.0005
Ra-226	1.068E-17	0.0000	1.552E-19	0.0000	1.558E-18	0.0000	9.826E-20	0.0000	2.885E-19	0.0000	3.484E-16	0.0000
Ra-228	1.086E-22	0.0000	1.644E-24	0.0000	1.662E-23	0.0000	9.598E-25	0.0000	2.899E-24	0.0000	8.524E-22	0.0000
Sr-90	7.215E-08	0.0019	1.074E-09	0.0000	1.117E-08	0.0003	5.171E-09	0.0001	3.752E-09	0.0001	8.309E-06	0.2159
Th-228	8.938E-24	0.0000	2.780E-25	0.0000	1.430E-24	0.0000	1.419E-26	0.0000	2.151E-27	0.0000	4.443E-22	0.0000
Th-229	6.917E-20	0.0000	2.068E-21	0.0000	1.440E-20	0.0000	2.726E-22	0.0000	5.167E-23	0.0000	5.799E-19	0.0000
Th-230	3.101E-16	0.0000	8.844E-18	0.0000	6.078E-17	0.0000	1.149E-18	0.0000	2.171E-19	0.0000	6.641E-16	0.0000
Th-232	6.391E-24	0.0000	1.841E-25	0.0000	1.202E-24	0.0000	2.064E-26	0.0000	3.831E-27	0.0000	1.270E-23	0.0000
U-233	1.084E-15	0.0000	3.337E-18	0.0000	1.611E-16	0.0000	3.415E-18	0.0000	1.757E-17	0.0000	1.289E-15	0.0000
U-234	2.799E-10	0.0000	8.627E-13	0.0000	4.168E-11	0.0000	8.875E-13	0.0000	4.553E-12	0.0000	3.313E-10	0.0000
U-235	1.105E-13	0.0000	3.427E-16	0.0000	1.655E-14	0.0000	3.524E-16	0.0000	1.808E-15	0.0000	1.497E-13	0.0000
U-236	7.372E-13	0.0000	2.266E-15	0.0000	1.095E-13	0.0000	2.331E-15	0.0000	1.196E-14	0.0000	8.721E-13	0.0000
Total	4.663E-07	0.0121	5.208E-09	0.0001	1.558E-07	0.0040	1.428E-08	0.0004	3.218E-08	0.0008	3.849E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 20 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

RESRAD, Version 6.3 T⌀ Limit = 180 days 07/11/2007 15:00 Page 21
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	1.596E-08	0.0415	3.580E-13	0.0000	0.000E+00	0.0000	3.347E-08	0.0009	1.253E-09	0.0000	2.372E-08	0.0006	3.964E-10	0.0000
Am-241	4.659E-08	0.0012	2.764E-09	0.0001	0.000E+00	0.0000	1.959E-08	0.0005	9.736E-11	0.0000	1.057E-11	0.0000	3.286E-08	0.0009
C-14	4.002E-13	0.0000	6.596E-11	0.0000	0.000E+00	0.0000	7.286E-08	0.0019	8.696E-09	0.0002	6.766E-09	0.0002	1.266E-11	0.0000
Co-60	2.923E-06	0.0759	5.069E-13	0.0000	0.000E+00	0.0000	3.752E-08	0.0010	9.751E-09	0.0003	2.234E-09	0.0001	8.785E-10	0.0000
Cs-137	1.448E-05	0.3763	4.094E-12	0.0000	0.000E+00	0.0000	7.645E-07	0.0199	3.231E-07	0.0084	2.007E-07	0.0052	2.293E-08	0.0006
Eu-152	6.098E-06	0.1584	6.279E-12	0.0000	0.000E+00	0.0000	2.230E-09	0.0001	2.092E-10	0.0000	1.382E-11	0.0000	1.721E-09	0.0000
Eu-154	2.108E-06	0.0548	2.496E-12	0.0000	0.000E+00	0.0000	1.201E-09	0.0000	1.127E-10	0.0000	7.446E-12	0.0000	9.524E-10	0.0000
H-3	0.000E+00	0.0000	1.753E-09	0.0000	0.000E+00	0.0000	4.775E-08	0.0012	3.524E-09	0.0001	5.782E-09	0.0002	1.122E-11	0.0000
Ni-63	0.000E+00	0.0000	2.533E-11	0.0000	0.000E+00	0.0000	3.101E-07	0.0081	2.117E-08	0.0005	1.960E-07	0.0051	1.210E-08	0.0003
Pu-238	1.260E-10	0.0000	3.323E-09	0.0001	0.000E+00	0.0000	2.485E-08	0.0006	2.469E-10	0.0000	6.836E-12	0.0000	4.141E-08	0.0011
Pu-239	4.037E-10	0.0000	3.975E-09	0.0001	0.000E+00	0.0000	3.087E-08	0.0008	3.068E-10	0.0000	8.326E-12	0.0000	5.072E-08	0.0013
Pu-240	3.474E-11	0.0000	9.451E-10	0.0000	0.000E+00	0.0000	7.341E-09	0.0002	7.294E-11	0.0000	1.980E-12	0.0000	1.210E-08	0.0003
Sr-90	5.406E-08	0.0014	1.882E-11	0.0000	0.000E+00	0.0000	7.049E-06	0.1831	6.875E-07	0.0179	3.883E-07	0.0101	3.687E-08	0.0010
Total	2.731E-05	0.7095	1.288E-08	0.0003	0.000E+00	0.0000	8.401E-06	0.2183	1.056E-06	0.0274	8.235E-07	0.0214	2.130E-07	0.0055

Attachment 6 Sheet No. 21 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 22
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.655E-06	0.0430
Am-241	1.085E-15	0.0000	3.339E-18	0.0000	0.000E+00	0.0000	1.611E-16	0.0000	3.416E-18	0.0000	1.757E-17	0.0000	1.019E-07	0.0026
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.840E-08	0.0023
Co-60	1.088E-10	0.0000	8.526E-12	0.0000	0.000E+00	0.0000	1.732E-11	0.0000	2.072E-11	0.0000	6.108E-12	0.0000	2.973E-06	0.0772
Cs-137	8.440E-09	0.0002	3.722E-09	0.0001	0.000E+00	0.0000	1.154E-09	0.0000	2.125E-09	0.0001	1.657E-09	0.0000	1.581E-05	0.4108
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.103E-06	0.1585
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.110E-06	0.0548
H-3	3.735E-07	0.0097	9.007E-11	0.0000	0.000E+00	0.0000	1.416E-07	0.0037	6.382E-09	0.0002	2.005E-08	0.0005	6.004E-07	0.0156
Ni-63	1.176E-08	0.0003	3.126E-10	0.0000	0.000E+00	0.0000	1.866E-09	0.0000	5.767E-10	0.0000	6.705E-09	0.0002	5.606E-07	0.0146
Pu-238	2.799E-10	0.0000	8.627E-13	0.0000	0.000E+00	0.0000	4.168E-11	0.0000	8.875E-13	0.0000	4.553E-12	0.0000	7.029E-08	0.0018
Pu-239	1.105E-13	0.0000	3.427E-16	0.0000	0.000E+00	0.0000	1.655E-14	0.0000	3.525E-16	0.0000	1.808E-15	0.0000	8.629E-08	0.0022
Pu-240	7.372E-13	0.0000	2.266E-15	0.0000	0.000E+00	0.0000	1.095E-13	0.0000	2.331E-15	0.0000	1.196E-14	0.0000	2.050E-08	0.0005
Sr-90	7.215E-08	0.0019	1.074E-09	0.0000	0.000E+00	0.0000	1.117E-08	0.0003	5.171E-09	0.0001	3.752E-09	0.0001	8.309E-06	0.2159
Total	4.663E-07	0.0121	5.208E-09	0.0001	0.000E+00	0.0000	1.558E-07	0.0040	1.428E-08	0.0004	3.218E-08	0.0008	3.849E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 22 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 23
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 7.000E+00 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	1.422E-16	5.547E-13	5.736E-15	1.354E-15	2.189E-13	5.910E-12	6.044E-14	5.787E-13	2.515E-15	2.103E-15	7.335E-12
Ag-108m	4.745E-04	1.057E+02	3.959E+00	7.494E+01	7.304E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.853E+02
Am-241	3.338E-03	4.962E+00	2.465E-02	2.676E-03	5.139E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.013E+01
C-14	1.618E-01	6.317E+02	7.541E+01	5.867E+01	7.866E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.659E+02
Co-60	1.117E-03	1.328E+02	3.450E+01	7.906E+00	1.720E+00	3.872E-01	2.133E-02	4.324E-02	5.092E-02	1.515E-02	1.774E+02
Cs-137	1.451E-02	8.621E+02	3.644E+02	2.263E+02	2.234E+01	5.029E+00	1.796E+00	5.549E-01	9.909E-01	7.866E-01	1.484E+03
Eu-152	3.690E-03	1.371E+01	1.286E+00	8.494E-02	5.680E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.076E+01
Eu-154	1.377E-03	5.114E+00	4.797E-01	3.169E-02	2.119E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.745E+00
Gd-152	5.583E-17	2.074E-13	1.945E-14	5.144E-16	8.595E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.133E-13
H-3	3.096E+02	1.165E+04	8.602E+02	1.411E+03	1.793E+00	5.673E+05	1.073E+02	1.705E+05	8.132E+03	2.433E+04	7.843E+05
Ni-63	1.585E-01	1.177E+04	8.033E+02	7.438E+03	2.440E+02	2.538E+02	4.741E+00	2.824E+01	8.563E+00	1.007E+02	2.065E+04
Np-237	7.611E-09	2.250E-04	3.607E-06	4.345E-08	1.172E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.403E-04
Pa-231	2.020E-15	2.976E-11	3.005E-12	7.980E-15	3.109E-12	1.630E-11	4.813E-14	2.261E-12	1.043E-12	7.094E-15	5.554E-11
Pb-210	1.230E-16	1.946E-12	3.583E-14	3.132E-14	1.893E-13	5.550E-12	3.240E-13	6.986E-13	2.819E-14	3.671E-14	8.841E-12
Pu-238	3.589E-03	5.335E+00	5.300E-02	1.439E-03	5.525E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.091E+01
Pu-239	3.982E-03	5.919E+00	5.881E-02	1.596E-03	6.130E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.211E+01
Pu-240	9.475E-04	1.408E+00	1.399E-02	3.798E-04	1.459E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.881E+00
Ra-226	2.351E-15	1.375E-10	1.841E-12	4.390E-12	3.619E-12	1.440E-11	1.641E-13	1.712E-12	9.340E-14	2.982E-13	1.640E-10
Ra-228	7.786E-21	4.539E-16	6.007E-18	1.440E-17	1.199E-17	4.941E-16	5.506E-18	5.659E-17	3.674E-18	1.068E-17	1.057E-15
Sr-90	7.053E-03	3.143E+03	3.066E+02	1.732E+02	1.086E+01	1.786E+01	2.060E-01	2.137E+00	9.739E-01	7.133E-01	3.656E+03
Th-228	3.295E-21	1.087E-17	1.860E-19	2.335E-20	5.072E-18	1.700E-16	3.794E-18	1.976E-17	2.064E-19	3.014E-20	2.099E-16
Th-229	2.561E-17	3.904E-14	4.131E-16	6.046E-17	3.943E-14	3.872E-13	8.122E-15	4.606E-14	5.751E-16	1.106E-16	5.210E-13
Th-230	2.313E-12	3.493E-09	3.595E-11	5.149E-12	3.561E-09	4.453E-09	9.490E-11	1.072E-09	3.368E-11	6.770E-12	1.276E-08
Th-232	3.370E-20	5.089E-17	5.239E-19	7.508E-20	5.188E-17	2.356E-16	5.184E-18	3.497E-17	6.103E-19	1.171E-19	3.798E-16
U-233	1.160E-13	4.630E-10	8.047E-12	3.369E-11	1.785E-10	1.783E-08	4.043E-11	1.940E-09	3.943E-11	2.081E-10	2.075E-08
U-234	7.252E-08	2.686E-04	4.260E-06	1.998E-05	1.116E-04	1.724E-02	3.921E-05	1.887E-03	3.912E-05	2.039E-04	1.982E-02
U-235	2.719E-11	1.007E-07	1.597E-09	7.492E-09	4.186E-08	6.404E-06	1.456E-08	7.009E-07	1.452E-08	7.571E-08	7.361E-06
U-236	1.945E-10	7.204E-07	1.143E-08	5.360E-08	2.995E-07	4.582E-05	1.042E-07	5.015E-06	1.039E-07	5.417E-07	5.267E-05

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 7.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 23 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 24
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	3.976E-18	0.0000	3.372E-20	0.0000	3.978E-19	0.0000	1.541E-21	0.0000	9.816E-22	0.0000	2.889E-19	0.0000
Ag-108m	1.561E-06	0.0474	3.502E-13	0.0000	3.273E-08	0.0010	1.226E-09	0.0000	2.320E-08	0.0007	3.877E-10	0.0000
Am-241	4.628E-08	0.0014	2.746E-09	0.0001	1.947E-08	0.0006	9.670E-11	0.0000	1.050E-11	0.0000	3.265E-08	0.0010
C-14	1.755E-14	0.0000	2.892E-12	0.0000	3.194E-09	0.0001	3.813E-10	0.0000	2.967E-10	0.0000	5.549E-13	0.0000
Co-60	1.726E-06	0.0524	2.994E-13	0.0000	2.216E-08	0.0007	5.760E-09	0.0002	1.320E-09	0.0000	5.189E-10	0.0000
Cs-137	1.320E-05	0.4008	3.731E-12	0.0000	6.967E-07	0.0212	2.944E-07	0.0089	1.829E-07	0.0056	2.090E-08	0.0006
Eu-152	4.953E-06	0.1504	5.099E-12	0.0000	1.811E-09	0.0001	1.699E-10	0.0000	1.122E-11	0.0000	1.397E-09	0.0000
Eu-154	1.538E-06	0.0467	1.821E-12	0.0000	8.766E-10	0.0000	8.223E-11	0.0000	5.433E-12	0.0000	6.949E-10	0.0000
Gd-152	0.000E+00	0.0000	3.237E-23	0.0000	5.087E-22	0.0000	4.772E-23	0.0000	1.261E-24	0.0000	3.444E-22	0.0000
H-3	0.000E+00	0.0000	1.611E-10	0.0000	4.386E-09	0.0001	3.238E-10	0.0000	5.311E-10	0.0000	1.031E-12	0.0000
Ni-63	0.000E+00	0.0000	2.459E-11	0.0000	3.011E-07	0.0091	2.055E-08	0.0006	1.903E-07	0.0058	1.175E-08	0.0004
Np-237	9.447E-12	0.0000	1.252E-14	0.0000	1.909E-12	0.0000	3.092E-14	0.0000	3.703E-16	0.0000	1.762E-13	0.0000
Pa-231	1.576E-18	0.0000	3.081E-20	0.0000	2.268E-18	0.0000	2.328E-19	0.0000	5.869E-22	0.0000	3.899E-19	0.0000
Pb-210	4.184E-20	0.0000	8.148E-21	0.0000	3.055E-17	0.0000	5.224E-19	0.0000	4.750E-19	0.0000	2.404E-18	0.0000
Pu-238	1.221E-10	0.0000	3.219E-09	0.0001	2.407E-08	0.0007	2.392E-10	0.0000	6.491E-12	0.0000	4.012E-08	0.0012
Pu-239	4.035E-10	0.0000	3.974E-09	0.0001	3.087E-08	0.0009	3.067E-10	0.0000	8.324E-12	0.0000	5.071E-08	0.0015
Pu-240	3.472E-11	0.0000	9.446E-10	0.0000	7.337E-09	0.0002	7.290E-11	0.0000	1.979E-12	0.0000	1.210E-08	0.0004
Ra-226	4.257E-16	0.0000	3.484E-20	0.0000	9.177E-17	0.0000	1.277E-18	0.0000	2.991E-18	0.0000	3.386E-18	0.0000
Ra-228	4.830E-22	0.0000	3.347E-26	0.0000	5.408E-22	0.0000	7.428E-24	0.0000	1.750E-23	0.0000	2.252E-23	0.0000
Sr-90	4.910E-08	0.0015	1.710E-11	0.0000	6.403E-06	0.1944	6.245E-07	0.0190	3.527E-07	0.0107	3.349E-08	0.0010
Th-228	6.514E-22	0.0000	7.164E-25	0.0000	5.253E-24	0.0000	8.148E-26	0.0000	1.026E-26	0.0000	6.254E-24	0.0000
Th-229	6.647E-19	0.0000	7.651E-21	0.0000	3.647E-20	0.0000	3.677E-22	0.0000	5.096E-23	0.0000	6.753E-20	0.0000
Th-230	1.023E-17	0.0000	2.096E-17	0.0000	1.307E-16	0.0000	1.311E-18	0.0000	1.807E-19	0.0000	2.288E-16	0.0000
Th-232	6.600E-26	0.0000	4.894E-25	0.0000	2.244E-24	0.0000	2.252E-26	0.0000	3.104E-27	0.0000	4.020E-24	0.0000
U-233	6.392E-19	0.0000	4.465E-19	0.0000	1.415E-17	0.0000	2.317E-19	0.0000	1.045E-18	0.0000	9.480E-18	0.0000
U-234	2.675E-14	0.0000	7.075E-14	0.0000	2.200E-12	0.0000	3.502E-14	0.0000	1.636E-13	0.0000	1.510E-12	0.0000
U-235	2.288E-14	0.0000	2.524E-17	0.0000	9.053E-16	0.0000	1.441E-17	0.0000	6.734E-17	0.0000	6.283E-16	0.0000
U-236	3.857E-17	0.0000	1.876E-16	0.0000	5.986E-15	0.0000	9.529E-17	0.0000	4.452E-16	0.0000	4.097E-15	0.0000
Total	2.307E-05	0.7007	1.110E-08	0.0003	7.547E-06	0.2292	9.481E-07	0.0288	7.513E-07	0.0228	2.047E-07	0.0062

Attachment 6 Sheet No. 24 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 25
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	4.998E-18	0.0000	7.285E-20	0.0000	7.396E-19	0.0000	1.891E-21	0.0000	2.701E-21	0.0000	1.051E-17	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.619E-06	0.0492
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.012E-07	0.0031
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.876E-09	0.0001
Co-60	9.031E-11	0.0000	7.088E-12	0.0000	1.442E-11	0.0000	1.744E-11	0.0000	5.108E-12	0.0000	1.756E-06	0.0533
Cs-137	9.585E-09	0.0003	4.229E-09	0.0001	1.312E-09	0.0000	2.427E-09	0.0001	1.887E-09	0.0001	1.441E-05	0.4377
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.956E-06	0.1505
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.540E-06	0.0468
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.345E-22	0.0000
H-3	1.661E-07	0.0050	4.041E-11	0.0000	6.421E-08	0.0020	3.062E-09	0.0001	9.161E-09	0.0003	2.480E-07	0.0075
Ni-63	1.404E-08	0.0004	3.733E-10	0.0000	2.229E-09	0.0001	6.904E-10	0.0000	8.017E-09	0.0002	5.490E-07	0.0167
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.158E-11	0.0000
Pa-231	3.369E-18	0.0000	1.222E-20	0.0000	5.257E-19	0.0000	1.929E-19	0.0000	8.696E-22	0.0000	8.599E-18	0.0000
Pb-210	8.170E-18	0.0000	1.243E-18	0.0000	2.563E-18	0.0000	1.178E-19	0.0000	1.169E-19	0.0000	4.621E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.778E-08	0.0021
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.627E-08	0.0026
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.049E-08	0.0006
Ra-226	1.864E-17	0.0000	2.717E-19	0.0000	2.729E-18	0.0000	1.697E-19	0.0000	4.890E-19	0.0000	5.475E-16	0.0000
Ra-228	1.670E-22	0.0000	2.493E-24	0.0000	2.492E-23	0.0000	1.556E-24	0.0000	4.580E-24	0.0000	1.272E-21	0.0000
Sr-90	8.174E-08	0.0025	1.217E-09	0.0000	1.266E-08	0.0004	5.876E-09	0.0002	4.257E-09	0.0001	7.568E-06	0.2298
Th-228	1.382E-23	0.0000	4.224E-25	0.0000	2.146E-24	0.0000	2.328E-26	0.0000	3.423E-27	0.0000	6.801E-22	0.0000
Th-229	1.151E-19	0.0000	3.412E-21	0.0000	2.337E-20	0.0000	4.367E-22	0.0000	8.252E-23	0.0000	9.192E-19	0.0000
Th-230	4.836E-16	0.0000	1.381E-17	0.0000	9.204E-17	0.0000	1.644E-18	0.0000	3.083E-19	0.0000	9.835E-16	0.0000
Th-232	9.815E-24	0.0000	2.803E-25	0.0000	1.787E-24	0.0000	2.958E-26	0.0000	5.493E-27	0.0000	1.876E-23	0.0000
U-233	1.705E-15	0.0000	5.250E-18	0.0000	2.535E-16	0.0000	5.384E-18	0.0000	2.766E-17	0.0000	2.023E-15	0.0000
U-234	3.880E-10	0.0000	1.196E-12	0.0000	5.778E-11	0.0000	1.232E-12	0.0000	6.316E-12	0.0000	4.585E-10	0.0000
U-235	1.543E-13	0.0000	4.787E-16	0.0000	2.313E-14	0.0000	4.932E-16	0.0000	2.528E-15	0.0000	2.054E-13	0.0000
U-236	1.030E-12	0.0000	3.166E-15	0.0000	1.530E-13	0.0000	3.262E-15	0.0000	1.672E-14	0.0000	1.217E-12	0.0000
Total	2.720E-07	0.0083	5.869E-09	0.0002	8.049E-08	0.0024	1.207E-08	0.0004	2.333E-08	0.0007	3.293E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 25 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 26
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 7.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.561E-06	0.0474	3.502E-13	0.0000	0.000E+00	0.0000	3.273E-08	0.0010	1.226E-09	0.0000	2.320E-08	0.0007	3.877E-10	0.0000
Am-241	4.629E-08	0.0014	2.746E-09	0.0001	0.000E+00	0.0000	1.947E-08	0.0006	9.674E-11	0.0000	1.050E-11	0.0000	3.265E-08	0.0010
C-14	1.755E-14	0.0000	2.892E-12	0.0000	0.000E+00	0.0000	3.194E-09	0.0001	3.813E-10	0.0000	2.967E-10	0.0000	5.549E-13	0.0000
Co-60	1.726E-06	0.0524	2.994E-13	0.0000	0.000E+00	0.0000	2.216E-08	0.0007	5.760E-09	0.0002	1.320E-09	0.0000	5.189E-10	0.0000
Cs-137	1.320E-05	0.4008	3.731E-12	0.0000	0.000E+00	0.0000	6.967E-07	0.0212	2.944E-07	0.0089	1.829E-07	0.0056	2.090E-08	0.0006
Eu-152	4.953E-06	0.1504	5.099E-12	0.0000	0.000E+00	0.0000	1.811E-09	0.0001	1.699E-10	0.0000	1.122E-11	0.0000	1.397E-09	0.0000
Eu-154	1.538E-06	0.0467	1.821E-12	0.0000	0.000E+00	0.0000	8.766E-10	0.0000	8.223E-11	0.0000	5.433E-12	0.0000	6.949E-10	0.0000
H-3	0.000E+00	0.0000	1.611E-10	0.0000	0.000E+00	0.0000	4.386E-09	0.0001	3.238E-10	0.0000	5.311E-10	0.0000	1.031E-12	0.0000
Ni-63	0.000E+00	0.0000	2.459E-11	0.0000	0.000E+00	0.0000	3.011E-07	0.0091	2.055E-08	0.0006	1.903E-07	0.0058	1.175E-08	0.0004
Pu-238	1.221E-10	0.0000	3.219E-09	0.0001	0.000E+00	0.0000	2.407E-08	0.0007	2.392E-10	0.0000	6.654E-12	0.0000	4.012E-08	0.0012
Pu-239	4.036E-10	0.0000	3.974E-09	0.0001	0.000E+00	0.0000	3.087E-08	0.0009	3.067E-10	0.0000	8.324E-12	0.0000	5.071E-08	0.0015
Pu-240	3.472E-11	0.0000	9.446E-10	0.0000	0.000E+00	0.0000	7.337E-09	0.0002	7.290E-11	0.0000	1.979E-12	0.0000	1.210E-08	0.0004
Sr-90	4.910E-08	0.0015	1.710E-11	0.0000	0.000E+00	0.0000	6.403E-06	0.1944	6.245E-07	0.0190	3.527E-07	0.0107	3.349E-08	0.0010
Total	2.307E-05	0.7007	1.110E-08	0.0003	0.000E+00	0.0000	7.547E-06	0.2292	9.481E-07	0.0288	7.513E-07	0.0228	2.047E-07	0.0062

Attachment 6 Sheet No. 26 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 27
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.619E-06	0.0492
Am-241	1.706E-15	0.0000	5.253E-18	0.0000	0.000E+00	0.0000	2.535E-16	0.0000	5.385E-18	0.0000	2.766E-17	0.0000	1.013E-07	0.0031
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.876E-09	0.0001
Co-60	9.031E-11	0.0000	7.088E-12	0.0000	0.000E+00	0.0000	1.442E-11	0.0000	1.744E-11	0.0000	5.108E-12	0.0000	1.756E-06	0.0533
Cs-137	9.585E-09	0.0003	4.229E-09	0.0001	0.000E+00	0.0000	1.312E-09	0.0000	2.427E-09	0.0001	1.887E-09	0.0001	1.441E-05	0.4377
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.956E-06	0.1505
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.540E-06	0.0468
H-3	1.661E-07	0.0050	4.041E-11	0.0000	0.000E+00	0.0000	6.421E-08	0.0020	3.062E-09	0.0001	9.161E-09	0.0003	2.480E-07	0.0075
Ni-63	1.404E-08	0.0004	3.733E-10	0.0000	0.000E+00	0.0000	2.229E-09	0.0001	6.904E-10	0.0000	8.017E-09	0.0002	5.490E-07	0.0167
Pu-238	3.880E-10	0.0000	1.196E-12	0.0000	0.000E+00	0.0000	5.778E-11	0.0000	1.232E-12	0.0000	6.316E-12	0.0000	6.824E-08	0.0021
Pu-239	1.543E-13	0.0000	4.788E-16	0.0000	0.000E+00	0.0000	2.313E-14	0.0000	4.934E-16	0.0000	2.528E-15	0.0000	8.627E-08	0.0026
Pu-240	1.030E-12	0.0000	3.166E-15	0.0000	0.000E+00	0.0000	1.530E-13	0.0000	3.262E-15	0.0000	1.672E-14	0.0000	2.049E-08	0.0006
Sr-90	8.174E-08	0.0025	1.217E-09	0.0000	0.000E+00	0.0000	1.266E-08	0.0004	5.876E-09	0.0002	4.257E-09	0.0001	7.568E-06	0.2298
Total	2.720E-07	0.0083	5.869E-09	0.0002	0.000E+00	0.0000	8.049E-08	0.0024	1.207E-08	0.0004	2.333E-08	0.0007	3.293E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 27 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 28
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.100E+01 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	5.334E-16	2.047E-12	1.489E-14	5.023E-15	8.212E-13	1.731E-11	1.843E-13	1.840E-12	7.594E-15	6.595E-15	2.224E-11
Ag-108m	4.641E-04	1.034E+02	3.872E+00	7.330E+01	7.144E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.813E+02
Am-241	3.316E-03	4.929E+00	2.449E-02	2.659E-03	5.105E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.006E+01
C-14	7.072E-03	2.762E+01	3.297E+00	2.565E+00	3.439E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.348E+01
Co-60	6.599E-04	7.842E+01	2.038E+01	4.670E+00	1.016E+00	3.597E-01	1.986E-02	4.036E-02	4.846E-02	1.426E-02	1.050E+02
Cs-137	1.322E-02	7.857E+02	3.320E+02	2.062E+02	2.036E+01	7.207E+00	2.580E+00	7.990E-01	1.455E+00	1.142E+00	1.357E+03
Eu-152	2.997E-03	1.113E+01	1.044E+00	6.898E-02	4.613E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.686E+01
Eu-154	1.005E-03	3.731E+00	3.500E-01	2.313E-02	1.546E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.651E+00
Gd-152	7.971E-17	2.961E-13	2.777E-14	7.342E-16	1.227E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.473E-13
H-3	2.839E+01	1.069E+03	7.889E+01	1.294E+02	1.644E-01	5.226E+04	9.887E+00	1.571E+04	7.491E+02	2.241E+03	7.224E+04
Ni-63	1.538E-01	1.143E+04	7.798E+02	7.220E+03	2.368E+02	3.874E+02	7.247E+00	4.323E+01	1.326E+01	1.548E+02	2.027E+04
Np-237	1.192E-08	3.530E-04	5.691E-06	6.835E-08	1.835E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.771E-04
Pa-231	4.967E-15	7.342E-11	7.474E-12	1.934E-14	7.647E-12	5.809E-11	1.681E-13	7.656E-12	3.223E-12	1.949E-14	1.577E-10
Pb-210	7.254E-16	1.124E-11	2.004E-13	1.781E-13	1.117E-12	1.105E-11	6.623E-13	1.467E-12	8.039E-14	8.587E-14	2.608E-11
Pu-238	3.477E-03	5.168E+00	5.135E-02	1.394E-03	5.352E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.057E+01
Pu-239	3.981E-03	5.917E+00	5.879E-02	1.596E-03	6.128E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.211E+01
Pu-240	9.470E-04	1.408E+00	1.399E-02	3.796E-04	1.458E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.880E+00
Ra-226	9.021E-15	5.307E-10	7.239E-12	1.711E-11	1.389E-11	4.456E-11	5.328E-13	5.864E-12	4.226E-13	1.243E-12	6.216E-10
Ra-228	2.717E-20	1.593E-15	2.148E-17	5.106E-17	4.183E-17	9.394E-16	1.053E-17	1.083E-16	6.643E-18	1.912E-17	2.791E-15
Sr-90	6.407E-03	2.855E+03	2.784E+02	1.573E+02	9.863E+00	2.550E+01	2.947E-01	3.061E+00	1.409E+00	1.026E+00	3.332E+03
Th-228	1.499E-20	4.326E-17	7.130E-19	8.945E-20	2.308E-17	3.022E-16	6.798E-18	3.551E-17	3.601E-19	5.178E-20	4.120E-16
Th-229	9.894E-17	1.494E-13	1.543E-15	2.203E-16	1.523E-13	6.967E-13	1.553E-14	1.034E-13	1.813E-15	3.281E-16	1.121E-12
Th-230	5.632E-12	8.455E-09	8.593E-11	1.208E-11	8.670E-09	1.651E-08	3.558E-10	3.243E-09	8.740E-11	1.722E-11	3.743E-08
Th-232	8.290E-20	1.245E-16	1.265E-18	1.779E-19	1.276E-16	5.031E-16	1.110E-17	7.772E-17	1.474E-18	2.801E-19	8.472E-16
U-233	2.847E-13	1.108E-09	1.872E-11	8.126E-11	4.382E-10	6.894E-08	1.568E-10	7.551E-09	1.568E-10	8.160E-10	7.926E-08
U-234	1.116E-07	4.136E-04	6.574E-06	3.077E-05	1.717E-04	4.199E-02	9.565E-05	4.613E-03	9.702E-05	5.014E-04	4.792E-02
U-235	4.249E-11	1.575E-07	2.503E-09	1.172E-08	6.541E-08	1.576E-05	3.589E-08	1.731E-06	3.639E-08	1.881E-07	1.798E-05
U-236	3.039E-10	1.127E-06	1.791E-08	8.383E-08	4.679E-07	1.127E-04	2.568E-07	1.238E-05	2.603E-07	1.346E-06	1.287E-04

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.100E+01 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 28 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 29
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	5.823E-18	0.0000	4.938E-20	0.0000	5.819E-19	0.0000	2.111E-21	0.0000	1.436E-21	0.0000	4.232E-19	0.0000
Ag-108m	1.527E-06	0.0533	3.426E-13	0.0000	3.202E-08	0.0011	1.199E-09	0.0000	2.270E-08	0.0008	3.792E-10	0.0000
Am-241	4.598E-08	0.0016	2.728E-09	0.0001	1.934E-08	0.0007	9.607E-11	0.0000	1.043E-11	0.0000	3.243E-08	0.0011
C-14	7.670E-16	0.0000	1.264E-13	0.0000	1.396E-10	0.0000	1.667E-11	0.0000	1.297E-11	0.0000	2.425E-14	0.0000
Co-60	1.020E-06	0.0356	1.769E-13	0.0000	1.309E-08	0.0005	3.402E-09	0.0001	7.796E-10	0.0000	3.065E-10	0.0000
Cs-137	1.203E-05	0.4200	3.400E-12	0.0000	6.349E-07	0.0222	2.683E-07	0.0094	1.667E-07	0.0058	1.904E-08	0.0007
Eu-152	4.022E-06	0.1405	4.141E-12	0.0000	1.471E-09	0.0001	1.379E-10	0.0000	9.114E-12	0.0000	1.135E-09	0.0000
Eu-154	1.122E-06	0.0392	1.329E-12	0.0000	6.396E-10	0.0000	6.000E-11	0.0000	3.964E-12	0.0000	5.070E-10	0.0000
Gd-152	0.000E+00	0.0000	3.567E-23	0.0000	5.606E-22	0.0000	5.258E-23	0.0000	1.390E-24	0.0000	3.795E-22	0.0000
H-3	0.000E+00	0.0000	1.477E-11	0.0000	4.022E-10	0.0000	2.969E-11	0.0000	4.870E-11	0.0000	9.453E-14	0.0000
Ni-63	0.000E+00	0.0000	2.388E-11	0.0000	2.923E-07	0.0102	1.995E-08	0.0007	1.847E-07	0.0065	1.140E-08	0.0004
Np-237	1.113E-11	0.0000	1.475E-14	0.0000	2.250E-12	0.0000	3.647E-14	0.0000	4.367E-16	0.0000	2.076E-13	0.0000
Pa-231	2.111E-18	0.0000	4.126E-20	0.0000	3.039E-18	0.0000	3.121E-19	0.0000	7.849E-22	0.0000	5.221E-19	0.0000
Pb-210	6.802E-20	0.0000	1.325E-20	0.0000	4.958E-17	0.0000	8.457E-19	0.0000	7.701E-19	0.0000	3.908E-18	0.0000
Pu-238	1.182E-10	0.0000	3.119E-09	0.0001	2.332E-08	0.0008	2.317E-10	0.0000	6.288E-12	0.0000	3.887E-08	0.0014
Pu-239	4.034E-10	0.0000	3.973E-09	0.0001	3.086E-08	0.0011	3.066E-10	0.0000	8.322E-12	0.0000	5.070E-08	0.0018
Pu-240	3.470E-11	0.0000	9.441E-10	0.0000	7.333E-09	0.0003	7.286E-11	0.0000	1.977E-12	0.0000	1.209E-08	0.0004
Ra-226	6.336E-16	0.0000	5.185E-20	0.0000	1.366E-16	0.0000	1.903E-18	0.0000	4.456E-18	0.0000	5.040E-18	0.0000
Ra-228	6.827E-22	0.0000	4.731E-26	0.0000	7.646E-22	0.0000	1.052E-23	0.0000	2.477E-23	0.0000	3.183E-23	0.0000
Sr-90	4.460E-08	0.0016	1.553E-11	0.0000	5.816E-06	0.2031	5.672E-07	0.0198	3.204E-07	0.0112	3.042E-08	0.0011
Th-228	9.455E-22	0.0000	1.040E-24	0.0000	7.547E-24	0.0000	1.165E-25	0.0000	1.467E-26	0.0000	9.077E-24	0.0000
Th-229	9.946E-19	0.0000	1.145E-20	0.0000	5.454E-20	0.0000	5.489E-22	0.0000	7.592E-23	0.0000	1.010E-19	0.0000
Th-230	1.359E-17	0.0000	2.784E-17	0.0000	1.735E-16	0.0000	1.738E-18	0.0000	2.391E-19	0.0000	3.038E-16	0.0000
Th-232	8.838E-26	0.0000	6.554E-25	0.0000	3.004E-24	0.0000	3.010E-26	0.0000	4.142E-27	0.0000	5.383E-24	0.0000
U-233	8.547E-19	0.0000	5.969E-19	0.0000	1.887E-17	0.0000	3.081E-19	0.0000	1.395E-18	0.0000	1.268E-17	0.0000
U-234	3.104E-14	0.0000	8.209E-14	0.0000	2.553E-12	0.0000	4.065E-14	0.0000	1.899E-13	0.0000	1.752E-12	0.0000
U-235	2.691E-14	0.0000	2.968E-17	0.0000	1.065E-15	0.0000	1.696E-17	0.0000	7.921E-17	0.0000	7.390E-16	0.0000
U-236	4.535E-17	0.0000	2.206E-16	0.0000	7.040E-15	0.0000	1.121E-16	0.0000	5.236E-16	0.0000	4.818E-15	0.0000
Total	1.981E-05	0.6918	1.083E-08	0.0004	6.872E-06	0.2400	8.610E-07	0.0301	6.953E-07	0.0243	1.973E-07	0.0069

Attachment 6 Sheet No. 29 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 30
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	8.186E-18	0.0000	1.192E-19	0.0000	1.209E-18	0.0000	2.913E-21	0.0000	4.393E-21	0.0000	1.640E-17	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.583E-06	0.0553
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.006E-07	0.0035
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.694E-10	0.0000
Co-60	6.875E-11	0.0000	5.400E-12	0.0000	1.099E-11	0.0000	1.337E-11	0.0000	3.904E-12	0.0000	1.037E-06	0.0362
Cs-137	1.046E-08	0.0004	4.618E-09	0.0002	1.434E-09	0.0001	2.658E-09	0.0001	2.064E-09	0.0001	1.314E-05	0.4588
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.025E-06	0.1406
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E-06	0.0392
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.030E-21	0.0000
H-3	1.530E-08	0.0005	3.722E-12	0.0000	5.914E-09	0.0002	2.820E-10	0.0000	8.437E-10	0.0000	2.284E-08	0.0008
Ni-63	1.618E-08	0.0006	4.302E-10	0.0000	2.570E-09	0.0001	7.972E-10	0.0000	9.248E-09	0.0003	5.376E-07	0.0188
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.364E-11	0.0000
Pa-231	5.065E-18	0.0000	1.828E-20	0.0000	7.817E-19	0.0000	2.822E-19	0.0000	1.237E-21	0.0000	1.217E-17	0.0000
Pb-210	1.404E-17	0.0000	2.139E-18	0.0000	4.445E-18	0.0000	2.159E-19	0.0000	2.254E-19	0.0000	7.626E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.566E-08	0.0023
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.625E-08	0.0030
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.048E-08	0.0007
Ra-226	3.091E-17	0.0000	4.561E-19	0.0000	4.644E-18	0.0000	2.847E-19	0.0000	8.513E-19	0.0000	8.189E-16	0.0000
Ra-228	2.180E-22	0.0000	3.294E-24	0.0000	3.325E-23	0.0000	2.046E-24	0.0000	5.949E-24	0.0000	1.777E-21	0.0000
Sr-90	8.898E-08	0.0031	1.325E-09	0.0000	1.379E-08	0.0005	6.409E-09	0.0002	4.639E-09	0.0002	6.894E-06	0.2407
Th-228	1.756E-23	0.0000	5.364E-25	0.0000	2.727E-24	0.0000	3.017E-26	0.0000	4.381E-27	0.0000	9.842E-22	0.0000
Th-229	1.848E-19	0.0000	5.471E-21	0.0000	3.675E-20	0.0000	6.644E-22	0.0000	1.252E-22	0.0000	1.390E-18	0.0000
Th-230	7.181E-16	0.0000	2.053E-17	0.0000	1.332E-16	0.0000	2.256E-18	0.0000	4.199E-19	0.0000	1.395E-15	0.0000
Th-232	1.324E-23	0.0000	3.819E-25	0.0000	2.439E-24	0.0000	3.977E-26	0.0000	7.347E-27	0.0000	2.527E-23	0.0000
U-233	2.552E-15	0.0000	7.856E-18	0.0000	3.795E-16	0.0000	8.072E-18	0.0000	4.144E-17	0.0000	3.023E-15	0.0000
U-234	5.153E-10	0.0000	1.589E-12	0.0000	7.677E-11	0.0000	1.640E-12	0.0000	8.397E-12	0.0000	6.083E-10	0.0000
U-235	2.066E-13	0.0000	6.412E-16	0.0000	3.099E-14	0.0000	6.616E-16	0.0000	3.389E-15	0.0000	2.712E-13	0.0000
U-236	1.379E-12	0.0000	4.240E-15	0.0000	2.049E-13	0.0000	4.375E-15	0.0000	2.241E-14	0.0000	1.627E-12	0.0000
Total	1.315E-07	0.0046	6.384E-09	0.0002	2.379E-08	0.0008	1.016E-08	0.0004	1.681E-08	0.0006	2.863E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 30 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 31
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.100E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	1.527E-06	0.0533	3.426E-13	0.0000	0.000E+00	0.0000	3.202E-08	0.0011	1.199E-09	0.0000	2.270E-08	0.0008	3.792E-10	0.0000
Am-241	4.599E-08	0.0016	2.728E-09	0.0001	0.000E+00	0.0000	1.934E-08	0.0007	9.611E-11	0.0000	1.043E-11	0.0000	3.243E-08	0.0011
C-14	7.670E-16	0.0000	1.264E-13	0.0000	0.000E+00	0.0000	1.396E-10	0.0000	1.667E-11	0.0000	1.297E-11	0.0000	2.425E-14	0.0000
Co-60	1.020E-06	0.0356	1.769E-13	0.0000	0.000E+00	0.0000	1.309E-08	0.0005	3.402E-09	0.0001	7.796E-10	0.0000	3.065E-10	0.0000
Cs-137	1.203E-05	0.4200	3.400E-12	0.0000	0.000E+00	0.0000	6.349E-07	0.0222	2.683E-07	0.0094	1.667E-07	0.0058	1.904E-08	0.0007
Eu-152	4.022E-06	0.1405	4.141E-12	0.0000	0.000E+00	0.0000	1.471E-09	0.0001	1.379E-10	0.0000	9.114E-12	0.0000	1.135E-09	0.0000
Eu-154	1.122E-06	0.0392	1.329E-12	0.0000	0.000E+00	0.0000	6.396E-10	0.0000	6.000E-11	0.0000	3.964E-12	0.0000	5.070E-10	0.0000
H-3	0.000E+00	0.0000	1.477E-11	0.0000	0.000E+00	0.0000	4.022E-10	0.0000	2.969E-11	0.0000	4.870E-11	0.0000	9.453E-14	0.0000
Ni-63	0.000E+00	0.0000	2.388E-11	0.0000	0.000E+00	0.0000	2.923E-07	0.0102	1.995E-08	0.0007	1.847E-07	0.0065	1.140E-08	0.0004
Pu-238	1.183E-10	0.0000	3.119E-09	0.0001	0.000E+00	0.0000	2.332E-08	0.0008	2.317E-10	0.0000	6.478E-12	0.0000	3.887E-08	0.0014
Pu-239	4.035E-10	0.0000	3.973E-09	0.0001	0.000E+00	0.0000	3.086E-08	0.0011	3.066E-10	0.0000	8.322E-12	0.0000	5.070E-08	0.0018
Pu-240	3.470E-11	0.0000	9.441E-10	0.0000	0.000E+00	0.0000	7.333E-09	0.0003	7.286E-11	0.0000	1.978E-12	0.0000	1.209E-08	0.0004
Sr-90	4.460E-08	0.0016	1.553E-11	0.0000	0.000E+00	0.0000	5.816E-06	0.2031	5.672E-07	0.0198	3.204E-07	0.0112	3.042E-08	0.0011
Total	1.981E-05	0.6918	1.083E-08	0.0004	0.000E+00	0.0000	6.872E-06	0.2400	8.610E-07	0.0301	6.953E-07	0.0243	1.973E-07	0.0069

Attachment 6 Sheet No. 31 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 32
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.583E-06	0.0553
Am-241	2.552E-15	0.0000	7.862E-18	0.0000	0.000E+00	0.0000	3.795E-16	0.0000	8.073E-18	0.0000	4.144E-17	0.0000	1.006E-07	0.0035
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.694E-10	0.0000
Co-60	6.875E-11	0.0000	5.400E-12	0.0000	0.000E+00	0.0000	1.099E-11	0.0000	1.337E-11	0.0000	3.904E-12	0.0000	1.037E-06	0.0362
Cs-137	1.046E-08	0.0004	4.618E-09	0.0002	0.000E+00	0.0000	1.434E-09	0.0001	2.658E-09	0.0001	2.064E-09	0.0001	1.314E-05	0.4588
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.025E-06	0.1406
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.124E-06	0.0392
H-3	1.530E-08	0.0005	3.722E-12	0.0000	0.000E+00	0.0000	5.914E-09	0.0002	2.820E-10	0.0000	8.437E-10	0.0000	2.284E-08	0.0008
Ni-63	1.618E-08	0.0006	4.302E-10	0.0000	0.000E+00	0.0000	2.570E-09	0.0001	7.972E-10	0.0000	9.248E-09	0.0003	5.376E-07	0.0188
Pu-238	5.153E-10	0.0000	1.589E-12	0.0000	0.000E+00	0.0000	7.677E-11	0.0000	1.640E-12	0.0000	8.397E-12	0.0000	6.627E-08	0.0023
Pu-239	2.067E-13	0.0000	6.413E-16	0.0000	0.000E+00	0.0000	3.099E-14	0.0000	6.619E-16	0.0000	3.389E-15	0.0000	8.625E-08	0.0030
Pu-240	1.379E-12	0.0000	4.240E-15	0.0000	0.000E+00	0.0000	2.049E-13	0.0000	4.375E-15	0.0000	2.241E-14	0.0000	2.048E-08	0.0007
Sr-90	8.898E-08	0.0031	1.325E-09	0.0000	0.000E+00	0.0000	1.379E-08	0.0005	6.409E-09	0.0002	4.639E-09	0.0002	6.894E-06	0.2407
Total	1.315E-07	0.0046	6.384E-09	0.0002	0.000E+00	0.0000	2.379E-08	0.0008	1.016E-08	0.0004	1.681E-08	0.0006	2.863E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 32 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 33
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 4.300E+01 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Ac-227	2.478E-14	9.301E-11	2.822E-13	2.298E-13	3.814E-11	2.308E-09	2.501E-11	2.533E-10	5.493E-13	9.268E-13	2.720E-09
Ag-108m	3.889E-04	8.665E+01	3.245E+00	6.143E+01	5.987E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.519E+02
Am-241	3.147E-03	4.678E+00	2.324E-02	2.523E-03	4.845E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.549E+00
C-14	8.479E-14	3.312E-10	3.957E-11	3.078E-11	4.123E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.016E-10
Co-60	9.780E-06	1.162E+00	3.020E-01	6.920E-02	1.506E-02	2.090E-02	1.157E-03	2.359E-03	2.904E-03	8.420E-04	1.577E+00
Cs-137	6.289E-03	3.737E+02	1.579E+02	9.809E+01	9.682E+00	1.344E+01	4.825E+00	1.499E+00	2.798E+00	2.164E+00	6.641E+02
Eu-152	5.670E-04	2.106E+00	1.975E-01	1.305E-02	8.728E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E+00
Eu-154	8.070E-05	2.998E-01	2.812E-02	1.858E-03	1.242E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.540E-01
Gd-152	1.634E-16	6.068E-13	5.692E-14	1.504E-15	2.515E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.167E-13
H-3	1.328E-07	4.997E-06	3.691E-07	6.054E-07	7.687E-10	2.534E-04	4.793E-08	7.617E-05	3.633E-06	1.087E-05	3.500E-04
Ni-63	1.213E-01	9.013E+03	6.151E+02	5.695E+03	1.868E+02	1.199E+03	2.246E+01	1.342E+02	4.178E+01	4.837E+02	1.739E+04
Np-237	4.539E-08	1.347E-03	2.188E-05	2.617E-07	6.987E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.439E-03
Pa-231	7.357E-14	1.091E-09	1.123E-10	2.808E-13	1.133E-10	3.274E-09	8.981E-12	3.801E-10	1.329E-10	5.354E-13	5.113E-09
Pb-210	1.315E-13	1.979E-09	3.356E-11	3.066E-11	2.025E-10	1.854E-09	9.874E-11	1.966E-10	1.052E-11	1.088E-11	4.417E-09
Pu-238	2.698E-03	4.010E+00	3.984E-02	1.081E-03	4.153E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.203E+00
Pu-239	3.973E-03	5.906E+00	5.868E-02	1.593E-03	6.117E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.208E+01
Pu-240	9.429E-04	1.402E+00	1.393E-02	3.780E-04	1.452E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.867E+00
Ra-226	4.933E-13	2.924E-08	4.086E-10	9.552E-10	7.594E-10	1.164E-08	1.271E-10	1.278E-09	8.077E-11	2.328E-10	4.472E-08
Ra-228	8.492E-19	5.014E-14	6.919E-16	1.627E-15	1.307E-15	2.562E-14	2.827E-16	2.869E-15	1.811E-16	5.215E-16	8.324E-14
Sr-90	2.969E-03	1.323E+03	1.290E+02	7.288E+01	4.570E+00	4.638E+01	5.367E-01	5.585E+00	2.606E+00	1.882E+00	1.586E+03
Th-228	7.328E-19	1.750E-15	2.668E-17	3.363E-18	1.128E-15	7.538E-15	1.668E-16	8.616E-16	9.353E-18	1.344E-18	1.149E-14
Th-229	5.700E-15	8.506E-12	8.530E-14	1.174E-14	8.775E-12	4.689E-11	1.028E-12	6.620E-12	1.103E-13	2.037E-14	7.205E-11
Th-230	7.692E-11	1.146E-07	1.145E-09	1.568E-10	1.184E-07	8.638E-07	1.892E-08	1.149E-07	1.667E-09	3.028E-10	1.234E-06
Th-232	1.228E-18	1.830E-15	1.829E-17	2.506E-18	1.891E-15	1.435E-14	3.149E-16	1.902E-15	2.716E-17	4.899E-18	2.034E-14
U-233	4.150E-12	1.561E-08	2.531E-10	1.157E-09	6.389E-09	3.975E-06	9.072E-09	4.384E-07	9.360E-09	4.794E-08	4.503E-06
U-234	3.681E-07	1.367E-03	2.178E-05	1.017E-04	5.667E-04	5.739E-01	1.310E-03	6.335E-02	1.357E-03	6.938E-03	6.490E-01
U-235	1.588E-10	5.897E-07	9.396E-09	4.386E-08	2.445E-07	2.335E-04	5.330E-07	2.577E-05	5.519E-07	2.822E-06	2.640E-04
U-236	1.135E-09	4.213E-06	6.713E-08	3.133E-07	1.747E-06	1.669E-03	3.810E-06	1.842E-04	3.945E-06	2.017E-05	1.888E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 4.300E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 33 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 34
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.203E-17	0.0000	3.564E-19	0.0000	4.178E-18	0.0000	1.091E-20	0.0000	1.033E-20	0.0000	3.054E-18	0.0000
Ag-108m	1.280E-06	0.1029	2.871E-13	0.0000	2.683E-08	0.0022	1.005E-09	0.0001	1.902E-08	0.0015	3.178E-10	0.0000
Am-241	4.364E-08	0.0035	2.589E-09	0.0002	1.835E-08	0.0015	9.118E-11	0.0000	9.899E-12	0.0000	3.078E-08	0.0025
C-14	9.191E-27	0.0000	1.515E-24	0.0000	1.674E-21	0.0000	2.000E-22	0.0000	1.555E-22	0.0000	2.907E-25	0.0000
Co-60	1.511E-08	0.0012	2.621E-15	0.0000	1.940E-10	0.0000	5.042E-11	0.0000	1.155E-11	0.0000	4.542E-12	0.0000
Cs-137	5.721E-06	0.4602	1.617E-12	0.0000	3.020E-07	0.0243	1.276E-07	0.0103	7.927E-08	0.0064	9.058E-09	0.0007
Eu-152	7.610E-07	0.0612	7.835E-13	0.0000	2.783E-10	0.0000	2.610E-11	0.0000	1.725E-12	0.0000	2.147E-10	0.0000
Eu-154	9.017E-08	0.0073	1.068E-13	0.0000	5.139E-11	0.0000	4.820E-12	0.0000	3.185E-13	0.0000	4.074E-11	0.0000
Gd-152	0.000E+00	0.0000	4.722E-23	0.0000	7.421E-22	0.0000	6.961E-23	0.0000	1.840E-24	0.0000	5.025E-22	0.0000
H-3	0.000E+00	0.0000	6.897E-20	0.0000	1.878E-18	0.0000	1.387E-19	0.0000	2.275E-19	0.0000	4.414E-22	0.0000
Ni-63	0.000E+00	0.0000	1.883E-11	0.0000	2.305E-07	0.0185	1.573E-08	0.0013	1.457E-07	0.0117	8.994E-09	0.0007
Np-237	2.422E-11	0.0000	3.210E-14	0.0000	4.899E-12	0.0000	7.960E-14	0.0000	9.519E-16	0.0000	4.517E-13	0.0000
Pa-231	9.393E-18	0.0000	1.836E-19	0.0000	1.354E-17	0.0000	1.394E-18	0.0000	3.475E-21	0.0000	2.324E-18	0.0000
Pb-210	9.149E-19	0.0000	1.782E-19	0.0000	6.628E-16	0.0000	1.117E-17	0.0000	1.024E-17	0.0000	5.257E-17	0.0000
Pu-238	9.175E-11	0.0000	2.420E-09	0.0002	1.809E-08	0.0015	1.798E-10	0.0000	4.879E-12	0.0000	3.016E-08	0.0024
Pu-239	4.027E-10	0.0000	3.966E-09	0.0003	3.080E-08	0.0025	3.061E-10	0.0000	8.307E-12	0.0000	5.060E-08	0.0041
Pu-240	3.455E-11	0.0000	9.400E-10	0.0001	7.301E-09	0.0006	7.255E-11	0.0000	1.969E-12	0.0000	1.204E-08	0.0010
Ra-226	5.207E-15	0.0000	4.261E-19	0.0000	1.125E-15	0.0000	1.576E-17	0.0000	3.679E-17	0.0000	4.142E-17	0.0000
Ra-228	3.885E-21	0.0000	2.692E-25	0.0000	4.358E-21	0.0000	6.026E-23	0.0000	1.416E-22	0.0000	1.812E-22	0.0000
Sr-90	2.067E-08	0.0017	7.196E-12	0.0000	2.695E-06	0.2168	2.628E-07	0.0211	1.485E-07	0.0119	1.410E-08	0.0011
Th-228	6.028E-21	0.0000	6.630E-24	0.0000	4.611E-23	0.0000	6.970E-25	0.0000	8.793E-26	0.0000	5.787E-23	0.0000
Th-229	8.557E-18	0.0000	9.849E-20	0.0000	4.679E-19	0.0000	4.680E-21	0.0000	6.413E-22	0.0000	8.692E-19	0.0000
Th-230	5.623E-17	0.0000	1.152E-16	0.0000	7.163E-16	0.0000	7.146E-18	0.0000	9.757E-19	0.0000	1.257E-15	0.0000
Th-232	3.935E-25	0.0000	2.918E-24	0.0000	1.335E-23	0.0000	1.332E-25	0.0000	1.819E-26	0.0000	2.397E-23	0.0000
U-233	3.749E-18	0.0000	2.619E-18	0.0000	8.201E-17	0.0000	1.324E-18	0.0000	6.082E-18	0.0000	5.561E-17	0.0000
U-234	5.902E-14	0.0000	1.561E-13	0.0000	4.856E-12	0.0000	7.741E-14	0.0000	3.612E-13	0.0000	3.331E-12	0.0000
U-235	5.754E-14	0.0000	6.348E-17	0.0000	2.278E-15	0.0000	3.631E-17	0.0000	1.695E-16	0.0000	1.580E-15	0.0000
U-236	9.688E-17	0.0000	4.711E-16	0.0000	1.505E-14	0.0000	2.398E-16	0.0000	1.119E-15	0.0000	1.029E-14	0.0000
Total	7.931E-06	0.6381	9.944E-09	0.0008	3.329E-06	0.2679	4.079E-07	0.0328	3.925E-07	0.0316	1.563E-07	0.0126

Attachment 6 Sheet No. 34 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 35
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	1.118E-16	0.0000	1.631E-18	0.0000	1.657E-17	0.0000	3.194E-20	0.0000	6.037E-20	0.0000	1.797E-16	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.327E-06	0.1067
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.547E-08	0.0077
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.031E-21	0.0000
Co-60	2.850E-12	0.0000	2.242E-13	0.0000	4.573E-13	0.0000	5.634E-13	0.0000	1.633E-13	0.0000	1.538E-08	0.0012
Cs-137	1.156E-08	0.0009	5.110E-09	0.0004	1.588E-09	0.0001	2.970E-09	0.0002	2.294E-09	0.0002	6.262E-06	0.5038
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.615E-07	0.0613
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.026E-08	0.0073
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.363E-21	0.0000
H-3	7.410E-17	0.0000	1.802E-20	0.0000	2.864E-17	0.0000	1.366E-18	0.0000	4.086E-18	0.0000	1.105E-16	0.0000
Ni-63	2.890E-08	0.0023	7.688E-10	0.0001	4.596E-09	0.0004	1.432E-09	0.0001	1.657E-08	0.0013	4.532E-07	0.0365
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.969E-11	0.0000
Pa-231	4.357E-17	0.0000	1.554E-19	0.0000	6.527E-18	0.0000	2.219E-18	0.0000	8.243E-21	0.0000	7.932E-17	0.0000
Pb-210	3.297E-16	0.0000	4.883E-17	0.0000	9.929E-17	0.0000	5.078E-18	0.0000	5.438E-18	0.0000	1.226E-15	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.095E-08	0.0041
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.609E-08	0.0069
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.039E-08	0.0016
Ra-226	4.812E-16	0.0000	7.075E-18	0.0000	7.173E-17	0.0000	4.476E-18	0.0000	1.294E-17	0.0000	7.004E-15	0.0000
Ra-228	2.186E-21	0.0000	3.307E-23	0.0000	3.346E-22	0.0000	2.100E-23	0.0000	6.047E-23	0.0000	1.126E-20	0.0000
Sr-90	9.606E-08	0.0077	1.432E-09	0.0001	1.490E-08	0.0012	6.960E-09	0.0006	5.024E-09	0.0004	3.265E-06	0.2627
Th-228	1.949E-22	0.0000	6.053E-24	0.0000	3.111E-23	0.0000	3.270E-25	0.0000	4.723E-26	0.0000	6.372E-21	0.0000
Th-229	2.687E-18	0.0000	7.993E-20	0.0000	4.809E-19	0.0000	6.789E-21	0.0000	1.227E-21	0.0000	1.325E-17	0.0000
Th-230	5.824E-15	0.0000	1.671E-16	0.0000	9.608E-16	0.0000	1.184E-17	0.0000	2.089E-18	0.0000	9.118E-15	0.0000
Th-232	1.071E-22	0.0000	3.096E-24	0.0000	1.781E-23	0.0000	2.206E-25	0.0000	3.888E-26	0.0000	1.691E-22	0.0000
U-233	2.185E-14	0.0000	6.731E-17	0.0000	3.254E-15	0.0000	6.967E-17	0.0000	3.563E-16	0.0000	2.575E-14	0.0000
U-234	2.084E-09	0.0002	6.428E-12	0.0000	3.109E-10	0.0000	6.675E-12	0.0000	3.408E-11	0.0000	2.451E-09	0.0002
U-235	9.011E-13	0.0000	2.798E-15	0.0000	1.353E-13	0.0000	2.904E-15	0.0000	1.483E-14	0.0000	1.119E-12	0.0000
U-236	6.007E-12	0.0000	1.849E-14	0.0000	8.941E-13	0.0000	1.919E-14	0.0000	9.800E-14	0.0000	7.064E-12	0.0000
Total	1.386E-07	0.0112	7.317E-09	0.0006	2.140E-08	0.0017	1.137E-08	0.0009	2.392E-08	0.0019	1.243E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 35 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 36
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 4.300E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.280E-06	0.1029	2.871E-13	0.0000	0.000E+00	0.0000	2.683E-08	0.0022	1.005E-09	0.0001	1.902E-08	0.0015	3.178E-10	0.0000
Am-241	4.366E-08	0.0035	2.589E-09	0.0002	0.000E+00	0.0000	1.836E-08	0.0015	9.126E-11	0.0000	9.900E-12	0.0000	3.078E-08	0.0025
C-14	9.191E-27	0.0000	1.515E-24	0.0000	0.000E+00	0.0000	1.674E-21	0.0000	2.000E-22	0.0000	1.555E-22	0.0000	2.907E-25	0.0000
Co-60	1.511E-08	0.0012	2.621E-15	0.0000	0.000E+00	0.0000	1.940E-10	0.0000	5.042E-11	0.0000	1.155E-11	0.0000	4.542E-12	0.0000
Cs-137	5.721E-06	0.4602	1.617E-12	0.0000	0.000E+00	0.0000	3.020E-07	0.0243	1.276E-07	0.0103	7.927E-08	0.0064	9.058E-09	0.0007
Eu-152	7.610E-07	0.0612	7.835E-13	0.0000	0.000E+00	0.0000	2.783E-10	0.0000	2.610E-11	0.0000	1.725E-12	0.0000	2.147E-10	0.0000
Eu-154	9.017E-08	0.0073	1.068E-13	0.0000	0.000E+00	0.0000	5.139E-11	0.0000	4.820E-12	0.0000	3.185E-13	0.0000	4.074E-11	0.0000
H-3	0.000E+00	0.0000	6.897E-20	0.0000	0.000E+00	0.0000	1.878E-18	0.0000	1.387E-19	0.0000	2.275E-19	0.0000	4.414E-22	0.0000
Ni-63	0.000E+00	0.0000	1.883E-11	0.0000	0.000E+00	0.0000	2.305E-07	0.0185	1.573E-08	0.0013	1.457E-07	0.0117	8.994E-09	0.0007
Pu-238	9.181E-11	0.0000	2.420E-09	0.0002	0.000E+00	0.0000	1.810E-08	0.0015	1.798E-10	0.0000	5.240E-12	0.0000	3.016E-08	0.0024
Pu-239	4.028E-10	0.0000	3.966E-09	0.0003	0.000E+00	0.0000	3.080E-08	0.0025	3.061E-10	0.0000	8.307E-12	0.0000	5.060E-08	0.0041
Pu-240	3.455E-11	0.0000	9.400E-10	0.0001	0.000E+00	0.0000	7.301E-09	0.0006	7.255E-11	0.0000	1.970E-12	0.0000	1.204E-08	0.0010
Sr-90	2.067E-08	0.0017	7.196E-12	0.0000	0.000E+00	0.0000	2.695E-06	0.2168	2.628E-07	0.0211	1.485E-07	0.0119	1.410E-08	0.0011
Total	7.931E-06	0.6381	9.944E-09	0.0008	0.000E+00	0.0000	3.329E-06	0.2679	4.079E-07	0.0328	3.925E-07	0.0316	1.563E-07	0.0126

Attachment 6 Sheet No. 36 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 37
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.327E-06	0.1067
Am-241	2.185E-14	0.0000	6.739E-17	0.0000	0.000E+00	0.0000	3.255E-15	0.0000	6.968E-17	0.0000	3.563E-16	0.0000	9.550E-08	0.0077
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.031E-21	0.0000
Co-60	2.850E-12	0.0000	2.242E-13	0.0000	0.000E+00	0.0000	4.573E-13	0.0000	5.634E-13	0.0000	1.633E-13	0.0000	1.538E-08	0.0012
Cs-137	1.156E-08	0.0009	5.110E-09	0.0004	0.000E+00	0.0000	1.588E-09	0.0001	2.970E-09	0.0002	2.294E-09	0.0002	6.262E-06	0.5038
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.615E-07	0.0613
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.026E-08	0.0073
H-3	7.410E-17	0.0000	1.802E-20	0.0000	0.000E+00	0.0000	2.864E-17	0.0000	1.366E-18	0.0000	4.086E-18	0.0000	1.105E-16	0.0000
Ni-63	2.890E-08	0.0023	7.688E-10	0.0001	0.000E+00	0.0000	4.596E-09	0.0004	1.432E-09	0.0001	1.657E-08	0.0013	4.532E-07	0.0365
Pu-238	2.084E-09	0.0002	6.429E-12	0.0000	0.000E+00	0.0000	3.109E-10	0.0000	6.675E-12	0.0000	3.408E-11	0.0000	5.340E-08	0.0043
Pu-239	9.012E-13	0.0000	2.800E-15	0.0000	0.000E+00	0.0000	1.353E-13	0.0000	2.906E-15	0.0000	1.483E-14	0.0000	8.609E-08	0.0069
Pu-240	6.007E-12	0.0000	1.849E-14	0.0000	0.000E+00	0.0000	8.941E-13	0.0000	1.919E-14	0.0000	9.800E-14	0.0000	2.040E-08	0.0016
Sr-90	9.606E-08	0.0077	1.432E-09	0.0001	0.000E+00	0.0000	1.490E-08	0.0012	6.960E-09	0.0006	5.024E-09	0.0004	3.265E-06	0.2627
Total	1.386E-07	0.0112	7.317E-09	0.0006	0.000E+00	0.0000	2.140E-08	0.0017	1.137E-08	0.0009	2.392E-08	0.0019	1.243E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 37 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 38
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.350E+02 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	4.313E-13	1.611E-09	3.277E-12	3.987E-12	6.640E-10	1.129E-07	1.227E-09	1.246E-08	2.037E-11	4.551E-11	1.289E-07
Ag-108m	2.340E-04	5.213E+01	1.952E+00	3.696E+01	3.602E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.140E+01
Am-241	2.708E-03	4.026E+00	2.000E-02	2.171E-03	4.169E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.217E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	5.389E-11	6.403E-06	1.664E-06	3.813E-07	8.295E-08	3.640E-07	2.017E-08	4.116E-08	5.094E-08	1.472E-08	9.023E-06
Cs-137	7.426E-04	4.412E+01	1.865E+01	1.158E+01	1.143E+00	5.016E+00	1.802E+00	5.604E-01	1.052E+00	8.109E-01	8.474E+01
Eu-152	4.729E-06	1.757E-02	1.648E-03	1.089E-04	7.280E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.660E-02
Eu-154	5.736E-08	2.131E-04	1.998E-05	1.320E-06	8.830E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.227E-04
Gd-152	1.826E-16	6.783E-13	6.362E-14	1.681E-15	2.811E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.025E-12
H-3	0.000E+00	2.863E-30	0.000E+00	0.000E+00	0.000E+00	1.614E-28	0.000E+00	4.855E-29	1.672E-30	6.927E-30	2.215E-28
Ni-63	6.134E-02	4.556E+03	3.109E+02	2.879E+03	9.443E+01	1.919E+03	3.598E+01	2.152E+02	6.720E+01	7.765E+02	1.085E+04
Np-237	1.323E-07	3.929E-03	6.390E-05	7.637E-07	2.036E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.197E-03
Pa-231	6.642E-13	9.863E-09	1.017E-09	2.523E-12	1.022E-09	7.351E-08	1.990E-10	8.246E-09	2.681E-09	8.600E-12	9.655E-08
Pb-210	6.813E-12	1.018E-07	1.703E-09	1.568E-09	1.049E-08	2.886E-07	1.574E-08	3.198E-08	1.621E-09	1.759E-09	4.552E-07
Pu-238	1.301E-03	1.933E+00	1.921E-02	5.214E-04	2.002E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.955E+00
Pu-239	3.952E-03	5.875E+00	5.837E-02	1.584E-03	6.084E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.202E+01
Pu-240	9.312E-04	1.384E+00	1.375E-02	3.733E-04	1.434E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.832E+00
Ra-226	1.196E-11	7.104E-07	9.984E-09	2.328E-08	1.842E-08	7.970E-07	8.771E-09	8.895E-08	5.566E-09	1.612E-08	1.679E-06
Ra-228	9.880E-18	5.842E-13	8.098E-15	1.900E-14	1.521E-14	7.519E-13	8.278E-15	8.383E-14	5.191E-15	1.511E-14	1.491E-12
Sr-90	3.252E-04	1.449E+02	1.413E+01	7.984E+00	5.007E-01	1.612E+01	1.866E-01	1.943E+00	9.091E-01	6.556E-01	1.874E+02
Th-228	9.483E-18	2.179E-14	3.256E-16	4.114E-17	1.460E-14	2.512E-13	5.540E-15	2.844E-14	2.879E-16	4.187E-17	3.222E-13
Th-229	1.592E-13	2.369E-10	2.360E-12	3.217E-13	2.450E-10	3.498E-09	7.690E-11	4.174E-10	4.133E-12	6.943E-13	4.482E-09
Th-230	5.572E-10	8.288E-07	8.247E-09	1.122E-09	8.578E-07	1.587E-05	3.492E-07	1.836E-06	1.560E-08	2.511E-09	1.977E-05
Th-232	1.110E-17	1.651E-14	1.644E-16	2.237E-17	1.709E-14	3.041E-13	6.690E-15	3.537E-14	3.096E-16	5.028E-17	3.803E-13
U-233	3.581E-11	1.336E-07	2.142E-09	9.921E-09	5.512E-08	8.616E-05	1.968E-07	9.520E-06	2.047E-07	1.044E-06	9.732E-05
U-234	7.193E-07	2.672E-03	4.260E-05	1.987E-04	1.107E-03	2.404E+00	5.491E-03	2.657E-01	5.722E-03	2.916E-02	2.714E+00
U-235	4.400E-10	1.634E-06	2.605E-08	1.215E-07	6.773E-07	1.326E-03	3.029E-06	1.465E-04	3.154E-06	1.608E-05	1.497E-03
U-236	3.131E-09	1.163E-05	1.854E-07	8.650E-07	4.821E-06	9.446E-03	2.158E-05	1.044E-03	2.247E-05	1.146E-04	1.067E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of Radon and its Decay Products as pCi/yr at t= 1.350E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 38 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 39
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.055E-16	0.0000	3.439E-18	0.0000	4.018E-17	0.0000	7.992E-20	0.0000	9.946E-20	0.0000	2.947E-17	0.0000
Ag-108m	7.699E-07	0.3181	1.727E-13	0.0000	1.614E-08	0.0067	6.045E-10	0.0002	1.144E-08	0.0047	1.912E-10	0.0001
Am-241	3.755E-08	0.0155	2.228E-09	0.0009	1.579E-08	0.0065	7.846E-11	0.0000	8.518E-12	0.0000	2.649E-08	0.0109
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	8.326E-14	0.0000	1.444E-20	0.0000	1.069E-15	0.0000	2.778E-16	0.0000	6.366E-17	0.0000	2.503E-17	0.0000
Cs-137	6.755E-07	0.2791	1.909E-13	0.0000	3.566E-08	0.0147	1.507E-08	0.0062	9.359E-09	0.0039	1.070E-09	0.0004
Eu-152	6.347E-09	0.0026	6.535E-15	0.0000	2.321E-12	0.0000	2.177E-13	0.0000	1.438E-14	0.0000	1.791E-12	0.0000
Eu-154	6.408E-11	0.0000	7.589E-17	0.0000	3.652E-14	0.0000	3.426E-15	0.0000	2.264E-16	0.0000	2.895E-14	0.0000
Gd-152	0.000E+00	0.0000	4.987E-23	0.0000	7.837E-22	0.0000	7.351E-23	0.0000	1.943E-24	0.0000	5.306E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	9.520E-12	0.0000	1.165E-07	0.0482	7.953E-09	0.0033	7.364E-08	0.0304	4.546E-09	0.0019
Np-237	5.821E-11	0.0000	7.715E-14	0.0000	1.178E-11	0.0000	1.916E-13	0.0000	2.289E-15	0.0000	1.085E-12	0.0000
Pa-231	5.659E-17	0.0000	1.106E-18	0.0000	8.161E-17	0.0000	8.418E-18	0.0000	2.087E-20	0.0000	1.400E-17	0.0000
Pb-210	2.047E-17	0.0000	3.987E-18	0.0000	1.477E-14	0.0000	2.469E-16	0.0000	2.273E-16	0.0000	1.176E-15	0.0000
Pu-238	4.424E-11	0.0000	1.167E-09	0.0005	8.723E-09	0.0036	8.668E-11	0.0000	2.352E-12	0.0000	1.454E-08	0.0060
Pu-239	4.005E-10	0.0002	3.945E-09	0.0016	3.064E-08	0.0127	3.044E-10	0.0001	8.262E-12	0.0000	5.033E-08	0.0208
Pu-240	3.413E-11	0.0000	9.284E-10	0.0004	7.211E-09	0.0030	7.165E-11	0.0000	1.945E-12	0.0000	1.189E-08	0.0049
Ra-226	6.742E-14	0.0000	5.516E-18	0.0000	1.458E-14	0.0000	2.049E-16	0.0000	4.778E-16	0.0000	5.362E-16	0.0000
Ra-228	2.765E-20	0.0000	1.916E-24	0.0000	3.104E-20	0.0000	4.304E-22	0.0000	1.010E-21	0.0000	1.289E-21	0.0000
Sr-90	2.264E-09	0.0009	7.883E-13	0.0000	2.952E-07	0.1220	2.879E-08	0.0119	1.626E-08	0.0067	1.544E-09	0.0006
Th-228	4.582E-20	0.0000	5.040E-23	0.0000	3.424E-22	0.0000	5.112E-24	0.0000	6.458E-25	0.0000	4.399E-22	0.0000
Th-229	1.268E-16	0.0000	1.460E-18	0.0000	6.923E-18	0.0000	6.896E-20	0.0000	9.394E-21	0.0000	1.288E-17	0.0000
Th-230	2.737E-16	0.0000	5.608E-16	0.0000	3.483E-15	0.0000	3.465E-17	0.0000	4.712E-18	0.0000	6.119E-15	0.0000
Th-232	2.373E-24	0.0000	1.760E-23	0.0000	8.041E-23	0.0000	8.003E-25	0.0000	1.089E-25	0.0000	1.445E-22	0.0000
U-233	2.160E-17	0.0000	1.509E-17	0.0000	4.700E-16	0.0000	7.533E-18	0.0000	3.491E-17	0.0000	3.203E-16	0.0000
U-234	9.568E-14	0.0000	2.531E-13	0.0000	7.875E-12	0.0000	1.256E-13	0.0000	5.856E-13	0.0000	5.399E-12	0.0000
U-235	1.316E-13	0.0000	1.451E-16	0.0000	5.211E-15	0.0000	8.308E-17	0.0000	3.876E-16	0.0000	3.614E-15	0.0000
U-236	2.207E-16	0.0000	1.073E-15	0.0000	3.428E-14	0.0000	5.465E-16	0.0000	2.549E-15	0.0000	2.344E-14	0.0000
Total	1.492E-06	0.6166	8.279E-09	0.0034	5.259E-07	0.2173	5.296E-08	0.0219	1.107E-07	0.0458	1.106E-07	0.0457

Attachment 6 Sheet No. 39 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 40
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.226E-15	0.0000	3.251E-17	0.0000	3.302E-16	0.0000	5.327E-19	0.0000	1.206E-18	0.0000	3.069E-15	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.982E-07	0.3298
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.215E-08	0.0339
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	4.498E-17	0.0000	3.540E-18	0.0000	7.225E-18	0.0000	8.943E-18	0.0000	2.584E-18	0.0000	8.476E-14	0.0000
Cs-137	3.622E-09	0.0015	1.601E-09	0.0007	4.979E-10	0.0002	9.348E-10	0.0004	7.205E-10	0.0003	7.440E-07	0.3074
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.352E-09	0.0026
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.415E-11	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.440E-21	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	3.835E-08	0.0158	1.020E-09	0.0004	6.102E-09	0.0025	1.906E-09	0.0008	2.202E-08	0.0091	2.721E-07	0.1124
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.134E-11	0.0000
Pa-231	4.878E-16	0.0000	1.724E-18	0.0000	7.139E-17	0.0000	2.313E-17	0.0000	7.327E-20	0.0000	7.459E-16	0.0000
Pb-210	1.670E-14	0.0000	2.477E-15	0.0000	5.035E-15	0.0000	2.558E-16	0.0000	2.762E-16	0.0000	4.119E-14	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.456E-08	0.0102
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.563E-08	0.0354
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.014E-08	0.0083
Ra-226	1.307E-14	0.0000	1.922E-16	0.0000	1.951E-15	0.0000	1.221E-16	0.0000	3.529E-16	0.0000	9.891E-14	0.0000
Ra-228	3.052E-20	0.0000	4.621E-22	0.0000	4.680E-21	0.0000	2.898E-22	0.0000	8.436E-22	0.0000	9.822E-20	0.0000
Sr-90	2.804E-08	0.0116	4.180E-10	0.0002	4.351E-09	0.0018	2.037E-09	0.0008	1.468E-09	0.0006	3.804E-07	0.1572
Th-228	2.953E-21	0.0000	9.180E-23	0.0000	4.713E-22	0.0000	4.758E-24	0.0000	6.920E-25	0.0000	5.018E-20	0.0000
Th-229	8.040E-17	0.0000	2.398E-18	0.0000	1.289E-17	0.0000	1.222E-19	0.0000	2.030E-20	0.0000	2.440E-16	0.0000
Th-230	5.342E-14	0.0000	1.537E-15	0.0000	8.027E-15	0.0000	6.581E-17	0.0000	1.048E-17	0.0000	7.353E-14	0.0000
Th-232	1.176E-21	0.0000	3.407E-23	0.0000	1.790E-22	0.0000	1.515E-24	0.0000	2.434E-25	0.0000	1.637E-21	0.0000
U-233	2.354E-13	0.0000	7.255E-16	0.0000	3.510E-14	0.0000	7.548E-16	0.0000	3.850E-15	0.0000	2.767E-13	0.0000
U-234	5.377E-09	0.0022	1.659E-11	0.0000	8.029E-10	0.0003	1.729E-11	0.0000	8.813E-11	0.0000	6.316E-09	0.0026
U-235	3.185E-12	0.0000	9.893E-15	0.0000	4.787E-13	0.0000	1.030E-14	0.0000	5.253E-14	0.0000	3.877E-12	0.0000
U-236	2.116E-11	0.0000	6.515E-14	0.0000	3.152E-12	0.0000	6.786E-14	0.0000	3.459E-13	0.0000	2.485E-11	0.0000
Total	7.541E-08	0.0312	3.056E-09	0.0013	1.176E-08	0.0049	4.895E-09	0.0020	2.430E-08	0.0100	2.420E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 40 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 41
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.350E+02 years

0
Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0
Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

0
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	7.699E-07	0.3181	1.727E-13	0.0000	0.000E+00	0.0000	1.614E-08	0.0067	6.045E-10	0.0002	1.144E-08	0.0047	1.912E-10	0.0001
Am-241	3.761E-08	0.0155	2.228E-09	0.0009	0.000E+00	0.0000	1.580E-08	0.0065	7.865E-11	0.0000	8.520E-12	0.0000	2.649E-08	0.0109
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	8.326E-14	0.0000	1.444E-20	0.0000	0.000E+00	0.0000	1.069E-15	0.0000	2.778E-16	0.0000	6.366E-17	0.0000	2.503E-17	0.0000
Cs-137	6.755E-07	0.2791	1.909E-13	0.0000	0.000E+00	0.0000	3.566E-08	0.0147	1.507E-08	0.0062	9.359E-09	0.0039	1.070E-09	0.0004
Eu-152	6.347E-09	0.0026	6.535E-15	0.0000	0.000E+00	0.0000	2.321E-12	0.0000	2.177E-13	0.0000	1.438E-14	0.0000	1.791E-12	0.0000
Eu-154	6.408E-11	0.0000	7.589E-17	0.0000	0.000E+00	0.0000	3.652E-14	0.0000	3.426E-15	0.0000	2.264E-16	0.0000	2.895E-14	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	9.520E-12	0.0000	0.000E+00	0.0000	1.165E-07	0.0482	7.953E-09	0.0033	7.364E-08	0.0304	4.546E-09	0.0019
Pu-238	4.440E-11	0.0000	1.167E-09	0.0005	0.000E+00	0.0000	8.731E-09	0.0036	8.680E-11	0.0000	2.939E-12	0.0000	1.455E-08	0.0060
Pu-239	4.007E-10	0.0002	3.945E-09	0.0016	0.000E+00	0.0000	3.064E-08	0.0127	3.044E-10	0.0001	8.263E-12	0.0000	5.033E-08	0.0208
Pu-240	3.413E-11	0.0000	9.284E-10	0.0004	0.000E+00	0.0000	7.211E-09	0.0030	7.165E-11	0.0000	1.947E-12	0.0000	1.189E-08	0.0049
Sr-90	2.264E-09	0.0009	7.883E-13	0.0000	0.000E+00	0.0000	2.952E-07	0.1220	2.879E-08	0.0119	1.626E-08	0.0067	1.544E-09	0.0006
Total	1.492E-06	0.6166	8.279E-09	0.0034	0.000E+00	0.0000	5.259E-07	0.2173	5.296E-08	0.0219	1.107E-07	0.0458	1.106E-07	0.0457

Attachment 6 Sheet No. 41 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 42
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.982E-07	0.3298
Am-241	2.354E-13	0.0000	7.279E-16	0.0000	0.000E+00	0.0000	3.511E-14	0.0000	7.550E-16	0.0000	3.850E-15	0.0000	8.222E-08	0.0340
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	4.498E-17	0.0000	3.540E-18	0.0000	0.000E+00	0.0000	7.225E-18	0.0000	8.943E-18	0.0000	2.584E-18	0.0000	8.476E-14	0.0000
Cs-137	3.622E-09	0.0015	1.601E-09	0.0007	0.000E+00	0.0000	4.979E-10	0.0002	9.348E-10	0.0004	7.205E-10	0.0003	7.440E-07	0.3074
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.352E-09	0.0026
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.415E-11	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	3.835E-08	0.0158	1.020E-09	0.0004	0.000E+00	0.0000	6.102E-09	0.0025	1.906E-09	0.0008	2.202E-08	0.0091	2.721E-07	0.1124
Pu-238	5.377E-09	0.0022	1.660E-11	0.0000	0.000E+00	0.0000	8.029E-10	0.0003	1.729E-11	0.0000	8.813E-11	0.0000	3.088E-08	0.0128
Pu-239	3.188E-12	0.0000	9.927E-15	0.0000	0.000E+00	0.0000	4.791E-13	0.0000	1.033E-14	0.0000	5.253E-14	0.0000	8.563E-08	0.0354
Pu-240	2.116E-11	0.0000	6.515E-14	0.0000	0.000E+00	0.0000	3.152E-12	0.0000	6.786E-14	0.0000	3.459E-13	0.0000	2.016E-08	0.0083
Sr-90	2.804E-08	0.0116	4.180E-10	0.0002	0.000E+00	0.0000	4.351E-09	0.0018	2.037E-09	0.0008	1.468E-09	0.0006	3.804E-07	0.1572
Total	7.541E-08	0.0312	3.056E-09	0.0013	0.000E+00	0.0000	1.176E-08	0.0049	4.895E-09	0.0020	2.430E-08	0.0100	2.420E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 42 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 43
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Ac-227	2.329E-12	8.690E-09	1.567E-11	2.151E-11	3.586E-09	8.148E-07	8.860E-09	8.999E-08	1.384E-10	3.289E-10	9.264E-07
Ag-108m	9.406E-05	2.096E+01	7.848E-01	1.486E+01	1.448E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.674E+01
Am-241	2.068E-03	3.075E+00	1.528E-02	1.658E-03	3.184E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.276E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	1.994E-20	2.370E-15	6.159E-16	1.411E-16	3.070E-17	3.030E-16	1.679E-17	3.428E-17	4.249E-17	1.227E-17	3.567E-15
Cs-137	1.609E-05	9.563E-01	4.042E-01	2.510E-01	2.478E-02	2.445E-01	8.788E-02	2.733E-02	5.138E-02	3.957E-02	2.087E+00
Eu-152	8.840E-10	3.284E-06	3.080E-07	2.035E-08	1.361E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.973E-06
Eu-154	1.295E-13	4.809E-10	4.511E-11	2.981E-12	1.993E-10	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.283E-10
Gd-152	1.825E-16	6.781E-13	6.360E-14	1.681E-15	2.810E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.024E-12
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.805E-02	1.340E+03	9.147E+01	8.469E+02	2.778E+01	1.275E+03	2.391E+01	1.430E+02	4.470E+01	5.162E+02	4.310E+03
Np-237	2.584E-07	7.676E-03	1.249E-04	1.492E-06	3.978E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.200E-03
Pa-231	2.824E-12	4.195E-08	4.329E-09	1.072E-11	4.348E-09	3.993E-07	1.078E-09	4.445E-08	1.421E-08	4.276E-11	5.097E-07
Pb-210	6.869E-11	1.025E-06	1.709E-08	1.576E-08	1.057E-07	4.377E-06	2.389E-07	4.854E-07	2.463E-08	2.661E-08	6.316E-06
Pu-238	3.515E-04	5.225E-01	5.192E-03	1.409E-04	5.411E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.069E+00
Pu-239	3.914E-03	5.818E+00	5.781E-02	1.569E-03	6.026E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.190E+01
Pu-240	9.106E-04	1.354E+00	1.345E-02	3.650E-04	1.402E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.769E+00
Ra-226	8.793E-11	5.223E-06	7.351E-08	1.713E-07	1.354E-07	8.221E-06	9.055E-08	9.192E-07	5.760E-08	1.663E-07	1.506E-05
Ra-228	4.502E-17	2.663E-12	3.695E-14	8.667E-14	6.931E-14	4.408E-12	4.852E-14	4.914E-13	3.043E-14	8.857E-14	7.922E-12
Sr-90	6.162E-06	2.746E+00	2.678E-01	1.513E-01	9.486E-03	6.916E-01	8.007E-03	8.336E-02	3.904E-02	2.814E-02	4.025E+00
Th-228	4.428E-17	1.009E-13	1.501E-15	1.897E-16	6.817E-14	1.519E-12	3.349E-14	1.718E-13	1.719E-15	2.501E-16	1.897E-12
Th-229	1.461E-12	2.173E-09	2.161E-11	2.939E-12	2.249E-09	4.497E-08	9.898E-10	5.122E-09	3.986E-11	6.237E-12	5.558E-08
Th-230	1.667E-09	2.479E-06	2.464E-08	3.347E-09	2.567E-06	6.048E-05	1.332E-06	6.776E-06	4.743E-08	7.139E-09	7.372E-05
Th-232	4.729E-17	7.032E-14	6.992E-16	9.500E-17	7.280E-14	1.635E-12	3.601E-14	1.843E-13	1.340E-15	2.047E-16	2.001E-12
U-233	1.402E-10	5.219E-07	8.346E-09	3.879E-08	2.158E-07	4.270E-04	9.756E-07	4.720E-05	1.016E-06	5.180E-06	4.822E-04
U-234	7.144E-07	2.654E-03	4.232E-05	1.974E-04	1.100E-03	2.708E+00	6.188E-03	2.994E-01	6.453E-03	3.287E-02	3.057E+00
U-235	7.914E-10	2.940E-06	4.687E-08	2.186E-07	1.218E-06	2.686E-03	6.137E-06	2.970E-04	6.397E-06	3.260E-05	3.033E-03
U-236	5.590E-09	2.076E-05	3.311E-07	1.544E-06	8.605E-06	1.900E-02	4.341E-05	2.101E-03	4.525E-05	2.306E-04	2.145E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0

	Radionuclides							
Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 43 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 44
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years
0 Water Independent Pathways (Inhalation excludes radon)
0

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.890E-15	0.0000	1.603E-17	0.0000	1.871E-16	0.0000	3.358E-19	0.0000	4.633E-19	0.0000	1.374E-16	0.0000
Ag-108m	3.095E-07	0.4919	6.943E-14	0.0000	6.489E-09	0.0103	2.430E-10	0.0004	4.600E-09	0.0073	7.686E-11	0.0001
Am-241	2.868E-08	0.0456	1.702E-09	0.0027	1.206E-08	0.0192	5.993E-11	0.0001	6.506E-12	0.0000	2.023E-08	0.0322
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.082E-23	0.0000	0.000E+00	0.0000	3.957E-25	0.0000	1.028E-25	0.0000	2.356E-26	0.0000	9.263E-27	0.0000
Cs-137	1.464E-08	0.0233	4.138E-15	0.0000	7.728E-10	0.0012	3.266E-10	0.0005	2.029E-10	0.0003	2.318E-11	0.0000
Eu-152	1.187E-12	0.0000	1.222E-18	0.0000	4.339E-16	0.0000	4.070E-17	0.0000	2.689E-18	0.0000	3.348E-16	0.0000
Eu-154	1.447E-16	0.0000	1.713E-22	0.0000	8.244E-20	0.0000	7.733E-21	0.0000	5.109E-22	0.0000	6.535E-20	0.0000
Gd-152	0.000E+00	0.0000	4.983E-23	0.0000	7.831E-22	0.0000	7.345E-23	0.0000	1.941E-24	0.0000	5.302E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	2.801E-12	0.0000	3.428E-08	0.0545	2.340E-09	0.0037	2.166E-08	0.0344	1.337E-09	0.0021
Np-237	1.075E-10	0.0002	1.425E-13	0.0000	2.176E-11	0.0000	3.541E-13	0.0000	4.231E-15	0.0000	2.005E-12	0.0000
Pa-231	2.147E-16	0.0000	4.197E-18	0.0000	3.096E-16	0.0000	3.195E-17	0.0000	7.909E-20	0.0000	5.310E-17	0.0000
Pb-210	1.668E-16	0.0000	3.248E-17	0.0000	1.202E-13	0.0000	2.003E-15	0.0000	1.847E-15	0.0000	9.584E-15	0.0000
Pu-238	1.196E-11	0.0000	3.153E-10	0.0005	2.358E-09	0.0037	2.343E-11	0.0000	6.358E-13	0.0000	3.930E-09	0.0062
Pu-239	3.967E-10	0.0006	3.907E-09	0.0062	3.035E-08	0.0482	3.015E-10	0.0005	8.183E-12	0.0000	4.985E-08	0.0792
Pu-240	3.337E-11	0.0001	9.079E-10	0.0014	7.052E-09	0.0112	7.007E-11	0.0001	1.902E-12	0.0000	1.163E-08	0.0185
Ra-226	4.174E-13	0.0000	3.415E-17	0.0000	9.030E-14	0.0000	1.271E-15	0.0000	2.961E-15	0.0000	3.320E-15	0.0000
Ra-228	1.113E-19	0.0000	7.710E-24	0.0000	1.250E-19	0.0000	1.734E-21	0.0000	4.067E-21	0.0000	5.188E-21	0.0000
Sr-90	4.289E-11	0.0001	1.494E-14	0.0000	5.594E-09	0.0089	5.455E-10	0.0009	3.081E-10	0.0005	2.926E-11	0.0000
Th-228	1.882E-19	0.0000	2.070E-22	0.0000	1.397E-21	0.0000	2.077E-23	0.0000	2.625E-24	0.0000	1.807E-21	0.0000
Th-229	9.762E-16	0.0000	1.124E-17	0.0000	5.326E-17	0.0000	5.298E-19	0.0000	7.202E-20	0.0000	9.916E-17	0.0000
Th-230	7.350E-16	0.0000	1.506E-15	0.0000	9.349E-15	0.0000	9.294E-17	0.0000	1.262E-17	0.0000	1.643E-14	0.0000
Th-232	9.019E-24	0.0000	6.688E-23	0.0000	3.055E-22	0.0000	3.037E-24	0.0000	4.126E-25	0.0000	5.493E-22	0.0000
U-233	7.545E-17	0.0000	5.269E-17	0.0000	1.639E-15	0.0000	2.620E-17	0.0000	1.218E-16	0.0000	1.119E-15	0.0000
U-234	9.038E-14	0.0000	2.390E-13	0.0000	7.439E-12	0.0000	1.186E-13	0.0000	5.532E-13	0.0000	5.100E-12	0.0000
U-235	2.241E-13	0.0000	2.472E-16	0.0000	8.874E-15	0.0000	1.415E-16	0.0000	6.600E-16	0.0000	6.153E-15	0.0000
U-236	3.729E-16	0.0000	1.813E-15	0.0000	5.793E-14	0.0000	9.236E-16	0.0000	4.308E-15	0.0000	3.961E-14	0.0000
Total	3.534E-07	0.5617	6.835E-09	0.0109	9.899E-08	0.1573	3.910E-09	0.0062	2.679E-08	0.0426	8.711E-08	0.1385

Attachment 6 Sheet No. 44 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 45
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	1.320E-14	0.0000	1.928E-16	0.0000	1.958E-15	0.0000	3.003E-18	0.0000	7.157E-18	0.0000	1.759E-14	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.209E-07	0.5100
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.274E-08	0.0997
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.645E-26	0.0000	2.870E-27	0.0000	5.856E-27	0.0000	7.249E-27	0.0000	2.093E-27	0.0000	3.140E-23	0.0000
Cs-137	1.679E-10	0.0003	7.423E-11	0.0001	2.309E-11	0.0000	4.340E-11	0.0001	3.343E-11	0.0001	1.631E-08	0.0259
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.187E-12	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.448E-16	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.439E-21	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.412E-08	0.0383	6.420E-10	0.0010	3.839E-09	0.0061	1.200E-09	0.0019	1.386E-08	0.0220	1.033E-07	0.1642
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.318E-10	0.0002
Pa-231	2.269E-15	0.0000	7.999E-18	0.0000	3.299E-16	0.0000	1.054E-16	0.0000	3.164E-19	0.0000	3.326E-15	0.0000
Pb-210	1.920E-13	0.0000	2.847E-14	0.0000	5.784E-14	0.0000	2.935E-15	0.0000	3.172E-15	0.0000	4.182E-13	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.639E-09	0.0106
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.481E-08	0.1348
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.969E-08	0.0313
Ra-226	1.079E-13	0.0000	1.587E-15	0.0000	1.611E-14	0.0000	1.009E-15	0.0000	2.915E-15	0.0000	6.448E-13	0.0000
Ra-228	1.521E-19	0.0000	2.302E-21	0.0000	2.332E-20	0.0000	1.444E-21	0.0000	4.203E-21	0.0000	4.306E-19	0.0000
Sr-90	1.144E-09	0.0018	1.706E-11	0.0000	1.776E-10	0.0003	8.317E-11	0.0001	5.994E-11	0.0001	8.001E-09	0.0127
Th-228	1.510E-20	0.0000	4.694E-22	0.0000	2.408E-21	0.0000	2.408E-23	0.0000	3.502E-24	0.0000	2.097E-19	0.0000
Th-229	8.190E-16	0.0000	2.446E-17	0.0000	1.264E-16	0.0000	9.739E-19	0.0000	1.519E-19	0.0000	2.111E-15	0.0000
Th-230	1.755E-13	0.0000	5.053E-15	0.0000	2.568E-14	0.0000	1.785E-16	0.0000	2.679E-17	0.0000	2.345E-13	0.0000
Th-232	5.434E-21	0.0000	1.575E-22	0.0000	8.053E-22	0.0000	5.814E-24	0.0000	8.856E-25	0.0000	7.337E-21	0.0000
U-233	1.002E-12	0.0000	3.088E-15	0.0000	1.494E-13	0.0000	3.218E-15	0.0000	1.640E-14	0.0000	1.177E-12	0.0000
U-234	5.641E-09	0.0090	1.741E-11	0.0000	8.424E-10	0.0013	1.816E-11	0.0000	9.248E-11	0.0001	6.625E-09	0.0105
U-235	5.985E-12	0.0000	1.859E-14	0.0000	8.996E-13	0.0000	1.938E-14	0.0000	9.875E-14	0.0000	7.262E-12	0.0000
U-236	3.947E-11	0.0001	1.215E-13	0.0000	5.881E-12	0.0000	1.267E-13	0.0000	6.456E-13	0.0000	4.635E-11	0.0001
Total	3.112E-08	0.0495	7.509E-10	0.0012	4.890E-09	0.0078	1.345E-09	0.0021	1.405E-08	0.0223	6.292E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 45 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 46
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0

	Radionuclides							
Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0

Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	3.095E-07	0.4919	6.943E-14	0.0000	0.000E+00	0.0000	6.489E-09	0.0103	2.430E-10	0.0004	4.600E-09	0.0073	7.686E-11	0.0001
Am-241	2.879E-08	0.0458	1.702E-09	0.0027	0.000E+00	0.0000	1.208E-08	0.0192	6.028E-11	0.0001	6.510E-12	0.0000	2.023E-08	0.0322
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.082E-23	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.957E-25	0.0000	1.028E-25	0.0000	2.356E-26	0.0000	9.263E-27	0.0000
Cs-137	1.464E-08	0.0233	4.138E-15	0.0000	0.000E+00	0.0000	7.728E-10	0.0012	3.266E-10	0.0005	2.029E-10	0.0003	2.318E-11	0.0000
Eu-152	1.187E-12	0.0000	1.222E-18	0.0000	0.000E+00	0.0000	4.339E-16	0.0000	4.070E-17	0.0000	2.689E-18	0.0000	3.348E-16	0.0000
Eu-154	1.447E-16	0.0000	1.713E-22	0.0000	0.000E+00	0.0000	8.244E-20	0.0000	7.733E-21	0.0000	5.109E-22	0.0000	6.535E-20	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	2.801E-12	0.0000	0.000E+00	0.0000	3.428E-08	0.0545	2.340E-09	0.0037	2.166E-08	0.0344	1.337E-09	0.0021
Pu-238	1.246E-11	0.0000	3.156E-10	0.0005	0.000E+00	0.0000	2.365E-09	0.0038	2.355E-11	0.0000	1.194E-12	0.0000	3.935E-09	0.0063
Pu-239	3.969E-10	0.0006	3.907E-09	0.0062	0.000E+00	0.0000	3.035E-08	0.0482	3.015E-10	0.0005	8.184E-12	0.0000	4.985E-08	0.0792
Pu-240	3.337E-11	0.0001	9.079E-10	0.0014	0.000E+00	0.0000	7.052E-09	0.0112	7.007E-11	0.0001	1.906E-12	0.0000	1.163E-08	0.0185
Sr-90	4.289E-11	0.0001	1.494E-14	0.0000	0.000E+00	0.0000	5.594E-09	0.0089	5.455E-10	0.0009	3.081E-10	0.0005	2.926E-11	0.0000
Total	3.534E-07	0.5617	6.835E-09	0.0109	0.000E+00	0.0000	9.899E-08	0.1573	3.910E-09	0.0062	2.679E-08	0.0426	8.711E-08	0.1385

Attachment 6 Sheet No. 46 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 47
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.209E-07	0.5100
Am-241	1.003E-12	0.0000	3.113E-15	0.0000	0.000E+00	0.0000	1.496E-13	0.0000	3.219E-15	0.0000	1.640E-14	0.0000	6.288E-08	0.0999
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.645E-26	0.0000	2.870E-27	0.0000	0.000E+00	0.0000	5.856E-27	0.0000	7.249E-27	0.0000	2.093E-27	0.0000	3.140E-23	0.0000
Cs-137	1.679E-10	0.0003	7.423E-11	0.0001	0.000E+00	0.0000	2.309E-11	0.0000	4.340E-11	0.0001	3.343E-11	0.0001	1.631E-08	0.0259
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.187E-12	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.448E-16	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.412E-08	0.0383	6.420E-10	0.0010	0.000E+00	0.0000	3.839E-09	0.0061	1.200E-09	0.0019	1.386E-08	0.0220	1.033E-07	0.1642
Pu-238	5.641E-09	0.0090	1.744E-11	0.0000	0.000E+00	0.0000	8.425E-10	0.0013	1.816E-11	0.0000	9.249E-11	0.0001	1.326E-08	0.0211
Pu-239	6.001E-12	0.0000	1.879E-14	0.0000	0.000E+00	0.0000	9.019E-13	0.0000	1.949E-14	0.0000	9.876E-14	0.0000	8.482E-08	0.1348
Pu-240	3.947E-11	0.0001	1.215E-13	0.0000	0.000E+00	0.0000	5.881E-12	0.0000	1.267E-13	0.0000	6.456E-13	0.0000	1.974E-08	0.0314
Sr-90	1.144E-09	0.0018	1.706E-11	0.0000	0.000E+00	0.0000	1.776E-10	0.0003	8.317E-11	0.0001	5.994E-11	0.0001	8.001E-09	0.0127
Total	3.112E-08	0.0495	7.509E-10	0.0012	0.000E+00	0.0000	4.890E-09	0.0078	1.345E-09	0.0021	1.405E-08	0.0223	6.292E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 47 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 48
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	1.743E-11	6.499E-08	1.098E-10	1.609E-10	2.683E-08	6.902E-06	7.506E-08	7.625E-07	1.142E-09	2.787E-09	7.835E-06
Ag-108m	1.969E-06	4.388E-01	1.643E-02	3.111E-01	3.032E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.694E-01
Am-241	6.594E-04	9.802E-01	4.870E-03	5.287E-04	1.015E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.001E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cs-137	1.403E-12	8.335E-08	3.523E-08	2.188E-08	2.160E-09	7.479E-08	2.688E-08	8.362E-09	1.573E-08	1.211E-08	2.805E-07
Eu-152	1.347E-25	5.005E-22	4.695E-23	3.102E-24	2.074E-22	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.580E-22
Eu-154	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Gd-152	1.816E-16	6.747E-13	6.329E-14	1.673E-15	2.796E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.019E-12
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.005E-04	7.462E+00	5.093E-01	4.716E+00	1.547E-01	2.536E+01	4.755E-01	2.844E+00	8.893E-01	1.027E+01	5.268E+01
Np-237	5.310E-07	1.578E-02	2.568E-04	3.068E-06	8.175E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.685E-02
Pa-231	1.835E-11	2.726E-07	2.814E-08	6.958E-11	2.825E-08	2.913E-06	7.853E-09	3.232E-07	1.024E-07	2.985E-10	3.676E-06
Pb-210	8.240E-10	1.229E-05	2.045E-07	1.887E-07	1.268E-06	6.504E-05	3.550E-06	7.210E-06	3.657E-07	3.954E-07	9.051E-05
Pu-238	1.366E-06	2.030E-03	2.017E-05	5.475E-07	2.102E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.153E-03
Pu-239	3.758E-03	5.586E+00	5.551E-02	1.506E-03	5.785E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.143E+01
Pu-240	8.283E-04	1.231E+00	1.223E-02	3.320E-04	1.275E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.519E+00
Ra-226	8.654E-10	5.142E-05	7.242E-07	1.687E-06	1.332E-06	9.767E-05	1.076E-06	1.092E-05	6.848E-07	1.977E-06	1.675E-04
Ra-228	3.064E-16	1.813E-11	2.517E-13	5.901E-13	4.717E-13	3.337E-11	3.674E-13	3.721E-12	2.305E-13	6.707E-13	5.780E-11
Sr-90	3.036E-13	1.353E-07	1.320E-08	7.453E-09	4.674E-10	1.058E-07	1.225E-09	1.276E-08	5.978E-09	4.307E-09	2.865E-07
Th-228	3.052E-16	6.925E-13	1.028E-14	1.299E-15	4.699E-13	1.168E-11	2.576E-13	1.321E-12	1.315E-14	1.912E-15	1.445E-11
Th-229	2.726E-11	4.052E-08	4.027E-10	5.467E-11	4.196E-08	9.810E-07	2.161E-08	1.092E-07	7.285E-10	1.075E-10	1.196E-06
Th-230	3.889E-09	5.781E-06	5.744E-08	7.796E-09	5.987E-06	1.553E-04	3.420E-06	1.717E-05	1.097E-07	1.589E-08	1.878E-04
Th-232	3.101E-16	4.610E-13	4.581E-15	6.218E-16	4.774E-13	1.179E-11	2.597E-13	1.309E-12	8.564E-15	1.254E-15	1.431E-11
U-233	6.415E-10	2.386E-06	3.809E-08	1.774E-07	9.876E-07	2.105E-03	4.808E-06	2.327E-04	5.013E-06	2.554E-05	2.376E-03
U-234	1.295E-07	4.811E-04	7.673E-06	3.578E-05	1.994E-04	4.981E-01	1.138E-03	5.507E-02	1.187E-03	6.046E-03	5.622E-01
U-235	1.274E-09	4.733E-06	7.547E-08	3.520E-07	1.961E-06	4.336E-03	9.906E-06	4.793E-04	1.033E-05	5.262E-05	4.895E-03
U-236	8.638E-09	3.209E-05	5.117E-07	2.386E-06	1.330E-05	2.948E-02	6.735E-05	3.259E-03	7.022E-05	3.578E-04	3.328E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 6 Sheet No. 48 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 49
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ac-227	1.313E-14	0.0000	1.114E-16	0.0000	1.300E-15	0.0000	2.195E-18	0.0000	3.218E-18	0.0000	9.544E-16	0.0000
Ag-108m	6.480E-09	0.0503	1.454E-15	0.0000	1.359E-10	0.0011	5.088E-12	0.0000	9.632E-11	0.0007	1.609E-12	0.0000
Am-241	9.144E-09	0.0710	5.425E-10	0.0042	3.846E-09	0.0299	1.911E-11	0.0001	2.074E-12	0.0000	6.450E-09	0.0501
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	1.276E-15	0.0000	3.607E-22	0.0000	6.736E-17	0.0000	2.847E-17	0.0000	1.768E-17	0.0000	2.020E-18	0.0000
Eu-152	1.791E-28	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Gd-152	0.000E+00	0.0000	4.958E-23	0.0000	7.792E-22	0.0000	7.309E-23	0.0000	1.932E-24	0.0000	5.276E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	1.559E-14	0.0000	1.909E-10	0.0015	1.303E-11	0.0001	1.206E-10	0.0009	7.447E-12	0.0001
Np-237	2.141E-10	0.0017	2.838E-13	0.0000	4.333E-11	0.0003	7.052E-13	0.0000	8.425E-15	0.0000	3.993E-12	0.0000
Pa-231	1.307E-15	0.0000	2.555E-17	0.0000	1.885E-15	0.0000	1.946E-16	0.0000	4.812E-19	0.0000	3.233E-16	0.0000
Pb-210	1.802E-15	0.0000	3.510E-16	0.0000	1.298E-12	0.0000	2.160E-14	0.0000	1.993E-14	0.0000	1.036E-13	0.0000
Pu-238	4.645E-14	0.0000	1.225E-12	0.0000	9.160E-12	0.0001	9.101E-14	0.0000	2.470E-15	0.0000	1.527E-11	0.0001
Pu-239	3.809E-10	0.0030	3.751E-09	0.0291	2.914E-08	0.2262	2.895E-10	0.0022	7.857E-12	0.0001	4.786E-08	0.3716
Pu-240	3.035E-11	0.0002	8.258E-10	0.0064	6.414E-09	0.0498	6.373E-11	0.0005	1.730E-12	0.0000	1.057E-08	0.0821
Ra-226	3.748E-12	0.0000	3.067E-16	0.0000	8.110E-13	0.0000	1.142E-14	0.0000	2.661E-14	0.0000	2.981E-14	0.0000
Ra-228	7.079E-19	0.0000	4.905E-23	0.0000	7.950E-19	0.0000	1.104E-20	0.0000	2.588E-20	0.0000	3.300E-20	0.0000
Sr-90	2.113E-18	0.0000	7.359E-22	0.0000	2.756E-16	0.0000	2.688E-17	0.0000	1.518E-17	0.0000	1.442E-18	0.0000
Th-228	1.212E-18	0.0000	1.333E-21	0.0000	8.955E-21	0.0000	1.329E-22	0.0000	1.680E-23	0.0000	1.163E-20	0.0000
Th-229	1.647E-14	0.0000	1.895E-16	0.0000	8.980E-16	0.0000	8.926E-18	0.0000	1.212E-18	0.0000	1.673E-15	0.0000
Th-230	1.629E-15	0.0000	3.338E-15	0.0000	2.072E-14	0.0000	2.059E-16	0.0000	2.794E-17	0.0000	3.642E-14	0.0000
Th-232	5.541E-23	0.0000	4.109E-22	0.0000	1.876E-21	0.0000	1.865E-23	0.0000	2.531E-24	0.0000	3.375E-21	0.0000
U-233	3.237E-16	0.0000	2.261E-16	0.0000	7.022E-15	0.0000	1.121E-16	0.0000	5.220E-16	0.0000	4.800E-15	0.0000
U-234	1.608E-14	0.0000	4.252E-14	0.0000	1.323E-12	0.0000	2.110E-14	0.0000	9.841E-14	0.0000	9.072E-13	0.0000
U-235	3.507E-13	0.0000	3.868E-16	0.0000	1.389E-14	0.0000	2.215E-16	0.0000	1.033E-15	0.0000	9.631E-15	0.0000
U-236	5.600E-16	0.0000	2.723E-15	0.0000	8.700E-14	0.0000	1.387E-15	0.0000	6.470E-15	0.0000	5.949E-14	0.0000
Total	1.625E-08	0.1262	5.121E-09	0.0398	3.978E-08	0.3088	3.913E-10	0.0030	2.288E-10	0.0018	6.492E-08	0.5040

Attachment 6 Sheet No. 49 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 50
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	1.028E-13	0.0000	1.502E-15	0.0000	1.526E-14	0.0000	2.284E-17	0.0000	5.577E-17	0.0000	1.352E-13	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.719E-09	0.0522
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.000E-08	0.1553
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	4.983E-17	0.0000	2.203E-17	0.0000	6.854E-18	0.0000	1.289E-17	0.0000	9.925E-18	0.0000	1.493E-15	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.791E-28	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.431E-21	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	4.642E-10	0.0036	1.236E-11	0.0001	7.390E-11	0.0006	2.311E-11	0.0002	2.668E-10	0.0021	1.172E-09	0.0091
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.624E-10	0.0020
Pa-231	1.542E-14	0.0000	5.429E-17	0.0000	2.234E-15	0.0000	7.082E-16	0.0000	2.063E-18	0.0000	2.215E-14	0.0000
Pb-210	2.531E-12	0.0000	3.755E-13	0.0000	7.626E-13	0.0000	3.868E-14	0.0000	4.181E-14	0.0000	5.194E-12	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.579E-11	0.0002
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.143E-08	0.6322
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.791E-08	0.1390
Ra-226	1.155E-12	0.0000	1.699E-14	0.0000	1.725E-13	0.0000	1.082E-14	0.0000	3.122E-14	0.0000	6.014E-12	0.0000
Ra-228	1.064E-18	0.0000	1.611E-20	0.0000	1.632E-19	0.0000	1.011E-20	0.0000	2.942E-20	0.0000	2.856E-18	0.0000
Sr-90	1.673E-16	0.0000	2.495E-18	0.0000	2.598E-17	0.0000	1.218E-17	0.0000	8.772E-18	0.0000	5.380E-16	0.0000
Th-228	1.072E-19	0.0000	3.333E-21	0.0000	1.709E-20	0.0000	1.701E-22	0.0000	2.473E-23	0.0000	1.362E-18	0.0000
Th-229	1.601E-14	0.0000	4.785E-16	0.0000	2.417E-15	0.0000	1.612E-17	0.0000	2.378E-18	0.0000	3.816E-14	0.0000
Th-230	4.256E-13	0.0000	1.226E-14	0.0000	6.155E-14	0.0000	3.931E-16	0.0000	5.693E-17	0.0000	5.622E-13	0.0000
Th-232	3.643E-20	0.0000	1.057E-21	0.0000	5.323E-21	0.0000	3.482E-23	0.0000	5.095E-24	0.0000	4.859E-20	0.0000
U-233	4.587E-12	0.0000	1.414E-14	0.0000	6.844E-13	0.0000	1.475E-14	0.0000	7.513E-14	0.0000	5.389E-12	0.0000
U-234	1.013E-09	0.0079	3.127E-12	0.0000	1.513E-10	0.0012	3.262E-12	0.0000	1.662E-11	0.0001	1.190E-09	0.0092
U-235	9.348E-12	0.0001	2.904E-14	0.0000	1.405E-12	0.0000	3.028E-14	0.0000	1.543E-13	0.0000	1.134E-11	0.0001
U-236	5.924E-11	0.0005	1.824E-13	0.0000	8.827E-12	0.0001	1.902E-13	0.0000	9.690E-13	0.0000	6.956E-11	0.0005
Total	1.555E-09	0.0121	1.612E-11	0.0001	2.372E-10	0.0018	2.666E-11	0.0002	2.847E-10	0.0022	1.288E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

Attachment 6 Sheet No. 50 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 51
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0 Water Independent Pathways (Inhalation excludes radon)

0

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	6.480E-09	0.0503	1.454E-15	0.0000	0.000E+00	0.0000	1.359E-10	0.0011	5.088E-12	0.0000	9.632E-11	0.0007	1.609E-12	0.0000
Am-241	9.358E-09	0.0727	5.428E-10	0.0042	0.000E+00	0.0000	3.889E-09	0.0302	1.981E-11	0.0002	2.083E-12	0.0000	6.454E-09	0.0501
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	1.276E-15	0.0000	3.607E-22	0.0000	0.000E+00	0.0000	6.736E-17	0.0000	2.847E-17	0.0000	1.768E-17	0.0000	2.020E-18	0.0000
Eu-152	1.791E-28	0.0000	4.958E-23	0.0000	0.000E+00	0.0000	7.792E-22	0.0000	7.309E-23	0.0000	1.932E-24	0.0000	5.276E-22	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	1.559E-14	0.0000	0.000E+00	0.0000	1.909E-10	0.0015	1.303E-11	0.0001	1.206E-10	0.0009	7.447E-12	0.0001
Pu-238	3.814E-12	0.0000	1.272E-12	0.0000	0.000E+00	0.0000	1.261E-11	0.0001	1.453E-13	0.0000	1.474E-13	0.0000	1.635E-11	0.0001
Pu-239	3.813E-10	0.0030	3.751E-09	0.0291	0.000E+00	0.0000	2.914E-08	0.2262	2.895E-10	0.0022	7.858E-12	0.0001	4.786E-08	0.3716
Pu-240	3.035E-11	0.0002	8.258E-10	0.0064	0.000E+00	0.0000	6.414E-09	0.0498	6.373E-11	0.0005	1.736E-12	0.0000	1.057E-08	0.0821
Sr-90	2.113E-18	0.0000	7.359E-22	0.0000	0.000E+00	0.0000	2.756E-16	0.0000	2.688E-17	0.0000	1.518E-17	0.0000	1.442E-18	0.0000
Total	1.625E-08	0.1262	5.121E-09	0.0398	0.000E+00	0.0000	3.978E-08	0.3088	3.913E-10	0.0030	2.288E-10	0.0018	6.492E-08	0.5040

Attachment 6 Sheet No. 51 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 6

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 52
Intrisk : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-														
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.719E-09	0.0522
Am-241	4.603E-12	0.0000	1.462E-14	0.0000	0.000E+00	0.0000	6.868E-13	0.0000	1.476E-14	0.0000	7.514E-14	0.0000	2.027E-08	0.1574
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Cs-137	4.983E-17	0.0000	2.203E-17	0.0000	0.000E+00	0.0000	6.854E-18	0.0000	1.289E-17	0.0000	9.925E-18	0.0000	1.493E-15	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.431E-21	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	4.642E-10	0.0036	1.236E-11	0.0001	0.000E+00	0.0000	7.390E-11	0.0006	2.311E-11	0.0002	2.668E-10	0.0021	1.172E-09	0.0091
Pu-238	1.017E-09	0.0079	3.532E-12	0.0000	0.000E+00	0.0000	1.523E-10	0.0012	3.312E-12	0.0000	1.669E-11	0.0001	1.228E-09	0.0095
Pu-239	9.466E-12	0.0001	3.060E-14	0.0000	0.000E+00	0.0000	1.423E-12	0.0000	3.101E-14	0.0000	1.543E-13	0.0000	8.144E-08	0.6322
Pu-240	5.924E-11	0.0005	1.824E-13	0.0000	0.000E+00	0.0000	8.827E-12	0.0001	1.902E-13	0.0000	9.690E-13	0.0000	1.798E-08	0.1396
Sr-90	1.673E-16	0.0000	2.495E-18	0.0000	0.000E+00	0.0000	2.598E-17	0.0000	1.218E-17	0.0000	8.772E-18	0.0000	5.380E-16	0.0000
Total	1.555E-09	0.0121	1.612E-11	0.0001	0.000E+00	0.0000	2.372E-10	0.0018	2.666E-11	0.0002	2.847E-10	0.0022	1.288E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 6 Sheet No. 52 of 52
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 1
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Table of Contents

Part IV: Concentration of Radionuclides

Concentration of radionuclides in different media
Time= 0.000E+00 2
Time= 1.000E+00 4
Time= 3.000E+00 6
Time= 7.000E+00 8
Time= 1.100E+01 10
Time= 4.300E+01 12
Time= 1.350E+02 14
Time= 3.000E+02 16
Time= 1.000E+03 18

Attachment 7 Sheet No. 1 of 19
Originator: S. W. Clark SWC Date 7/4/07
Chk'd By M. W. Perrott MWP Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 2
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 0.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	1.300E-02	1.300E-02	1.535E-07	0.000E+00	0.000E+00
Am-241	8.900E-02	8.900E-02	1.051E-06	0.000E+00	0.000E+00
C-14	3.200E-01	3.200E-01	3.779E-06	0.000E+00	0.000E+00
Co-60	7.400E-02	7.400E-02	8.740E-07	0.000E+00	0.000E+00
Cs-137	4.500E-01	4.500E-01	5.315E-06	0.000E+00	0.000E+00
Eu-152	1.400E-01	1.400E-01	1.653E-06	0.000E+00	0.000E+00
Eu-154	6.300E-02	6.300E-02	7.441E-07	0.000E+00	0.000E+00
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	2.000E+00	2.000E+00	2.362E-05	0.000E+00	0.000E+00
Ni-63	4.400E+00	4.400E+00	5.197E-05	0.000E+00	0.000E+00
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	1.000E-01	1.000E-01	1.181E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.240E-06	0.000E+00	0.000E+00
Pu-240	2.500E-02	2.500E-02	2.953E-07	0.000E+00	0.000E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Sr-90	2.200E-01	2.200E-01	2.598E-06	0.000E+00	0.000E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.652E+01 pCi/ml
Concentration of gaseous H-3 in air = 2.303E+00 pCi/m**3
Concentration of gaseous C-14 in air = 1.170E+00 pCi/m**3

Attachment 7 Sheet No. 2 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 3
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 0.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	0.000E+00	1.950E+00	1.950E+00	1.950E+00	1.950E+00	4.173E-01	2.844E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	8.906E-02	8.927E-02	8.930E-02	8.930E-02	2.529E-03	9.882E-05	0.000E+00	0.000E+00
C-14	0.000E+00	2.634E+03	5.926E+02	2.226E+03	1.001E+03	1.581E+03	4.613E+02	0.000E+00	0.000E+00
Co-60	0.000E+00	5.920E+00	5.920E+00	5.920E+00	5.920E+00	8.792E+00	7.252E-01	0.000E+00	0.000E+00
Cs-137	0.000E+00	1.800E+01	1.800E+01	1.800E+01	1.800E+01	4.347E+01	9.721E+00	0.000E+00	0.000E+00
Eu-152	0.000E+00	3.501E-01	3.504E-01	3.505E-01	3.505E-01	1.877E-01	4.464E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.575E-01	1.577E-01	1.577E-01	1.577E-01	8.445E-02	2.009E-03	0.000E+00	0.000E+00
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	0.000E+00	1.320E+04	1.320E+04	1.320E+04	1.320E+04	5.162E+03	3.136E+03	0.000E+00	0.000E+00
Ni-63	0.000E+00	2.200E+02	2.200E+02	2.200E+02	2.200E+02	8.581E+01	2.860E+02	0.000E+00	0.000E+00
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	0.000E+00	1.001E-01	1.003E-01	1.003E-01	1.003E-01	5.682E-03	5.552E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.051E-01	1.053E-01	1.054E-01	1.054E-01	5.966E-03	5.829E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.502E-02	2.508E-02	2.508E-02	2.508E-02	1.421E-03	1.388E-05	0.000E+00	0.000E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Sr-90	0.000E+00	6.600E+01	6.600E+01	6.600E+01	6.600E+01	3.678E+01	7.480E+00	0.000E+00	0.000E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 4
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	1.151E-17	1.151E-17	1.359E-22	6.340E-16	8.426E-18
Ag-108m	1.293E-02	1.293E-02	1.527E-07	0.000E+00	0.000E+00
Am-241	8.885E-02	8.885E-02	1.049E-06	0.000E+00	0.000E+00
C-14	1.466E-01	1.466E-01	1.731E-06	0.000E+00	0.000E+00
Co-60	6.487E-02	6.487E-02	7.662E-07	1.670E-04	2.220E-06
Cs-137	4.397E-01	4.397E-01	5.193E-06	1.132E-03	1.504E-05
Eu-152	1.329E-01	1.329E-01	1.570E-06	0.000E+00	0.000E+00
Eu-154	5.823E-02	5.823E-02	6.877E-07	0.000E+00	0.000E+00
Gd-152	2.445E-16	2.445E-16	2.887E-21	0.000E+00	0.000E+00
H-3	1.102E+00	1.102E+00	1.301E-05	8.378E+02	1.113E+01
Ni-63	4.367E+00	4.367E+00	5.158E-05	5.193E-02	6.901E-04
Np-237	2.880E-08	2.880E-08	3.402E-13	0.000E+00	0.000E+00
Pa-231	1.093E-15	1.093E-15	1.291E-20	3.124E-16	4.152E-18
Pb-210	1.420E-18	1.420E-18	1.677E-23	4.994E-16	6.637E-18
Pu-238	9.921E-02	9.921E-02	1.172E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.240E-06	0.000E+00	0.000E+00
Pu-240	2.500E-02	2.500E-02	2.952E-07	0.000E+00	0.000E+00
Ra-226	1.837E-16	1.837E-16	2.170E-21	7.178E-16	9.539E-18
Ra-228	7.114E-22	7.114E-22	8.402E-27	1.220E-24	1.621E-26
Sr-90	2.148E-01	2.148E-01	2.537E-06	4.036E-03	5.364E-05
Th-228	6.039E-23	6.039E-23	7.132E-28	1.430E-26	1.901E-28
Th-229	1.982E-18	1.982E-18	2.341E-23	5.902E-17	7.843E-19
Th-230	1.271E-12	1.271E-12	1.502E-17	1.649E-14	2.191E-16
Th-232	1.824E-20	1.824E-20	2.154E-25	0.000E+00	0.000E+00
U-233	6.294E-14	6.294E-14	7.434E-19	6.985E-14	9.283E-16
U-234	2.820E-07	2.820E-07	3.330E-12	4.928E-07	6.550E-09
U-235	1.033E-10	1.033E-10	1.220E-15	1.802E-10	2.395E-12
U-236	7.390E-10	7.390E-10	8.728E-15	1.290E-09	1.714E-11

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 9.099E+00 pCi/ml
Concentration of gaseous H-3 in air = 1.268E+00 pCi/m**3
Concentration of gaseous C-14 in air = 5.360E-01 pCi/m**3

Attachment 7 Sheet No. 4 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 5
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	6.171E-16	5.595E-16	3.806E-15	3.518E-15	1.989E-15	1.655E-17	4.224E-18	1.031E-16	6.873E-15
Ag-108m	0.000E+00	1.939E+00	1.939E+00	1.940E+00	1.939E+00	4.150E-01	2.828E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	8.891E-02	8.913E-02	8.916E-02	8.916E-02	2.525E-03	9.866E-05	0.000E+00	0.000E+00
C-14	0.000E+00	1.243E+03	2.720E+02	1.171E+03	5.058E+02	8.319E+02	2.330E+02	0.000E+00	0.000E+00
Co-60	1.658E-04	5.190E+00	5.191E+00	5.228E+00	5.193E+00	7.708E+00	6.359E-01	6.316E-04	4.211E-04
Cs-137	1.124E-03	1.759E+01	1.760E+01	1.761E+01	1.759E+01	4.249E+01	9.501E+00	2.854E-02	1.427E-03
Eu-152	0.000E+00	3.323E-01	3.327E-01	3.337E-01	3.328E-01	1.782E-01	4.238E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.456E-01	1.457E-01	1.464E-01	1.458E-01	7.805E-02	1.857E-03	0.000E+00	0.000E+00
Gd-152	0.000E+00	6.113E-16	6.119E-16	5.793E-16	6.103E-16	3.277E-16	3.130E-18	0.000E+00	0.000E+00
H-3	8.360E+02	1.049E+04	1.191E+04	9.312E+03	9.127E+03	3.859E+03	2.742E+03	1.097E+01	1.097E+01
Ni-63	5.170E-02	2.184E+02	2.187E+02	2.187E+02	2.187E+02	8.527E+01	2.844E+02	6.689E-02	6.689E-02
Np-237	0.000E+00	5.551E-07	5.747E-07	4.773E-07	5.072E-07	4.611E-08	2.114E-10	0.000E+00	0.000E+00
Pa-231	3.155E-16	1.078E-14	1.289E-14	1.177E-14	1.249E-14	6.541E-15	1.143E-17	4.419E-17	4.394E-16
Pb-210	4.781E-16	3.177E-16	2.891E-15	2.443E-15	2.600E-15	1.414E-16	6.508E-17	1.413E-15	4.720E-16
Pu-238	0.000E+00	9.927E-02	9.952E-02	9.959E-02	9.955E-02	5.637E-03	5.508E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.051E-01	1.053E-01	1.053E-01	1.053E-01	5.966E-03	5.829E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.501E-02	2.507E-02	2.508E-02	2.508E-02	1.420E-03	1.388E-05	0.000E+00	0.000E+00
Ra-226	6.874E-16	7.003E-15	1.144E-14	7.681E-15	8.740E-15	6.157E-16	6.770E-16	3.401E-16	1.701E-15
Ra-228	1.241E-24	2.534E-20	2.824E-20	1.618E-20	1.938E-20	1.382E-21	1.418E-21	9.496E-25	4.928E-24
Sr-90	4.020E-03	6.444E+01	6.446E+01	6.454E+01	6.446E+01	3.592E+01	7.306E+00	3.128E-03	5.214E-03
Th-228	1.505E-26	4.008E-22	8.799E-23	7.249E-22	8.709E-22	3.434E-23	1.795E-24	2.051E-26	1.030E-25
Th-229	5.916E-17	8.171E-17	3.751E-16	3.131E-16	3.517E-16	2.667E-18	1.616E-19	7.954E-17	3.977E-16
Th-230	2.843E-14	1.652E-12	1.539E-12	4.144E-12	4.657E-12	1.440E-13	1.031E-14	3.151E-14	1.684E-13
Th-232	0.000E+00	2.027E-20	1.844E-20	5.775E-20	6.480E-20	1.388E-21	8.945E-23	0.000E+00	0.000E+00
U-233	6.918E-14	3.176E-13	5.947E-13	6.140E-13	7.059E-13	3.576E-14	4.866E-14	8.665E-15	5.199E-14
U-234	4.901E-07	1.283E-06	3.772E-06	2.871E-06	3.212E-06	1.200E-07	2.372E-07	6.297E-08	3.778E-07
U-235	1.792E-10	4.695E-10	1.380E-09	1.050E-09	1.175E-09	4.390E-11	8.677E-11	2.303E-11	1.382E-10
U-236	1.283E-09	3.360E-09	9.873E-09	7.511E-09	8.407E-09	3.141E-10	6.210E-10	1.648E-10	9.888E-10

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 7 Sheet No. 5 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 6
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 3.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	3.054E-16	3.054E-16	3.606E-21	1.721E-15	2.287E-17
Ag-108m	1.279E-02	1.279E-02	1.510E-07	0.000E+00	0.000E+00
Am-241	8.857E-02	8.857E-02	1.046E-06	0.000E+00	0.000E+00
C-14	3.072E-02	3.072E-02	3.628E-07	0.000E+00	0.000E+00
Co-60	4.986E-02	4.986E-02	5.889E-07	3.852E-04	5.119E-06
Cs-137	4.197E-01	4.197E-01	4.957E-06	3.242E-03	4.309E-05
Eu-152	1.198E-01	1.198E-01	1.415E-06	0.000E+00	0.000E+00
Eu-154	4.974E-02	4.974E-02	5.874E-07	0.000E+00	0.000E+00
Gd-152	6.968E-16	6.968E-16	8.230E-21	0.000E+00	0.000E+00
H-3	3.342E-01	3.342E-01	3.946E-06	1.440E+03	1.914E+01
Ni-63	4.303E+00	4.303E+00	5.082E-05	1.535E-01	2.040E-03
Np-237	8.627E-08	8.627E-08	1.019E-12	0.000E+00	0.000E+00
Pa-231	9.817E-15	9.817E-15	1.159E-19	2.207E-15	2.933E-17
Pb-210	1.131E-16	1.131E-16	1.336E-21	2.159E-15	2.869E-17
Pu-238	9.765E-02	9.765E-02	1.153E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.240E-06	0.000E+00	0.000E+00
Pu-240	2.499E-02	2.499E-02	2.951E-07	0.000E+00	0.000E+00
Ra-226	4.933E-15	4.933E-15	5.826E-20	3.289E-15	4.370E-17
Ra-228	1.810E-20	1.810E-20	2.137E-25	2.461E-19	3.270E-21
Sr-90	2.047E-01	2.047E-01	2.418E-06	1.154E-02	1.534E-04
Th-228	4.078E-21	4.078E-21	4.816E-26	8.605E-20	1.144E-21
Th-229	5.339E-17	5.339E-17	6.306E-22	1.805E-16	2.399E-18
Th-230	1.136E-11	1.136E-11	1.342E-16	4.399E-13	5.846E-15
Th-232	1.638E-19	1.638E-19	1.935E-24	9.057E-20	1.204E-21
U-233	5.648E-13	5.648E-13	6.670E-18	1.919E-12	2.550E-14
U-234	8.370E-07	8.370E-07	9.885E-12	4.404E-06	5.853E-08
U-235	3.089E-10	3.089E-10	3.648E-15	1.619E-09	2.152E-11
U-236	2.211E-09	2.211E-09	2.611E-14	1.159E-08	1.540E-10

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 2.760E+00 pCi/ml
Concentration of gaseous H-3 in air = 3.848E-01 pCi/m**3
Concentration of gaseous C-14 in air = 1.123E-01 pCi/m**3

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 7
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 3.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.734E-15	3.292E-15	1.176E-14	1.327E-14	1.140E-14	1.414E-16	2.118E-17	3.596E-16	2.396E-14
Ag-108m	0.000E+00	1.918E+00	1.918E+00	1.919E+00	1.918E+00	4.105E-01	2.797E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	8.862E-02	8.884E-02	8.887E-02	8.887E-02	2.516E-03	9.834E-05	0.000E+00	0.000E+00
C-14	0.000E+00	2.606E+02	5.702E+01	2.455E+02	1.060E+02	1.744E+02	4.885E+01	0.000E+00	0.000E+00
Co-60	3.842E-04	3.989E+00	3.991E+00	4.020E+00	3.993E+00	5.927E+00	4.890E-01	1.509E-03	1.006E-03
Cs-137	3.234E-03	1.679E+01	1.681E+01	1.683E+01	1.681E+01	4.059E+01	9.079E+00	8.470E-02	4.235E-03
Eu-152	0.000E+00	2.995E-01	2.998E-01	3.007E-01	2.999E-01	1.605E-01	3.819E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.244E-01	1.245E-01	1.250E-01	1.245E-01	6.667E-02	1.586E-03	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.742E-15	1.744E-15	1.715E-15	1.743E-15	9.340E-16	8.898E-18	0.000E+00	0.000E+00
H-3	1.439E+03	7.657E+03	1.018E+04	4.942E+03	4.880E+03	2.336E+03	2.151E+03	1.909E+01	1.909E+01
Ni-63	1.533E-01	2.154E+02	2.161E+02	2.162E+02	2.162E+02	8.428E+01	2.813E+02	2.019E-01	2.019E-01
Np-237	0.000E+00	1.705E-06	1.724E-06	1.627E-06	1.657E-06	1.530E-07	6.712E-10	0.000E+00	0.000E+00
Pa-231	2.301E-15	1.010E-13	1.132E-13	1.286E-13	1.325E-13	6.831E-14	9.806E-17	3.801E-16	3.751E-15
Pb-210	2.151E-15	3.993E-15	1.464E-14	1.682E-14	1.499E-14	1.061E-15	3.683E-16	8.391E-15	2.803E-15
Pu-238	0.000E+00	9.771E-02	9.795E-02	9.802E-02	9.798E-02	5.549E-03	5.421E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.050E-01	1.053E-01	1.053E-01	1.053E-01	5.965E-03	5.828E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.501E-02	2.507E-02	2.507E-02	2.507E-02	1.420E-03	1.387E-05	0.000E+00	0.000E+00
Ra-226	3.278E-15	1.943E-13	2.175E-13	1.887E-13	1.956E-13	1.534E-14	1.374E-14	2.140E-15	1.070E-14
Ra-228	2.430E-19	9.680E-19	2.237E-18	2.074E-18	2.054E-18	1.586E-19	1.603E-19	1.498E-19	7.490E-19
Sr-90	1.153E-02	6.143E+01	6.148E+01	6.156E+01	6.149E+01	3.427E+01	6.972E+00	9.118E-03	1.520E-02
Th-228	8.515E-20	1.106E-19	5.349E-19	5.915E-19	5.727E-19	7.592E-21	3.937E-22	1.051E-19	5.256E-19
Th-229	1.782E-16	2.702E-16	1.160E-15	9.728E-16	2.172E-15	1.228E-17	1.080E-18	2.164E-16	1.083E-15
Th-230	5.471E-13	1.443E-11	1.554E-11	4.512E-11	4.683E-11	1.289E-12	8.247E-14	6.736E-13	3.468E-12
Th-232	9.105E-20	3.000E-19	7.406E-19	1.157E-18	1.162E-18	2.237E-20	1.389E-21	1.120E-19	5.612E-19
U-233	1.914E-12	4.087E-12	1.345E-11	1.308E-11	1.387E-11	4.626E-13	8.100E-13	2.505E-13	1.503E-12
U-234	4.396E-06	7.699E-06	2.970E-05	2.874E-05	2.980E-05	8.771E-07	1.655E-06	5.777E-07	3.466E-06
U-235	1.616E-09	2.833E-09	1.092E-08	1.056E-08	1.095E-08	3.226E-10	6.089E-10	2.124E-10	1.274E-09
U-236	1.156E-08	2.027E-08	7.816E-08	7.560E-08	7.838E-08	2.308E-09	4.357E-09	1.520E-09	9.117E-09

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 7 Sheet No. 7 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 8
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 7.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	3.748E-15	3.748E-15	4.427E-20	8.178E-15	1.087E-16
Ag-108m	1.251E-02	1.251E-02	1.477E-07	0.000E+00	0.000E+00
Am-241	8.799E-02	8.799E-02	1.039E-06	0.000E+00	0.000E+00
C-14	1.347E-03	1.347E-03	1.591E-08	0.000E+00	0.000E+00
Co-60	2.945E-02	2.945E-02	3.478E-07	5.310E-04	7.057E-06
Cs-137	3.825E-01	3.825E-01	4.517E-06	6.896E-03	9.165E-05
Eu-152	9.727E-02	9.727E-02	1.149E-06	0.000E+00	0.000E+00
Eu-154	3.629E-02	3.629E-02	4.286E-07	0.000E+00	0.000E+00
Gd-152	1.472E-15	1.472E-15	1.738E-20	0.000E+00	0.000E+00
H-3	3.070E-02	3.070E-02	3.626E-07	7.760E+02	1.031E+01
Ni-63	4.177E+00	4.177E+00	4.934E-05	3.479E-01	4.623E-03
Np-237	2.006E-07	2.006E-07	2.369E-12	0.000E+00	0.000E+00
Pa-231	5.324E-14	5.324E-14	6.288E-19	2.188E-14	2.908E-16
Pb-210	3.242E-15	3.242E-15	3.828E-20	7.512E-15	9.984E-17
Pu-238	9.460E-02	9.460E-02	1.117E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.240E-06	0.000E+00	0.000E+00
Pu-240	2.498E-02	2.498E-02	2.950E-07	0.000E+00	0.000E+00
Ra-226	6.197E-14	6.197E-14	7.319E-19	1.961E-14	2.606E-16
Ra-228	2.052E-19	2.052E-19	2.424E-24	6.756E-19	8.979E-21
Sr-90	1.859E-01	1.859E-01	2.196E-06	2.447E-02	3.253E-04
Th-228	8.686E-20	8.686E-20	1.026E-24	2.320E-19	3.083E-21
Th-229	6.752E-16	6.752E-16	7.974E-21	5.283E-16	7.020E-18
Th-230	6.098E-11	6.098E-11	7.202E-16	5.525E-12	7.342E-14
Th-232	8.884E-19	8.884E-19	1.049E-23	3.139E-19	4.172E-21
U-233	3.057E-12	3.057E-12	3.610E-17	2.446E-11	3.251E-13
U-234	1.912E-06	1.912E-06	2.258E-11	2.364E-05	3.142E-07
U-235	7.168E-10	7.168E-10	8.465E-15	8.780E-09	1.167E-10
U-236	5.128E-09	5.128E-09	6.057E-14	6.282E-08	8.349E-10

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 2.536E-01 pCi/ml
Concentration of gaseous H-3 in air = 3.535E-02 pCi/m**3
Concentration of gaseous C-14 in air = 4.926E-03 pCi/m**3

Attachment 7 Sheet No. 8 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 9
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 7.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	8.096E-15	1.914E-14	5.985E-14	5.900E-14	5.736E-14	8.368E-16	1.262E-16	1.518E-15	1.011E-13
Ag-108m	0.000E+00	1.876E+00	1.876E+00	1.877E+00	1.876E+00	4.015E-01	2.736E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	8.805E-02	8.826E-02	8.829E-02	8.829E-02	2.500E-03	9.770E-05	0.000E+00	0.000E+00
C-14	0.000E+00	1.142E+01	2.500E+00	1.077E+01	4.649E+00	7.647E+00	2.142E+00	0.000E+00	0.000E+00
Co-60	5.305E-04	2.357E+00	2.360E+00	2.377E+00	2.361E+00	3.504E+00	2.892E-01	2.102E-03	1.401E-03
Cs-137	6.889E-03	1.531E+01	1.534E+01	1.536E+01	1.535E+01	3.705E+01	8.291E+00	1.820E-01	9.098E-03
Eu-152	0.000E+00	2.432E-01	2.435E-01	2.442E-01	2.435E-01	1.304E-01	3.101E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	9.075E-02	9.084E-02	9.124E-02	9.087E-02	4.865E-02	1.157E-03	0.000E+00	0.000E+00
Gd-152	0.000E+00	3.680E-15	3.684E-15	3.661E-15	3.683E-15	1.973E-15	1.878E-17	0.000E+00	0.000E+00
H-3	7.771E+02	3.202E+03	4.515E+03	1.752E+03	1.698E+03	9.120E+02	9.398E+02	1.042E+01	1.042E+01
Ni-63	3.476E-01	2.093E+02	2.111E+02	2.113E+02	2.112E+02	8.234E+01	2.752E+02	4.603E-01	4.603E-01
Np-237	0.000E+00	3.992E-06	4.012E-06	3.915E-06	3.945E-06	3.658E-07	1.586E-09	0.000E+00	0.000E+00
Pa-231	2.233E-14	5.656E-13	6.757E-13	8.009E-13	8.130E-13	4.105E-13	5.503E-16	3.324E-15	3.421E-14
Pb-210	7.603E-15	4.610E-14	8.103E-14	8.367E-14	9.785E-14	6.494E-15	2.484E-15	3.240E-14	1.084E-14
Pu-238	0.000E+00	9.466E-02	9.489E-02	9.496E-02	9.492E-02	5.376E-03	5.252E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.050E-01	1.053E-01	1.053E-01	1.053E-01	5.964E-03	5.827E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.499E-02	2.505E-02	2.506E-02	2.506E-02	1.419E-03	1.387E-05	0.000E+00	0.000E+00
Ra-226	1.972E-14	2.468E-12	2.602E-12	2.422E-12	2.492E-12	1.962E-13	1.712E-13	1.356E-14	6.782E-14
Ra-228	6.768E-19	8.975E-18	1.248E-17	1.253E-17	1.282E-17	9.819E-19	9.159E-19	4.551E-19	2.275E-18
Sr-90	2.446E-02	5.581E+01	5.594E+01	5.602E+01	5.595E+01	3.119E+01	6.348E+00	1.944E-02	3.240E-02
Th-228	2.329E-19	5.185E-19	1.566E-18	2.267E-18	2.336E-18	3.979E-20	1.953E-21	3.136E-19	1.568E-18
Th-229	5.304E-16	1.448E-15	4.029E-15	5.898E-15	6.751E-15	1.002E-16	6.245E-18	6.710E-16	3.361E-15
Th-230	6.101E-12	8.047E-11	1.032E-10	2.737E-10	2.782E-10	7.062E-12	4.352E-13	7.823E-12	3.965E-11
Th-232	3.227E-19	1.488E-18	2.978E-18	5.594E-18	5.832E-18	1.150E-19	7.017E-21	4.281E-19	2.148E-18
U-233	2.443E-11	3.973E-11	1.612E-10	1.648E-10	1.687E-10	4.815E-12	8.826E-12	3.222E-12	1.933E-11
U-234	2.362E-05	3.543E-05	1.533E-04	1.592E-04	1.617E-04	4.400E-06	8.174E-06	3.124E-06	1.874E-05
U-235	8.773E-09	1.318E-08	5.695E-08	5.913E-08	6.004E-08	1.635E-09	3.038E-09	1.160E-09	6.962E-09
U-236	6.277E-08	9.427E-08	4.075E-07	4.231E-07	4.296E-07	1.170E-08	2.174E-08	8.302E-09	4.981E-08

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 7 Sheet No. 9 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 10
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.100E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	1.406E-14	1.406E-14	1.661E-19	2.380E-14	3.163E-16
Ag-108m	1.223E-02	1.223E-02	1.445E-07	0.000E+00	0.000E+00
Am-241	8.742E-02	8.742E-02	1.032E-06	0.000E+00	0.000E+00
C-14	5.888E-05	5.888E-05	6.954E-10	0.000E+00	0.000E+00
Co-60	1.740E-02	1.740E-02	2.055E-07	4.930E-04	6.552E-06
Cs-137	3.486E-01	3.486E-01	4.117E-06	9.879E-03	1.313E-04
Eu-152	7.899E-02	7.899E-02	9.329E-07	0.000E+00	0.000E+00
Eu-154	2.648E-02	2.648E-02	3.127E-07	0.000E+00	0.000E+00
Gd-152	2.101E-15	2.101E-15	2.482E-20	0.000E+00	0.000E+00
H-3	2.815E-03	2.815E-03	3.325E-08	7.148E+01	9.499E-01
Ni-63	4.055E+00	4.055E+00	4.790E-05	5.309E-01	7.055E-03
Np-237	3.142E-07	3.142E-07	3.711E-12	0.000E+00	0.000E+00
Pa-231	1.309E-13	1.309E-13	1.547E-18	7.838E-14	1.042E-15
Pb-210	1.912E-14	1.912E-14	2.258E-19	1.489E-14	1.978E-16
Pu-238	9.165E-02	9.165E-02	1.082E-06	0.000E+00	0.000E+00
Pu-239	1.049E-01	1.049E-01	1.239E-06	0.000E+00	0.000E+00
Pu-240	2.496E-02	2.496E-02	2.948E-07	0.000E+00	0.000E+00
Ra-226	2.378E-13	2.378E-13	2.809E-18	6.020E-14	8.000E-16
Ra-228	7.164E-19	7.164E-19	8.460E-24	1.283E-18	1.705E-20
Sr-90	1.689E-01	1.689E-01	1.995E-06	3.495E-02	4.645E-04
Th-228	3.951E-19	3.951E-19	4.667E-24	4.116E-19	5.471E-21
Th-229	2.608E-15	2.608E-15	3.080E-20	9.267E-16	1.232E-17
Th-230	1.485E-10	1.485E-10	1.753E-15	2.121E-11	2.819E-13
Th-232	2.185E-18	2.185E-18	2.581E-23	6.671E-19	8.865E-21
U-233	7.504E-12	7.504E-12	8.863E-17	9.450E-11	1.256E-12
U-234	2.941E-06	2.941E-06	3.473E-11	5.755E-05	7.648E-07
U-235	1.120E-09	1.120E-09	1.323E-14	2.160E-08	2.870E-10
U-236	8.012E-09	8.012E-09	9.462E-14	1.545E-07	2.053E-09

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 2.325E-02 pCi/ml
Concentration of gaseous H-3 in air = 3.241E-03 pCi/m**3
Concentration of gaseous C-14 in air = 2.153E-04 pCi/m**3

Attachment 7 Sheet No. 10 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 11
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.100E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	2.372E-14	6.616E-14	1.840E-13	1.727E-13	1.890E-13	2.281E-15	4.241E-16	4.630E-15	3.083E-13
Ag-108m	0.000E+00	1.835E+00	1.835E+00	1.836E+00	1.835E+00	3.927E-01	2.676E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	8.747E-02	8.769E-02	8.772E-02	8.771E-02	2.484E-03	9.706E-05	0.000E+00	0.000E+00
C-14	0.000E+00	4.995E-01	1.093E-01	4.708E-01	2.033E-01	3.344E-01	9.365E-02	0.000E+00	0.000E+00
Co-60	4.927E-04	1.392E+00	1.395E+00	1.405E+00	1.396E+00	2.072E+00	1.710E-01	1.957E-03	1.304E-03
Cs-137	9.872E-03	1.396E+01	1.401E+01	1.403E+01	1.401E+01	3.382E+01	7.571E+00	2.613E-01	1.307E-02
Eu-152	0.000E+00	1.975E-01	1.977E-01	1.983E-01	1.978E-01	1.059E-01	2.519E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	6.622E-02	6.628E-02	6.658E-02	6.630E-02	3.550E-02	8.443E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	5.254E-15	5.259E-15	5.241E-15	5.259E-15	2.816E-15	2.680E-17	0.000E+00	0.000E+00
H-3	7.158E+01	2.949E+02	4.158E+02	1.613E+02	1.563E+02	8.398E+01	8.655E+01	9.599E-01	9.599E-01
Ni-63	5.307E-01	2.035E+02	2.061E+02	2.064E+02	2.064E+02	8.043E+01	2.693E+02	7.035E-01	7.035E-01
Np-237	0.000E+00	6.264E-06	6.284E-06	6.188E-06	6.218E-06	5.772E-07	2.495E-09	0.000E+00	0.000E+00
Pa-231	7.958E-14	1.429E-12	1.818E-12	2.166E-12	2.197E-12	1.085E-12	1.418E-15	1.153E-14	1.211E-13
Pb-210	1.514E-14	2.239E-13	2.888E-13	3.479E-13	3.623E-13	2.848E-14	9.639E-15	6.622E-14	2.220E-14
Pu-238	0.000E+00	9.171E-02	9.193E-02	9.200E-02	9.196E-02	5.208E-03	5.088E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.050E-01	1.053E-01	1.053E-01	1.053E-01	5.963E-03	5.826E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.498E-02	2.504E-02	2.505E-02	2.505E-02	1.418E-03	1.386E-05	0.000E+00	0.000E+00
Ra-226	6.104E-14	9.514E-12	9.897E-12	9.642E-12	9.846E-12	7.770E-13	6.702E-13	4.403E-14	2.202E-13
Ra-228	1.287E-18	3.003E-17	3.678E-17	3.602E-17	3.634E-17	2.852E-18	2.562E-18	8.704E-19	4.352E-18
Sr-90	3.494E-02	5.072E+01	5.089E+01	5.097E+01	5.091E+01	2.838E+01	5.780E+00	2.780E-02	4.633E-02
Th-228	4.139E-19	1.358E-18	3.042E-18	4.717E-18	4.722E-18	1.088E-19	5.156E-21	5.618E-19	2.809E-18
Th-229	9.544E-16	4.380E-15	8.798E-15	1.696E-14	1.552E-14	3.403E-16	2.002E-17	1.282E-15	6.434E-15
Th-230	2.261E-11	2.053E-10	3.001E-10	7.262E-10	7.341E-10	1.758E-11	1.070E-12	2.936E-11	1.481E-10
Th-232	6.892E-19	3.513E-18	6.668E-18	1.322E-17	1.331E-17	2.778E-19	1.672E-20	9.169E-19	4.604E-18
U-233	9.443E-11	1.424E-10	6.126E-10	6.409E-10	6.500E-10	1.780E-11	3.276E-11	1.250E-11	7.497E-11
U-234	5.752E-05	8.233E-05	3.691E-04	3.910E-04	3.947E-04	1.051E-05	1.943E-05	7.622E-06	4.573E-05
U-235	2.158E-08	3.093E-08	1.385E-07	1.467E-07	1.481E-07	3.944E-09	7.295E-09	2.860E-09	1.716E-08
U-236	1.544E-07	2.213E-07	9.912E-07	1.049E-06	1.060E-06	2.822E-08	5.219E-08	2.046E-08	1.228E-07

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 12
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 4.300E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	6.531E-13	6.531E-13	7.714E-18	3.164E-12	4.205E-14
Ag-108m	1.025E-02	1.025E-02	1.211E-07	0.000E+00	0.000E+00
Am-241	8.296E-02	8.296E-02	9.798E-07	0.000E+00	0.000E+00
C-14	7.060E-16	7.060E-16	8.338E-21	0.000E+00	0.000E+00
Co-60	2.578E-04	2.578E-04	3.045E-09	2.863E-05	3.805E-07
Cs-137	1.658E-01	1.658E-01	1.958E-06	1.841E-02	2.447E-04
Eu-152	1.495E-02	1.495E-02	1.765E-07	0.000E+00	0.000E+00
Eu-154	2.127E-03	2.127E-03	2.513E-08	0.000E+00	0.000E+00
Gd-152	4.306E-15	4.306E-15	5.086E-20	0.000E+00	0.000E+00
H-3	1.316E-11	1.316E-11	1.555E-16	3.465E-07	4.605E-09
Ni-63	3.199E+00	3.199E+00	3.778E-05	1.642E+00	2.182E-02
Np-237	1.196E-06	1.196E-06	1.413E-11	0.000E+00	0.000E+00
Pa-231	1.939E-12	1.939E-12	2.290E-17	4.467E-12	5.937E-14
Pb-210	3.467E-12	3.467E-12	4.095E-17	2.550E-12	3.389E-14
Pu-238	7.111E-02	7.111E-02	8.398E-07	0.000E+00	0.000E+00
Pu-239	1.047E-01	1.047E-01	1.237E-06	0.000E+00	0.000E+00
Pu-240	2.485E-02	2.485E-02	2.935E-07	0.000E+00	0.000E+00
Ra-226	1.300E-11	1.300E-11	1.536E-16	1.598E-11	2.123E-13
Ra-228	2.239E-17	2.239E-17	2.644E-22	3.510E-17	4.665E-19
Sr-90	7.826E-02	7.826E-02	9.243E-07	6.354E-02	8.444E-04
Th-228	1.932E-17	1.932E-17	2.281E-22	1.030E-17	1.369E-19
Th-229	1.503E-13	1.503E-13	1.775E-18	6.282E-14	8.348E-16
Th-230	2.028E-09	2.028E-09	2.395E-14	1.164E-09	1.547E-11
Th-232	3.238E-17	3.238E-17	3.824E-22	1.935E-17	2.571E-19
U-233	1.094E-10	1.094E-10	1.292E-15	5.446E-09	7.238E-11
U-234	9.704E-06	9.704E-06	1.146E-10	7.863E-04	1.045E-05
U-235	4.187E-09	4.187E-09	4.945E-14	3.199E-07	4.251E-09
U-236	2.991E-08	2.991E-08	3.533E-13	2.287E-06	3.039E-08

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.087E-10 pCi/ml
Concentration of gaseous H-3 in air = 1.516E-11 pCi/m**3
Concentration of gaseous C-14 in air = 2.582E-15 pCi/m**3

Attachment 7 Sheet No. 12 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 13
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 4.300E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	3.162E-12	5.769E-12	2.152E-11	2.316E-11	2.326E-11	8.433E-14	4.223E-14	6.277E-13	4.183E-11
Ag-108m	0.000E+00	1.538E+00	1.538E+00	1.538E+00	1.538E+00	3.291E-01	2.243E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	8.302E-02	8.322E-02	8.325E-02	8.325E-02	2.357E-03	9.212E-05	0.000E+00	0.000E+00
C-14	0.000E+00	5.990E-12	1.310E-12	5.650E-12	2.439E-12	4.013E-12	1.124E-12	0.000E+00	0.000E+00
Co-60	2.862E-05	2.066E-02	2.081E-02	2.097E-02	2.083E-02	3.092E-02	2.557E-03	1.140E-04	7.600E-05
Cs-137	1.841E-02	6.656E+00	6.748E+00	6.766E+00	6.759E+00	1.630E+01	3.660E+00	4.888E-01	2.444E-02
Eu-152	0.000E+00	3.737E-02	3.741E-02	3.752E-02	3.742E-02	2.003E-02	4.765E-04	0.000E+00	0.000E+00
Eu-154	0.000E+00	5.320E-03	5.325E-03	5.349E-03	5.327E-03	2.852E-03	6.783E-05	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.077E-14	1.078E-14	1.078E-14	1.078E-14	5.772E-15	5.492E-17	0.000E+00	0.000E+00
H-3	3.471E-07	1.426E-06	2.013E-06	7.786E-07	7.547E-07	4.059E-07	4.188E-07	4.654E-09	4.654E-09
Ni-63	1.642E+00	1.621E+02	1.703E+02	1.713E+02	1.712E+02	6.662E+01	2.256E+02	2.181E+00	2.181E+00
Np-237	0.000E+00	2.391E-05	2.393E-05	2.384E-05	2.387E-05	2.219E-06	9.555E-09	0.000E+00	0.000E+00
Pa-231	4.484E-12	2.558E-11	4.774E-11	5.546E-11	5.566E-11	2.487E-11	2.980E-14	6.095E-13	6.618E-12
Pb-210	2.540E-12	3.832E-11	5.065E-11	5.365E-11	5.282E-11	4.470E-12	1.517E-12	9.873E-12	3.320E-12
Pu-238	0.000E+00	7.115E-02	7.133E-02	7.138E-02	7.135E-02	4.041E-03	3.948E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.048E-01	1.051E-01	1.051E-01	1.051E-01	5.952E-03	5.815E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.487E-02	2.493E-02	2.494E-02	2.494E-02	1.412E-03	1.380E-05	0.000E+00	0.000E+00
Ra-226	1.595E-11	5.396E-10	6.207E-10	6.231E-10	6.241E-10	4.963E-11	4.337E-11	1.050E-11	5.252E-11
Ra-228	3.510E-17	9.364E-16	1.117E-15	1.120E-15	1.121E-15	8.853E-17	7.844E-17	2.337E-17	1.168E-16
Sr-90	6.354E-02	2.357E+01	2.389E+01	2.395E+01	2.392E+01	1.335E+01	2.730E+00	5.063E-02	8.439E-02
Th-228	1.033E-17	4.539E-17	8.538E-17	1.372E-16	1.367E-16	3.654E-18	1.718E-19	1.378E-17	6.891E-17
Th-229	6.424E-14	2.612E-13	5.638E-13	1.029E-12	1.025E-12	1.984E-14	1.172E-15	8.490E-14	4.258E-13
Th-230	1.183E-09	3.938E-09	9.599E-09	1.607E-08	1.611E-08	2.852E-10	1.678E-11	1.563E-09	7.833E-09
Th-232	1.966E-17	6.398E-17	1.581E-16	2.643E-16	2.642E-16	4.610E-18	2.703E-19	2.602E-17	1.304E-16
U-233	5.445E-09	7.408E-09	3.453E-08	3.735E-08	3.749E-08	9.749E-10	1.793E-09	7.229E-10	4.337E-09
U-234	7.862E-04	1.055E-03	4.971E-03	5.401E-03	5.414E-03	1.399E-04	2.570E-04	1.044E-04	6.265E-04
U-235	3.198E-07	4.296E-07	2.023E-06	2.197E-06	2.202E-06	5.692E-08	1.046E-07	4.247E-08	2.548E-07
U-236	2.286E-06	3.071E-06	1.446E-05	1.570E-05	1.574E-05	4.069E-07	7.479E-07	3.036E-07	1.822E-06

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 7 Sheet No. 13 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 14
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.350E+02 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	1.137E-11	1.137E-11	1.343E-16	1.546E-10	2.055E-12
Ag-108m	6.168E-03	6.168E-03	7.284E-08	0.000E+00	0.000E+00
Am-241	7.139E-02	7.139E-02	8.432E-07	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	1.420E-09	1.420E-09	1.678E-14	4.986E-10	6.626E-12
Cs-137	1.958E-02	1.958E-02	2.312E-07	6.871E-03	9.131E-05
Eu-152	1.247E-04	1.247E-04	1.472E-09	0.000E+00	0.000E+00
Eu-154	1.512E-06	1.512E-06	1.786E-11	0.000E+00	0.000E+00
Gd-152	4.813E-15	4.813E-15	5.685E-20	0.000E+00	0.000E+00
H-3	7.537E-36	7.537E-36	8.901E-41	2.208E-31	2.935E-33
Ni-63	1.617E+00	1.617E+00	1.910E-05	2.629E+00	3.494E-02
Np-237	3.487E-06	3.487E-06	4.118E-11	0.000E+00	0.000E+00
Pa-231	1.751E-11	1.751E-11	2.068E-16	1.006E-10	1.337E-12
Pb-210	1.796E-10	1.796E-10	2.121E-15	3.953E-10	5.253E-12
Pu-238	3.428E-02	3.428E-02	4.049E-07	0.000E+00	0.000E+00
Pu-239	1.042E-01	1.042E-01	1.230E-06	0.000E+00	0.000E+00
Pu-240	2.455E-02	2.455E-02	2.899E-07	0.000E+00	0.000E+00
Ra-226	3.154E-10	3.154E-10	3.725E-15	1.092E-09	1.451E-11
Ra-228	2.604E-16	2.604E-16	3.076E-21	1.030E-15	1.369E-17
Sr-90	8.573E-03	8.573E-03	1.013E-07	2.208E-02	2.935E-04
Th-228	2.500E-16	2.500E-16	2.952E-21	3.434E-16	4.564E-18
Th-229	4.196E-12	4.196E-12	4.956E-17	4.761E-12	6.328E-14
Th-230	1.469E-08	1.469E-08	1.735E-13	2.166E-08	2.879E-10
Th-232	2.926E-16	2.926E-16	3.456E-21	4.148E-16	5.513E-18
U-233	9.438E-10	9.438E-10	1.115E-14	1.180E-07	1.569E-09
U-234	1.896E-05	1.896E-05	2.239E-10	3.293E-03	4.376E-05
U-235	1.160E-08	1.160E-08	1.370E-13	1.816E-06	2.414E-08
U-236	8.255E-08	8.255E-08	9.749E-13	1.294E-05	1.720E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 6.225E-35 pCi/ml
Concentration of gaseous H-3 in air = 8.678E-36 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 7 Sheet No. 14 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 15
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.350E+02 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.546E-10	2.313E-10	1.001E-09	1.089E-09	1.090E-09	2.399E-12	1.807E-12	3.080E-11	2.053E-09
Ag-108m	0.000E+00	9.252E-01	9.252E-01	9.255E-01	9.252E-01	1.980E-01	1.349E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	7.144E-02	7.161E-02	7.164E-02	7.163E-02	2.028E-03	7.927E-05	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	4.986E-10	1.143E-07	1.168E-07	1.179E-07	1.171E-07	1.739E-07	1.446E-08	1.987E-09	1.325E-09
Cs-137	6.871E-03	7.921E-01	8.265E-01	8.314E-01	8.304E-01	1.998E+00	4.525E-01	1.826E-01	9.128E-03
Eu-152	0.000E+00	3.117E-04	3.120E-04	3.130E-04	3.121E-04	1.671E-04	3.975E-06	0.000E+00	0.000E+00
Eu-154	0.000E+00	3.781E-06	3.785E-06	3.801E-06	3.786E-06	2.027E-06	4.821E-08	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.204E-14	1.205E-14	1.205E-14	1.205E-14	6.452E-15	6.139E-17	0.000E+00	0.000E+00
H-3	2.212E-31	9.034E-31	1.277E-30	4.905E-31	4.753E-31	2.564E-31	2.656E-31	2.966E-33	2.966E-33
Ni-63	2.629E+00	8.435E+01	9.747E+01	9.901E+01	9.898E+01	3.835E+01	1.335E+02	3.494E+00	3.494E+00
Np-237	0.000E+00	6.972E-05	6.975E-05	6.967E-05	6.969E-05	6.480E-06	2.788E-08	0.000E+00	0.000E+00
Pa-231	1.007E-10	3.094E-10	8.098E-10	8.993E-10	9.000E-10	3.750E-10	4.061E-13	1.346E-11	1.476E-10
Pb-210	3.953E-10	2.328E-09	4.286E-09	4.549E-09	4.573E-09	3.371E-10	1.215E-10	1.574E-09	5.265E-10
Pu-238	0.000E+00	3.431E-02	3.439E-02	3.442E-02	3.440E-02	1.948E-03	1.903E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.042E-01	1.045E-01	1.045E-01	1.045E-01	5.920E-03	5.784E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.456E-02	2.462E-02	2.463E-02	2.463E-02	1.395E-03	1.363E-05	0.000E+00	0.000E+00
Ra-226	1.092E-09	1.406E-08	1.951E-08	2.007E-08	2.011E-08	1.577E-09	1.438E-09	7.249E-10	3.624E-09
Ra-228	1.030E-15	1.173E-14	1.692E-14	1.728E-14	1.729E-14	1.348E-15	1.245E-15	6.841E-16	3.421E-15
Sr-90	2.208E-02	2.604E+00	2.715E+00	2.729E+00	2.726E+00	1.526E+00	3.154E-01	1.760E-02	2.934E-02
Th-228	3.441E-16	8.537E-16	2.430E-15	3.260E-15	3.263E-15	6.222E-17	3.031E-18	4.578E-16	2.289E-15
Th-229	4.792E-12	1.105E-11	3.455E-11	4.655E-11	4.663E-11	6.585E-13	3.710E-14	6.354E-12	3.180E-11
Th-230	2.174E-08	4.471E-08	1.520E-07	1.894E-07	1.895E-07	2.418E-09	1.326E-10	2.886E-08	1.444E-07
Th-232	4.166E-16	8.715E-16	2.925E-15	3.701E-15	3.703E-15	4.807E-17	2.652E-18	5.528E-16	2.766E-15
U-233	1.180E-07	1.572E-07	7.450E-07	8.135E-07	8.142E-07	2.097E-08	3.848E-08	1.568E-08	9.408E-08
U-234	3.293E-03	4.370E-03	2.076E-02	2.273E-02	2.273E-02	5.846E-04	1.072E-03	4.375E-04	2.625E-03
U-235	1.816E-06	2.413E-06	1.146E-05	1.253E-05	1.253E-05	3.225E-07	5.915E-07	2.413E-07	1.448E-06
U-236	1.294E-05	1.719E-05	8.163E-05	8.928E-05	8.932E-05	2.298E-06	4.214E-06	1.719E-06	1.032E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 16
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 3.000E+02 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	6.140E-11	6.140E-11	7.252E-16	1.116E-09	1.483E-11
Ag-108m	2.479E-03	2.479E-03	2.928E-08	0.000E+00	0.000E+00
Am-241	5.453E-02	5.453E-02	6.440E-07	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	5.257E-19	5.257E-19	6.209E-24	4.151E-19	5.516E-21
Cs-137	4.243E-04	4.243E-04	5.011E-09	3.350E-04	4.452E-06
Eu-152	2.330E-08	2.330E-08	2.752E-13	0.000E+00	0.000E+00
Eu-154	3.413E-12	3.413E-12	4.031E-17	0.000E+00	0.000E+00
Gd-152	4.812E-15	4.812E-15	5.683E-20	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	4.757E-01	4.757E-01	5.618E-06	1.747E+00	2.322E-02
Np-237	6.811E-06	6.811E-06	8.045E-11	0.000E+00	0.000E+00
Pa-231	7.445E-11	7.445E-11	8.793E-16	5.468E-10	7.267E-12
Pb-210	1.811E-09	1.811E-09	2.138E-14	5.995E-09	7.967E-11
Pu-238	9.266E-03	9.266E-03	1.094E-07	0.000E+00	0.000E+00
Pu-239	1.032E-01	1.032E-01	1.219E-06	0.000E+00	0.000E+00
Pu-240	2.400E-02	2.400E-02	2.835E-07	0.000E+00	0.000E+00
Ra-226	2.318E-09	2.318E-09	2.737E-14	1.126E-08	1.497E-10
Ra-228	1.187E-15	1.187E-15	1.402E-20	6.039E-15	8.026E-17
Sr-90	1.624E-04	1.624E-04	1.918E-09	9.474E-04	1.259E-05
Th-228	1.167E-15	1.167E-15	1.379E-20	2.076E-15	2.759E-17
Th-229	3.851E-11	3.851E-11	4.548E-16	6.145E-11	8.167E-13
Th-230	4.395E-08	4.395E-08	5.191E-13	8.276E-08	1.100E-09
Th-232	1.247E-15	1.247E-15	1.472E-20	2.237E-15	2.973E-17
U-233	3.695E-09	3.695E-09	4.364E-14	5.850E-07	7.774E-09
U-234	1.883E-05	1.883E-05	2.224E-10	3.710E-03	4.930E-05
U-235	2.086E-08	2.086E-08	2.464E-13	3.680E-06	4.891E-08
U-236	1.473E-07	1.473E-07	1.740E-12	2.603E-05	3.459E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 0.000E+00 pCi/ml
Concentration of gaseous H-3 in air = 0.000E+00 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 7 Sheet No. 16 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 17
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 3.000E+02 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.116E-09	1.618E-09	7.176E-09	7.824E-09	7.827E-09	1.562E-11	1.279E-11	2.224E-10	1.482E-08
Ag-108m	0.000E+00	3.719E-01	3.719E-01	3.720E-01	3.719E-01	7.959E-02	5.424E-01	0.000E+00	0.000E+00
Am-241	0.000E+00	5.456E-02	5.470E-02	5.472E-02	5.471E-02	1.549E-03	6.055E-05	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	4.151E-19	4.262E-17	4.469E-17	4.525E-17	4.494E-17	6.677E-17	5.600E-18	1.655E-18	1.103E-18
Cs-137	3.350E-04	1.742E-02	1.909E-02	1.930E-02	1.928E-02	4.620E-02	1.061E-02	8.902E-03	4.451E-04
Eu-152	0.000E+00	5.828E-08	5.833E-08	5.851E-08	5.835E-08	3.124E-08	7.430E-10	0.000E+00	0.000E+00
Eu-154	0.000E+00	8.535E-12	8.543E-12	8.581E-12	8.546E-12	4.575E-12	1.088E-13	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.203E-14	1.205E-14	1.205E-14	1.205E-14	6.450E-15	6.137E-17	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.747E+00	2.611E+01	3.483E+01	3.585E+01	3.584E+01	1.381E+01	4.977E+01	2.321E+00	2.321E+00
Np-237	0.000E+00	1.362E-04	1.362E-04	1.362E-04	1.362E-04	1.267E-05	5.449E-08	0.000E+00	0.000E+00
Pa-231	5.470E-10	1.468E-09	4.191E-09	4.578E-09	4.579E-09	1.880E-09	1.952E-12	7.286E-11	8.004E-10
Pb-210	5.995E-09	2.609E-08	5.587E-08	5.978E-08	5.980E-08	4.231E-09	1.547E-09	2.389E-08	7.985E-09
Pu-238	0.000E+00	9.272E-03	9.295E-03	9.301E-03	9.298E-03	5.265E-04	5.144E-06	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.033E-01	1.035E-01	1.035E-01	1.035E-01	5.863E-03	5.729E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.402E-02	2.408E-02	2.409E-02	2.409E-02	1.364E-03	1.333E-05	0.000E+00	0.000E+00
Ra-226	1.126E-08	1.077E-07	1.638E-07	1.702E-07	1.703E-07	1.330E-08	1.233E-08	7.484E-09	3.742E-08
Ra-228	6.038E-15	5.525E-14	8.559E-14	8.798E-14	8.801E-14	6.834E-15	6.398E-15	4.010E-15	2.005E-14
Sr-90	9.474E-04	5.010E-02	5.487E-02	5.539E-02	5.532E-02	3.112E-02	6.550E-03	7.554E-04	1.259E-03
Th-228	2.080E-15	4.607E-15	1.433E-14	1.868E-14	1.869E-14	3.266E-16	1.606E-17	2.768E-15	1.384E-14
Th-229	6.160E-11	1.221E-10	4.271E-10	5.094E-10	5.097E-10	6.234E-12	3.350E-13	8.180E-11	4.091E-10
Th-230	8.285E-08	1.544E-07	5.659E-07	6.432E-07	6.433E-07	7.309E-09	3.828E-10	1.101E-07	5.504E-07
Th-232	2.240E-15	4.252E-15	1.537E-14	1.777E-14	1.777E-14	2.068E-16	1.094E-17	2.976E-15	1.488E-14
U-233	5.850E-07	7.771E-07	3.690E-06	4.037E-06	4.039E-06	1.039E-07	1.905E-07	7.773E-08	4.664E-07
U-234	3.710E-03	4.918E-03	2.339E-02	2.562E-02	2.562E-02	6.587E-04	1.207E-03	4.930E-04	2.958E-03
U-235	3.680E-06	4.883E-06	2.321E-05	2.541E-05	2.541E-05	6.535E-07	1.198E-06	4.890E-07	2.934E-06
U-236	2.603E-05	3.454E-05	1.642E-04	1.797E-04	1.798E-04	4.623E-06	8.475E-06	3.459E-06	2.076E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 7 Sheet No. 17 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 18
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in environmental media
at t = 1.000E+03 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	4.595E-10	4.595E-10	5.426E-15	9.455E-09	1.257E-10
Ag-108m	5.192E-05	5.192E-05	6.132E-10	0.000E+00	0.000E+00
Am-241	1.738E-02	1.738E-02	2.053E-07	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cs-137	3.698E-11	3.698E-11	4.367E-16	1.025E-10	1.362E-12
Eu-152	3.552E-24	3.552E-24	4.195E-29	0.000E+00	0.000E+00
Eu-154	3.790E-36	3.790E-36	4.476E-41	0.000E+00	0.000E+00
Gd-152	4.788E-15	4.788E-15	5.655E-20	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	2.648E-03	2.648E-03	3.128E-08	3.474E-02	4.616E-04
Np-237	1.400E-05	1.400E-05	1.653E-10	0.000E+00	0.000E+00
Pa-231	4.837E-10	4.837E-10	5.713E-15	3.991E-09	5.304E-11
Pb-210	2.172E-08	2.172E-08	2.565E-13	8.909E-08	1.184E-09
Pu-238	3.600E-05	3.600E-05	4.252E-10	0.000E+00	0.000E+00
Pu-239	9.907E-02	9.907E-02	1.170E-06	0.000E+00	0.000E+00
Pu-240	2.183E-02	2.183E-02	2.579E-07	0.000E+00	0.000E+00
Ra-226	2.281E-08	2.281E-08	2.694E-13	1.338E-07	1.778E-09
Ra-228	8.077E-15	8.077E-15	9.540E-20	4.572E-14	6.076E-16
Sr-90	8.003E-12	8.003E-12	9.452E-17	1.449E-10	1.926E-12
Th-228	8.046E-15	8.046E-15	9.503E-20	1.598E-14	2.123E-16
Th-229	7.185E-10	7.185E-10	8.485E-15	1.343E-09	1.785E-11
Th-230	1.025E-07	1.025E-07	1.211E-12	2.127E-07	2.826E-09
Th-232	8.174E-15	8.174E-15	9.654E-20	1.615E-14	2.146E-16
U-233	1.691E-08	1.691E-08	1.997E-13	2.883E-06	3.831E-08
U-234	3.414E-06	3.414E-06	4.032E-11	6.823E-04	9.067E-06
U-235	3.358E-08	3.358E-08	3.966E-13	5.939E-06	7.893E-08
U-236	2.277E-07	2.277E-07	2.689E-12	4.038E-05	5.366E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 0.000E+00 pCi/ml
Concentration of gaseous H-3 in air = 0.000E+00 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 7 Sheet No. 18 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 7

1RESRAD, Version 6.3 T« Limit = 180 days 07/11/2007 15:00 Page 19
Concent : 118-F-1 Process Trench Shallow Zone RESRAD Calculation
File : 118-F-1_Process_Trench_SZ.RAD

Concentration of radionuclides in foodstuff media
at t = 1.000E+03 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	9.454E-09	1.356E-08	6.064E-08	6.617E-08	6.617E-08	1.269E-10	1.076E-10	1.884E-09	1.256E-07
Ag-108m	0.000E+00	7.788E-03	7.788E-03	7.790E-03	7.788E-03	1.667E-03	1.136E-02	0.000E+00	0.000E+00
Am-241	0.000E+00	1.739E-02	1.744E-02	1.744E-02	1.744E-02	4.939E-04	1.930E-05	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Cs-137	1.025E-10	1.615E-09	2.126E-09	2.189E-09	2.186E-09	5.168E-09	1.241E-09	2.723E-09	1.362E-10
Eu-152	0.000E+00	8.882E-24	8.891E-24	8.918E-24	8.893E-24	4.761E-24	1.133E-25	0.000E+00	0.000E+00
Eu-154	0.000E+00	9.477E-36	9.487E-36	9.529E-36	9.490E-36	5.080E-36	1.208E-37	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.197E-14	1.199E-14	1.199E-14	1.199E-14	6.418E-15	6.107E-17	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	3.474E-02	1.787E-01	3.520E-01	3.723E-01	3.722E-01	1.418E-01	5.470E-01	4.616E-02	4.616E-02
Np-237	0.000E+00	2.800E-04	2.800E-04	2.800E-04	2.800E-04	2.604E-05	1.120E-07	0.000E+00	0.000E+00
Pa-231	3.991E-09	1.010E-08	2.997E-08	3.246E-08	3.246E-08	1.324E-08	1.344E-11	5.306E-10	5.836E-09
Pb-210	8.909E-08	3.354E-07	7.784E-07	8.351E-07	8.352E-07	5.783E-08	2.133E-08	3.550E-07	1.186E-07
Pu-238	0.000E+00	3.602E-05	3.611E-05	3.614E-05	3.612E-05	2.046E-06	1.999E-08	0.000E+00	0.000E+00
Pu-239	0.000E+00	9.913E-02	9.937E-02	9.940E-02	9.940E-02	5.629E-03	5.500E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.185E-02	2.190E-02	2.191E-02	2.191E-02	1.241E-03	1.212E-05	0.000E+00	0.000E+00
Ra-226	1.338E-07	1.090E-06	1.758E-06	1.835E-06	1.835E-06	1.429E-07	1.338E-07	8.890E-08	4.445E-07
Ra-228	4.571E-14	3.822E-13	6.117E-13	6.308E-13	6.308E-13	4.890E-14	4.603E-14	3.036E-14	1.518E-13
Sr-90	1.449E-10	2.610E-09	3.340E-09	3.413E-09	3.409E-09	1.944E-09	4.294E-10	1.156E-10	1.926E-10
Th-228	1.600E-14	3.393E-14	1.093E-13	1.409E-13	1.409E-13	2.376E-15	1.172E-16	2.129E-14	1.065E-13
Th-229	1.344E-09	2.496E-09	9.180E-09	1.021E-08	1.021E-08	1.147E-10	5.922E-12	1.786E-09	8.928E-09
Th-230	2.127E-07	3.820E-07	1.441E-06	1.574E-06	1.574E-06	1.695E-08	8.648E-10	2.827E-07	1.413E-06
Th-232	1.615E-14	2.948E-14	1.099E-13	1.212E-13	1.212E-13	1.333E-15	6.847E-17	2.147E-14	1.073E-13
U-233	2.883E-06	3.827E-06	1.818E-05	1.991E-05	1.991E-05	5.123E-07	9.390E-07	3.831E-07	2.299E-06
U-234	6.823E-04	9.044E-04	4.302E-03	4.714E-03	4.713E-03	1.212E-04	2.221E-04	9.068E-05	5.441E-04
U-235	5.939E-06	7.882E-06	3.745E-05	4.102E-05	4.102E-05	1.055E-06	1.934E-06	7.893E-07	4.736E-06
U-236	4.038E-05	5.358E-05	2.546E-04	2.789E-04	2.789E-04	7.174E-06	1.315E-05	5.366E-06	3.220E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 7 Sheet No. 19 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 1
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

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Attachment 8 Sheet No. 1 of 30
Originator: S. W. Clark Date 7/11/07
Chk'd By M. W. Perrott Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 2
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Dose Conversion Factor (and Related) Parameter Summary
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
B-1	Dose conversion factors for inhalation, mrem/pCi:			
B-1	Ac-227+D	6.724E+00	6.700E+00	DCF2(1)
B-1	Ag-108m+D	2.830E-04	2.830E-04	DCF2(2)
B-1	Am-241	4.440E-01	4.440E-01	DCF2(3)
B-1	C-14	2.090E-06	2.090E-06	DCF2(4)
B-1	Co-60	2.190E-04	2.190E-04	DCF2(5)
B-1	Eu-152	2.210E-04	2.210E-04	DCF2(6)
B-1	Eu-154	2.860E-04	2.860E-04	DCF2(8)
B-1	Gd-152	2.430E-01	2.430E-01	DCF2(9)
B-1	H-3	6.400E-08	6.400E-08	DCF2(10)
B-1	Ni-63	6.290E-06	6.290E-06	DCF2(11)
B-1	Np-237+D	5.400E-01	5.400E-01	DCF2(12)
B-1	Pa-231	1.280E+00	1.280E+00	DCF2(13)
B-1	Pb-210+D	2.320E-02	1.360E-02	DCF2(14)
B-1	Pu-238	3.920E-01	3.920E-01	DCF2(15)
B-1	Pu-239	4.290E-01	4.290E-01	DCF2(17)
B-1	Pu-240	4.290E-01	4.290E-01	DCF2(18)
B-1	Ra-226+D	8.594E-03	8.580E-03	DCF2(20)
B-1	Ra-228+D	5.078E-03	4.770E-03	DCF2(21)
B-1	Th-228+D	3.454E-01	3.420E-01	DCF2(22)
B-1	Th-229+D	2.169E+00	2.150E+00	DCF2(23)
B-1	Th-230	3.260E-01	3.260E-01	DCF2(24)
B-1	Th-232	1.640E+00	1.640E+00	DCF2(25)
B-1	U-233	1.350E-01	1.350E-01	DCF2(26)
B-1	U-234	1.320E-01	1.320E-01	DCF2(27)
B-1	U-235+D	1.230E-01	1.230E-01	DCF2(28)
B-1	U-236	1.250E-01	1.250E-01	DCF2(29)
D-1	Dose conversion factors for ingestion, mrem/pCi:			
D-1	Ac-227+D	1.480E-02	1.410E-02	DCF3(1)
D-1	Ag-108m+D	7.620E-06	7.620E-06	DCF3(2)
D-1	Am-241	3.640E-03	3.640E-03	DCF3(3)
D-1	C-14	2.090E-06	2.090E-06	DCF3(4)
D-1	Co-60	2.690E-05	2.690E-05	DCF3(5)
D-1	Eu-152	6.480E-06	6.480E-06	DCF3(6)
D-1	Eu-154	9.550E-06	9.550E-06	DCF3(8)
D-1	Gd-152	1.610E-04	1.610E-04	DCF3(9)
D-1	H-3	6.400E-08	6.400E-08	DCF3(10)
D-1	Ni-63	5.770E-07	5.770E-07	DCF3(11)
D-1	Np-237+D	4.444E-03	4.440E-03	DCF3(12)
D-1	Pa-231	1.060E-02	1.060E-02	DCF3(13)
D-1	Pb-210+D	7.276E-03	5.370E-03	DCF3(14)
D-1	Pu-238	3.200E-03	3.200E-03	DCF3(15)
D-1	Pu-239	3.540E-03	3.540E-03	DCF3(17)
D-1	Pu-240	3.540E-03	3.540E-03	DCF3(18)
D-1	Ra-226+D	1.321E-03	1.320E-03	DCF3(20)
D-1	Ra-228+D	1.442E-03	1.440E-03	DCF3(21)
D-1	Th-228+D	8.086E-04	3.960E-04	DCF3(22)
D-1	Th-229+D	4.027E-03	3.530E-03	DCF3(23)

Attachment 8 Sheet No. 2 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 3
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-1	Th-230	5.480E-04	5.480E-04	DCF3(24)
D-1	Th-232	2.730E-03	2.730E-03	DCF3(25)
D-1	U-233	2.890E-04	2.890E-04	DCF3(26)
D-1	U-234	2.830E-04	2.830E-04	DCF3(27)
D-1	U-235+D	2.673E-04	2.660E-04	DCF3(28)
D-1	U-236	2.690E-04	2.690E-04	DCF3(29)
D-34	Food transfer factors:			
D-34	Ac-227+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(1,1)
D-34	Ac-227+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,2)
D-34	Ac-227+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(1,3)
D-34				
D-34	Ag-108m+D , plant/soil concentration ratio, dimensionless	1.500E-01	1.500E-01	RTF(2,1)
D-34	Ag-108m+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.000E-03	3.000E-03	RTF(2,2)
D-34	Ag-108m+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.500E-02	2.500E-02	RTF(2,3)
D-34				
D-34	Am-241 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(3,1)
D-34	Am-241 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-05	5.000E-05	RTF(3,2)
D-34	Am-241 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-06	2.000E-06	RTF(3,3)
D-34				
D-34	C-14 , plant/soil concentration ratio, dimensionless	5.500E+00	5.500E+00	RTF(4,1)
D-34	C-14 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.100E-02	3.100E-02	RTF(4,2)
D-34	C-14 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.200E-02	1.200E-02	RTF(4,3)
D-34				
D-34	Co-60 , plant/soil concentration ratio, dimensionless	8.000E-02	8.000E-02	RTF(5,1)
D-34	Co-60 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-02	2.000E-02	RTF(5,2)
D-34	Co-60 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-03	2.000E-03	RTF(5,3)
D-34				
D-34	Eu-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(6,1)
D-34	Eu-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(6,2)
D-34	Eu-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-05	5.000E-05	RTF(6,3)
D-34				
D-34	Eu-154 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(8,1)
D-34	Eu-154 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(8,2)
D-34	Eu-154 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-05	5.000E-05	RTF(8,3)
D-34				
D-34	Gd-152 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(9,1)
D-34	Gd-152 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	2.000E-03	2.000E-03	RTF(9,2)
D-34	Gd-152 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-05	2.000E-05	RTF(9,3)
D-34				
D-34	H-3 , plant/soil concentration ratio, dimensionless	4.800E+00	4.800E+00	RTF(10,1)
D-34	H-3 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.200E-02	1.200E-02	RTF(10,2)
D-34	H-3 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-02	1.000E-02	RTF(10,3)
D-34				
D-34	Ni-63 , plant/soil concentration ratio, dimensionless	5.000E-02	5.000E-02	RTF(11,1)
D-34	Ni-63 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(11,2)
D-34	Ni-63 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	2.000E-02	2.000E-02	RTF(11,3)
D-34				

Attachment 8 Sheet No. 3 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 4
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	Np-237+D , plant/soil concentration ratio, dimensionless	2.000E-02	2.000E-02	RTF(12,1)
D-34	Np-237+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(12,2)
D-34	Np-237+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(12,3)
D-34				
D-34	Pa-231 , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(13,1)
D-34	Pa-231 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	5.000E-03	5.000E-03	RTF(13,2)
D-34	Pa-231 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(13,3)
D-34				
D-34	Pb-210+D , plant/soil concentration ratio, dimensionless	1.000E-02	1.000E-02	RTF(14,1)
D-34	Pb-210+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	8.000E-04	8.000E-04	RTF(14,2)
D-34	Pb-210+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	3.000E-04	3.000E-04	RTF(14,3)
D-34				
D-34	Pu-238 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(15,1)
D-34	Pu-238 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(15,2)
D-34	Pu-238 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(15,3)
D-34				
D-34	Pu-239 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(17,1)
D-34	Pu-239 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(17,2)
D-34	Pu-239 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(17,3)
D-34				
D-34	Pu-240 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(18,1)
D-34	Pu-240 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(18,2)
D-34	Pu-240 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-06	1.000E-06	RTF(18,3)
D-34				
D-34	Ra-226+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(20,1)
D-34	Ra-226+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(20,2)
D-34	Ra-226+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(20,3)
D-34				
D-34	Ra-228+D , plant/soil concentration ratio, dimensionless	4.000E-02	4.000E-02	RTF(21,1)
D-34	Ra-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,2)
D-34	Ra-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	1.000E-03	1.000E-03	RTF(21,3)
D-34				
D-34	Th-228+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(22,1)
D-34	Th-228+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(22,2)
D-34	Th-228+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(22,3)
D-34				
D-34	Th-229+D , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(23,1)
D-34	Th-229+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(23,2)
D-34	Th-229+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(23,3)
D-34				
D-34	Th-230 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(24,1)
D-34	Th-230 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(24,2)
D-34	Th-230 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(24,3)
D-34				
D-34	Th-232 , plant/soil concentration ratio, dimensionless	1.000E-03	1.000E-03	RTF(25,1)
D-34	Th-232 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	1.000E-04	1.000E-04	RTF(25,2)
D-34	Th-232 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	5.000E-06	5.000E-06	RTF(25,3)
D-34				

Attachment 8 Sheet No. 4 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 5
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-34	U-233 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(26,1)
D-34	U-233 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(26,2)
D-34	U-233 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(26,3)
D-34				
D-34	U-234 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(27,1)
D-34	U-234 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(27,2)
D-34	U-234 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(27,3)
D-34				
D-34	U-235+D , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(28,1)
D-34	U-235+D , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(28,2)
D-34	U-235+D , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(28,3)
D-34				
D-34	U-236 , plant/soil concentration ratio, dimensionless	2.500E-03	2.500E-03	RTF(29,1)
D-34	U-236 , beef/livestock-intake ratio, (pCi/kg)/(pCi/d)	3.400E-04	3.400E-04	RTF(29,2)
D-34	U-236 , milk/livestock-intake ratio, (pCi/L)/(pCi/d)	6.000E-04	6.000E-04	RTF(29,3)
D-5	Bioaccumulation factors, fresh water, L/kg:			
D-5	Ac-227+D , fish	1.500E+01	1.500E+01	BIOFAC(1,1)
D-5	Ac-227+D , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(1,2)
D-5				
D-5	Ag-108m+D , fish	5.000E+00	5.000E+00	BIOFAC(2,1)
D-5	Ag-108m+D , crustacea and mollusks	7.700E+02	7.700E+02	BIOFAC(2,2)
D-5				
D-5	Am-241 , fish	3.000E+01	3.000E+01	BIOFAC(3,1)
D-5	Am-241 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(3,2)
D-5				
D-5	C-14 , fish	5.000E+04	5.000E+04	BIOFAC(4,1)
D-5	C-14 , crustacea and mollusks	9.100E+03	9.100E+03	BIOFAC(4,2)
D-5				
D-5	Co-60 , fish	3.000E+02	3.000E+02	BIOFAC(5,1)
D-5	Co-60 , crustacea and mollusks	2.000E+02	2.000E+02	BIOFAC(5,2)
D-5				
D-5	Eu-152 , fish	5.000E+01	5.000E+01	BIOFAC(6,1)
D-5	Eu-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(6,2)
D-5				
D-5	Eu-154 , fish	5.000E+01	5.000E+01	BIOFAC(8,1)
D-5	Eu-154 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(8,2)
D-5				
D-5	Gd-152 , fish	2.500E+01	2.500E+01	BIOFAC(9,1)
D-5	Gd-152 , crustacea and mollusks	1.000E+03	1.000E+03	BIOFAC(9,2)
D-5				
D-5	H-3 , fish	1.000E+00	1.000E+00	BIOFAC(10,1)
D-5	H-3 , crustacea and mollusks	1.000E+00	1.000E+00	BIOFAC(10,2)
D-5				
D-5	Ni-63 , fish	1.000E+02	1.000E+02	BIOFAC(11,1)
D-5	Ni-63 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(11,2)
D-5				
D-5	Np-237+D , fish	3.000E+01	3.000E+01	BIOFAC(12,1)
D-5	Np-237+D , crustacea and mollusks	4.000E+02	4.000E+02	BIOFAC(12,2)
D-5				

Attachment 8 Sheet No. 5 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 6
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Dose Conversion Factor (and Related) Parameter Summary (continued)
File: HEAST 2001 MORBIDITY

Menu	Parameter	Current Value	Base Case*	Parameter Name
D-5	Pa-231 , fish	1.000E+01	1.000E+01	BIOFAC(13,1)
D-5	Pa-231 , crustacea and mollusks	1.100E+02	1.100E+02	BIOFAC(13,2)
D-5				
D-5	Pb-210+D , fish	3.000E+02	3.000E+02	BIOFAC(14,1)
D-5	Pb-210+D , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(14,2)
D-5				
D-5	Pu-238 , fish	3.000E+01	3.000E+01	BIOFAC(15,1)
D-5	Pu-238 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(15,2)
D-5				
D-5	Pu-239 , fish	3.000E+01	3.000E+01	BIOFAC(17,1)
D-5	Pu-239 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(17,2)
D-5				
D-5	Pu-240 , fish	3.000E+01	3.000E+01	BIOFAC(18,1)
D-5	Pu-240 , crustacea and mollusks	1.000E+02	1.000E+02	BIOFAC(18,2)
D-5				
D-5	Ra-226+D , fish	5.000E+01	5.000E+01	BIOFAC(20,1)
D-5	Ra-226+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(20,2)
D-5				
D-5	Ra-228+D , fish	5.000E+01	5.000E+01	BIOFAC(21,1)
D-5	Ra-228+D , crustacea and mollusks	2.500E+02	2.500E+02	BIOFAC(21,2)
D-5				
D-5	Th-228+D , fish	1.000E+02	1.000E+02	BIOFAC(22,1)
D-5	Th-228+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(22,2)
D-5				
D-5	Th-229+D , fish	1.000E+02	1.000E+02	BIOFAC(23,1)
D-5	Th-229+D , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(23,2)
D-5				
D-5	Th-230 , fish	1.000E+02	1.000E+02	BIOFAC(24,1)
D-5	Th-230 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(24,2)
D-5				
D-5	Th-232 , fish	1.000E+02	1.000E+02	BIOFAC(25,1)
D-5	Th-232 , crustacea and mollusks	5.000E+02	5.000E+02	BIOFAC(25,2)
D-5				
D-5	U-233 , fish	1.000E+01	1.000E+01	BIOFAC(26,1)
D-5	U-233 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(26,2)
D-5				
D-5	U-234 , fish	1.000E+01	1.000E+01	BIOFAC(27,1)
D-5	U-234 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(27,2)
D-5				
D-5	U-235+D , fish	1.000E+01	1.000E+01	BIOFAC(28,1)
D-5	U-235+D , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(28,2)
D-5				
D-5	U-236 , fish	1.000E+01	1.000E+01	BIOFAC(29,1)
D-5	U-236 , crustacea and mollusks	6.000E+01	6.000E+01	BIOFAC(29,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Attachment 8 Sheet No. 6 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 7
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Site-Specific Parameter Summary

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R011	Area of contaminated zone (m**2)	1.087E+04	1.000E+04	---	AREA
R011	Thickness of contaminated zone (m)	8.500E+00	2.000E+00	---	THICK0
R011	Length parallel to aquifer flow (m)	2.120E+02	1.000E+02	---	LCZPAQ
R011	Basic radiation dose limit (mrem/yr)	1.500E+01	3.000E+01	---	BRDL
R011	Time since placement of material (yr)	0.000E+00	0.000E+00	---	TI
R011	Times for calculations (yr)	1.000E+00	1.000E+00	---	T(2)
R011	Times for calculations (yr)	3.000E+00	3.000E+00	---	T(3)
R011	Times for calculations (yr)	7.000E+00	1.000E+01	---	T(4)
R011	Times for calculations (yr)	1.100E+01	3.000E+01	---	T(5)
R011	Times for calculations (yr)	4.300E+01	1.000E+02	---	T(6)
R011	Times for calculations (yr)	1.350E+02	3.000E+02	---	T(7)
R011	Times for calculations (yr)	3.000E+02	1.000E+03	---	T(8)
R011	Times for calculations (yr)	1.000E+03	0.000E+00	---	T(9)
R011	Times for calculations (yr)	not used	0.000E+00	---	T(10)
R012	Initial principal radionuclide (pCi/g): Ag-108m	1.100E-02	0.000E+00	---	S1(2)
R012	Initial principal radionuclide (pCi/g): Am-241	2.300E-01	0.000E+00	---	S1(3)
R012	Initial principal radionuclide (pCi/g): C-14	1.900E+00	0.000E+00	---	S1(4)
R012	Initial principal radionuclide (pCi/g): Co-60	7.500E-03	0.000E+00	---	S1(5)
R012	Initial principal radionuclide (pCi/g): Eu-152	4.100E-02	0.000E+00	---	S1(6)
R012	Initial principal radionuclide (pCi/g): Eu-154	1.800E-02	0.000E+00	---	S1(8)
R012	Initial principal radionuclide (pCi/g): H-3	2.500E+00	0.000E+00	---	S1(10)
R012	Initial principal radionuclide (pCi/g): Ni-63	2.500E+00	0.000E+00	---	S1(11)
R012	Initial principal radionuclide (pCi/g): Pu-238	1.600E-01	0.000E+00	---	S1(15)
R012	Initial principal radionuclide (pCi/g): Pu-239	1.050E-01	0.000E+00	---	S1(17)
R012	Initial principal radionuclide (pCi/g): Pu-240	2.500E-02	0.000E+00	---	S1(18)
R012	Concentration in groundwater (pCi/L): Ag-108m	not used	0.000E+00	---	W1(2)
R012	Concentration in groundwater (pCi/L): Am-241	not used	0.000E+00	---	W1(3)
R012	Concentration in groundwater (pCi/L): C-14	not used	0.000E+00	---	W1(4)
R012	Concentration in groundwater (pCi/L): Co-60	not used	0.000E+00	---	W1(5)
R012	Concentration in groundwater (pCi/L): Eu-152	not used	0.000E+00	---	W1(6)
R012	Concentration in groundwater (pCi/L): Eu-154	not used	0.000E+00	---	W1(8)
R012	Concentration in groundwater (pCi/L): H-3	not used	0.000E+00	---	W1(10)
R012	Concentration in groundwater (pCi/L): Ni-63	not used	0.000E+00	---	W1(11)
R012	Concentration in groundwater (pCi/L): Pu-238	not used	0.000E+00	---	W1(15)
R012	Concentration in groundwater (pCi/L): Pu-239	not used	0.000E+00	---	W1(17)
R012	Concentration in groundwater (pCi/L): Pu-240	not used	0.000E+00	---	W1(18)
R013	Cover depth (m)	0.000E+00	0.000E+00	---	COVER0
R013	Density of cover material (g/cm**3)	not used	1.500E+00	---	DENSCV
R013	Cover depth erosion rate (m/yr)	not used	1.000E-03	---	VCV
R013	Density of contaminated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSCZ
R013	Contaminated zone erosion rate (m/yr)	1.000E-03	1.000E-03	---	VCZ
R013	Contaminated zone total porosity	4.000E-01	4.000E-01	---	TPCZ
R013	Contaminated zone field capacity	1.500E-01	2.000E-01	---	FCCZ
R013	Contaminated zone hydraulic conductivity (m/yr)	2.500E+02	1.000E+01	---	HCCZ
R013	Contaminated zone b parameter	4.050E+00	5.300E+00	---	BCZ
R013	Average annual wind speed (m/sec)	3.400E+00	2.000E+00	---	WIND
R013	Humidity in air (g/m**3)	8.000E+00	8.000E+00	---	HUMID
R013	Evapotranspiration coefficient	9.100E-01	5.000E-01	---	EVAPTR

Attachment 8 Sheet No. 7 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 8
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R013	Precipitation (m/yr)	1.600E-01	1.000E+00	---	PRECIP
R013	Irrigation (m/yr)	7.600E-01	2.000E-01	---	RI
R013	Irrigation mode	overhead	overhead	---	IDITCH
R013	Runoff coefficient	2.000E-01	2.000E-01	---	RUNOFF
R013	Watershed area for nearby stream or pond (m**2)	1.000E+06	1.000E+06	---	WAREA
R013	Accuracy for water/soil computations	1.000E-03	1.000E-03	---	EPS
R014	Density of saturated zone (g/cm**3)	1.600E+00	1.500E+00	---	DENSAQ
R014	Saturated zone total porosity	4.000E-01	4.000E-01	---	TPSZ
R014	Saturated zone effective porosity	2.500E-01	2.000E-01	---	EPSZ
R014	Saturated zone field capacity	1.500E-01	2.000E-01	---	FCSZ
R014	Saturated zone hydraulic conductivity (m/yr)	5.530E+03	1.000E+02	---	HCSZ
R014	Saturated zone hydraulic gradient	1.250E-03	2.000E-02	---	HGWT
R014	Saturated zone b parameter	4.050E+00	5.300E+00	---	BSZ
R014	Water table drop rate (m/yr)	1.000E-03	1.000E-03	---	VWT
R014	Well pump intake depth (m below water table)	4.600E+00	1.000E+01	---	DWIBWT
R014	Model: Nondispersion (ND) or Mass-Balance (MB)	ND	ND	---	MODEL
R014	Well pumping rate (m**3/yr)	2.500E+02	2.500E+02	---	UW
R015	Number of unsaturated zone strata	0	1	---	NS
R016	Distribution coefficients for Ag-108m				
R016	Contaminated zone (cm**3/g)	9.000E+01	0.000E+00	---	DCNUCC(2)
R016	Saturated zone (cm**3/g)	9.000E+01	0.000E+00	---	DCNUCS(2)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	6.521E-05	ALEACH(2)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(2)
R016	Distribution coefficients for Am-241				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+01	---	DCNUCC(3)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+01	---	DCNUCS(3)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(3)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(3)
R016	Distribution coefficients for C-14				
R016	Contaminated zone (cm**3/g)	2.000E+02	0.000E+00	---	DCNUCC(4)
R016	Saturated zone (cm**3/g)	2.000E+02	0.000E+00	---	DCNUCS(4)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(4)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(4)
R016	Distribution coefficients for Co-60				
R016	Contaminated zone (cm**3/g)	5.000E+01	1.000E+03	---	DCNUCC(5)
R016	Saturated zone (cm**3/g)	5.000E+01	1.000E+03	---	DCNUCS(5)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(5)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(5)
R016	Distribution coefficients for Eu-152				
R016	Contaminated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCC(6)
R016	Saturated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCS(6)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(6)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(6)

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Chk'd By M. W. Perrott Date
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Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for Eu-154				
R016	Contaminated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCC(8)
R016	Saturated zone (cm**3/g)	2.000E+02	-1.000E+00	---	DCNUCS(8)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(8)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(8)
R016	Distribution coefficients for H-3				
R016	Contaminated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCC(10)
R016	Saturated zone (cm**3/g)	0.000E+00	0.000E+00	---	DCNUCS(10)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	4.854E-02	ALEACH(10)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(10)
R016	Distribution coefficients for Ni-63				
R016	Contaminated zone (cm**3/g)	3.000E+01	1.000E+03	---	DCNUCC(11)
R016	Saturated zone (cm**3/g)	3.000E+01	1.000E+03	---	DCNUCS(11)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.951E-04	ALEACH(11)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(11)
R016	Distribution coefficients for Pu-238				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(15)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(15)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(15)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(15)
R016	Distribution coefficients for Pu-239				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(17)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(17)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(17)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(17)
R016	Distribution coefficients for Pu-240				
R016	Contaminated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCC(18)
R016	Saturated zone (cm**3/g)	2.000E+02	2.000E+03	---	DCNUCS(18)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(18)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(18)
R016	Distribution coefficients for daughter Ac-227				
R016	Contaminated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCC(1)
R016	Saturated zone (cm**3/g)	2.000E+01	2.000E+01	---	DCNUCS(1)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.921E-04	ALEACH(1)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(1)
R016	Distribution coefficients for daughter Gd-152				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCC(9)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	8.249E+02	DCNUCS(9)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	7.123E-06	ALEACH(9)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(9)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Np-237				
R016	Contaminated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCC(12)
R016	Saturated zone (cm**3/g)	-1.000E+00	-1.000E+00	2.574E+02	DCNUCS(12)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.282E-05	ALEACH(12)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(12)
R016	Distribution coefficients for daughter Pa-231				
R016	Contaminated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCC(13)
R016	Saturated zone (cm**3/g)	5.000E+01	5.000E+01	---	DCNUCS(13)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	1.172E-04	ALEACH(13)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(13)
R016	Distribution coefficients for daughter Pb-210				
R016	Contaminated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCC(14)
R016	Saturated zone (cm**3/g)	1.000E+02	1.000E+02	---	DCNUCS(14)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	5.869E-05	ALEACH(14)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(14)
R016	Distribution coefficients for daughter Ra-226				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(20)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(20)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.380E-05	ALEACH(20)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(20)
R016	Distribution coefficients for daughter Ra-228				
R016	Contaminated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCC(21)
R016	Saturated zone (cm**3/g)	7.000E+01	7.000E+01	---	DCNUCS(21)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	8.380E-05	ALEACH(21)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(21)
R016	Distribution coefficients for daughter Th-228				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(22)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(22)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(22)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(22)
R016	Distribution coefficients for daughter Th-229				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(23)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(23)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(23)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(23)
R016	Distribution coefficients for daughter Th-230				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(24)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(24)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(24)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(24)

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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R016	Distribution coefficients for daughter Th-232				
R016	Contaminated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCC(25)
R016	Saturated zone (cm**3/g)	2.000E+02	6.000E+04	---	DCNUCS(25)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.936E-05	ALEACH(25)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(25)
R016	Distribution coefficients for daughter U-233				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(26)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(26)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(26)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(26)
R016	Distribution coefficients for daughter U-234				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(27)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(27)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(27)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(27)
R016	Distribution coefficients for daughter U-235				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(28)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(28)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(28)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(28)
R016	Distribution coefficients for daughter U-236				
R016	Contaminated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCC(29)
R016	Saturated zone (cm**3/g)	2.000E+00	5.000E+01	---	DCNUCS(29)
R016	Leach rate (/yr)	0.000E+00	0.000E+00	2.771E-03	ALEACH(29)
R016	Solubility constant	0.000E+00	0.000E+00	not used	SOLUBK(29)
R017	Inhalation rate (m**3/yr)	7.300E+03	8.400E+03	---	INHALR
R017	Mass loading for inhalation (g/m**3)	1.000E-04	1.000E-04	---	MLINH
R017	Exposure duration	3.000E+01	3.000E+01	---	ED
R017	Shielding factor, inhalation	4.000E-01	4.000E-01	---	SHF3
R017	Shielding factor, external gamma	8.000E-01	7.000E-01	---	SHF1
R017	Fraction of time spent indoors	6.000E-01	5.000E-01	---	FIND
R017	Fraction of time spent outdoors (on site)	2.000E-01	2.500E-01	---	FOTD
R017	Shape factor flag, external gamma	1.000E+00	1.000E+00	>0 shows circular AREA.	FS

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Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R017	Radii of shape factor array (used if FS = -1):				
R017	Outer annular radius (m), ring 1:	not used	5.000E+01	---	RAD_SHAPE(1)
R017	Outer annular radius (m), ring 2:	not used	7.071E+01	---	RAD_SHAPE(2)
R017	Outer annular radius (m), ring 3:	not used	0.000E+00	---	RAD_SHAPE(3)
R017	Outer annular radius (m), ring 4:	not used	0.000E+00	---	RAD_SHAPE(4)
R017	Outer annular radius (m), ring 5:	not used	0.000E+00	---	RAD_SHAPE(5)
R017	Outer annular radius (m), ring 6:	not used	0.000E+00	---	RAD_SHAPE(6)
R017	Outer annular radius (m), ring 7:	not used	0.000E+00	---	RAD_SHAPE(7)
R017	Outer annular radius (m), ring 8:	not used	0.000E+00	---	RAD_SHAPE(8)
R017	Outer annular radius (m), ring 9:	not used	0.000E+00	---	RAD_SHAPE(9)
R017	Outer annular radius (m), ring 10:	not used	0.000E+00	---	RAD_SHAPE(10)
R017	Outer annular radius (m), ring 11:	not used	0.000E+00	---	RAD_SHAPE(11)
R017	Outer annular radius (m), ring 12:	not used	0.000E+00	---	RAD_SHAPE(12)
R017	Fractions of annular areas within AREA:				
R017	Ring 1	not used	1.000E+00	---	FRACA(1)
R017	Ring 2	not used	2.732E-01	---	FRACA(2)
R017	Ring 3	not used	0.000E+00	---	FRACA(3)
R017	Ring 4	not used	0.000E+00	---	FRACA(4)
R017	Ring 5	not used	0.000E+00	---	FRACA(5)
R017	Ring 6	not used	0.000E+00	---	FRACA(6)
R017	Ring 7	not used	0.000E+00	---	FRACA(7)
R017	Ring 8	not used	0.000E+00	---	FRACA(8)
R017	Ring 9	not used	0.000E+00	---	FRACA(9)
R017	Ring 10	not used	0.000E+00	---	FRACA(10)
R017	Ring 11	not used	0.000E+00	---	FRACA(11)
R017	Ring 12	not used	0.000E+00	---	FRACA(12)
R018	Fruits, vegetables and grain consumption (kg/yr)	1.100E+02	1.600E+02	---	DIET(1)
R018	Leafy vegetable consumption (kg/yr)	2.700E+00	1.400E+01	---	DIET(2)
R018	Milk consumption (L/yr)	1.000E+02	9.200E+01	---	DIET(3)
R018	Meat and poultry consumption (kg/yr)	3.600E+01	6.300E+01	---	DIET(4)
R018	Fish consumption (kg/yr)	1.970E+01	5.400E+00	---	DIET(5)
R018	Other seafood consumption (kg/yr)	9.000E-01	9.000E-01	---	DIET(6)
R018	Soil ingestion rate (g/yr)	7.300E+01	3.650E+01	---	SOIL
R018	Drinking water intake (L/yr)	7.300E+02	5.100E+02	---	DWI
R018	Contamination fraction of drinking water	1.000E+00	1.000E+00	---	FDW
R018	Contamination fraction of household water	not used	1.000E+00	---	FHHW
R018	Contamination fraction of livestock water	1.000E+00	1.000E+00	---	FLW
R018	Contamination fraction of irrigation water	1.000E+00	1.000E+00	---	FIRW
R018	Contamination fraction of aquatic food	5.000E-01	5.000E-01	---	FR9
R018	Contamination fraction of plant food	-1	-1	0.500E+00	FPLANT
R018	Contamination fraction of meat	-1	-1	0.544E+00	FMEAT
R018	Contamination fraction of milk	-1	-1	0.544E+00	FMILK
R019	Livestock fodder intake for meat (kg/day)	6.800E+01	6.800E+01	---	LFI5
R019	Livestock fodder intake for milk (kg/day)	5.500E+01	5.500E+01	---	LFI6
R019	Livestock water intake for meat (L/day)	5.000E+01	5.000E+01	---	LWI5
R019	Livestock water intake for milk (L/day)	1.600E+02	1.600E+02	---	LWI6
R019	Livestock soil intake (kg/day)	5.000E-01	5.000E-01	---	LSI

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Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R019	Mass loading for foliar deposition (g/m**3)	1.000E-04	1.000E-04	---	MLFD
R019	Depth of soil mixing layer (m)	1.500E-01	1.500E-01	---	DM
R019	Depth of roots (m)	9.000E-01	9.000E-01	---	DROOT
R019	Drinking water fraction from ground water	1.000E+00	1.000E+00	---	FGWDW
R019	Household water fraction from ground water	not used	1.000E+00	---	FGWHH
R019	Livestock water fraction from ground water	1.000E+00	1.000E+00	---	FGWLW
R019	Irrigation fraction from ground water	1.000E+00	1.000E+00	---	FGWIR
R19B	Wet weight crop yield for Non-Leafy (kg/m**2)	7.000E-01	7.000E-01	---	YV(1)
R19B	Wet weight crop yield for Leafy (kg/m**2)	1.500E+00	1.500E+00	---	YV(2)
R19B	Wet weight crop yield for Fodder (kg/m**2)	1.100E+00	1.100E+00	---	YV(3)
R19B	Growing Season for Non-Leafy (years)	1.700E-01	1.700E-01	---	TE(1)
R19B	Growing Season for Leafy (years)	2.500E-01	2.500E-01	---	TE(2)
R19B	Growing Season for Fodder (years)	8.000E-02	8.000E-02	---	TE(3)
R19B	Translocation Factor for Non-Leafy	1.000E-01	1.000E-01	---	TIV(1)
R19B	Translocation Factor for Leafy	1.000E+00	1.000E+00	---	TIV(2)
R19B	Translocation Factor for Fodder	1.000E+00	1.000E+00	---	TIV(3)
R19B	Dry Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RDRY(1)
R19B	Dry Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RDRY(2)
R19B	Dry Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RDRY(3)
R19B	Wet Foliar Interception Fraction for Non-Leafy	2.500E-01	2.500E-01	---	RWET(1)
R19B	Wet Foliar Interception Fraction for Leafy	2.500E-01	2.500E-01	---	RWET(2)
R19B	Wet Foliar Interception Fraction for Fodder	2.500E-01	2.500E-01	---	RWET(3)
R19B	Weathering Removal Constant for Vegetation	2.000E+01	2.000E+01	---	WLAM
C14	C-12 concentration in water (g/cm**3)	2.000E-05	2.000E-05	---	C12WTR
C14	C-12 concentration in contaminated soil (g/g)	3.000E-02	3.000E-02	---	C12CZ
C14	Fraction of vegetation carbon from soil	2.000E-02	2.000E-02	---	CSOIL
C14	Fraction of vegetation carbon from air	9.800E-01	9.800E-01	---	CAIR
C14	C-14 evasion layer thickness in soil (m)	3.000E-01	3.000E-01	---	DMC
C14	C-14 evasion flux rate from soil (1/sec)	7.000E-07	7.000E-07	---	EVSN
C14	C-12 evasion flux rate from soil (1/sec)	1.000E-10	1.000E-10	---	REVSN
C14	Fraction of grain in beef cattle feed	8.000E-01	8.000E-01	---	AVFG4
C14	Fraction of grain in milk cow feed	2.000E-01	2.000E-01	---	AVFG5
C14	DCF correction factor for gaseous forms of C14	8.894E+01	0.000E+00	---	CO2F
STOR	Storage times of contaminated foodstuffs (days):				
STOR	Fruits, non-leafy vegetables, and grain	1.400E+01	1.400E+01	---	STOR_T(1)
STOR	Leafy vegetables	1.000E+00	1.000E+00	---	STOR_T(2)
STOR	Milk	1.000E+00	1.000E+00	---	STOR_T(3)
STOR	Meat and poultry	2.000E+01	2.000E+01	---	STOR_T(4)
STOR	Fish	7.000E+00	7.000E+00	---	STOR_T(5)
STOR	Crustacea and mollusks	7.000E+00	7.000E+00	---	STOR_T(6)
STOR	Well water	1.000E+00	1.000E+00	---	STOR_T(7)
STOR	Surface water	1.000E+00	1.000E+00	---	STOR_T(8)
STOR	Livestock fodder	4.500E+01	4.500E+01	---	STOR_T(9)
R021	Thickness of building foundation (m)	not used	1.500E-01	---	FLOOR1
R021	Bulk density of building foundation (g/cm**3)	not used	2.400E+00	---	DENSFL
R021	Total porosity of the cover material	not used	4.000E-01	---	TPCV

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Chk'd By M. W. Perrott Date
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Site-Specific Parameter Summary (continued)

Menu	Parameter	User Input	Default	Used by RESRAD (If different from user input)	Parameter Name
R021	Total porosity of the building foundation	not used	1.000E-01	---	TPFL
R021	Volumetric water content of the cover material	not used	5.000E-02	---	PH2OCV
R021	Volumetric water content of the foundation	not used	3.000E-02	---	PH2OFL
R021	Diffusion coefficient for radon gas (m/sec):				
R021	in cover material	not used	2.000E-06	---	DIFCV
R021	in foundation material	not used	3.000E-07	---	DIFFL
R021	in contaminated zone soil	not used	2.000E-06	---	DIFCZ
R021	Radon vertical dimension of mixing (m)	not used	2.000E+00	---	HMIX
R021	Average building air exchange rate (1/hr)	not used	5.000E-01	---	REXG
R021	Height of the building (room) (m)	not used	2.500E+00	---	HRM
R021	Building interior area factor	not used	0.000E+00	---	FAI
R021	Building depth below ground surface (m)	not used	-1.000E+00	---	DMFL
R021	Emanating power of Rn-222 gas	not used	2.500E-01	---	EMANA(1)
R021	Emanating power of Rn-220 gas	not used	1.500E-01	---	EMANA(2)
TITL	Number of graphical time points	32	---	---	NPTS
TITL	Maximum number of integration points for dose	1	---	---	LYMAX
TITL	Maximum number of integration points for risk	5	---	---	KYMAX

Summary of Pathway Selections

Pathway	User Selection
1 -- external gamma	active
2 -- inhalation (w/o radon)	active
3 -- plant ingestion	active
4 -- meat ingestion	active
5 -- milk ingestion	active
6 -- aquatic foods	active
7 -- drinking water	active
8 -- soil ingestion	active
9 -- radon	suppressed
Find peak pathway doses	active

Attachment 8 Sheet No. 14 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 15
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Contaminated Zone Dimensions

Area:	10871.00 square meters
Thickness:	8.50 meters
Cover Depth:	0.00 meters

Initial Soil Concentrations, pCi/g

Ag-108m	1.100E-02
Am-241	2.300E-01
C-14	1.900E+00
Co-60	7.500E-03
Eu-152	4.100E-02
Eu-154	1.800E-02
H-3	2.500E+00
Ni-63	2.500E+00
Pu-238	1.600E-01
Pu-239	1.050E-01
Pu-240	2.500E-02

0

Total Dose TDOSE(t), mrem/yr
Basic Radiation Dose Limit = 1.500E+01 mrem/yr
Total Mixture Sum M(t) = Fraction of Basic Dose Limit Received at Time (t)

t (years):	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
TDOSE(t):	4.233E+00	2.437E+00	1.069E+00	6.391E-01	4.687E-01	2.856E-01	2.021E-01	1.431E-01	7.364E-02
M(t):	2.822E-01	1.624E-01	7.126E-02	4.261E-02	3.125E-02	1.904E-02	1.347E-02	9.539E-03	4.909E-03

0Maximum TDOSE(t): 4.233E+00 mrem/yr at t = 0.000E+00 years

Attachment 8 Sheet No. 15 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 16
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	6.770E-02	0.0160	1.268E-07	0.0000	0.000E+00	0.0000	7.085E-04	0.0002	5.265E-05	0.0000	9.967E-04	0.0002	4.895E-06	0.0000
Am-241	6.638E-03	0.0016	4.159E-03	0.0010	0.000E+00	0.0000	4.721E-02	0.0112	4.655E-04	0.0001	5.053E-05	0.0000	4.889E-02	0.0116
C-14	1.705E-05	0.0000	6.718E-04	0.0002	0.000E+00	0.0000	2.523E+00	0.5959	5.356E-01	0.1265	4.338E-01	0.1025	2.319E-04	0.0001
Co-60	7.788E-02	0.0184	6.690E-08	0.0000	0.000E+00	0.0000	9.095E-04	0.0002	4.690E-04	0.0001	1.075E-04	0.0000	1.178E-05	0.0000
Eu-152	1.842E-01	0.0435	3.691E-07	0.0000	0.000E+00	0.0000	3.744E-05	0.0000	6.969E-06	0.0000	4.605E-07	0.0000	1.552E-05	0.0000
Eu-154	8.856E-02	0.0209	2.097E-07	0.0000	0.000E+00	0.0000	2.422E-05	0.0000	4.509E-06	0.0000	2.979E-07	0.0000	1.004E-05	0.0000
H-3	0.000E+00	0.0000	2.273E-03	0.0005	0.000E+00	0.0000	5.951E-02	0.0141	8.081E-03	0.0019	1.363E-02	0.0032	9.344E-06	0.0000
Ni-63	0.000E+00	0.0000	6.405E-07	0.0000	0.000E+00	0.0000	4.064E-03	0.0010	5.505E-04	0.0001	5.097E-03	0.0012	8.424E-05	0.0000
Pu-238	1.629E-05	0.0000	2.555E-03	0.0006	0.000E+00	0.0000	2.887E-02	0.0068	5.693E-04	0.0001	1.545E-05	0.0000	2.990E-02	0.0071
Pu-239	2.011E-05	0.0000	1.835E-03	0.0004	0.000E+00	0.0000	2.096E-02	0.0050	4.133E-04	0.0001	1.122E-05	0.0000	2.171E-02	0.0051
Pu-240	2.453E-06	0.0000	4.368E-04	0.0001	0.000E+00	0.0000	4.991E-03	0.0012	9.841E-05	0.0000	2.671E-06	0.0000	5.168E-03	0.0012
Total	4.250E-01	0.1004	1.193E-02	0.0028	0.000E+00	0.0000	2.690E+00	0.6355	5.463E-01	0.1291	4.537E-01	0.1072	1.060E-01	0.0251

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 0.000E+00 years
0
Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.946E-02	0.0164
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.074E-01	0.0254
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.493E+00	0.8252
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.937E-02	0.0188
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.843E-01	0.0435
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.860E-02	0.0209
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.351E-02	0.0197
Ni-63	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	9.796E-03	0.0023
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.193E-02	0.0146
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.495E-02	0.0106
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.070E-02	0.0025
Total	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.233E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 16 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 17
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	6.732E-02	0.0276	1.261E-07	0.0000	0.000E+00	0.0000	7.046E-04	0.0003	5.236E-05	0.0000	9.912E-04	0.0004	4.868E-06	0.0000
Am-241	6.627E-03	0.0027	4.153E-03	0.0017	0.000E+00	0.0000	4.714E-02	0.0193	4.647E-04	0.0002	5.045E-05	0.0000	4.881E-02	0.0200
C-14	7.810E-06	0.0000	3.077E-04	0.0001	0.000E+00	0.0000	1.190E+00	0.4885	2.818E-01	0.1157	2.192E-01	0.0899	1.062E-04	0.0000
Co-60	6.827E-02	0.0280	5.865E-08	0.0000	0.000E+00	0.0000	7.973E-04	0.0003	4.112E-04	0.0002	9.422E-05	0.0000	1.033E-05	0.0000
Eu-152	1.749E-01	0.0718	3.503E-07	0.0000	0.000E+00	0.0000	3.554E-05	0.0000	6.616E-06	0.0000	4.371E-07	0.0000	1.473E-05	0.0000
Eu-154	8.185E-02	0.0336	1.938E-07	0.0000	0.000E+00	0.0000	2.239E-05	0.0000	4.167E-06	0.0000	2.753E-07	0.0000	9.278E-06	0.0000
H-3	0.000E+00	0.0000	1.252E-03	0.0005	0.000E+00	0.0000	3.345E-02	0.0137	4.900E-03	0.0020	8.039E-03	0.0033	5.147E-06	0.0000
Ni-63	0.000E+00	0.0000	6.358E-07	0.0000	0.000E+00	0.0000	4.034E-03	0.0017	5.464E-04	0.0002	5.059E-03	0.0021	8.362E-05	0.0000
Pu-238	1.616E-05	0.0000	2.534E-03	0.0010	0.000E+00	0.0000	2.864E-02	0.0118	5.648E-04	0.0002	1.533E-05	0.0000	2.966E-02	0.0122
Pu-239	2.011E-05	0.0000	1.835E-03	0.0008	0.000E+00	0.0000	2.096E-02	0.0086	4.133E-04	0.0002	1.122E-05	0.0000	2.171E-02	0.0089
Pu-240	2.453E-06	0.0000	4.368E-04	0.0002	0.000E+00	0.0000	4.990E-03	0.0020	9.839E-05	0.0000	2.670E-06	0.0000	5.168E-03	0.0021
Total	3.990E-01	0.1637	1.052E-02	0.0043	0.000E+00	0.0000	1.331E+00	0.5462	2.893E-01	0.1187	2.334E-01	0.0958	1.056E-01	0.0433

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.908E-02	0.0283
Am-241	3.817E-14	0.0000	1.400E-16	0.0000	0.000E+00	0.0000	3.730E-15	0.0000	9.953E-17	0.0000	6.867E-16	0.0000	1.072E-01	0.0440
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.692E+00	0.6942
Co-60	3.300E-07	0.0000	2.683E-08	0.0000	0.000E+00	0.0000	3.385E-08	0.0000	5.073E-08	0.0000	2.013E-08	0.0000	6.959E-02	0.0286
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.749E-01	0.0718
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.188E-02	0.0336
H-3	4.882E-02	0.0200	1.388E-05	0.0000	0.000E+00	0.0000	1.398E-02	0.0057	1.141E-03	0.0005	3.887E-03	0.0016	1.155E-01	0.0474
Ni-63	1.237E-05	0.0000	3.467E-07	0.0000	0.000E+00	0.0000	1.310E-06	0.0000	6.308E-07	0.0000	8.511E-06	0.0000	9.747E-03	0.0040
Pu-238	1.620E-07	0.0000	5.494E-10	0.0000	0.000E+00	0.0000	1.666E-08	0.0000	5.277E-10	0.0000	3.231E-09	0.0000	6.144E-02	0.0252
Pu-239	3.499E-11	0.0000	1.187E-13	0.0000	0.000E+00	0.0000	3.599E-12	0.0000	1.142E-13	0.0000	6.975E-13	0.0000	4.495E-02	0.0184
Pu-240	2.519E-10	0.0000	8.541E-13	0.0000	0.000E+00	0.0000	2.591E-11	0.0000	8.201E-13	0.0000	5.022E-12	0.0000	1.070E-02	0.0044
Total	4.884E-02	0.0200	1.425E-05	0.0000	0.000E+00	0.0000	1.398E-02	0.0057	1.142E-03	0.0005	3.895E-03	0.0016	2.437E+00	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 17 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 18
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	6.658E-02	0.0623	1.247E-07	0.0000	0.000E+00	0.0000	6.969E-04	0.0007	5.179E-05	0.0000	9.803E-04	0.0009	4.815E-06	0.0000
Am-241	6.606E-03	0.0062	4.139E-03	0.0039	0.000E+00	0.0000	4.698E-02	0.0440	4.632E-04	0.0004	5.028E-05	0.0000	4.865E-02	0.0455
C-14	1.637E-06	0.0000	6.450E-05	0.0001	0.000E+00	0.0000	2.495E-01	0.2334	5.908E-02	0.0553	4.595E-02	0.0430	2.226E-05	0.0000
Co-60	5.247E-02	0.0491	4.508E-08	0.0000	0.000E+00	0.0000	6.128E-04	0.0006	3.160E-04	0.0003	7.241E-05	0.0001	7.939E-06	0.0000
Eu-152	1.576E-01	0.1474	3.157E-07	0.0000	0.000E+00	0.0000	3.203E-05	0.0000	5.962E-06	0.0000	3.939E-07	0.0000	1.327E-05	0.0000
Eu-154	6.991E-02	0.0654	1.655E-07	0.0000	0.000E+00	0.0000	1.912E-05	0.0000	3.560E-06	0.0000	2.352E-07	0.0000	7.925E-06	0.0000
H-3	0.000E+00	0.0000	3.798E-04	0.0004	0.000E+00	0.0000	1.015E-02	0.0095	1.486E-03	0.0014	2.438E-03	0.0023	1.561E-06	0.0000
Ni-63	0.000E+00	0.0000	6.264E-07	0.0000	0.000E+00	0.0000	3.975E-03	0.0037	5.384E-04	0.0005	4.985E-03	0.0047	8.239E-05	0.0001
Pu-238	1.590E-05	0.0000	2.495E-03	0.0023	0.000E+00	0.0000	2.819E-02	0.0264	5.559E-04	0.0005	1.510E-05	0.0000	2.920E-02	0.0273
Pu-239	2.011E-05	0.0000	1.834E-03	0.0017	0.000E+00	0.0000	2.096E-02	0.0196	4.132E-04	0.0004	1.122E-05	0.0000	2.170E-02	0.0203
Pu-240	2.452E-06	0.0000	4.367E-04	0.0004	0.000E+00	0.0000	4.989E-03	0.0047	9.837E-05	0.0001	2.670E-06	0.0000	5.166E-03	0.0048
Total	3.532E-01	0.3304	9.350E-03	0.0087	0.000E+00	0.0000	3.661E-01	0.3425	6.301E-02	0.0589	5.450E-02	0.0510	1.049E-01	0.0981

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+00 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.832E-02	0.0639
Am-241	1.045E-12	0.0000	3.647E-15	0.0000	0.000E+00	0.0000	1.118E-13	0.0000	4.156E-15	0.0000	2.308E-14	0.0000	1.069E-01	0.1000
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.546E-01	0.3318
Co-60	7.647E-07	0.0000	6.412E-08	0.0000	0.000E+00	0.0000	8.385E-08	0.0000	1.814E-07	0.0000	5.657E-08	0.0000	5.348E-02	0.0500
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.576E-01	0.1475
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.994E-02	0.0654
H-3	8.406E-02	0.0786	2.414E-05	0.0000	0.000E+00	0.0000	2.464E-02	0.0231	2.170E-03	0.0020	6.914E-03	0.0065	1.323E-01	0.1237
Ni-63	3.669E-05	0.0000	1.047E-06	0.0000	0.000E+00	0.0000	4.038E-06	0.0000	2.327E-06	0.0000	2.807E-05	0.0000	9.653E-03	0.0090
Pu-238	1.453E-06	0.0000	5.040E-09	0.0000	0.000E+00	0.0000	1.569E-07	0.0000	6.115E-09	0.0000	3.291E-08	0.0000	6.048E-02	0.0566
Pu-239	3.154E-10	0.0000	1.094E-12	0.0000	0.000E+00	0.0000	3.405E-11	0.0000	1.330E-12	0.0000	7.141E-12	0.0000	4.494E-02	0.0420
Pu-240	2.271E-09	0.0000	7.875E-12	0.0000	0.000E+00	0.0000	2.451E-10	0.0000	9.551E-12	0.0000	5.142E-11	0.0000	1.070E-02	0.0100
Total	8.410E-02	0.0787	2.526E-05	0.0000	0.000E+00	0.0000	2.465E-02	0.0231	2.172E-03	0.0020	6.942E-03	0.0065	1.069E+00	1.0000

*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 18 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 19
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+00 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	6.513E-02	0.1019	1.220E-07	0.0000	0.000E+00	0.0000	6.816E-04	0.0011	5.065E-05	0.0001	9.589E-04	0.0015	4.709E-06	0.0000
Am-241	6.563E-03	0.0103	4.112E-03	0.0064	0.000E+00	0.0000	4.668E-02	0.0730	4.602E-04	0.0007	4.996E-05	0.0001	4.834E-02	0.0756
C-14	7.178E-08	0.0000	2.828E-06	0.0000	0.000E+00	0.0000	1.094E-02	0.0171	2.591E-03	0.0041	2.015E-03	0.0032	9.761E-07	0.0000
Co-60	3.099E-02	0.0485	2.663E-08	0.0000	0.000E+00	0.0000	3.620E-04	0.0006	1.867E-04	0.0003	4.277E-05	0.0001	4.689E-06	0.0000
Eu-152	1.280E-01	0.2002	2.564E-07	0.0000	0.000E+00	0.0000	2.601E-05	0.0000	4.842E-06	0.0000	3.199E-07	0.0000	1.078E-05	0.0000
Eu-154	5.101E-02	0.0798	1.208E-07	0.0000	0.000E+00	0.0000	1.395E-05	0.0000	2.597E-06	0.0000	1.716E-07	0.0000	5.783E-06	0.0000
H-3	0.000E+00	0.0000	3.490E-05	0.0001	0.000E+00	0.0000	9.323E-04	0.0015	1.366E-04	0.0002	2.240E-04	0.0004	1.434E-07	0.0000
Ni-63	0.000E+00	0.0000	6.081E-07	0.0000	0.000E+00	0.0000	3.859E-03	0.0060	5.226E-04	0.0008	4.839E-03	0.0076	7.998E-05	0.0001
Pu-238	1.541E-05	0.0000	2.417E-03	0.0038	0.000E+00	0.0000	2.731E-02	0.0427	5.386E-04	0.0008	1.463E-05	0.0000	2.829E-02	0.0443
Pu-239	2.011E-05	0.0000	1.834E-03	0.0029	0.000E+00	0.0000	2.095E-02	0.0328	4.131E-04	0.0006	1.121E-05	0.0000	2.170E-02	0.0339
Pu-240	2.451E-06	0.0000	4.364E-04	0.0007	0.000E+00	0.0000	4.986E-03	0.0078	9.831E-05	0.0002	2.668E-06	0.0000	5.164E-03	0.0081
Total	2.817E-01	0.4408	8.838E-03	0.0138	0.000E+00	0.0000	1.167E-01	0.1827	5.005E-03	0.0078	8.158E-03	0.0128	1.036E-01	0.1621

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 7.000E+00 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.682E-02	0.1046
Am-241	1.332E-11	0.0000	4.649E-14	0.0000	0.000E+00	0.0000	1.449E-12	0.0000	5.845E-14	0.0000	3.084E-13	0.0000	1.062E-01	0.1662
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.555E-02	0.0243
Co-60	1.056E-06	0.0000	8.928E-08	0.0000	0.000E+00	0.0000	1.179E-07	0.0000	2.755E-07	0.0000	8.199E-08	0.0000	3.159E-02	0.0494
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.280E-01	0.2003
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.104E-02	0.0798
H-3	8.186E-02	0.1281	2.356E-05	0.0000	0.000E+00	0.0000	2.411E-02	0.0377	2.152E-03	0.0034	6.775E-03	0.0106	1.162E-01	0.1819
Ni-63	8.320E-05	0.0001	2.386E-06	0.0000	0.000E+00	0.0000	9.257E-06	0.0000	5.571E-06	0.0000	6.549E-05	0.0001	9.467E-03	0.0148
Pu-238	7.807E-06	0.0000	2.725E-08	0.0000	0.000E+00	0.0000	8.545E-07	0.0000	3.516E-08	0.0000	1.832E-07	0.0000	5.859E-02	0.0917
Pu-239	1.712E-09	0.0000	5.978E-12	0.0000	0.000E+00	0.0000	1.874E-10	0.0000	7.728E-12	0.0000	4.017E-11	0.0000	4.493E-02	0.0703
Pu-240	1.233E-08	0.0000	4.303E-11	0.0000	0.000E+00	0.0000	1.349E-09	0.0000	5.548E-11	0.0000	2.892E-10	0.0000	1.069E-02	0.0167
Total	8.195E-02	0.1282	2.606E-05	0.0000	0.000E+00	0.0000	2.412E-02	0.0377	2.158E-03	0.0034	6.841E-03	0.0107	6.391E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 19 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 20
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.100E+01 years
Water Independent Pathways (Inhalation excludes radon)

Radio-	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	6.370E-02	0.1359	1.193E-07	0.0000	0.000E+00	0.0000	6.667E-04	0.0014	4.955E-05	0.0001	9.379E-04	0.0020	4.607E-06	0.0000
Am-241	6.520E-03	0.0139	4.085E-03	0.0087	0.000E+00	0.0000	4.638E-02	0.0989	4.573E-04	0.0010	4.963E-05	0.0001	4.802E-02	0.1025
C-14	3.138E-09	0.0000	1.236E-07	0.0000	0.000E+00	0.0000	4.783E-04	0.0010	1.133E-04	0.0002	8.808E-05	0.0002	4.267E-08	0.0000
Co-60	1.831E-02	0.0391	1.573E-08	0.0000	0.000E+00	0.0000	2.138E-04	0.0005	1.103E-04	0.0002	2.527E-05	0.0001	2.770E-06	0.0000
Eu-152	1.039E-01	0.2217	2.082E-07	0.0000	0.000E+00	0.0000	2.112E-05	0.0000	3.932E-06	0.0000	2.598E-07	0.0000	8.754E-06	0.0000
Eu-154	3.722E-02	0.0794	8.813E-08	0.0000	0.000E+00	0.0000	1.018E-05	0.0000	1.895E-06	0.0000	1.252E-07	0.0000	4.219E-06	0.0000
H-3	0.000E+00	0.0000	3.200E-06	0.0000	0.000E+00	0.0000	8.549E-05	0.0002	1.252E-05	0.0000	2.054E-05	0.0000	1.315E-08	0.0000
Ni-63	0.000E+00	0.0000	5.903E-07	0.0000	0.000E+00	0.0000	3.746E-03	0.0080	5.074E-04	0.0011	4.698E-03	0.0100	7.764E-05	0.0002
Pu-238	1.493E-05	0.0000	2.341E-03	0.0050	0.000E+00	0.0000	2.646E-02	0.0565	5.218E-04	0.0011	1.419E-05	0.0000	2.740E-02	0.0585
Pu-239	2.010E-05	0.0000	1.834E-03	0.0039	0.000E+00	0.0000	2.095E-02	0.0447	4.130E-04	0.0009	1.121E-05	0.0000	2.169E-02	0.0463
Pu-240	2.449E-06	0.0000	4.362E-04	0.0009	0.000E+00	0.0000	4.983E-03	0.0106	9.826E-05	0.0002	2.667E-06	0.0000	5.161E-03	0.0110
Total	2.297E-01	0.4901	8.701E-03	0.0186	0.000E+00	0.0000	1.040E-01	0.2219	2.289E-03	0.0049	5.848E-03	0.0125	1.024E-01	0.2184

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.100E+01 years
Water Dependent Pathways

Radio-	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.536E-02	0.1395
Am-241	5.149E-11	0.0000	1.800E-13	0.0000	0.000E+00	0.0000	5.641E-12	0.0000	2.324E-13	0.0000	1.209E-12	0.0000	1.055E-01	0.2251
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.798E-04	0.0015
Co-60	9.806E-07	0.0000	8.312E-08	0.0000	0.000E+00	0.0000	1.100E-07	0.0000	2.622E-07	0.0000	7.714E-08	0.0000	1.866E-02	0.0398
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.040E-01	0.2218
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.724E-02	0.0794
H-3	1.096E-02	0.0234	3.185E-06	0.0000	0.000E+00	0.0000	3.296E-03	0.0070	3.119E-04	0.0007	9.332E-04	0.0020	1.563E-02	0.0333
Ni-63	1.270E-04	0.0003	3.647E-06	0.0000	0.000E+00	0.0000	1.417E-05	0.0000	8.627E-06	0.0000	1.007E-04	0.0002	9.283E-03	0.0198
Pu-238	1.901E-05	0.0000	6.649E-08	0.0000	0.000E+00	0.0000	2.089E-06	0.0000	8.718E-08	0.0000	4.505E-07	0.0000	5.678E-02	0.1211
Pu-239	4.213E-09	0.0000	1.474E-11	0.0000	0.000E+00	0.0000	4.628E-10	0.0000	1.937E-11	0.0000	9.979E-11	0.0000	4.492E-02	0.0958
Pu-240	3.032E-08	0.0000	1.060E-10	0.0000	0.000E+00	0.0000	3.331E-09	0.0000	1.390E-10	0.0000	7.183E-10	0.0000	1.068E-02	0.0228
Total	1.111E-02	0.0237	6.981E-06	0.0000	0.000E+00	0.0000	3.313E-03	0.0071	3.209E-04	0.0007	1.034E-03	0.0022	4.687E-01	1.0000

*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 20 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 21
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.300E+01 years
0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	5.338E-02	0.1869	9.999E-08	0.0000	0.000E+00	0.0000	5.587E-04	0.0020	4.152E-05	0.0001	7.860E-04	0.0028	3.860E-06	0.0000
Am-241	6.190E-03	0.0217	3.877E-03	0.0136	0.000E+00	0.0000	4.403E-02	0.1542	4.344E-04	0.0015	4.711E-05	0.0002	4.558E-02	0.1596
C-14	3.762E-20	0.0000	1.482E-18	0.0000	0.000E+00	0.0000	5.736E-15	0.0000	1.360E-15	0.0000	1.057E-15	0.0000	5.116E-19	0.0000
Co-60	2.713E-04	0.0009	2.331E-10	0.0000	0.000E+00	0.0000	3.169E-06	0.0000	1.634E-06	0.0000	3.744E-07	0.0000	4.105E-08	0.0000
Eu-152	1.966E-02	0.0689	3.940E-08	0.0000	0.000E+00	0.0000	3.997E-06	0.0000	7.440E-07	0.0000	4.916E-08	0.0000	1.656E-06	0.0000
Eu-154	2.990E-03	0.0105	7.081E-09	0.0000	0.000E+00	0.0000	8.180E-07	0.0000	1.523E-07	0.0000	1.006E-08	0.0000	3.390E-07	0.0000
H-3	0.000E+00	0.0000	1.496E-14	0.0000	0.000E+00	0.0000	3.998E-13	0.0000	5.860E-14	0.0000	9.611E-14	0.0000	6.150E-17	0.0000
Ni-63	0.000E+00	0.0000	4.656E-07	0.0000	0.000E+00	0.0000	2.955E-03	0.0103	4.002E-04	0.0014	3.705E-03	0.0130	6.124E-05	0.0002
Pu-238	1.159E-05	0.0000	1.817E-03	0.0064	0.000E+00	0.0000	2.053E-02	0.0719	4.048E-04	0.0014	1.108E-05	0.0000	2.126E-02	0.0745
Pu-239	2.006E-05	0.0001	1.830E-03	0.0064	0.000E+00	0.0000	2.091E-02	0.0732	4.123E-04	0.0014	1.119E-05	0.0000	2.165E-02	0.0758
Pu-240	2.439E-06	0.0000	4.343E-04	0.0015	0.000E+00	0.0000	4.962E-03	0.0174	9.784E-05	0.0003	2.655E-06	0.0000	5.138E-03	0.0180
Total	8.254E-02	0.2890	7.959E-03	0.0279	0.000E+00	0.0000	9.395E-02	0.3290	1.794E-03	0.0063	4.564E-03	0.0160	9.370E-02	0.3281

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 4.300E+01 years
0 Water Dependent Pathways

0	Water		Fish		Radon		Plant		Meat		Milk		All Pathways*	
Radio-Nuclide	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.	mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.477E-02	0.1918
Am-241	2.969E-09	0.0000	1.042E-11	0.0000	0.000E+00	0.0000	3.275E-10	0.0000	1.387E-11	0.0000	7.106E-11	0.0000	1.002E-01	0.3507
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.154E-15	0.0000
Co-60	5.697E-08	0.0000	4.843E-09	0.0000	0.000E+00	0.0000	6.433E-09	0.0000	1.571E-08	0.0000	4.556E-09	0.0000	2.766E-04	0.0010
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.967E-02	0.0689
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.992E-03	0.0105
H-3	5.349E-11	0.0000	1.554E-14	0.0000	0.000E+00	0.0000	1.608E-11	0.0000	1.522E-12	0.0000	4.553E-12	0.0000	7.624E-11	0.0000
Ni-63	3.929E-04	0.0014	1.130E-05	0.0000	0.000E+00	0.0000	4.401E-05	0.0002	2.718E-05	0.0001	3.147E-04	0.0011	7.912E-03	0.0277
Pu-238	2.599E-04	0.0009	9.109E-07	0.0000	0.000E+00	0.0000	2.869E-05	0.0001	1.220E-06	0.0000	6.235E-06	0.0000	4.434E-02	0.1552
Pu-239	6.249E-08	0.0000	2.195E-10	0.0000	0.000E+00	0.0000	6.898E-09	0.0000	2.956E-10	0.0000	1.497E-09	0.0000	4.484E-02	0.1570
Pu-240	4.490E-07	0.0000	1.574E-09	0.0000	0.000E+00	0.0000	4.956E-08	0.0000	2.106E-09	0.0000	1.077E-08	0.0000	1.064E-02	0.0372
Total	6.534E-04	0.0023	1.222E-05	0.0000	0.000E+00	0.0000	7.276E-05	0.0003	2.842E-05	0.0001	3.210E-04	0.0011	2.856E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 21 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 22
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.350E+02 years
0 Water Independent Pathways (Inhalation excludes radon)

0 Radio-Nuclide	Ground mrem/yr	fract.	Inhalation mrem/yr	fract.	Radon mrem/yr	fract.	Plant mrem/yr	fract.	Meat mrem/yr	fract.	Milk mrem/yr	fract.	Soil mrem/yr	fract.
Ag-108m	3.212E-02	0.1589	6.016E-08	0.0000	0.000E+00	0.0000	3.361E-04	0.0017	2.498E-05	0.0001	4.729E-04	0.0023	2.322E-06	0.0000
Am-241	5.331E-03	0.0264	3.337E-03	0.0165	0.000E+00	0.0000	3.792E-02	0.1876	3.748E-04	0.0019	4.055E-05	0.0002	3.922E-02	0.1941
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	1.495E-09	0.0000	1.284E-15	0.0000	0.000E+00	0.0000	1.746E-11	0.0000	9.003E-12	0.0000	2.063E-12	0.0000	2.262E-13	0.0000
Eu-152	1.640E-04	0.0008	3.286E-10	0.0000	0.000E+00	0.0000	3.334E-08	0.0000	6.205E-09	0.0000	4.100E-10	0.0000	1.382E-08	0.0000
Eu-154	2.125E-06	0.0000	5.032E-12	0.0000	0.000E+00	0.0000	5.814E-10	0.0000	1.082E-10	0.0000	7.150E-12	0.0000	2.409E-10	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	2.354E-07	0.0000	0.000E+00	0.0000	1.494E-03	0.0074	2.023E-04	0.0010	1.873E-03	0.0093	3.096E-05	0.0002
Pu-238	5.596E-06	0.0000	8.760E-04	0.0043	0.000E+00	0.0000	9.900E-03	0.0490	1.952E-04	0.0010	5.476E-06	0.0000	1.025E-02	0.0507
Pu-239	1.996E-05	0.0001	1.820E-03	0.0090	0.000E+00	0.0000	2.080E-02	0.1029	4.101E-04	0.0020	1.113E-05	0.0001	2.154E-02	0.1066
Pu-240	2.409E-06	0.0000	4.289E-04	0.0021	0.000E+00	0.0000	4.900E-03	0.0242	9.662E-05	0.0005	2.623E-06	0.0000	5.075E-03	0.0251
Total	3.764E-02	0.1863	6.462E-03	0.0320	0.000E+00	0.0000	7.534E-02	0.3728	1.304E-03	0.0065	2.406E-03	0.0119	7.612E-02	0.3767

0

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.350E+02 years
0 Water Dependent Pathways

0 Radio-Nuclide	Water mrem/yr	fract.	Fish mrem/yr	fract.	Radon mrem/yr	fract.	Plant mrem/yr	fract.	Meat mrem/yr	fract.	Milk mrem/yr	fract.	All Pathways* mrem/yr	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.295E-02	0.1631
Am-241	7.322E-08	0.0000	2.579E-10	0.0000	0.000E+00	0.0000	8.090E-09	0.0000	3.450E-10	0.0000	1.760E-09	0.0000	8.622E-02	0.4266
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	9.923E-13	0.0000	8.442E-14	0.0000	0.000E+00	0.0000	1.122E-13	0.0000	2.756E-13	0.0000	7.965E-14	0.0000	1.525E-09	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.641E-04	0.0008
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.126E-06	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	6.293E-04	0.0031	1.811E-05	0.0001	0.000E+00	0.0000	7.054E-05	0.0003	4.372E-05	0.0002	5.052E-04	0.0025	4.867E-03	0.0241
Pu-238	1.347E-03	0.0067	4.724E-06	0.0000	0.000E+00	0.0000	1.489E-04	0.0007	6.361E-06	0.0000	3.242E-05	0.0002	2.277E-02	0.1127
Pu-239	4.305E-07	0.0000	1.535E-09	0.0000	0.000E+00	0.0000	4.759E-08	0.0000	2.084E-09	0.0000	1.030E-08	0.0000	4.460E-02	0.2207
Pu-240	3.068E-06	0.0000	1.076E-08	0.0000	0.000E+00	0.0000	3.391E-07	0.0000	1.448E-08	0.0000	7.383E-08	0.0000	1.051E-02	0.0520
Total	1.979E-03	0.0098	2.285E-05	0.0001	0.000E+00	0.0000	2.198E-04	0.0011	5.010E-05	0.0002	5.377E-04	0.0027	2.021E-01	1.0000

0*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 22 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 23
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	1.291E-02	0.0902	2.418E-08	0.0000	0.000E+00	0.0000	1.351E-04	0.0009	1.004E-05	0.0001	1.901E-04	0.0013	9.336E-07	0.0000
Am-241	4.079E-03	0.0285	2.549E-03	0.0178	0.000E+00	0.0000	2.901E-02	0.2028	2.880E-04	0.0020	3.099E-05	0.0002	2.996E-02	0.2094
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	5.533E-19	0.0000	4.753E-25	0.0000	0.000E+00	0.0000	6.462E-21	0.0000	3.332E-21	0.0000	7.636E-22	0.0000	8.371E-23	0.0000
Eu-152	3.066E-08	0.0000	6.145E-14	0.0000	0.000E+00	0.0000	6.232E-12	0.0000	1.160E-12	0.0000	7.665E-14	0.0000	2.583E-12	0.0000
Eu-154	4.797E-12	0.0000	1.136E-17	0.0000	0.000E+00	0.0000	1.312E-15	0.0000	2.443E-16	0.0000	1.614E-17	0.0000	5.438E-16	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	6.924E-08	0.0000	0.000E+00	0.0000	4.394E-04	0.0031	5.951E-05	0.0004	5.510E-04	0.0039	9.107E-06	0.0001
Pu-238	1.544E-06	0.0000	2.369E-04	0.0017	0.000E+00	0.0000	2.677E-03	0.0187	5.279E-05	0.0004	1.610E-06	0.0000	2.771E-03	0.0194
Pu-239	1.978E-05	0.0001	1.803E-03	0.0126	0.000E+00	0.0000	2.060E-02	0.1440	4.062E-04	0.0028	1.102E-05	0.0001	2.133E-02	0.1491
Pu-240	2.355E-06	0.0000	4.194E-04	0.0029	0.000E+00	0.0000	4.792E-03	0.0335	9.449E-05	0.0007	2.565E-06	0.0000	4.963E-03	0.0347
Total	1.701E-02	0.1189	5.008E-03	0.0350	0.000E+00	0.0000	5.765E-02	0.4029	9.110E-04	0.0064	7.873E-04	0.0055	5.903E-02	0.4126

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 3.000E+02 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.325E-02	0.0926
Am-241	3.938E-07	0.0000	1.398E-09	0.0000	0.000E+00	0.0000	4.353E-08	0.0000	1.858E-09	0.0000	9.466E-09	0.0000	6.592E-02	0.4607
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	8.261E-22	0.0000	7.029E-23	0.0000	0.000E+00	0.0000	9.345E-23	0.0000	2.299E-22	0.0000	6.638E-23	0.0000	5.652E-19	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.067E-08	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.800E-12	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	4.181E-04	0.0029	1.203E-05	0.0001	0.000E+00	0.0000	4.688E-05	0.0003	2.908E-05	0.0002	3.358E-04	0.0023	1.901E-03	0.0133
Pu-238	1.597E-03	0.0112	5.609E-06	0.0000	0.000E+00	0.0000	1.766E-04	0.0012	7.553E-06	0.0001	3.847E-05	0.0003	7.566E-03	0.0529
Pu-239	9.307E-07	0.0000	3.472E-09	0.0000	0.000E+00	0.0000	1.029E-07	0.0000	4.671E-09	0.0000	2.193E-08	0.0000	4.417E-02	0.3087
Pu-240	6.479E-06	0.0000	2.272E-08	0.0000	0.000E+00	0.0000	7.163E-07	0.0000	3.062E-08	0.0000	1.560E-07	0.0000	1.028E-02	0.0719
Total	2.023E-03	0.0141	1.767E-05	0.0001	0.000E+00	0.0000	2.243E-04	0.0016	3.667E-05	0.0003	3.745E-04	0.0026	1.431E-01	1.0000

*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 23 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 24
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground mrem/yr	Ground fract.	Inhalation mrem/yr	Inhalation fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	Soil mrem/yr	Soil fract.
Ag-108m	2.703E-04	0.0037	5.064E-10	0.0000	0.000E+00	0.0000	2.829E-06	0.0000	2.103E-07	0.0000	3.980E-06	0.0001	1.955E-08	0.0000
Am-241	1.322E-03	0.0180	8.132E-04	0.0110	0.000E+00	0.0000	9.402E-03	0.1277	9.676E-05	0.0013	9.940E-06	0.0001	9.559E-03	0.1298
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-152	4.674E-24	0.0000	1.388E-17	0.0000	0.000E+00	0.0000	3.181E-17	0.0000	5.922E-18	0.0000	1.565E-19	0.0000	1.318E-17	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	3.855E-10	0.0000	0.000E+00	0.0000	2.446E-06	0.0000	3.313E-07	0.0000	3.068E-06	0.0000	5.071E-08	0.0000
Pu-238	2.689E-07	0.0000	9.513E-07	0.0000	0.000E+00	0.0000	1.087E-05	0.0001	2.197E-07	0.0000	4.916E-08	0.0000	1.088E-05	0.0001
Pu-239	1.899E-05	0.0003	1.731E-03	0.0235	0.000E+00	0.0000	1.978E-02	0.2686	3.900E-04	0.0053	1.058E-05	0.0001	2.048E-02	0.2781
Pu-240	2.142E-06	0.0000	3.815E-04	0.0052	0.000E+00	0.0000	4.359E-03	0.0592	8.595E-05	0.0012	2.334E-06	0.0000	4.514E-03	0.0613
Total	1.614E-03	0.0219	2.927E-03	0.0397	0.000E+00	0.0000	3.355E-02	0.4557	5.734E-04	0.0078	2.995E-05	0.0004	3.456E-02	0.4694

Total Dose Contributions TDOSE(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As mrem/yr and Fraction of Total Dose At t = 1.000E+03 years
Water Dependent Pathways

Radio-Nuclide	Water mrem/yr	Water fract.	Fish mrem/yr	Fish fract.	Radon mrem/yr	Radon fract.	Plant mrem/yr	Plant fract.	Meat mrem/yr	Meat fract.	Milk mrem/yr	Milk fract.	All Pathways* mrem/yr	All Pathways* fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.774E-04	0.0038
Am-241	2.031E-06	0.0000	7.517E-09	0.0000	0.000E+00	0.0000	2.246E-07	0.0000	9.559E-09	0.0000	4.861E-08	0.0000	2.121E-02	0.2880
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.496E-17	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	8.313E-06	0.0001	2.393E-07	0.0000	0.000E+00	0.0000	9.323E-07	0.0000	5.786E-07	0.0000	6.680E-06	0.0001	2.264E-05	0.0003
Pu-238	2.997E-04	0.0041	1.138E-06	0.0000	0.000E+00	0.0000	3.314E-05	0.0005	1.426E-06	0.0000	7.209E-06	0.0001	3.659E-04	0.0050
Pu-239	1.667E-06	0.0000	7.591E-09	0.0000	0.000E+00	0.0000	1.843E-07	0.0000	9.881E-09	0.0000	3.618E-08	0.0000	4.241E-02	0.5759
Pu-240	1.025E-05	0.0001	3.595E-08	0.0000	0.000E+00	0.0000	1.133E-06	0.0000	4.845E-08	0.0000	2.468E-07	0.0000	9.356E-03	0.1271
Total	3.220E-04	0.0044	1.429E-06	0.0000	0.000E+00	0.0000	3.561E-05	0.0005	2.072E-06	0.0000	1.422E-05	0.0002	7.364E-02	1.0000

O*Sum of all water independent and dependent pathways.

Attachment 8 Sheet No. 24 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 25
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Dose/Source Ratios Summed Over All Pathways
Parent and Progeny Principal Radionuclide Contributions Indicated

0 Parent (i)	Product (j)	Thread Fraction	DSR(j,t) At Time in Years (mrem/yr)/(pCi/g) 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m+D	Ag-108m+D	1.000E+00	6.314E+00	6.280E+00	6.211E+00	6.075E+00	5.942E+00	4.980E+00	2.996E+00	1.204E+00	2.522E-02
0Am-241	Am-241	1.000E+00	4.670E-01	4.663E-01	4.648E-01	4.617E-01	4.587E-01	4.354E-01	3.746E-01	2.861E-01	9.122E-02
Am-241	Np-237+D	1.000E+00	0.000E+00	1.929E-06	5.907E-06	1.382E-05	2.169E-05	8.277E-05	2.413E-04	4.715E-04	9.691E-04
Am-241	U-233	1.000E+00	0.000E+00	2.512E-13	5.662E-12	6.858E-11	2.616E-10	1.483E-08	3.644E-07	1.957E-06	1.004E-05
Am-241	Th-229+D	1.000E+00	0.000E+00	2.280E-15	7.636E-15	3.229E-14	8.402E-14	5.180E-12	2.736E-10	3.471E-09	7.741E-08
Am-241	äDSR(j)		4.670E-01	4.663E-01	4.648E-01	4.617E-01	4.587E-01	4.354E-01	3.749E-01	2.866E-01	9.220E-02
0C-14	C-14	1.000E+00	1.838E+00	8.904E-01	1.866E-01	8.184E-03	3.578E-04	4.292E-15	0.000E+00	0.000E+00	0.000E+00
0Co-60	Co-60	1.000E+00	1.058E+01	9.278E+00	7.131E+00	4.212E+00	2.488E+00	3.688E-02	2.034E-07	7.536E-17	0.000E+00
0Eu-152	Eu-152	7.208E-01	3.240E+00	3.075E+00	2.771E+00	2.251E+00	1.828E+00	3.458E-01	2.884E-03	5.392E-07	8.219E-23
0Eu-152	Eu-152	2.792E-01	1.255E+00	1.191E+00	1.073E+00	8.718E-01	7.080E-01	1.340E-01	1.117E-03	2.089E-07	3.184E-23
Eu-152	Gd-152	2.792E-01	0.000E+00	8.088E-17	2.306E-16	4.870E-16	6.952E-16	1.425E-15	1.593E-15	1.592E-15	1.584E-15
Eu-152	äDSR(j)		1.255E+00	1.191E+00	1.073E+00	8.718E-01	7.080E-01	1.340E-01	1.117E-03	2.089E-07	1.584E-15
0Eu-154	Eu-154	1.000E+00	4.922E+00	4.549E+00	3.886E+00	2.835E+00	2.069E+00	1.662E-01	1.181E-04	2.666E-10	2.961E-34
0H-3	H-3	1.000E+00	3.341E-02	4.620E-02	5.290E-02	4.650E-02	6.252E-03	3.049E-11	1.978E-35	0.000E+00	0.000E+00
0Ni-63	Ni-63	1.000E+00	3.919E-03	3.899E-03	3.861E-03	3.787E-03	3.713E-03	3.165E-03	1.947E-03	7.604E-04	9.056E-06
0Pu-238	Pu-238	1.840E-09	7.122E-10	7.066E-10	6.954E-10	6.737E-10	6.527E-10	5.064E-10	2.442E-10	6.599E-11	2.564E-13
0Pu-238	Pu-238	1.000E+00	3.871E-01	3.840E-01	3.780E-01	3.662E-01	3.547E-01	2.752E-01	1.327E-01	3.587E-02	1.393E-04
Pu-238	U-234	1.000E+00	0.000E+00	1.336E-06	1.091E-05	5.699E-05	1.377E-04	1.863E-03	9.632E-03	1.142E-02	2.133E-03
Pu-238	Th-230	1.000E+00	0.000E+00	1.230E-12	1.212E-11	7.920E-11	2.282E-10	7.122E-09	1.266E-07	5.067E-07	1.341E-06
Pu-238	Ra-226+D	1.000E+00	0.000E+00	2.594E-14	5.480E-13	6.690E-12	2.558E-11	1.544E-09	4.666E-08	3.990E-07	4.350E-06
Pu-238	Pb-210+D	1.000E+00	0.000E+00	2.899E-14	1.445E-13	6.644E-13	1.964E-12	3.314E-10	3.596E-08	5.544E-07	8.433E-06
Pu-238	äDSR(j)		3.871E-01	3.840E-01	3.780E-01	3.662E-01	3.549E-01	2.771E-01	1.423E-01	4.729E-02	2.287E-03
0Pu-239	Pu-239	1.000E+00	4.281E-01	4.280E-01	4.280E-01	4.279E-01	4.278E-01	4.270E-01	4.247E-01	4.207E-01	4.039E-01
Pu-239	U-235+D	1.000E+00	0.000E+00	9.221E-10	5.054E-09	2.240E-08	5.173E-08	7.014E-07	4.718E-06	1.002E-05	1.648E-05
Pu-239	Pa-231	1.000E+00	0.000E+00	1.062E-13	9.563E-13	6.101E-12	1.722E-11	5.445E-10	1.136E-08	6.417E-08	4.831E-07
Pu-239	Ac-227+D	1.000E+00	0.000E+00	6.977E-14	2.166E-13	1.092E-12	3.188E-12	3.955E-10	2.045E-08	1.690E-07	1.420E-06
Pu-239	äDSR(j)		4.281E-01	4.280E-01	4.280E-01	4.279E-01	4.278E-01	4.270E-01	4.247E-01	4.207E-01	4.039E-01
0Pu-240	Pu-240	4.950E-08	2.119E-08	2.118E-08	2.118E-08	2.116E-08	2.115E-08	2.106E-08	2.080E-08	2.034E-08	1.850E-08
0Pu-240	Pu-240	1.000E+00	4.280E-01	4.279E-01	4.278E-01	4.276E-01	4.273E-01	4.255E-01	4.202E-01	4.109E-01	3.738E-01
Pu-240	U-236	1.000E+00	0.000E+00	1.329E-08	1.092E-07	5.760E-07	1.406E-06	2.060E-05	1.405E-04	2.966E-04	4.691E-04
Pu-240	Th-232	1.000E+00	0.000E+00	2.932E-19	1.094E-17	4.431E-17	9.938E-17	2.333E-15	4.819E-14	2.702E-13	2.022E-12
Pu-240	Ra-228+D	1.000E+00	0.000E+00	2.001E-19	1.716E-17	9.456E-17	2.767E-16	8.413E-15	1.356E-13	7.220E-13	5.310E-12
Pu-240	Th-228+D	1.000E+00	0.000E+00	1.668E-20	3.376E-18	2.964E-17	1.171E-16	5.439E-15	7.726E-14	3.808E-13	2.701E-12
Pu-240	äDSR(j)		4.280E-01	4.279E-01	4.278E-01	4.276E-01	4.273E-01	4.255E-01	4.204E-01	4.112E-01	3.743E-01

The DSR includes contributions from associated (half-life ó 180 days) daughters.

Attachment 8 Sheet No. 25 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 26
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Single Radionuclide Soil Guidelines G(i,t) in pCi/g
Basic Radiation Dose Limit = 1.500E+01 mrem/yr

ONuclide (i)	t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	2.376E+00	2.389E+00	2.415E+00	2.469E+00	2.524E+00	3.012E+00	5.007E+00	1.246E+01	5.948E+02
Am-241	3.212E+01	3.217E+01	3.227E+01	3.249E+01	3.270E+01	3.445E+01	4.001E+01	5.234E+01	1.627E+02
C-14	8.160E+00	1.685E+01	8.037E+01	1.833E+03	4.193E+04	*4.455E+12	*4.455E+12	*4.455E+12	*4.455E+12
Co-60	1.417E+00	1.617E+00	2.104E+00	3.561E+00	6.029E+00	4.067E+02	7.376E+07	*1.132E+15	*1.132E+15
Eu-152	3.338E+00	3.516E+00	3.901E+00	4.804E+00	5.915E+00	3.126E+01	3.748E+03	2.005E+07	*1.765E+14
Eu-154	3.048E+00	3.297E+00	3.860E+00	5.290E+00	7.251E+00	9.025E+01	1.270E+05	5.626E+10	*2.639E+14
H-3	4.490E+02	3.247E+02	2.835E+02	3.226E+02	2.399E+03	4.919E+11	*9.597E+15	*9.597E+15	*9.597E+15
Ni-63	3.828E+03	3.847E+03	3.885E+03	3.961E+03	4.039E+03	4.740E+03	7.705E+03	1.973E+04	1.656E+06
Pu-238	3.875E+01	3.906E+01	3.969E+01	4.096E+01	4.227E+01	5.413E+01	1.054E+02	3.172E+02	6.560E+03
Pu-239	3.504E+01	3.504E+01	3.505E+01	3.505E+01	3.506E+01	3.513E+01	3.532E+01	3.566E+01	3.714E+01
Pu-240	3.505E+01	3.505E+01	3.506E+01	3.508E+01	3.510E+01	3.525E+01	3.568E+01	3.647E+01	4.008E+01

*At specific activity limit
0

Summed Dose/Source Ratios DSR(i,t) in (mrem/yr)/(pCi/g)
and Single Radionuclide Soil Guidelines G(i,t) in pCi/g
at tmin = time of minimum single radionuclide soil guideline
and at tmax = time of maximum total dose = 0.000E+00 years

ONuclide (i)	Initial (pCi/g)	tmin (years)	DSR(i,tmin)	G(i,tmin) (pCi/g)	DSR(i,tmax)	G(i,tmax) (pCi/g)
Ag-108m	1.100E-02	0.000E+00	6.314E+00	2.376E+00	6.314E+00	2.376E+00
Am-241	2.300E-01	0.000E+00	4.670E-01	3.212E+01	4.670E-01	3.212E+01
C-14	1.900E+00	0.000E+00	1.838E+00	8.160E+00	1.838E+00	8.160E+00
Co-60	7.500E-03	0.000E+00	1.058E+01	1.417E+00	1.058E+01	1.417E+00
Eu-152	4.100E-02	0.000E+00	4.494E+00	3.338E+00	4.494E+00	3.338E+00
Eu-154	1.800E-02	0.000E+00	4.922E+00	3.048E+00	4.922E+00	3.048E+00
H-3	2.500E+00	3.139 ñ 0.006	5.292E-02	2.834E+02	3.341E-02	4.490E+02
Ni-63	2.500E+00	0.000E+00	3.919E-03	3.828E+03	3.919E-03	3.828E+03
Pu-238	1.600E-01	0.000E+00	3.871E-01	3.875E+01	3.871E-01	3.875E+01
Pu-239	1.050E-01	0.000E+00	4.281E-01	3.504E+01	4.281E-01	3.504E+01
Pu-240	2.500E-02	0.000E+00	4.280E-01	3.505E+01	4.280E-01	3.505E+01

Attachment 8 Sheet No. 26 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 27
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr								
			t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	Ag-108m	1.000E+00	6.946E-02	6.908E-02	6.832E-02	6.682E-02	6.536E-02	5.477E-02	3.295E-02	1.325E-02	2.774E-04
OAm-241	Am-241	1.000E+00	1.074E-01	1.072E-01	1.069E-01	1.062E-01	1.055E-01	1.001E-01	8.616E-02	6.581E-02	2.098E-02
ONp-237	Am-241	1.000E+00	0.000E+00	4.437E-07	1.359E-06	3.180E-06	4.989E-06	1.904E-05	5.551E-05	1.084E-04	2.229E-04
OU-233	Am-241	1.000E+00	0.000E+00	5.777E-14	1.302E-12	1.577E-11	6.017E-11	3.412E-09	8.380E-08	4.501E-07	2.310E-06
OTh-229	Am-241	1.000E+00	0.000E+00	5.244E-16	1.756E-15	7.427E-15	1.932E-14	1.191E-12	6.293E-11	7.982E-10	1.780E-08
OC-14	C-14	1.000E+00	3.493E+00	1.692E+00	3.546E-01	1.555E-02	6.798E-04	8.154E-15	0.000E+00	0.000E+00	0.000E+00
OCo-60	Co-60	1.000E+00	7.937E-02	6.959E-02	5.348E-02	3.159E-02	1.866E-02	2.766E-04	1.525E-09	5.652E-19	0.000E+00
OEu-152	Eu-152	7.208E-01	1.328E-01	1.261E-01	1.136E-01	9.228E-02	7.494E-02	1.418E-02	1.183E-04	2.211E-08	3.370E-24
Eu-152	Eu-152	2.792E-01	5.145E-02	4.884E-02	4.401E-02	3.574E-02	2.903E-02	5.492E-03	4.581E-05	8.564E-09	1.305E-24
Eu-152	äDOSE(j)		1.843E-01	1.749E-01	1.576E-01	1.280E-01	1.040E-01	1.967E-02	1.641E-04	3.067E-08	4.675E-24
OGd-152	Eu-152	2.792E-01	0.000E+00	3.316E-18	9.453E-18	1.997E-17	2.850E-17	5.842E-17	6.530E-17	6.528E-17	6.496E-17
OEu-154	Eu-154	1.000E+00	8.860E-02	8.188E-02	6.994E-02	5.104E-02	3.724E-02	2.992E-03	2.126E-06	4.800E-12	0.000E+00
OH-3	H-3	1.000E+00	8.351E-02	1.155E-01	1.323E-01	1.162E-01	1.563E-02	7.624E-11	0.000E+00	0.000E+00	0.000E+00
ONi-63	Ni-63	1.000E+00	9.796E-03	9.747E-03	9.653E-03	9.467E-03	9.283E-03	7.912E-03	4.867E-03	1.901E-03	2.264E-05
OPu-238	Pu-238	1.840E-09	1.140E-10	1.131E-10	1.113E-10	1.078E-10	1.044E-10	8.103E-11	3.907E-11	1.056E-11	4.102E-14
Pu-238	Pu-238	1.000E+00	6.193E-02	6.144E-02	6.047E-02	5.859E-02	5.676E-02	4.404E-02	2.123E-02	5.738E-03	2.230E-05
Pu-238	äDOSE(j)		6.193E-02	6.144E-02	6.047E-02	5.859E-02	5.676E-02	4.404E-02	2.123E-02	5.738E-03	2.230E-05
OU-234	Pu-238	1.000E+00	0.000E+00	2.137E-07	1.746E-06	9.119E-06	2.203E-05	2.980E-04	1.541E-03	1.827E-03	3.413E-04
OTh-230	Pu-238	1.000E+00	0.000E+00	1.969E-13	1.939E-12	1.267E-11	3.651E-11	1.140E-09	2.025E-08	8.107E-08	2.145E-07
ORa-226	Pu-238	1.000E+00	0.000E+00	4.151E-15	8.768E-14	1.070E-12	4.092E-12	2.471E-10	7.466E-09	6.384E-08	6.961E-07
OPb-210	Pu-238	1.000E+00	0.000E+00	4.639E-15	2.313E-14	1.063E-13	3.143E-13	5.302E-11	5.753E-09	8.870E-08	1.349E-06
OPu-239	Pu-239	1.000E+00	4.495E-02	4.495E-02	4.494E-02	4.493E-02	4.492E-02	4.484E-02	4.460E-02	4.417E-02	4.241E-02
OU-235	Pu-239	1.000E+00	0.000E+00	9.682E-11	5.306E-10	2.352E-09	5.432E-09	7.365E-08	4.953E-07	1.052E-06	1.730E-06
OPa-231	Pu-239	1.000E+00	0.000E+00	1.115E-14	1.004E-13	6.406E-13	1.808E-12	5.717E-11	1.193E-09	6.738E-09	5.073E-08
OAc-227	Pu-239	1.000E+00	0.000E+00	7.326E-15	2.275E-14	1.147E-13	3.347E-13	4.153E-11	2.147E-09	1.775E-08	1.491E-07
OPu-240	Pu-240	4.950E-08	5.296E-10	5.296E-10	5.294E-10	5.291E-10	5.288E-10	5.266E-10	5.200E-10	5.085E-10	4.626E-10
Pu-240	Pu-240	1.000E+00	1.070E-02	1.070E-02	1.070E-02	1.069E-02	1.068E-02	1.064E-02	1.051E-02	1.027E-02	9.345E-03
Pu-240	äDOSE(j)		1.070E-02	1.070E-02	1.070E-02	1.069E-02	1.068E-02	1.064E-02	1.051E-02	1.027E-02	9.345E-03

Attachment 8 Sheet No. 27 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 28
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Individual Nuclide Dose Summed Over All Pathways
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	DOSE(j,t), mrem/yr t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
U-236	Pu-240	1.000E+00	0.000E+00	3.322E-10	2.729E-09	1.440E-08	3.514E-08	5.149E-07	3.511E-06	7.415E-06	1.173E-05
OTh-232	Pu-240	1.000E+00	0.000E+00	7.331E-21	2.734E-19	1.108E-18	2.485E-18	5.832E-17	1.205E-15	6.755E-15	5.056E-14
ORa-228	Pu-240	1.000E+00	0.000E+00	5.001E-21	4.289E-19	2.364E-18	6.918E-18	2.103E-16	3.390E-15	1.805E-14	1.327E-13
OTh-228	Pu-240	1.000E+00	0.000E+00	4.171E-22	8.440E-20	7.409E-19	2.926E-18	1.360E-16	1.931E-15	9.520E-15	6.752E-14

THF(i) is the thread fraction of the parent nuclide.

Attachment 8 Sheet No. 28 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 29
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ag-108m	Ag-108m	1.000E+00		1.100E-02	1.094E-02	1.082E-02	1.058E-02	1.035E-02	8.675E-03	5.219E-03	2.098E-03	4.393E-05
OAm-241	Am-241	1.000E+00		2.300E-01	2.296E-01	2.289E-01	2.274E-01	2.259E-01	2.144E-01	1.845E-01	1.409E-01	4.492E-02
ONp-237	Am-241	1.000E+00		0.000E+00	7.444E-08	2.229E-07	5.185E-07	8.120E-07	3.092E-06	9.011E-06	1.760E-05	3.618E-05
OU-233	Am-241	1.000E+00		0.000E+00	1.627E-13	1.460E-12	7.900E-12	1.939E-11	2.827E-10	2.439E-09	9.549E-09	4.370E-08
OTh-229	Am-241	1.000E+00		0.000E+00	5.122E-18	1.380E-16	1.745E-15	6.740E-15	3.883E-13	1.084E-11	9.952E-11	1.857E-09
OC-14	C-14	1.000E+00		1.900E+00	8.701E-01	1.824E-01	7.997E-03	3.496E-04	4.192E-15	0.000E+00	0.000E+00	0.000E+00
OCo-60	Co-60	1.000E+00		7.500E-03	6.575E-03	5.053E-03	2.985E-03	1.763E-03	2.613E-05	1.440E-10	5.328E-20	0.000E+00
OEu-152	Eu-152	7.208E-01		2.955E-02	2.805E-02	2.528E-02	2.053E-02	1.667E-02	3.155E-03	2.631E-05	4.919E-09	7.498E-25
Eu-152	Eu-152	2.792E-01		1.145E-02	1.087E-02	9.793E-03	7.953E-03	6.459E-03	1.222E-03	1.019E-05	1.905E-09	2.904E-25
Eu-152	äS(j):			4.100E-02	3.892E-02	3.507E-02	2.848E-02	2.313E-02	4.377E-03	3.651E-05	6.825E-09	1.040E-24
OGd-152	Eu-152	2.792E-01		0.000E+00	7.159E-17	2.041E-16	4.310E-16	6.153E-16	1.261E-15	1.410E-15	1.409E-15	1.402E-15
OEu-154	Eu-154	1.000E+00		1.800E-02	1.664E-02	1.421E-02	1.037E-02	7.566E-03	6.078E-04	4.320E-07	9.751E-13	1.083E-36
OH-3	H-3	1.000E+00		2.500E+00	1.377E+00	4.177E-01	3.837E-02	3.519E-03	1.645E-11	9.421E-36	0.000E+00	0.000E+00
ONi-63	Ni-63	1.000E+00		2.500E+00	2.482E+00	2.445E+00	2.374E+00	2.304E+00	1.817E+00	9.187E-01	2.703E-01	1.505E-03
OPu-238	Pu-238	1.840E-09		2.944E-10	2.921E-10	2.875E-10	2.785E-10	2.698E-10	2.093E-10	1.009E-10	2.728E-11	1.060E-13
Pu-238	Pu-238	1.000E+00		1.600E-01	1.587E-01	1.562E-01	1.514E-01	1.466E-01	1.138E-01	5.486E-02	1.483E-02	5.760E-05
Pu-238	äS(j):			1.600E-01	1.587E-01	1.562E-01	1.514E-01	1.466E-01	1.138E-01	5.486E-02	1.483E-02	5.760E-05
OU-234	Pu-238	1.000E+00		0.000E+00	4.512E-07	1.339E-06	3.059E-06	4.705E-06	1.553E-05	3.034E-05	3.013E-05	5.462E-06
OTh-230	Pu-238	1.000E+00		0.000E+00	2.034E-12	1.818E-11	9.757E-11	2.375E-10	3.244E-09	2.350E-08	7.032E-08	1.640E-07
ORa-226	Pu-238	1.000E+00		0.000E+00	2.940E-16	7.893E-15	9.915E-14	3.805E-13	2.081E-11	5.046E-10	3.709E-09	3.650E-08
OPb-210	Pu-238	1.000E+00		0.000E+00	2.272E-18	1.809E-16	5.186E-15	3.060E-14	5.547E-12	2.873E-10	2.897E-09	3.475E-08
OPu-239	Pu-239	1.000E+00		1.050E-01	1.050E-01	1.050E-01	1.050E-01	1.049E-01	1.047E-01	1.042E-01	1.032E-01	9.907E-02
OU-235	Pu-239	1.000E+00		0.000E+00	1.033E-10	3.089E-10	7.168E-10	1.120E-09	4.187E-09	1.160E-08	2.086E-08	3.358E-08
OPa-231	Pu-239	1.000E+00		0.000E+00	1.093E-15	9.817E-15	5.324E-14	1.309E-13	1.939E-12	1.751E-11	7.445E-11	4.837E-10
OAc-227	Pu-239	1.000E+00		0.000E+00	1.151E-17	3.054E-16	3.748E-15	1.406E-14	6.531E-13	1.137E-11	6.140E-11	4.595E-10
OPu-240	Pu-240	4.950E-08		1.237E-09	1.237E-09	1.237E-09	1.236E-09	1.236E-09	1.230E-09	1.215E-09	1.188E-09	1.081E-09
Pu-240	Pu-240	1.000E+00		2.500E-02	2.500E-02	2.499E-02	2.498E-02	2.496E-02	2.485E-02	2.455E-02	2.400E-02	2.183E-02
Pu-240	äS(j):			2.500E-02	2.500E-02	2.499E-02	2.498E-02	2.496E-02	2.485E-02	2.455E-02	2.400E-02	2.183E-02

Attachment 8 Sheet No. 29 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 8

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 30
Summary : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Individual Nuclide Soil Concentration
Parent Nuclide and Branch Fraction Indicated

ONuclide (j)	Parent (i)	THF(i)	S(j,t), pCi/g t= 0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
U-236	Pu-240	1.000E+00	0.000E+00	7.390E-10	2.211E-09	5.128E-09	8.012E-09	2.991E-08	8.255E-08	1.473E-07	2.277E-07
OTh-232	Pu-240	1.000E+00	0.000E+00	1.824E-20	1.638E-19	8.884E-19	2.185E-18	3.238E-17	2.926E-16	1.247E-15	8.174E-15
ORa-228	Pu-240	1.000E+00	0.000E+00	7.114E-22	1.810E-20	2.052E-19	7.164E-19	2.239E-17	2.604E-16	1.187E-15	8.077E-15
OTh-228	Pu-240	1.000E+00	0.000E+00	6.039E-23	4.078E-21	8.686E-20	3.951E-19	1.932E-17	2.500E-16	1.167E-15	8.046E-15

THF(i) is the thread fraction of the parent nuclide.
ORESCALC.EXE execution time = 14.42 seconds

Attachment 8 Sheet No. 30 of 30
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 1
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

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Time= 3.000E+00 16
Time= 7.000E+00 20
Time= 1.100E+01 24
Time= 4.300E+01 28
Time= 1.350E+02 32
Time= 3.000E+02 36
Time= 1.000E+03 40

Attachment 9 Sheet No. 1 of 43
Originator: S. W. Clark SWC Date 7/11/07
Chk'd By M. W. Perrott MWP Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 2
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Cancer Risk Slope Factors Summary Table
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-1	Ground external radiation slope factors, 1/yr per (pCi/g):			
Sf-1	Ac-227+D	1.47E-06	3.48E-10	SLPF(1,1)
Sf-1	Ag-108m+D	7.19E-06	7.18E-06	SLPF(2,1)
Sf-1	Am-241	2.76E-08	2.76E-08	SLPF(3,1)
Sf-1	C-14	7.83E-12	7.83E-12	SLPF(4,1)
Sf-1	Co-60	1.24E-05	1.24E-05	SLPF(5,1)
Sf-1	Eu-152	5.30E-06	5.30E-06	SLPF(6,1)
Sf-1	Eu-154	5.83E-06	5.83E-06	SLPF(8,1)
Sf-1	Gd-152	0.00E+00	0.00E+00	SLPF(9,1)
Sf-1	H-3	0.00E+00	0.00E+00	SLPF(10,1)
Sf-1	Ni-63	0.00E+00	0.00E+00	SLPF(11,1)
Sf-1	Np-237+D	7.97E-07	5.36E-08	SLPF(12,1)
Sf-1	Pa-231	1.39E-07	1.39E-07	SLPF(13,1)
Sf-1	Pb-210+D	4.21E-09	1.41E-09	SLPF(14,1)
Sf-1	Pu-238	7.22E-11	7.22E-11	SLPF(15,1)
Sf-1	Pu-239	2.00E-10	2.00E-10	SLPF(17,1)
Sf-1	Pu-240	6.98E-11	6.98E-11	SLPF(18,1)
Sf-1	Ra-226+D	8.49E-06	2.29E-08	SLPF(20,1)
Sf-1	Ra-228+D	4.53E-06	0.00E+00	SLPF(21,1)
Sf-1	Th-228+D	7.76E-06	5.59E-09	SLPF(22,1)
Sf-1	Th-229+D	1.17E-06	2.25E-07	SLPF(23,1)
Sf-1	Th-230	8.19E-10	8.19E-10	SLPF(24,1)
Sf-1	Th-232	3.42E-10	3.42E-10	SLPF(25,1)
Sf-1	U-233	9.82E-10	9.82E-10	SLPF(26,1)
Sf-1	U-234	2.52E-10	2.52E-10	SLPF(27,1)
Sf-1	U-235+D	5.43E-07	5.18E-07	SLPF(28,1)
Sf-1	U-236	1.25E-10	1.25E-10	SLPF(29,1)
Sf-2	Inhalation, slope factors, 1/(pCi):			
Sf-2	Ac-227+D	2.09E-07	1.49E-07	SLPF(1,2)
Sf-2	Ag-108m+D	2.67E-11	2.67E-11	SLPF(2,2)
Sf-2	Am-241	2.81E-08	2.81E-08	SLPF(3,2)
Sf-2	C-14	7.07E-12	7.07E-12	SLPF(4,2)
Sf-2	Co-60	3.58E-11	3.58E-11	SLPF(5,2)
Sf-2	Eu-152	9.10E-11	9.10E-11	SLPF(6,2)
Sf-2	Eu-154	1.15E-10	1.15E-10	SLPF(8,2)
Sf-2	Gd-152	9.10E-09	9.10E-09	SLPF(9,2)
Sf-2	H-3	1.99E-13	1.99E-13	SLPF(10,2)
Sf-2	Ni-63	5.77E-12	5.77E-12	SLPF(11,2)
Sf-2	Np-237+D	1.77E-08	1.77E-08	SLPF(12,2)
Sf-2	Pa-231	4.55E-08	4.55E-08	SLPF(13,2)
Sf-2	Pb-210+D	1.39E-08	2.77E-09	SLPF(14,2)
Sf-2	Pu-238	3.36E-08	3.36E-08	SLPF(15,2)
Sf-2	Pu-239	3.33E-08	3.33E-08	SLPF(17,2)
Sf-2	Pu-240	3.33E-08	3.33E-08	SLPF(18,2)
Sf-2	Ra-226+D	1.16E-08	1.15E-08	SLPF(20,2)
Sf-2	Ra-228+D	5.23E-09	5.18E-09	SLPF(21,2)
Sf-2	Th-228+D	1.43E-07	1.32E-07	SLPF(22,2)
Sf-2	Th-229+D	2.25E-07	1.75E-07	SLPF(23,2)
Sf-2	Th-230	2.85E-08	2.85E-08	SLPF(24,2)

Attachment 9 Sheet No. 2 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 3
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-2	Th-232	4.33E-08	4.33E-08	SLPF(25,2)
Sf-2	U-233	1.16E-08	1.16E-08	SLPF(26,2)
Sf-2	U-234	1.14E-08	1.14E-08	SLPF(27,2)
Sf-2	U-235+D	1.01E-08	1.01E-08	SLPF(28,2)
Sf-2	U-236	1.05E-08	1.05E-08	SLPF(29,2)
Sf-3	Food ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	6.53E-10	2.45E-10	SLPF(1,3)
Sf-3	Ag-108m+D	1.12E-11	1.12E-11	SLPF(2,3)
Sf-3	Am-241	1.34E-10	1.34E-10	SLPF(3,3)
Sf-3	C-14	2.00E-12	2.00E-12	SLPF(4,3)
Sf-3	Co-60	2.23E-11	2.23E-11	SLPF(5,3)
Sf-3	Eu-152	8.70E-12	8.70E-12	SLPF(6,3)
Sf-3	Eu-154	1.49E-11	1.49E-11	SLPF(8,3)
Sf-3	Gd-152	3.85E-11	3.85E-11	SLPF(9,3)
Sf-3	H-3	1.44E-13	1.44E-13	SLPF(10,3)
Sf-3	Ni-63	9.51E-13	9.51E-13	SLPF(11,3)
Sf-3	Np-237+D	9.10E-11	8.29E-11	SLPF(12,3)
Sf-3	Pa-231	2.26E-10	2.26E-10	SLPF(13,3)
Sf-3	Pb-210+D	3.44E-09	1.18E-09	SLPF(14,3)
Sf-3	Pu-238	1.69E-10	1.69E-10	SLPF(15,3)
Sf-3	Pu-239	1.74E-10	1.74E-10	SLPF(17,3)
Sf-3	Pu-240	1.74E-10	1.74E-10	SLPF(18,3)
Sf-3	Ra-226+D	5.15E-10	5.14E-10	SLPF(20,3)
Sf-3	Ra-228+D	1.43E-09	1.43E-09	SLPF(21,3)
Sf-3	Th-228+D	4.22E-10	1.48E-10	SLPF(22,3)
Sf-3	Th-229+D	7.16E-10	2.90E-10	SLPF(23,3)
Sf-3	Th-230	1.19E-10	1.19E-10	SLPF(24,3)
Sf-3	Th-232	1.33E-10	1.33E-10	SLPF(25,3)
Sf-3	U-233	9.69E-11	9.69E-11	SLPF(26,3)
Sf-3	U-234	9.55E-11	9.55E-11	SLPF(27,3)
Sf-3	U-235+D	9.76E-11	9.44E-11	SLPF(28,3)
Sf-3	U-236	9.03E-11	9.03E-11	SLPF(29,3)
Sf-3	Water ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	4.86E-10	2.01E-10	SLPF(1,4)
Sf-3	Ag-108m+D	8.14E-12	8.14E-12	SLPF(2,4)
Sf-3	Am-241	1.04E-10	1.04E-10	SLPF(3,4)
Sf-3	C-14	1.55E-12	1.55E-12	SLPF(4,4)
Sf-3	Co-60	1.57E-11	1.57E-11	SLPF(5,4)
Sf-3	Eu-152	6.07E-12	6.07E-12	SLPF(6,4)
Sf-3	Eu-154	1.03E-11	1.03E-11	SLPF(8,4)
Sf-3	Gd-152	2.97E-11	2.97E-11	SLPF(9,4)
Sf-3	H-3	1.12E-13	1.12E-13	SLPF(10,4)
Sf-3	Ni-63	6.70E-13	6.70E-13	SLPF(11,4)
Sf-3	Np-237+D	6.74E-11	6.18E-11	SLPF(12,4)
Sf-3	Pa-231	1.73E-10	1.73E-10	SLPF(13,4)
Sf-3	Pb-210+D	1.27E-09	8.81E-10	SLPF(14,4)
Sf-3	Pu-238	1.31E-10	1.31E-10	SLPF(15,4)
Sf-3	Pu-239	1.35E-10	1.35E-10	SLPF(17,4)

Attachment 9 Sheet No. 3 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 4
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-3	Pu-240	1.35E-10	1.35E-10	SLPF(18,4)
Sf-3	Ra-226+D	3.86E-10	3.85E-10	SLPF(20,4)
Sf-3	Ra-228+D	1.04E-09	1.04E-09	SLPF(21,4)
Sf-3	Th-228+D	3.00E-10	1.07E-10	SLPF(22,4)
Sf-3	Th-229+D	5.28E-10	2.24E-10	SLPF(23,4)
Sf-3	Th-230	9.10E-11	9.10E-11	SLPF(24,4)
Sf-3	Th-232	1.01E-10	1.01E-10	SLPF(25,4)
Sf-3	U-233	7.18E-11	7.18E-11	SLPF(26,4)
Sf-3	U-234	7.07E-11	7.07E-11	SLPF(27,4)
Sf-3	U-235+D	7.18E-11	6.96E-11	SLPF(28,4)
Sf-3	U-236	6.70E-11	6.70E-11	SLPF(29,4)
Sf-3	Soil ingestion, slope factors, 1/(pCi):			
Sf-3	Ac-227+D	1.16E-09	3.81E-10	SLPF(1,5)
Sf-3	Ag-108m+D	1.92E-11	1.92E-11	SLPF(2,5)
Sf-3	Am-241	2.17E-10	2.17E-10	SLPF(3,5)
Sf-3	C-14	2.79E-12	2.79E-12	SLPF(4,5)
Sf-3	Co-60	4.03E-11	4.03E-11	SLPF(5,5)
Sf-3	Eu-152	1.62E-11	1.62E-11	SLPF(6,5)
Sf-3	Eu-154	2.85E-11	2.85E-11	SLPF(8,5)
Sf-3	Gd-152	6.29E-11	6.29E-11	SLPF(9,5)
Sf-3	H-3	2.20E-13	2.20E-13	SLPF(10,5)
Sf-3	Ni-63	1.79E-12	1.79E-12	SLPF(11,5)
Sf-3	Np-237+D	1.62E-10	1.46E-10	SLPF(12,5)
Sf-3	Pa-231	3.74E-10	3.74E-10	SLPF(13,5)
Sf-3	Pb-210+D	2.66E-09	1.84E-09	SLPF(14,5)
Sf-3	Pu-238	2.72E-10	2.72E-10	SLPF(15,5)
Sf-3	Pu-239	2.76E-10	2.76E-10	SLPF(17,5)
Sf-3	Pu-240	2.77E-10	2.77E-10	SLPF(18,5)
Sf-3	Ra-226+D	7.30E-10	7.29E-10	SLPF(20,5)
Sf-3	Ra-228+D	2.29E-09	2.28E-09	SLPF(21,5)
Sf-3	Th-228+D	8.09E-10	2.89E-10	SLPF(22,5)
Sf-3	Th-229+D	1.29E-09	4.96E-10	SLPF(23,5)
Sf-3	Th-230	2.02E-10	2.02E-10	SLPF(24,5)
Sf-3	Th-232	2.31E-10	2.31E-10	SLPF(25,5)
Sf-3	U-233	1.60E-10	1.60E-10	SLPF(26,5)
Sf-3	U-234	1.58E-10	1.58E-10	SLPF(27,5)
Sf-3	U-235+D	1.63E-10	1.57E-10	SLPF(28,5)
Sf-3	U-236	1.49E-10	1.49E-10	SLPF(29,5)
Sf-Rn	Radon Inhalation slope factors, 1/(pCi):			
Sf-Rn	Rn-222	1.80E-12	1.80E-12	SLPFRN(1,1)
Sf-Rn	Po-218	3.70E-12	3.70E-12	SLPFRN(1,2)
Sf-Rn	Pb-214	6.20E-12	6.20E-12	SLPFRN(1,3)
Sf-Rn	Bi-214	1.50E-11	1.50E-11	SLPFRN(1,4)
Sf-Rn	Rn-220	1.90E-13	1.90E-13	SLPFRN(2,1)
Sf-Rn	Po-216	3.00E-15	3.00E-15	SLPFRN(2,2)
Sf-Rn	Pb-212	3.90E-11	3.90E-11	SLPFRN(2,3)
Sf-Rn	Bi-212	3.70E-11	3.70E-11	SLPFRN(2,4)

Attachment 9 Sheet No. 4 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 5
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Cancer Risk Slope Factors Summary Table (continued)
Risk Library: HEAST 2001 Morbidity

Menu	Parameter	Current Value	Base Case*	Parameter Name
Sf-Rn	Radon K factors, (mrem/WLM):			
Sf-Rn	Rn-222 Indoor	7.60E+02	7.60E+02	KFACTR(1,1)
Sf-Rn	Rn-222 Outdoor	5.70E+02	5.70E+02	KFACTR(1,2)
Sf-Rn	Rn-220 Indoor	1.50E+02	1.50E+02	KFACTR(2,1)
Sf-Rn	Rn-220 Outdoor	2.50E+02	2.50E+02	KFACTR(2,2)

*Base Case means Default.Lib w/o Associate Nuclide contributions.

Attachment 9 Sheet No. 5 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 6
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Risk Slope and Environmental Transport Factors for the Ground Pathway

ONuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)								
	t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Ac-225	4.500E-08	6.502E-01	6.502E-01	6.502E-01	6.502E-01	6.502E-01	6.502E-01	6.502E-01	6.502E-01	6.502E-01
Ac-227	3.480E-10	6.511E-01	6.511E-01	6.511E-01	6.511E-01	6.511E-01	6.511E-01	6.511E-01	6.511E-01	6.511E-01
Ac-228	4.530E-06	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01
Ag-108	8.560E-08	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01	6.376E-01
Ag-108m	7.180E-06	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01
Am-241	2.760E-08	6.603E-01	6.603E-01	6.603E-01	6.603E-01	6.603E-01	6.603E-01	6.603E-01	6.603E-01	6.603E-01
At-217	1.320E-09	6.396E-01	6.396E-01	6.396E-01	6.396E-01	6.396E-01	6.396E-01	6.396E-01	6.396E-01	6.396E-01
At-218	3.570E-09	6.601E-01	6.601E-01	6.601E-01	6.601E-01	6.601E-01	6.601E-01	6.601E-01	6.601E-01	6.601E-01
Bi-210	2.760E-09	6.431E-01	6.431E-01	6.431E-01	6.431E-01	6.431E-01	6.431E-01	6.431E-01	6.431E-01	6.431E-01
Bi-211	1.880E-07	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01
Bi-212	8.870E-07	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01	6.381E-01
Bi-213	5.650E-07	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01
Bi-214	7.480E-06	6.398E-01	6.398E-01	6.398E-01	6.398E-01	6.398E-01	6.398E-01	6.398E-01	6.398E-01	6.398E-01
C-14	7.830E-12	6.673E-01	6.673E-01	6.673E-01	6.673E-01	6.673E-01	6.673E-01	6.673E-01	6.673E-01	6.673E-01
Co-60	1.240E-05	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01	6.404E-01
Eu-152	5.300E-06	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01
Eu-154	5.830E-06	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01	6.408E-01
Fr-221	1.110E-07	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01	6.467E-01
Fr-223	1.400E-07	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	0.000E+00	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01
Ni-63	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Np-237	5.360E-08	6.526E-01	6.526E-01	6.526E-01	6.526E-01	6.526E-01	6.526E-01	6.526E-01	6.526E-01	6.526E-01
Pa-231	1.390E-07	6.435E-01	6.435E-01	6.435E-01	6.435E-01	6.435E-01	6.435E-01	6.435E-01	6.435E-01	6.435E-01
Pa-233	7.430E-07	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01	6.443E-01
Pb-209	5.370E-10	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01
Pb-210	1.410E-09	6.676E-01	6.676E-01	6.676E-01	6.676E-01	6.676E-01	6.676E-01	6.676E-01	6.676E-01	6.676E-01
Pb-211	2.290E-07	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01	6.397E-01
Pb-212	5.090E-07	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01	6.475E-01
Pb-214	9.820E-07	6.429E-01	6.429E-01	6.429E-01	6.429E-01	6.429E-01	6.429E-01	6.429E-01	6.429E-01	6.429E-01
Po-210	3.950E-11	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01
Po-211	3.580E-08	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01
Po-212	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-213	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Po-214	3.860E-10	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01	6.371E-01
Po-215	7.480E-10	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01	6.405E-01
Po-216	7.870E-11	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01
Po-218	4.260E-11	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01	6.391E-01
Pu-238	7.220E-11	6.728E-01	6.728E-01	6.728E-01	6.728E-01	6.728E-01	6.728E-01	6.728E-01	6.728E-01	6.728E-01
Pu-239	2.000E-10	6.490E-01	6.490E-01	6.490E-01	6.490E-01	6.490E-01	6.490E-01	6.490E-01	6.490E-01	6.490E-01
Pu-240	6.980E-11	6.691E-01	6.691E-01	6.691E-01	6.691E-01	6.691E-01	6.691E-01	6.691E-01	6.691E-01	6.691E-01
Ra-223	4.340E-07	6.463E-01	6.463E-01	6.463E-01	6.463E-01	6.463E-01	6.463E-01	6.463E-01	6.463E-01	6.463E-01
Ra-224	3.720E-08	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01	6.466E-01
Ra-225	5.910E-09	6.664E-01	6.664E-01	6.664E-01	6.664E-01	6.664E-01	6.664E-01	6.664E-01	6.664E-01	6.664E-01
Ra-226	2.290E-08	6.481E-01	6.481E-01	6.481E-01	6.481E-01	6.481E-01	6.481E-01	6.481E-01	6.481E-01	6.481E-01
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Rn-219	2.250E-07	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01	6.433E-01
Rn-220	1.700E-09	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01
Rn-222	1.740E-09	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01	6.378E-01
Th-227	3.780E-07	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01	6.471E-01

Attachment 9 Sheet No. 6 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 7
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Risk Slope and Environmental Transport Factors for the Ground Pathway

ONuclide (i)	Slope(i)*	ETFG(i,t) At Time in Years (dimensionless)								
	t=	0.000E+00	1.000E+00	3.000E+00	7.000E+00	1.100E+01	4.300E+01	1.350E+02	3.000E+02	1.000E+03
Th-228	5.590E-09	6.499E-01	6.499E-01	6.499E-01	6.499E-01	6.499E-01	6.499E-01	6.499E-01	6.499E-01	6.499E-01
Th-229	2.250E-07	6.509E-01	6.509E-01	6.509E-01	6.509E-01	6.509E-01	6.509E-01	6.509E-01	6.509E-01	6.509E-01
Th-230	8.190E-10	6.524E-01	6.524E-01	6.524E-01	6.524E-01	6.524E-01	6.524E-01	6.524E-01	6.524E-01	6.524E-01
Th-231	2.450E-08	6.532E-01	6.532E-01	6.532E-01	6.532E-01	6.532E-01	6.532E-01	6.532E-01	6.532E-01	6.532E-01
Th-232	3.420E-10	6.557E-01	6.557E-01	6.557E-01	6.557E-01	6.557E-01	6.557E-01	6.557E-01	6.557E-01	6.557E-01
Tl-207	1.520E-08	6.399E-01	6.399E-01	6.399E-01	6.399E-01	6.399E-01	6.399E-01	6.399E-01	6.399E-01	6.399E-01
Tl-208	1.760E-05	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01	6.414E-01
Tl-209	9.830E-06	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01	6.413E-01
Tl-210	0.000E+00	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01	6.800E-01
U-233	9.820E-10	6.493E-01	6.493E-01	6.493E-01	6.493E-01	6.493E-01	6.493E-01	6.493E-01	6.493E-01	6.493E-01
U-234	2.520E-10	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01	6.561E-01
U-235	5.180E-07	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01	6.479E-01
U-236	1.250E-10	6.614E-01	6.614E-01	6.614E-01	6.614E-01	6.614E-01	6.614E-01	6.614E-01	6.614E-01	6.614E-01

* - Units are 1/yr per (pCi/g) at infinite depth and area. Multiplication by ETFG(i,t) converts to site conditions.

Attachment 9 Sheet No. 7 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 8
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 0.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	4.480E-04	9.298E+01	6.910E+00	1.308E+02	6.424E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.313E+02
Am-241	9.368E-03	1.297E+01	1.279E-01	1.388E-02	1.343E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.654E+01
C-14	3.214E+02	1.207E+06	2.562E+05	2.076E+05	1.110E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.671E+06
Co-60	3.055E-04	3.381E+01	1.744E+01	3.995E+00	4.380E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.568E+01
Eu-152	1.670E-03	5.778E+00	1.075E+00	7.106E-02	2.394E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.319E+00
Eu-154	7.331E-04	2.537E+00	4.721E-01	3.120E-02	1.051E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.091E+00
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	3.552E+04	9.299E+05	1.263E+05	2.130E+05	1.460E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.269E+06
Ni-63	1.018E-01	7.044E+03	9.540E+02	8.833E+03	1.460E+02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.698E+04
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	6.517E-03	9.023E+00	1.779E-01	4.828E-03	9.344E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.855E+01
Pu-239	4.277E-03	5.921E+00	1.168E-01	3.169E-03	6.132E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.217E+01
Pu-240	1.018E-03	1.410E+00	2.780E-02	7.544E-04	1.460E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.898E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 0.000E+00 years

0

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 8 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 9
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)
0

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.821E-18	0.0000	1.636E-20	0.0000	1.803E-19	0.0000	1.583E-21	0.0000	8.822E-22	0.0000	1.306E-19	0.0000
Ag-108m	1.394E-06	0.0827	3.307E-13	0.0000	2.879E-08	0.0017	2.139E-09	0.0001	4.050E-08	0.0024	3.410E-10	0.0000
Am-241	1.227E-07	0.0073	7.707E-09	0.0005	5.088E-08	0.0030	5.017E-10	0.0000	5.446E-11	0.0000	8.533E-08	0.0051
C-14	2.510E-11	0.0000	5.746E-09	0.0003	6.106E-06	0.3622	1.298E-06	0.0770	1.051E-06	0.0623	7.828E-10	0.0000
Co-60	4.459E-07	0.0265	8.187E-14	0.0000	5.645E-09	0.0003	2.911E-09	0.0002	6.670E-10	0.0000	1.321E-10	0.0000
Eu-152	2.117E-06	0.1256	2.308E-12	0.0000	7.634E-10	0.0000	1.421E-10	0.0000	9.388E-12	0.0000	5.891E-10	0.0000
Eu-154	7.737E-07	0.0459	9.700E-13	0.0000	4.348E-10	0.0000	8.094E-11	0.0000	5.348E-12	0.0000	3.447E-10	0.0000
Gd-152	0.000E+00	0.0000	7.752E-24	0.0000	1.135E-22	0.0000	2.112E-23	0.0000	5.583E-25	0.0000	7.683E-23	0.0000
H-3	0.000E+00	0.0000	1.848E-08	0.0011	3.504E-07	0.0208	4.775E-08	0.0028	8.046E-08	0.0048	8.398E-11	0.0000
Ni-63	0.000E+00	0.0000	1.580E-11	0.0000	1.802E-07	0.0107	2.440E-08	0.0014	2.260E-07	0.0134	7.029E-09	0.0004
Np-237	1.694E-11	0.0000	2.379E-14	0.0000	3.376E-12	0.0000	1.084E-13	0.0000	1.299E-15	0.0000	3.118E-13	0.0000
Pa-231	8.615E-19	0.0000	1.785E-20	0.0000	1.223E-18	0.0000	2.487E-19	0.0000	6.304E-22	0.0000	2.103E-19	0.0000
Pb-210	2.492E-20	0.0000	5.142E-21	0.0000	1.802E-17	0.0000	6.153E-19	0.0000	5.575E-19	0.0000	1.413E-18	0.0000
Pu-238	2.075E-10	0.0000	5.846E-09	0.0003	4.071E-08	0.0024	8.027E-10	0.0000	2.179E-11	0.0000	6.786E-08	0.0040
Pu-239	4.085E-10	0.0000	4.269E-09	0.0003	3.088E-08	0.0018	6.089E-10	0.0000	1.653E-11	0.0000	5.073E-08	0.0030
Pu-240	3.496E-11	0.0000	1.015E-09	0.0001	7.344E-09	0.0004	1.448E-10	0.0000	3.930E-12	0.0000	1.211E-08	0.0007
Ra-226	3.033E-16	0.0000	2.630E-20	0.0000	6.447E-17	0.0000	1.774E-18	0.0000	4.162E-18	0.0000	2.381E-18	0.0000
Ra-228	2.364E-22	0.0000	1.734E-26	0.0000	2.607E-22	0.0000	7.086E-24	0.0000	1.672E-23	0.0000	1.087E-23	0.0000
Th-228	3.003E-22	0.0000	3.503E-25	0.0000	2.449E-24	0.0000	7.615E-26	0.0000	9.579E-27	0.0000	2.848E-24	0.0000
Th-229	7.584E-19	0.0000	9.246E-21	0.0000	4.111E-20	0.0000	8.255E-22	0.0000	1.150E-22	0.0000	7.600E-20	0.0000
Th-230	9.067E-18	0.0000	1.970E-17	0.0000	1.145E-16	0.0000	2.286E-18	0.0000	3.163E-19	0.0000	2.002E-16	0.0000
Th-232	3.605E-26	0.0000	2.835E-25	0.0000	1.212E-24	0.0000	2.420E-26	0.0000	3.350E-27	0.0000	2.168E-24	0.0000
U-233	9.043E-19	0.0000	6.701E-19	0.0000	1.988E-17	0.0000	6.507E-19	0.0000	2.911E-18	0.0000	1.325E-17	0.0000
U-234	3.036E-14	0.0000	8.526E-14	0.0000	2.468E-12	0.0000	7.793E-14	0.0000	3.643E-13	0.0000	1.694E-12	0.0000
U-235	1.591E-14	0.0000	1.862E-17	0.0000	6.217E-16	0.0000	1.963E-17	0.0000	9.178E-17	0.0000	4.317E-16	0.0000
U-236	2.675E-17	0.0000	1.384E-16	0.0000	4.112E-15	0.0000	1.298E-16	0.0000	6.070E-16	0.0000	2.815E-15	0.0000
Total	4.854E-06	0.2880	4.308E-08	0.0026	6.802E-06	0.4035	1.377E-06	0.0817	1.399E-06	0.0830	2.253E-07	0.0134

Attachment 9 Sheet No. 9 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 10
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.863E-18	0.0000	4.171E-20	0.0000	2.762E-19	0.0000	1.561E-21	0.0000	2.008E-21	0.0000	4.335E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.466E-06	0.0870
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.672E-07	0.0159
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.461E-06	0.5020
Co-60	1.139E-11	0.0000	1.371E-12	0.0000	1.814E-12	0.0000	4.313E-12	0.0000	1.271E-12	0.0000	4.552E-07	0.0270
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.118E-06	0.1257
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.745E-07	0.0460
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.197E-22	0.0000
H-3	1.410E-06	0.0836	5.217E-10	0.0000	5.339E-07	0.0317	4.769E-08	0.0028	1.500E-07	0.0089	2.639E-06	0.1566
Ni-63	5.657E-09	0.0003	2.307E-10	0.0000	8.973E-10	0.0001	5.496E-10	0.0000	6.395E-09	0.0004	4.513E-07	0.0268
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.076E-11	0.0000
Pa-231	1.474E-18	0.0000	8.259E-21	0.0000	2.336E-19	0.0000	1.747E-19	0.0000	8.404E-22	0.0000	4.454E-18	0.0000
Pb-210	4.349E-18	0.0000	1.010E-18	0.0000	1.363E-18	0.0000	1.392E-19	0.0000	1.425E-19	0.0000	2.764E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.154E-07	0.0068
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.691E-08	0.0052
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.065E-08	0.0012
Ra-226	1.052E-17	0.0000	2.407E-19	0.0000	1.604E-18	0.0000	1.950E-19	0.0000	5.570E-19	0.0000	3.892E-16	0.0000
Ra-228	8.210E-23	0.0000	1.919E-24	0.0000	1.275E-23	0.0000	1.595E-24	0.0000	4.675E-24	0.0000	6.349E-22	0.0000
Th-228	6.907E-24	0.0000	3.321E-25	0.0000	1.124E-24	0.0000	2.422E-26	0.0000	3.549E-27	0.0000	3.144E-22	0.0000
Th-229	1.219E-19	0.0000	5.509E-21	0.0000	2.487E-20	0.0000	9.541E-22	0.0000	1.804E-22	0.0000	1.039E-18	0.0000
Th-230	3.420E-16	0.0000	1.496E-17	0.0000	6.879E-17	0.0000	2.700E-18	0.0000	5.132E-19	0.0000	7.750E-16	0.0000
Th-232	4.787E-24	0.0000	2.122E-25	0.0000	9.070E-25	0.0000	3.093E-26	0.0000	5.773E-27	0.0000	9.671E-24	0.0000
U-233	1.919E-15	0.0000	9.064E-18	0.0000	2.850E-16	0.0000	1.197E-17	0.0000	6.163E-17	0.0000	2.325E-15	0.0000
U-234	3.394E-10	0.0000	1.606E-12	0.0000	5.052E-11	0.0000	2.132E-12	0.0000	1.095E-11	0.0000	4.094E-10	0.0000
U-235	8.324E-14	0.0000	3.963E-16	0.0000	1.247E-14	0.0000	5.261E-16	0.0000	2.701E-15	0.0000	1.164E-13	0.0000
U-236	5.555E-13	0.0000	2.622E-15	0.0000	8.248E-14	0.0000	3.480E-15	0.0000	1.787E-14	0.0000	6.698E-13	0.0000
Total	1.416E-06	0.0840	7.554E-10	0.0000	5.348E-07	0.0317	4.824E-08	0.0029	1.565E-07	0.0093	1.686E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 0.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 10 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 11
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

0
Water Independent Pathways (Inhalation excludes radon)

0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.394E-06	0.0827	3.307E-13	0.0000	0.000E+00	0.0000	2.879E-08	0.0017	2.139E-09	0.0001	4.050E-08	0.0024	3.410E-10	0.0000
Am-241	1.227E-07	0.0073	7.707E-09	0.0005	0.000E+00	0.0000	5.089E-08	0.0030	5.018E-10	0.0000	5.446E-11	0.0000	8.534E-08	0.0051
C-14	2.510E-11	0.0000	5.746E-09	0.0003	0.000E+00	0.0000	6.106E-06	0.3622	1.298E-06	0.0770	1.051E-06	0.0623	7.828E-10	0.0000
Co-60	4.459E-07	0.0265	8.187E-14	0.0000	0.000E+00	0.0000	5.645E-09	0.0003	2.911E-09	0.0002	6.670E-10	0.0000	1.321E-10	0.0000
Eu-152	2.117E-06	0.1256	2.308E-12	0.0000	0.000E+00	0.0000	7.634E-10	0.0000	1.421E-10	0.0000	9.388E-12	0.0000	5.891E-10	0.0000
Eu-154	7.737E-07	0.0459	9.700E-13	0.0000	0.000E+00	0.0000	4.348E-10	0.0000	8.094E-11	0.0000	5.348E-12	0.0000	3.447E-10	0.0000
H-3	0.000E+00	0.0000	1.848E-08	0.0011	0.000E+00	0.0000	3.504E-07	0.0208	4.775E-08	0.0028	8.046E-08	0.0048	8.398E-11	0.0000
Ni-63	0.000E+00	0.0000	1.580E-11	0.0000	0.000E+00	0.0000	1.802E-07	0.0107	2.440E-08	0.0014	2.260E-07	0.0134	7.029E-09	0.0004
Pu-238	2.075E-10	0.0000	5.846E-09	0.0003	0.000E+00	0.0000	4.071E-08	0.0024	8.028E-10	0.0000	2.215E-11	0.0000	6.786E-08	0.0040
Pu-239	4.085E-10	0.0000	4.269E-09	0.0003	0.000E+00	0.0000	3.088E-08	0.0018	6.089E-10	0.0000	1.653E-11	0.0000	5.073E-08	0.0030
Pu-240	3.496E-11	0.0000	1.015E-09	0.0001	0.000E+00	0.0000	7.344E-09	0.0004	1.448E-10	0.0000	3.931E-12	0.0000	1.211E-08	0.0007
Total	4.854E-06	0.2880	4.308E-08	0.0026	0.000E+00	0.0000	6.802E-06	0.4035	1.377E-06	0.0817	1.399E-06	0.0830	2.253E-07	0.0134

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 0.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.466E-06	0.0870
Am-241	1.919E-15	0.0000	9.070E-18	0.0000	0.000E+00	0.0000	2.850E-16	0.0000	1.197E-17	0.0000	6.163E-17	0.0000	2.672E-07	0.0159
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.461E-06	0.5020
Co-60	1.139E-11	0.0000	1.371E-12	0.0000	0.000E+00	0.0000	1.814E-12	0.0000	4.313E-12	0.0000	1.271E-12	0.0000	4.552E-07	0.0270
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.118E-06	0.1257
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.745E-07	0.0460
H-3	1.410E-06	0.0836	5.217E-10	0.0000	0.000E+00	0.0000	5.339E-07	0.0317	4.769E-08	0.0028	1.500E-07	0.0089	2.639E-06	0.1566
Ni-63	5.657E-09	0.0003	2.307E-10	0.0000	0.000E+00	0.0000	8.973E-10	0.0001	5.496E-10	0.0000	6.395E-09	0.0004	4.513E-07	0.0268
Pu-238	3.394E-10	0.0000	1.606E-12	0.0000	0.000E+00	0.0000	5.052E-11	0.0000	2.132E-12	0.0000	1.095E-11	0.0000	1.159E-07	0.0069
Pu-239	8.324E-14	0.0000	3.964E-16	0.0000	0.000E+00	0.0000	1.247E-14	0.0000	5.262E-16	0.0000	2.701E-15	0.0000	8.691E-08	0.0052
Pu-240	5.555E-13	0.0000	2.622E-15	0.0000	0.000E+00	0.0000	8.248E-14	0.0000	3.480E-15	0.0000	1.787E-14	0.0000	2.065E-08	0.0012
Total	1.416E-06	0.0840	7.554E-10	0.0000	0.000E+00	0.0000	5.348E-07	0.0317	4.824E-08	0.0029	1.565E-07	0.0093	1.686E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 11 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 12
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total Ingestion*
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	
Ac-227	4.687E-19	2.132E-15	1.790E-16	9.407E-18	6.721E-16	4.504E-13	6.306E-15	3.377E-14	1.447E-16	2.201E-16	4.939E-13
Ag-108m	4.456E-04	9.247E+01	6.872E+00	1.301E+02	6.389E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.301E+02
Am-241	9.353E-03	1.295E+01	1.277E-01	1.386E-02	1.341E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.650E+01
C-14	1.472E+02	5.695E+05	1.348E+05	1.049E+05	5.082E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.093E+05
Co-60	2.678E-04	2.964E+01	1.529E+01	3.503E+00	3.840E-01	1.227E-02	9.975E-04	1.258E-03	1.886E-03	7.483E-04	4.883E+01
Eu-152	1.585E-03	5.485E+00	1.021E+00	6.746E-02	2.273E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.846E+00
Eu-154	6.776E-04	2.344E+00	4.364E-01	2.883E-02	9.715E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.781E+00
Gd-152	2.916E-18	1.009E-14	1.878E-15	4.983E-17	4.181E-15	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.620E-14
H-3	1.957E+04	5.227E+05	7.657E+04	1.256E+05	8.042E+01	7.629E+05	2.168E+02	2.184E+05	1.783E+04	6.073E+04	1.785E+06
Ni-63	1.011E-01	6.992E+03	9.470E+02	8.768E+03	1.449E+02	2.144E+01	6.009E-01	2.271E+00	1.093E+00	1.475E+01	1.689E+04
Np-237	3.032E-09	8.091E-05	2.332E-06	2.969E-08	4.347E-06	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.762E-05
Pa-231	4.452E-17	5.820E-13	1.012E-13	4.037E-16	6.383E-14	2.303E-13	9.716E-16	2.830E-14	2.676E-14	2.173E-16	1.034E-12
Pb-210	9.252E-20	1.788E-15	7.114E-17	6.000E-17	1.327E-16	5.584E-13	3.472E-14	3.242E-14	4.355E-15	5.600E-15	6.375E-13
Pu-238	6.465E-03	8.952E+00	1.765E-01	4.790E-03	9.270E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.840E+01
Pu-239	4.276E-03	5.921E+00	1.167E-01	3.168E-03	6.132E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.217E+01
Pu-240	1.018E-03	1.410E+00	2.779E-02	7.543E-04	1.460E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.898E+00
Ra-226	1.197E-17	5.934E-13	1.133E-14	3.175E-14	1.717E-14	8.029E-13	1.011E-14	4.756E-14	7.952E-15	2.713E-14	1.549E-12
Ra-228	2.898E-23	1.431E-18	2.704E-20	7.619E-20	4.155E-20	9.057E-22	1.776E-23	4.617E-22	4.280E-24	9.102E-22	1.578E-18
Th-228	2.460E-24	2.216E-20	6.719E-22	9.660E-23	3.527E-21	1.099E-23	3.814E-25	3.566E-24	4.061E-26	9.692E-25	2.647E-20
Th-229	2.086E-19	3.568E-16	1.169E-17	2.010E-18	2.991E-16	1.116E-13	3.818E-15	1.257E-14	1.232E-16	2.070E-17	1.288E-13
Th-230	8.286E-14	1.271E-10	3.030E-12	5.421E-13	1.188E-10	3.321E-11	9.486E-13	2.154E-11	1.480E-12	3.545E-13	3.070E-10
Th-232	7.428E-22	1.140E-18	2.717E-20	4.862E-21	1.065E-18	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.237E-18
U-233	6.625E-15	3.448E-11	1.466E-12	4.459E-12	9.499E-12	1.305E-10	4.314E-13	1.273E-11	3.427E-13	2.376E-12	1.963E-10
U-234	1.838E-08	6.216E-05	1.892E-06	9.209E-06	2.635E-05	5.725E-04	1.941E-06	5.888E-05	1.864E-06	1.142E-05	7.462E-04
U-235	4.206E-12	1.423E-08	4.330E-10	2.108E-09	6.031E-09	1.308E-07	4.437E-10	1.346E-08	4.260E-10	2.609E-09	1.706E-07
U-236	3.010E-11	1.018E-07	3.099E-09	1.508E-08	4.316E-08	9.364E-07	3.175E-09	9.631E-08	3.049E-09	1.867E-08	1.221E-06

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+00 years

0

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 12 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 13
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.063E-18	0.0000	1.854E-20	0.0000	2.042E-19	0.0000	1.756E-21	0.0000	9.993E-22	0.0000	1.480E-19	0.0000
Ag-108m	1.386E-06	0.1202	3.289E-13	0.0000	2.863E-08	0.0025	2.128E-09	0.0002	4.028E-08	0.0035	3.391E-10	0.0000
Am-241	1.225E-07	0.0106	7.694E-09	0.0007	5.080E-08	0.0044	5.008E-10	0.0000	5.437E-11	0.0000	8.520E-08	0.0074
C-14	1.150E-11	0.0000	2.632E-09	0.0002	2.880E-06	0.2497	6.819E-07	0.0591	5.303E-07	0.0460	3.585E-10	0.0000
Co-60	3.909E-07	0.0339	7.177E-14	0.0000	4.948E-09	0.0004	2.552E-09	0.0002	5.847E-10	0.0001	1.158E-10	0.0000
Eu-152	2.009E-06	0.1742	2.191E-12	0.0000	7.247E-10	0.0001	1.349E-10	0.0000	8.912E-12	0.0000	5.592E-10	0.0000
Eu-154	7.150E-07	0.0620	8.965E-13	0.0000	4.019E-10	0.0000	7.480E-11	0.0000	4.942E-12	0.0000	3.186E-10	0.0000
Gd-152	0.000E+00	0.0000	8.155E-24	0.0000	1.194E-22	0.0000	2.222E-23	0.0000	5.874E-25	0.0000	8.082E-23	0.0000
H-3	0.000E+00	0.0000	1.018E-08	0.0009	1.968E-07	0.0171	2.883E-08	0.0025	4.729E-08	0.0041	4.626E-11	0.0000
Ni-63	0.000E+00	0.0000	1.569E-11	0.0000	1.788E-07	0.0155	2.422E-08	0.0021	2.243E-07	0.0194	6.977E-09	0.0006
Np-237	1.806E-11	0.0000	2.536E-14	0.0000	3.599E-12	0.0000	1.155E-13	0.0000	1.385E-15	0.0000	3.324E-13	0.0000
Pa-231	9.498E-19	0.0000	1.968E-20	0.0000	1.349E-18	0.0000	2.743E-19	0.0000	6.947E-22	0.0000	2.319E-19	0.0000
Pb-210	2.916E-20	0.0000	6.017E-21	0.0000	2.107E-17	0.0000	7.188E-19	0.0000	6.517E-19	0.0000	1.653E-18	0.0000
Pu-238	2.059E-10	0.0000	5.800E-09	0.0005	4.039E-08	0.0035	7.964E-10	0.0001	2.161E-11	0.0000	6.732E-08	0.0058
Pu-239	4.085E-10	0.0000	4.268E-09	0.0004	3.088E-08	0.0027	6.089E-10	0.0001	1.653E-11	0.0000	5.073E-08	0.0044
Pu-240	3.495E-11	0.0000	1.015E-09	0.0001	7.343E-09	0.0006	1.448E-10	0.0000	3.930E-12	0.0000	1.211E-08	0.0010
Ra-226	3.451E-16	0.0000	2.992E-20	0.0000	7.335E-17	0.0000	2.020E-18	0.0000	4.737E-18	0.0000	2.709E-18	0.0000
Ra-228	2.653E-22	0.0000	1.946E-26	0.0000	2.926E-22	0.0000	7.957E-24	0.0000	1.877E-23	0.0000	1.220E-23	0.0000
Th-228	3.402E-22	0.0000	3.968E-25	0.0000	2.763E-24	0.0000	8.578E-26	0.0000	1.079E-26	0.0000	3.226E-24	0.0000
Th-229	8.639E-19	0.0000	1.053E-20	0.0000	4.682E-20	0.0000	9.395E-22	0.0000	1.307E-22	0.0000	8.657E-20	0.0000
Th-230	9.977E-18	0.0000	2.168E-17	0.0000	1.260E-16	0.0000	2.514E-18	0.0000	3.477E-19	0.0000	2.203E-16	0.0000
Th-232	3.974E-26	0.0000	3.126E-25	0.0000	1.336E-24	0.0000	2.667E-26	0.0000	3.688E-27	0.0000	2.391E-24	0.0000
U-233	9.967E-19	0.0000	7.385E-19	0.0000	2.190E-17	0.0000	7.158E-19	0.0000	3.207E-18	0.0000	1.461E-17	0.0000
U-234	3.227E-14	0.0000	9.062E-14	0.0000	2.623E-12	0.0000	8.282E-14	0.0000	3.872E-13	0.0000	1.801E-12	0.0000
U-235	1.695E-14	0.0000	1.984E-17	0.0000	6.625E-16	0.0000	2.092E-17	0.0000	9.780E-17	0.0000	4.600E-16	0.0000
U-236	2.851E-17	0.0000	1.475E-16	0.0000	4.381E-15	0.0000	1.383E-16	0.0000	6.468E-16	0.0000	3.000E-15	0.0000
Total	4.625E-06	0.4010	3.161E-08	0.0027	3.420E-06	0.2965	7.419E-07	0.0643	8.428E-07	0.0731	2.241E-07	0.0194

Attachment 9 Sheet No. 13 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 14
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.188E-18	0.0000	4.885E-20	0.0000	3.226E-19	0.0000	1.781E-21	0.0000	2.347E-21	0.0000	5.000E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.458E-06	0.1264
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.668E-07	0.0231
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.095E-06	0.3551
Co-60	1.143E-11	0.0000	1.374E-12	0.0000	1.816E-12	0.0000	4.270E-12	0.0000	1.266E-12	0.0000	3.991E-07	0.0346
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.011E-06	0.1743
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.158E-07	0.0621
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.312E-22	0.0000
H-3	1.070E-06	0.0928	3.979E-10	0.0000	4.097E-07	0.0355	3.775E-08	0.0033	1.156E-07	0.0100	1.917E-06	0.1662
Ni-63	6.004E-09	0.0005	2.449E-10	0.0000	9.523E-10	0.0001	5.830E-10	0.0001	6.785E-09	0.0006	4.489E-07	0.0389
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.213E-11	0.0000
Pa-231	1.682E-18	0.0000	9.415E-21	0.0000	2.659E-19	0.0000	1.973E-19	0.0000	9.402E-22	0.0000	4.981E-18	0.0000
Pb-210	5.556E-18	0.0000	1.165E-18	0.0000	1.442E-18	0.0000	1.591E-19	0.0000	1.790E-19	0.0000	3.263E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.145E-07	0.0099
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.691E-08	0.0075
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.065E-08	0.0018
Ra-226	1.281E-17	0.0000	2.846E-19	0.0000	1.852E-18	0.0000	2.374E-19	0.0000	6.799E-19	0.0000	4.438E-16	0.0000
Ra-228	9.159E-23	0.0000	2.115E-24	0.0000	1.386E-23	0.0000	1.713E-24	0.0000	4.986E-24	0.0000	7.111E-22	0.0000
Th-228	7.686E-24	0.0000	3.641E-25	0.0000	1.214E-24	0.0000	2.583E-26	0.0000	3.755E-27	0.0000	3.560E-22	0.0000
Th-229	1.231E-19	0.0000	5.854E-21	0.0000	2.789E-20	0.0000	1.092E-21	0.0000	2.052E-22	0.0000	1.167E-18	0.0000
Th-230	3.888E-16	0.0000	1.701E-17	0.0000	7.748E-17	0.0000	2.995E-18	0.0000	5.681E-19	0.0000	8.677E-16	0.0000
Th-232	5.453E-24	0.0000	2.401E-25	0.0000	1.014E-24	0.0000	3.420E-26	0.0000	6.373E-27	0.0000	1.086E-23	0.0000
U-233	2.186E-15	0.0000	1.033E-17	0.0000	3.247E-16	0.0000	1.365E-17	0.0000	7.024E-17	0.0000	2.647E-15	0.0000
U-234	3.735E-10	0.0000	1.767E-12	0.0000	5.560E-11	0.0000	2.347E-12	0.0000	1.205E-11	0.0000	4.503E-10	0.0000
U-235	9.177E-14	0.0000	4.370E-16	0.0000	1.375E-14	0.0000	5.803E-16	0.0000	2.979E-15	0.0000	1.277E-13	0.0000
U-236	6.124E-13	0.0000	2.890E-15	0.0000	9.094E-14	0.0000	3.839E-15	0.0000	1.971E-14	0.0000	7.382E-13	0.0000
Total	1.077E-06	0.0933	6.460E-10	0.0001	4.107E-07	0.0356	3.834E-08	0.0033	1.224E-07	0.0106	1.153E-05	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+00 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 14 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 15
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

0
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.386E-06	0.1202	3.289E-13	0.0000	0.000E+00	0.0000	2.863E-08	0.0025	2.128E-09	0.0002	4.028E-08	0.0035	3.391E-10	0.0000
Am-241	1.225E-07	0.0106	7.694E-09	0.0007	0.000E+00	0.0000	5.080E-08	0.0044	5.010E-10	0.0000	5.437E-11	0.0000	8.520E-08	0.0074
C-14	1.150E-11	0.0000	2.632E-09	0.0002	0.000E+00	0.0000	2.880E-06	0.2497	6.819E-07	0.0591	5.303E-07	0.0460	3.585E-10	0.0000
Co-60	3.909E-07	0.0339	7.177E-14	0.0000	0.000E+00	0.0000	4.948E-09	0.0004	2.552E-09	0.0002	5.847E-10	0.0001	1.158E-10	0.0000
Eu-152	2.009E-06	0.1742	2.191E-12	0.0000	0.000E+00	0.0000	7.247E-10	0.0001	1.349E-10	0.0000	8.912E-12	0.0000	5.592E-10	0.0000
Eu-154	7.150E-07	0.0620	8.965E-13	0.0000	0.000E+00	0.0000	4.019E-10	0.0000	7.480E-11	0.0000	4.942E-12	0.0000	3.186E-10	0.0000
H-3	0.000E+00	0.0000	1.018E-08	0.0009	0.000E+00	0.0000	1.968E-07	0.0171	2.883E-08	0.0025	4.729E-08	0.0041	4.626E-11	0.0000
Ni-63	0.000E+00	0.0000	1.569E-11	0.0000	0.000E+00	0.0000	1.788E-07	0.0155	2.422E-08	0.0021	2.243E-07	0.0194	6.977E-09	0.0006
Pu-238	2.059E-10	0.0000	5.800E-09	0.0005	0.000E+00	0.0000	4.039E-08	0.0035	7.965E-10	0.0001	2.200E-11	0.0000	6.732E-08	0.0058
Pu-239	4.085E-10	0.0000	4.268E-09	0.0004	0.000E+00	0.0000	3.088E-08	0.0027	6.089E-10	0.0001	1.653E-11	0.0000	5.073E-08	0.0044
Pu-240	3.495E-11	0.0000	1.015E-09	0.0001	0.000E+00	0.0000	7.343E-09	0.0006	1.448E-10	0.0000	3.930E-12	0.0000	1.211E-08	0.0010
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ
Total	4.625E-06	0.4010	3.161E-08	0.0027	0.000E+00	0.0000	3.420E-06	0.2965	7.419E-07	0.0643	8.428E-07	0.0731	2.241E-07	0.0194

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.458E-06	0.1264
Am-241	2.186E-15	0.0000	1.033E-17	0.0000	0.000E+00	0.0000	3.247E-16	0.0000	1.365E-17	0.0000	7.024E-17	0.0000	2.668E-07	0.0231
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.095E-06	0.3551
Co-60	1.143E-11	0.0000	1.374E-12	0.0000	0.000E+00	0.0000	1.816E-12	0.0000	4.270E-12	0.0000	1.266E-12	0.0000	3.991E-07	0.0346
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.011E-06	0.1743
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.158E-07	0.0621
H-3	1.070E-06	0.0928	3.979E-10	0.0000	0.000E+00	0.0000	4.097E-07	0.0355	3.775E-08	0.0033	1.156E-07	0.0100	1.917E-06	0.1662
Ni-63	6.004E-09	0.0005	2.449E-10	0.0000	0.000E+00	0.0000	9.523E-10	0.0001	5.830E-10	0.0001	6.785E-09	0.0006	4.489E-07	0.0389
Pu-238	3.735E-10	0.0000	1.767E-12	0.0000	0.000E+00	0.0000	5.560E-11	0.0000	2.347E-12	0.0000	1.205E-11	0.0000	1.150E-07	0.0100
Pu-239	9.178E-14	0.0000	4.370E-16	0.0000	0.000E+00	0.0000	1.375E-14	0.0000	5.805E-16	0.0000	2.979E-15	0.0000	8.691E-08	0.0075
Pu-240	6.124E-13	0.0000	2.890E-15	0.0000	0.000E+00	0.0000	9.094E-14	0.0000	3.839E-15	0.0000	1.971E-14	0.0000	2.065E-08	0.0018
ÍÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ	ÍÍÍÍÍÍÍÍÍ	ÍÍÍÍÍÍ
Total	1.077E-06	0.0933	6.460E-10	0.0001	0.000E+00	0.0000	4.107E-07	0.0356	3.834E-08	0.0033	1.224E-07	0.0106	1.153E-05	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 15 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 16
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+00 years

Radio-Nuclide	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	1.244E-17	4.786E-14	1.919E-15	2.272E-16	1.783E-14	1.264E-12	2.197E-14	1.489E-13	8.469E-16	9.230E-16	1.505E-12
Ag-108m	4.407E-04	9.145E+01	6.796E+00	1.286E+02	6.318E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.275E+02
Am-241	9.322E-03	1.291E+01	1.272E-01	1.381E-02	1.337E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.641E+01
C-14	3.086E+01	1.194E+05	2.827E+04	2.198E+04	1.065E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.696E+05
Co-60	2.058E-04	2.278E+01	1.175E+01	2.692E+00	2.951E-01	2.843E-02	2.384E-03	3.117E-03	6.744E-03	2.103E-03	3.756E+01
Eu-152	1.429E-03	4.943E+00	9.200E-01	6.079E-02	2.048E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.972E+00
Eu-154	5.788E-04	2.003E+00	3.728E-01	2.463E-02	8.299E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.230E+00
Gd-152	8.312E-18	2.876E-14	5.353E-15	1.416E-16	1.192E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.617E-14
H-3	5.935E+03	1.586E+05	2.322E+04	3.810E+04	2.439E+01	1.313E+06	3.772E+02	3.851E+05	3.390E+04	1.080E+05	2.061E+06
Ni-63	9.959E-02	6.889E+03	9.330E+02	8.639E+03	1.428E+02	6.358E+01	1.814E+00	6.998E+00	4.032E+00	4.865E+01	1.673E+04
Np-237	9.080E-09	2.483E-04	7.739E-06	9.428E-08	1.302E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.691E-04
Pa-231	3.998E-16	5.429E-12	1.055E-12	3.078E-15	5.733E-13	1.680E-12	8.336E-15	2.784E-13	2.812E-13	2.252E-15	9.311E-12
Pb-210	7.369E-18	1.168E-13	4.608E-15	3.876E-15	1.057E-14	2.513E-12	2.062E-13	2.662E-13	2.862E-14	2.816E-14	3.178E-12
Pu-238	6.364E-03	8.811E+00	1.737E-01	4.715E-03	9.124E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.811E+01
Pu-239	4.276E-03	5.920E+00	1.167E-01	3.168E-03	6.131E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.217E+01
Pu-240	1.018E-03	1.409E+00	2.779E-02	7.541E-04	1.459E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.897E+00
Ra-226	3.215E-16	1.715E-11	4.247E-13	1.047E-12	4.610E-13	3.830E-12	6.361E-14	4.128E-13	5.557E-14	1.481E-13	2.360E-11
Ra-228	7.370E-22	3.919E-17	9.600E-19	2.379E-18	1.057E-18	1.774E-16	2.783E-18	1.707E-17	2.143E-18	6.337E-18	2.493E-16
Th-228	1.661E-22	7.454E-19	2.640E-20	3.375E-21	2.382E-19	6.216E-17	1.953E-18	6.062E-18	1.222E-19	1.803E-20	7.133E-17
Th-229	5.620E-18	8.277E-15	1.917E-16	3.007E-17	8.058E-15	3.362E-13	1.039E-14	3.418E-14	4.294E-16	1.217E-16	3.978E-13
Th-230	7.404E-13	1.063E-09	2.264E-11	3.452E-12	1.062E-09	6.390E-10	2.013E-11	2.406E-10	1.772E-11	3.720E-12	3.072E-09
Th-232	6.672E-21	9.579E-18	2.041E-19	3.113E-20	9.567E-18	6.647E-17	2.081E-18	7.920E-18	2.336E-19	4.437E-20	9.613E-17
U-233	5.945E-14	2.413E-10	9.020E-12	3.391E-11	8.524E-11	3.611E-09	1.247E-11	3.865E-10	1.437E-11	7.987E-11	4.474E-09
U-234	5.454E-08	1.873E-04	5.855E-06	2.768E-05	7.820E-05	5.134E-03	1.781E-05	5.543E-04	2.161E-05	1.163E-04	6.143E-03
U-235	1.258E-11	4.321E-08	1.350E-09	6.385E-09	1.804E-08	1.180E-06	4.091E-09	1.273E-07	4.962E-09	2.671E-08	1.412E-06
U-236	9.004E-11	3.092E-07	9.662E-09	4.569E-08	1.291E-07	8.441E-06	2.928E-08	9.113E-07	3.551E-08	1.911E-07	1.010E-05

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+00 years

0

Radon Pathway	Radionuclides							
	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 16 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 17
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)
0

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.616E-18	0.0000	2.351E-20	0.0000	2.588E-19	0.0000	2.139E-21	0.0000	1.267E-21	0.0000	1.876E-19	0.0000
Ag-108m	1.371E-06	0.1958	3.253E-13	0.0000	2.832E-08	0.0040	2.104E-09	0.0003	3.983E-08	0.0057	3.354E-10	0.0000
Am-241	1.221E-07	0.0174	7.669E-09	0.0011	5.064E-08	0.0072	4.992E-10	0.0001	5.419E-11	0.0000	8.492E-08	0.0121
C-14	2.410E-12	0.0000	5.516E-10	0.0001	6.037E-07	0.0862	1.429E-07	0.0204	1.112E-07	0.0159	7.514E-11	0.0000
Co-60	3.004E-07	0.0429	5.516E-14	0.0000	3.803E-09	0.0005	1.961E-09	0.0003	4.494E-10	0.0001	8.904E-11	0.0000
Eu-152	1.811E-06	0.2585	1.974E-12	0.0000	6.531E-10	0.0001	1.216E-10	0.0000	8.032E-12	0.0000	5.040E-10	0.0001
Eu-154	6.108E-07	0.0872	7.658E-13	0.0000	3.433E-10	0.0000	6.390E-11	0.0000	4.222E-12	0.0000	2.721E-10	0.0000
Gd-152	0.000E+00	0.0000	8.901E-24	0.0000	1.303E-22	0.0000	2.425E-23	0.0000	6.410E-25	0.0000	8.821E-23	0.0000
H-3	0.000E+00	0.0000	3.088E-09	0.0004	5.969E-08	0.0085	8.743E-09	0.0012	1.434E-08	0.0020	1.403E-11	0.0000
Ni-63	0.000E+00	0.0000	1.546E-11	0.0000	1.762E-07	0.0252	2.387E-08	0.0034	2.210E-07	0.0316	6.875E-09	0.0010
Np-237	2.029E-11	0.0000	2.850E-14	0.0000	4.045E-12	0.0000	1.299E-13	0.0000	1.557E-15	0.0000	3.735E-13	0.0000
Pa-231	1.143E-18	0.0000	2.368E-20	0.0000	1.624E-18	0.0000	3.304E-19	0.0000	8.353E-22	0.0000	2.791E-19	0.0000
Pb-210	3.933E-20	0.0000	8.114E-21	0.0000	2.838E-17	0.0000	9.665E-19	0.0000	8.771E-19	0.0000	2.230E-18	0.0000
Pu-238	2.026E-10	0.0000	5.709E-09	0.0008	3.975E-08	0.0057	7.839E-10	0.0001	2.127E-11	0.0000	6.626E-08	0.0095
Pu-239	4.085E-10	0.0001	4.268E-09	0.0006	3.088E-08	0.0044	6.088E-10	0.0001	1.652E-11	0.0000	5.072E-08	0.0072
Pu-240	3.494E-11	0.0000	1.015E-09	0.0001	7.341E-09	0.0010	1.448E-10	0.0000	3.929E-12	0.0000	1.210E-08	0.0017
Ra-226	4.411E-16	0.0000	3.825E-20	0.0000	9.380E-17	0.0000	2.585E-18	0.0000	6.061E-18	0.0000	3.463E-18	0.0000
Ra-228	3.301E-22	0.0000	2.422E-26	0.0000	3.642E-22	0.0000	9.912E-24	0.0000	2.337E-23	0.0000	1.518E-23	0.0000
Th-228	4.308E-22	0.0000	5.025E-25	0.0000	3.475E-24	0.0000	1.075E-25	0.0000	1.353E-26	0.0000	4.085E-24	0.0000
Th-229	1.107E-18	0.0000	1.350E-20	0.0000	5.998E-20	0.0000	1.202E-21	0.0000	1.671E-22	0.0000	1.110E-19	0.0000
Th-230	1.196E-17	0.0000	2.599E-17	0.0000	1.510E-16	0.0000	3.011E-18	0.0000	4.158E-19	0.0000	2.641E-16	0.0000
Th-232	4.784E-26	0.0000	3.762E-25	0.0000	1.608E-24	0.0000	3.206E-26	0.0000	4.428E-27	0.0000	2.878E-24	0.0000
U-233	1.199E-18	0.0000	8.883E-19	0.0000	2.629E-17	0.0000	8.578E-19	0.0000	3.852E-18	0.0000	1.757E-17	0.0000
U-234	3.602E-14	0.0000	1.012E-13	0.0000	2.928E-12	0.0000	9.249E-14	0.0000	4.323E-13	0.0000	2.010E-12	0.0000
U-235	1.903E-14	0.0000	2.227E-17	0.0000	7.439E-16	0.0000	2.349E-17	0.0000	1.098E-16	0.0000	5.164E-16	0.0000
U-236	3.200E-17	0.0000	1.655E-16	0.0000	4.919E-15	0.0000	1.554E-16	0.0000	7.262E-16	0.0000	3.368E-15	0.0000
Total	4.216E-06	0.6020	2.232E-08	0.0032	1.001E-06	0.1430	1.818E-07	0.0260	3.869E-07	0.0552	2.222E-07	0.0317

Attachment 9 Sheet No. 17 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 18
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	2.926E-18	0.0000	6.562E-20	0.0000	4.348E-19	0.0000	2.314E-21	0.0000	3.124E-21	0.0000	6.521E-18	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.442E-06	0.2059
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.659E-07	0.0380
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.584E-07	0.1226
Co-60	1.102E-11	0.0000	1.327E-12	0.0000	1.755E-12	0.0000	4.167E-12	0.0000	1.229E-12	0.0000	3.067E-07	0.0438
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.812E-06	0.2587
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.115E-07	0.0873
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.523E-22	0.0000
H-3	6.278E-07	0.0896	2.329E-10	0.0000	2.391E-07	0.0341	2.172E-08	0.0031	6.734E-08	0.0096	1.042E-06	0.1488
Ni-63	6.683E-09	0.0010	2.726E-10	0.0000	1.060E-09	0.0002	6.502E-10	0.0001	7.560E-09	0.0011	4.442E-07	0.0634
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.487E-11	0.0000
Pa-231	2.151E-18	0.0000	1.202E-20	0.0000	3.384E-19	0.0000	2.491E-19	0.0000	1.165E-21	0.0000	6.153E-18	0.0000
Pb-210	7.105E-18	0.0000	1.476E-18	0.0000	1.820E-18	0.0000	2.157E-19	0.0000	2.433E-19	0.0000	4.336E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.127E-07	0.0161
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.690E-08	0.0124
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.064E-08	0.0029
Ra-226	1.707E-17	0.0000	3.809E-19	0.0000	2.492E-18	0.0000	3.131E-19	0.0000	9.162E-19	0.0000	5.683E-16	0.0000
Ra-228	1.086E-22	0.0000	2.525E-24	0.0000	1.662E-23	0.0000	1.905E-24	0.0000	5.755E-24	0.0000	8.782E-22	0.0000
Th-228	8.939E-24	0.0000	4.269E-25	0.0000	1.430E-24	0.0000	2.817E-26	0.0000	4.269E-27	0.0000	4.498E-22	0.0000
Th-229	1.788E-19	0.0000	8.205E-21	0.0000	3.721E-20	0.0000	1.398E-21	0.0000	2.649E-22	0.0000	1.519E-18	0.0000
Th-230	4.963E-16	0.0000	2.173E-17	0.0000	9.726E-17	0.0000	3.649E-18	0.0000	6.895E-19	0.0000	1.076E-15	0.0000
Th-232	6.392E-24	0.0000	2.827E-25	0.0000	1.203E-24	0.0000	4.096E-26	0.0000	7.607E-27	0.0000	1.287E-23	0.0000
U-233	2.803E-15	0.0000	1.324E-17	0.0000	4.163E-16	0.0000	1.752E-17	0.0000	9.010E-17	0.0000	3.390E-15	0.0000
U-234	4.479E-10	0.0001	2.119E-12	0.0000	6.668E-11	0.0000	2.818E-12	0.0000	1.446E-11	0.0000	5.396E-10	0.0001
U-235	1.105E-13	0.0000	5.260E-16	0.0000	1.655E-14	0.0000	6.993E-16	0.0000	3.588E-15	0.0000	1.523E-13	0.0000
U-236	7.372E-13	0.0000	3.479E-15	0.0000	1.095E-13	0.0000	4.626E-15	0.0000	2.373E-14	0.0000	8.878E-13	0.0000
Total	6.349E-07	0.0907	5.090E-10	0.0001	2.403E-07	0.0343	2.237E-08	0.0032	7.492E-08	0.0107	7.003E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+00 years

0

Radon Pathway	Radionuclides Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 18 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 19
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

0
Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	1.371E-06	0.1958	3.253E-13	0.0000	0.000E+00	0.0000	2.832E-08	0.0040	2.104E-09	0.0003	3.983E-08	0.0057	3.354E-10	0.0000
Am-241	1.221E-07	0.0174	7.669E-09	0.0011	0.000E+00	0.0000	5.064E-08	0.0072	4.993E-10	0.0001	5.420E-11	0.0000	8.492E-08	0.0121
C-14	2.410E-12	0.0000	5.516E-10	0.0001	0.000E+00	0.0000	6.037E-07	0.0862	1.429E-07	0.0204	1.112E-07	0.0159	7.514E-11	0.0000
Co-60	3.004E-07	0.0429	5.516E-14	0.0000	0.000E+00	0.0000	3.803E-09	0.0005	1.961E-09	0.0003	4.494E-10	0.0001	8.904E-11	0.0000
Eu-152	1.811E-06	0.2585	1.974E-12	0.0000	0.000E+00	0.0000	6.531E-10	0.0001	1.216E-10	0.0000	8.032E-12	0.0000	5.040E-10	0.0001
Eu-154	6.108E-07	0.0872	7.658E-13	0.0000	0.000E+00	0.0000	3.433E-10	0.0000	6.390E-11	0.0000	4.222E-12	0.0000	2.721E-10	0.0000
H-3	0.000E+00	0.0000	3.088E-09	0.0004	0.000E+00	0.0000	5.969E-08	0.0085	8.743E-09	0.0012	1.434E-08	0.0020	1.403E-11	0.0000
Ni-63	0.000E+00	0.0000	1.546E-11	0.0000	0.000E+00	0.0000	1.762E-07	0.0252	2.387E-08	0.0034	2.210E-07	0.0316	6.875E-09	0.0010
Pu-238	2.027E-10	0.0000	5.709E-09	0.0008	0.000E+00	0.0000	3.976E-08	0.0057	7.840E-10	0.0001	2.171E-11	0.0000	6.626E-08	0.0095
Pu-239	4.085E-10	0.0001	4.268E-09	0.0006	0.000E+00	0.0000	3.088E-08	0.0044	6.088E-10	0.0001	1.652E-11	0.0000	5.072E-08	0.0072
Pu-240	3.494E-11	0.0000	1.015E-09	0.0001	0.000E+00	0.0000	7.341E-09	0.0010	1.448E-10	0.0000	3.929E-12	0.0000	1.210E-08	0.0017
Total	4.216E-06	0.6020	2.232E-08	0.0032	0.000E+00	0.0000	1.001E-06	0.1430	1.818E-07	0.0260	3.869E-07	0.0552	2.222E-07	0.0317

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+00 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.442E-06	0.2059
Am-241	2.803E-15	0.0000	1.325E-17	0.0000	0.000E+00	0.0000	4.164E-16	0.0000	1.752E-17	0.0000	9.010E-17	0.0000	2.659E-07	0.0380
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.584E-07	0.1226
Co-60	1.102E-11	0.0000	1.327E-12	0.0000	0.000E+00	0.0000	1.755E-12	0.0000	4.167E-12	0.0000	1.229E-12	0.0000	3.067E-07	0.0438
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.812E-06	0.2587
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.115E-07	0.0873
H-3	6.278E-07	0.0896	2.329E-10	0.0000	0.000E+00	0.0000	2.391E-07	0.0341	2.172E-08	0.0031	6.734E-08	0.0096	1.042E-06	0.1488
Ni-63	6.683E-09	0.0010	2.726E-10	0.0000	0.000E+00	0.0000	1.060E-09	0.0002	6.502E-10	0.0001	7.560E-09	0.0011	4.442E-07	0.0634
Pu-238	4.479E-10	0.0001	2.119E-12	0.0000	0.000E+00	0.0000	6.668E-11	0.0000	2.818E-12	0.0000	1.446E-11	0.0000	1.133E-07	0.0162
Pu-239	1.105E-13	0.0000	5.261E-16	0.0000	0.000E+00	0.0000	1.655E-14	0.0000	6.996E-16	0.0000	3.588E-15	0.0000	8.690E-08	0.0124
Pu-240	7.372E-13	0.0000	3.479E-15	0.0000	0.000E+00	0.0000	1.095E-13	0.0000	4.626E-15	0.0000	2.373E-14	0.0000	2.064E-08	0.0029
Total	6.349E-07	0.0907	5.090E-10	0.0001	0.000E+00	0.0000	2.403E-07	0.0343	2.237E-08	0.0032	7.492E-08	0.0107	7.003E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 19 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 20
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 7.000E+00 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Ac-227	1.527E-16	5.547E-13	1.138E-14	2.687E-15	2.189E-13	5.887E-12	9.246E-14	5.768E-13	4.986E-15	4.159E-15	7.353E-12
Ag-108m	4.310E-04	8.945E+01	6.648E+00	1.258E+02	6.180E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.226E+02
Am-241	9.262E-03	1.282E+01	1.264E-01	1.372E-02	1.328E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.624E+01
C-14	1.353E+00	5.234E+03	1.240E+03	9.639E+02	4.670E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	7.438E+03
Co-60	1.216E-04	1.346E+01	6.939E+00	1.590E+00	1.743E-01	3.925E-02	3.319E-03	4.382E-03	1.024E-02	3.048E-03	2.222E+01
Eu-152	1.160E-03	4.014E+00	7.472E-01	4.937E-02	1.664E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.474E+00
Eu-154	4.223E-04	1.461E+00	2.720E-01	1.797E-02	6.055E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.357E+00
Gd-152	1.756E-17	6.074E-14	1.131E-14	2.989E-16	2.517E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.752E-14
H-3	5.453E+02	1.457E+04	2.134E+03	3.500E+03	2.241E+00	1.279E+06	3.681E+02	3.767E+05	3.362E+04	1.059E+05	1.816E+06
Ni-63	9.668E-02	6.688E+03	9.058E+02	8.387E+03	1.386E+02	1.442E+02	4.135E+00	1.604E+01	9.656E+00	1.135E+02	1.641E+04
Np-237	2.112E-08	5.814E-04	1.850E-05	2.228E-07	3.028E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.304E-04
Pa-231	2.168E-15	2.976E-11	5.964E-12	1.584E-14	3.109E-12	1.629E-11	7.386E-14	2.260E-12	2.069E-12	1.408E-14	5.956E-11
Pb-210	2.112E-16	3.114E-12	1.138E-13	9.944E-14	3.029E-13	8.870E-12	7.913E-13	1.108E-12	8.902E-14	1.166E-13	1.461E-11
Pu-238	6.165E-03	8.536E+00	1.683E-01	4.568E-03	8.839E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.755E+01
Pu-239	4.275E-03	5.919E+00	1.167E-01	3.167E-03	6.130E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.217E+01
Pu-240	1.017E-03	1.408E+00	2.777E-02	7.537E-04	1.459E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.896E+00
Ra-226	4.039E-15	2.200E-10	5.845E-12	1.394E-11	5.791E-12	2.300E-11	4.017E-13	2.726E-12	2.964E-13	9.454E-13	2.730E-10
Ra-228	8.359E-21	4.539E-16	1.192E-17	2.858E-17	1.199E-17	4.941E-16	8.454E-18	5.660E-17	7.292E-18	2.120E-17	1.094E-15
Th-228	3.538E-21	1.087E-17	3.691E-19	4.634E-20	5.072E-18	1.700E-16	5.825E-18	1.976E-17	4.096E-19	5.982E-20	2.124E-16
Th-229	7.107E-17	1.009E-13	2.118E-15	3.101E-16	1.019E-13	1.001E-12	3.221E-14	1.189E-13	2.950E-15	5.672E-16	1.361E-12
Th-230	3.974E-12	5.589E-09	1.141E-10	1.635E-11	5.698E-09	7.126E-09	2.331E-10	1.715E-09	1.070E-10	2.150E-11	2.062E-08
Th-232	3.619E-20	5.090E-17	1.040E-18	1.490E-19	5.188E-17	2.356E-16	7.958E-18	3.497E-17	1.211E-18	2.324E-19	3.839E-16
U-233	3.218E-13	1.197E-09	4.127E-11	1.728E-10	4.613E-10	4.609E-08	1.604E-10	5.014E-09	2.022E-10	1.067E-09	5.441E-08
U-234	1.246E-07	4.297E-04	1.353E-05	6.345E-05	1.786E-04	2.759E-02	9.630E-05	3.020E-03	1.242E-04	6.474E-04	3.216E-02
U-235	2.919E-11	1.007E-07	3.169E-09	1.487E-08	4.186E-08	6.404E-06	2.235E-08	7.009E-07	2.882E-08	1.502E-07	7.467E-06
U-236	2.089E-10	7.204E-07	2.268E-08	1.064E-07	2.995E-07	4.582E-05	1.599E-07	5.015E-06	2.062E-07	1.075E-06	5.343E-05

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 7.000E+00 years

0

	Radionuclides							
Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 20 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 21
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years
0
Water Independent Pathways (Inhalation excludes radon)
0

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.028E-18	0.0000	3.620E-20	0.0000	3.978E-19	0.0000	3.058E-21	0.0000	1.948E-21	0.0000	2.889E-19	0.0000
Ag-108m	1.341E-06	0.2655	3.182E-13	0.0000	2.770E-08	0.0055	2.058E-09	0.0004	3.896E-08	0.0077	3.281E-10	0.0001
Am-241	1.213E-07	0.0240	7.619E-09	0.0015	5.031E-08	0.0100	4.960E-10	0.0001	5.384E-11	0.0000	8.436E-08	0.0167
C-14	1.056E-13	0.0000	2.418E-11	0.0000	2.647E-08	0.0052	6.268E-09	0.0012	4.874E-09	0.0010	3.294E-12	0.0000
Co-60	1.774E-07	0.0351	3.258E-14	0.0000	2.246E-09	0.0004	1.158E-09	0.0002	2.655E-10	0.0001	5.259E-11	0.0000
Eu-152	1.471E-06	0.2911	1.603E-12	0.0000	5.304E-10	0.0001	9.872E-11	0.0000	6.523E-12	0.0000	4.093E-10	0.0001
Eu-154	4.457E-07	0.0882	5.588E-13	0.0000	2.505E-10	0.0000	4.662E-11	0.0000	3.080E-12	0.0000	1.985E-10	0.0000
Gd-152	0.000E+00	0.0000	1.018E-23	0.0000	1.490E-22	0.0000	2.773E-23	0.0000	7.330E-25	0.0000	1.009E-22	0.0000
H-3	0.000E+00	0.0000	2.836E-10	0.0001	5.483E-09	0.0011	8.032E-10	0.0002	1.318E-09	0.0003	1.289E-12	0.0000
Ni-63	0.000E+00	0.0000	1.500E-11	0.0000	1.711E-07	0.0339	2.317E-08	0.0046	2.145E-07	0.0425	6.674E-09	0.0013
Np-237	2.473E-11	0.0000	3.474E-14	0.0000	4.933E-12	0.0000	1.586E-13	0.0000	1.899E-15	0.0000	4.552E-13	0.0000
Pa-231	1.597E-18	0.0000	3.308E-20	0.0000	2.268E-18	0.0000	4.620E-19	0.0000	1.165E-21	0.0000	3.899E-19	0.0000
Pb-210	6.785E-20	0.0000	1.400E-20	0.0000	4.887E-17	0.0000	1.659E-18	0.0000	1.508E-18	0.0000	3.847E-18	0.0000
Pu-238	1.963E-10	0.0000	5.530E-09	0.0011	3.851E-08	0.0076	7.594E-10	0.0002	2.061E-11	0.0000	6.419E-08	0.0127
Pu-239	4.084E-10	0.0001	4.267E-09	0.0008	3.087E-08	0.0061	6.087E-10	0.0001	1.652E-11	0.0000	5.071E-08	0.0100
Pu-240	3.492E-11	0.0000	1.014E-09	0.0002	7.337E-09	0.0015	1.447E-10	0.0000	3.927E-12	0.0000	1.210E-08	0.0024
Ra-226	6.902E-16	0.0000	5.984E-20	0.0000	1.468E-16	0.0000	4.054E-18	0.0000	9.496E-18	0.0000	5.418E-18	0.0000
Ra-228	4.898E-22	0.0000	3.594E-26	0.0000	5.408E-22	0.0000	1.474E-23	0.0000	3.474E-23	0.0000	2.252E-23	0.0000
Th-228	6.594E-22	0.0000	7.692E-25	0.0000	5.254E-24	0.0000	1.617E-25	0.0000	2.036E-26	0.0000	6.254E-24	0.0000
Th-229	1.742E-18	0.0000	2.123E-20	0.0000	9.426E-20	0.0000	1.886E-21	0.0000	2.614E-22	0.0000	1.745E-19	0.0000
Th-230	1.658E-17	0.0000	3.602E-17	0.0000	2.091E-16	0.0000	4.163E-18	0.0000	5.737E-19	0.0000	3.660E-16	0.0000
Th-232	6.682E-26	0.0000	5.255E-25	0.0000	2.244E-24	0.0000	4.470E-26	0.0000	6.160E-27	0.0000	4.020E-24	0.0000
U-233	1.672E-18	0.0000	1.239E-18	0.0000	3.656E-17	0.0000	1.188E-18	0.0000	5.362E-18	0.0000	2.450E-17	0.0000
U-234	4.328E-14	0.0000	1.215E-13	0.0000	3.519E-12	0.0000	1.112E-13	0.0000	5.195E-13	0.0000	2.415E-12	0.0000
U-235	2.316E-14	0.0000	2.710E-17	0.0000	9.053E-16	0.0000	2.860E-17	0.0000	1.336E-16	0.0000	6.283E-16	0.0000
U-236	3.893E-17	0.0000	2.014E-16	0.0000	5.986E-15	0.0000	1.891E-16	0.0000	8.836E-16	0.0000	4.097E-15	0.0000
Total	3.557E-06	0.7040	1.876E-08	0.0037	3.608E-07	0.0714	3.561E-08	0.0070	2.600E-07	0.0515	2.190E-07	0.0434

Attachment 9 Sheet No. 21 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 22
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.997E-18	0.0000	1.117E-19	0.0000	7.382E-19	0.0000	3.757E-21	0.0000	5.360E-21	0.0000	1.061E-17	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.410E-06	0.2792
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.642E-07	0.0523
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.764E-08	0.0074
Co-60	9.153E-12	0.0000	1.103E-12	0.0000	1.461E-12	0.0000	3.507E-12	0.0000	1.027E-12	0.0000	1.812E-07	0.0359
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.472E-06	0.2913
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.462E-07	0.0883
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.885E-22	0.0000
H-3	3.821E-07	0.0756	1.415E-10	0.0000	1.449E-07	0.0287	1.298E-08	0.0026	4.073E-08	0.0081	5.887E-07	0.1165
Ni-63	7.978E-09	0.0016	3.256E-10	0.0001	1.267E-09	0.0003	7.785E-10	0.0002	9.040E-09	0.0018	4.348E-07	0.0861
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.032E-11	0.0000
Pa-231	3.376E-18	0.0000	1.879E-20	0.0000	5.262E-19	0.0000	3.831E-19	0.0000	1.726E-21	0.0000	9.057E-18	0.0000
Pb-210	1.305E-17	0.0000	3.051E-18	0.0000	4.099E-18	0.0000	3.726E-19	0.0000	3.697E-19	0.0000	7.691E-17	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.092E-07	0.0216
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.688E-08	0.0172
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.063E-08	0.0041
Ra-226	2.993E-17	0.0000	6.837E-19	0.0000	4.546E-18	0.0000	5.411E-19	0.0000	1.549E-18	0.0000	8.933E-16	0.0000
Ra-228	1.671E-22	0.0000	3.828E-24	0.0000	2.493E-23	0.0000	3.089E-24	0.0000	9.091E-24	0.0000	1.311E-21	0.0000
Th-228	1.383E-23	0.0000	6.487E-25	0.0000	2.146E-24	0.0000	4.622E-26	0.0000	6.795E-27	0.0000	6.886E-22	0.0000
Th-229	2.972E-19	0.0000	1.350E-20	0.0000	6.022E-20	0.0000	2.239E-21	0.0000	4.241E-22	0.0000	2.407E-18	0.0000
Th-230	7.739E-16	0.0000	3.393E-17	0.0000	1.473E-16	0.0000	5.222E-18	0.0000	9.790E-19	0.0000	1.594E-15	0.0000
Th-232	9.818E-24	0.0000	4.305E-25	0.0000	1.787E-24	0.0000	5.871E-26	0.0000	1.090E-26	0.0000	1.901E-23	0.0000
U-233	4.407E-15	0.0000	2.083E-17	0.0000	6.552E-16	0.0000	2.761E-17	0.0000	1.419E-16	0.0000	5.323E-15	0.0000
U-234	6.207E-10	0.0001	2.937E-12	0.0000	9.245E-11	0.0000	3.913E-12	0.0000	2.005E-11	0.0000	7.468E-10	0.0001
U-235	1.543E-13	0.0000	7.349E-16	0.0000	2.313E-14	0.0000	9.787E-16	0.0000	5.017E-15	0.0000	2.090E-13	0.0000
U-236	1.030E-12	0.0000	4.861E-15	0.0000	1.530E-13	0.0000	6.473E-15	0.0000	3.318E-14	0.0000	1.238E-12	0.0000
Total	3.907E-07	0.0773	4.711E-10	0.0001	1.462E-07	0.0289	1.377E-08	0.0027	4.979E-08	0.0099	5.052E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 7.000E+00 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 22 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 23
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.341E-06	0.2655	3.182E-13	0.0000	0.000E+00	0.0000	2.770E-08	0.0055	2.058E-09	0.0004	3.896E-08	0.0077	3.281E-10	0.0001
Am-241	1.213E-07	0.0240	7.619E-09	0.0015	0.000E+00	0.0000	5.031E-08	0.0100	4.961E-10	0.0001	5.384E-11	0.0000	8.437E-08	0.0167
C-14	1.056E-13	0.0000	2.418E-11	0.0000	0.000E+00	0.0000	2.647E-08	0.0052	6.268E-09	0.0012	4.874E-09	0.0010	3.294E-12	0.0000
Co-60	1.774E-07	0.0351	3.258E-14	0.0000	0.000E+00	0.0000	2.246E-09	0.0004	1.158E-09	0.0002	2.655E-10	0.0001	5.259E-11	0.0000
Eu-152	1.471E-06	0.2911	1.603E-12	0.0000	0.000E+00	0.0000	5.304E-10	0.0001	9.872E-11	0.0000	6.523E-12	0.0000	4.093E-10	0.0001
Eu-154	4.457E-07	0.0882	5.588E-13	0.0000	0.000E+00	0.0000	2.505E-10	0.0000	4.662E-11	0.0000	3.080E-12	0.0000	1.985E-10	0.0000
H-3	0.000E+00	0.0000	2.836E-10	0.0001	0.000E+00	0.0000	5.483E-09	0.0011	8.032E-10	0.0002	1.318E-09	0.0003	1.289E-12	0.0000
Ni-63	0.000E+00	0.0000	1.500E-11	0.0000	0.000E+00	0.0000	1.711E-07	0.0339	2.317E-08	0.0046	2.145E-07	0.0425	6.674E-09	0.0013
Pu-238	1.963E-10	0.0000	5.531E-09	0.0011	0.000E+00	0.0000	3.852E-08	0.0076	7.595E-10	0.0002	2.113E-11	0.0000	6.420E-08	0.0127
Pu-239	4.084E-10	0.0001	4.267E-09	0.0008	0.000E+00	0.0000	3.087E-08	0.0061	6.087E-10	0.0001	1.652E-11	0.0000	5.071E-08	0.0100
Pu-240	3.492E-11	0.0000	1.014E-09	0.0002	0.000E+00	0.0000	7.337E-09	0.0015	1.447E-10	0.0000	3.927E-12	0.0000	1.210E-08	0.0024
Total	3.557E-06	0.7040	1.876E-08	0.0037	0.000E+00	0.0000	3.608E-07	0.0714	3.561E-08	0.0070	2.600E-07	0.0515	2.190E-07	0.0434

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 7.000E+00 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.410E-06	0.2792
Am-241	4.408E-15	0.0000	2.084E-17	0.0000	0.000E+00	0.0000	6.552E-16	0.0000	2.762E-17	0.0000	1.419E-16	0.0000	2.642E-07	0.0523
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.764E-08	0.0074
Co-60	9.153E-12	0.0000	1.103E-12	0.0000	0.000E+00	0.0000	1.461E-12	0.0000	3.507E-12	0.0000	1.027E-12	0.0000	1.812E-07	0.0359
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.472E-06	0.2913
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.462E-07	0.0883
H-3	3.821E-07	0.0756	1.415E-10	0.0000	0.000E+00	0.0000	1.449E-07	0.0287	1.298E-08	0.0026	4.073E-08	0.0081	5.887E-07	0.1165
Ni-63	7.978E-09	0.0016	3.256E-10	0.0001	0.000E+00	0.0000	1.267E-09	0.0003	7.785E-10	0.0002	9.040E-09	0.0018	4.348E-07	0.0861
Pu-238	6.207E-10	0.0001	2.937E-12	0.0000	0.000E+00	0.0000	9.245E-11	0.0000	3.913E-12	0.0000	2.005E-11	0.0000	1.100E-07	0.0218
Pu-239	1.543E-13	0.0000	7.350E-16	0.0000	0.000E+00	0.0000	2.313E-14	0.0000	9.791E-16	0.0000	5.017E-15	0.0000	8.688E-08	0.0172
Pu-240	1.030E-12	0.0000	4.861E-15	0.0000	0.000E+00	0.0000	1.530E-13	0.0000	6.473E-15	0.0000	3.318E-14	0.0000	2.063E-08	0.0041
Total	3.907E-07	0.0773	4.711E-10	0.0001	0.000E+00	0.0000	1.462E-07	0.0289	1.377E-08	0.0027	4.979E-08	0.0099	5.052E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 23 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 24
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.100E+01 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	5.727E-16	2.047E-12	2.956E-14	9.968E-15	8.212E-13	1.611E-11	2.709E-13	1.809E-12	1.506E-14	1.281E-14	2.113E-11
Ag-108m	4.216E-04	8.750E+01	6.502E+00	1.231E+02	6.045E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.177E+02
Am-241	9.201E-03	1.274E+01	1.256E-01	1.363E-02	1.319E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.607E+01
C-14	5.915E-02	2.288E+02	5.420E+01	4.214E+01	2.042E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.252E+02
Co-60	7.181E-05	7.948E+00	4.099E+00	9.392E-01	1.030E-01	3.645E-02	3.090E-03	4.090E-03	9.747E-03	2.868E-03	1.315E+01
Eu-152	9.422E-04	3.260E+00	6.068E-01	4.009E-02	1.351E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.258E+00
Eu-154	3.082E-04	1.066E+00	1.985E-01	1.311E-02	4.418E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.720E+00
Gd-152	2.506E-17	8.671E-14	1.614E-14	4.267E-16	3.594E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.392E-13
H-3	5.000E+01	1.336E+03	1.957E+02	3.210E+02	2.055E-01	1.713E+05	4.976E+01	5.150E+04	4.874E+03	1.458E+04	2.442E+05
Ni-63	9.385E-02	6.492E+03	8.793E+02	8.141E+03	1.346E+02	2.201E+02	6.321E+00	2.456E+01	1.495E+01	1.746E+02	1.609E+04
Np-237	3.308E-08	9.123E-04	2.919E-05	3.505E-07	4.742E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.892E-04
Pa-231	5.333E-15	7.342E-11	1.483E-11	3.838E-14	7.647E-12	5.812E-11	2.582E-13	7.662E-12	6.396E-12	3.868E-14	1.684E-10
Pb-210	1.246E-15	1.798E-11	6.365E-13	5.656E-13	1.787E-12	1.771E-11	1.624E-12	2.338E-12	2.557E-13	2.726E-13	4.317E-11
Pu-238	5.973E-03	8.269E+00	1.630E-01	4.425E-03	8.564E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.700E+01
Pu-239	4.274E-03	5.917E+00	1.167E-01	3.167E-03	6.128E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.217E+01
Pu-240	1.017E-03	1.408E+00	2.776E-02	7.533E-04	1.458E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.894E+00
Ra-226	1.550E-14	8.492E-10	2.298E-11	5.434E-11	2.222E-11	7.137E-11	1.307E-12	9.354E-12	1.343E-12	3.952E-12	1.036E-09
Ra-228	2.918E-20	1.593E-15	4.263E-17	1.013E-16	4.183E-17	9.395E-16	1.617E-17	1.083E-16	1.318E-17	3.795E-17	2.894E-15
Th-228	1.609E-20	4.326E-17	1.415E-18	1.775E-19	2.308E-17	3.022E-16	1.044E-17	3.551E-17	7.146E-19	1.028E-19	4.169E-16
Th-229	2.745E-16	3.861E-13	7.912E-15	1.130E-15	3.936E-13	1.801E-12	6.162E-14	2.672E-13	9.297E-15	1.683E-15	2.930E-12
Th-230	9.675E-12	1.353E-08	2.729E-10	3.835E-11	1.387E-08	2.641E-08	8.741E-10	5.189E-09	2.775E-10	5.469E-11	6.052E-08
Th-232	8.901E-20	1.245E-16	2.511E-18	3.531E-19	1.276E-16	5.031E-16	1.705E-17	7.773E-17	2.925E-18	5.559E-19	8.564E-16
U-233	7.899E-13	2.864E-09	9.603E-11	4.167E-10	1.133E-09	1.781E-07	6.221E-10	1.951E-08	8.042E-10	4.185E-09	2.078E-07
U-234	1.916E-07	6.618E-04	2.087E-05	9.770E-05	2.748E-04	6.719E-02	2.349E-04	7.381E-03	3.080E-04	1.592E-03	7.776E-02
U-235	4.562E-11	1.575E-07	4.968E-09	2.325E-08	6.541E-08	1.576E-05	5.510E-08	1.731E-06	7.221E-08	3.732E-07	1.824E-05
U-236	3.263E-10	1.127E-06	3.554E-08	1.664E-07	4.679E-07	1.127E-04	3.942E-07	1.238E-05	5.166E-07	2.670E-06	1.305E-04

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.100E+01 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 24 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 25
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	5.900E-18	0.0000	5.302E-20	0.0000	5.819E-19	0.0000	4.190E-21	0.0000	2.851E-21	0.0000	4.232E-19	0.0000
Ag-108m	1.312E-06	0.3289	3.112E-13	0.0000	2.709E-08	0.0068	2.013E-09	0.0005	3.811E-08	0.0096	3.209E-10	0.0001
Am-241	1.205E-07	0.0302	7.570E-09	0.0019	4.998E-08	0.0125	4.927E-10	0.0001	5.349E-11	0.0000	8.382E-08	0.0210
C-14	4.618E-15	0.0000	1.057E-12	0.0000	1.157E-09	0.0003	2.740E-10	0.0001	2.131E-10	0.0001	1.440E-13	0.0000
Co-60	1.048E-07	0.0263	1.925E-14	0.0000	1.327E-09	0.0003	6.843E-10	0.0002	1.568E-10	0.0000	3.107E-11	0.0000
Eu-152	1.194E-06	0.2994	1.302E-12	0.0000	4.307E-10	0.0001	8.017E-11	0.0000	5.297E-12	0.0000	3.324E-10	0.0001
Eu-154	3.252E-07	0.0815	4.077E-13	0.0000	1.828E-10	0.0000	3.402E-11	0.0000	2.248E-12	0.0000	1.449E-10	0.0000
Gd-152	0.000E+00	0.0000	1.122E-23	0.0000	1.642E-22	0.0000	3.056E-23	0.0000	8.077E-25	0.0000	1.112E-22	0.0000
H-3	0.000E+00	0.0000	2.600E-11	0.0000	5.027E-10	0.0001	7.365E-11	0.0000	1.208E-10	0.0000	1.182E-13	0.0000
Ni-63	0.000E+00	0.0000	1.457E-11	0.0000	1.661E-07	0.0416	2.249E-08	0.0056	2.083E-07	0.0522	6.479E-09	0.0016
Np-237	2.915E-11	0.0000	4.094E-14	0.0000	5.814E-12	0.0000	1.870E-13	0.0000	2.240E-15	0.0000	5.365E-13	0.0000
Pa-231	2.138E-18	0.0000	4.430E-20	0.0000	3.039E-18	0.0000	6.193E-19	0.0000	1.558E-21	0.0000	5.221E-19	0.0000
Pb-210	1.103E-19	0.0000	2.276E-20	0.0000	7.934E-17	0.0000	2.685E-18	0.0000	2.445E-18	0.0000	6.253E-18	0.0000
Pu-238	1.902E-10	0.0000	5.358E-09	0.0013	3.731E-08	0.0094	7.357E-10	0.0002	1.997E-11	0.0000	6.219E-08	0.0156
Pu-239	4.083E-10	0.0001	4.266E-09	0.0011	3.086E-08	0.0077	6.085E-10	0.0002	1.652E-11	0.0000	5.070E-08	0.0127
Pu-240	3.491E-11	0.0000	1.014E-09	0.0003	7.333E-09	0.0018	1.446E-10	0.0000	3.924E-12	0.0000	1.209E-08	0.0030
Ra-226	1.027E-15	0.0000	8.907E-20	0.0000	2.186E-16	0.0000	6.044E-18	0.0000	1.415E-17	0.0000	8.064E-18	0.0000
Ra-228	6.923E-22	0.0000	5.079E-26	0.0000	7.646E-22	0.0000	2.087E-23	0.0000	4.915E-23	0.0000	3.183E-23	0.0000
Th-228	9.572E-22	0.0000	1.117E-24	0.0000	7.547E-24	0.0000	2.312E-25	0.0000	2.911E-26	0.0000	9.077E-24	0.0000
Th-229	2.606E-18	0.0000	3.177E-20	0.0000	1.409E-19	0.0000	2.815E-21	0.0000	3.893E-22	0.0000	2.611E-19	0.0000
Th-230	2.202E-17	0.0000	4.783E-17	0.0000	2.776E-16	0.0000	5.520E-18	0.0000	7.592E-19	0.0000	4.861E-16	0.0000
Th-232	8.948E-26	0.0000	7.037E-25	0.0000	3.004E-24	0.0000	5.975E-26	0.0000	8.220E-27	0.0000	5.383E-24	0.0000
U-233	2.235E-18	0.0000	1.656E-18	0.0000	4.876E-17	0.0000	1.580E-18	0.0000	7.156E-18	0.0000	3.276E-17	0.0000
U-234	5.022E-14	0.0000	1.410E-13	0.0000	4.084E-12	0.0000	1.291E-13	0.0000	6.029E-13	0.0000	2.802E-12	0.0000
U-235	2.723E-14	0.0000	3.187E-17	0.0000	1.065E-15	0.0000	3.365E-17	0.0000	1.572E-16	0.0000	7.390E-16	0.0000
U-236	4.578E-17	0.0000	2.368E-16	0.0000	7.040E-15	0.0000	2.225E-16	0.0000	1.039E-15	0.0000	4.818E-15	0.0000
Total	3.057E-06	0.7665	1.825E-08	0.0046	3.223E-07	0.0808	2.763E-08	0.0069	2.470E-07	0.0619	2.161E-07	0.0542

Attachment 9 Sheet No. 25 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 26
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	8.163E-18	0.0000	1.824E-19	0.0000	1.205E-18	0.0000	5.773E-21	0.0000	8.710E-21	0.0000	1.653E-17	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.379E-06	0.3458
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.624E-07	0.0658
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.645E-09	0.0004
Co-60	6.968E-12	0.0000	8.402E-13	0.0000	1.114E-12	0.0000	2.689E-12	0.0000	7.852E-13	0.0000	1.070E-07	0.0268
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.195E-06	0.2996
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.255E-07	0.0816
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.179E-22	0.0000
H-3	5.017E-08	0.0126	1.873E-11	0.0000	1.939E-08	0.0049	1.835E-09	0.0005	5.490E-09	0.0014	7.763E-08	0.0195
Ni-63	9.193E-09	0.0023	3.752E-10	0.0001	1.460E-09	0.0004	8.988E-10	0.0002	1.043E-08	0.0026	4.257E-07	0.1067
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.573E-11	0.0000
Pa-231	5.074E-18	0.0000	2.809E-20	0.0000	7.821E-19	0.0000	5.599E-19	0.0000	2.455E-21	0.0000	1.281E-17	0.0000
Pb-210	2.241E-17	0.0000	5.243E-18	0.0000	7.101E-18	0.0000	6.866E-19	0.0000	7.123E-19	0.0000	1.270E-16	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.058E-07	0.0265
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.686E-08	0.0218
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.062E-08	0.0052
Ra-226	4.944E-17	0.0000	1.120E-18	0.0000	7.428E-18	0.0000	9.045E-19	0.0000	2.702E-18	0.0000	1.336E-15	0.0000
Ra-228	2.181E-22	0.0000	5.058E-24	0.0000	3.325E-23	0.0000	4.062E-24	0.0000	1.181E-23	0.0000	1.831E-21	0.0000
Th-228	1.756E-23	0.0000	8.237E-25	0.0000	2.728E-24	0.0000	5.990E-26	0.0000	8.696E-27	0.0000	9.964E-22	0.0000
Th-229	4.777E-19	0.0000	2.184E-20	0.0000	9.575E-20	0.0000	3.408E-21	0.0000	6.423E-22	0.0000	3.642E-18	0.0000
Th-230	1.149E-15	0.0000	5.043E-17	0.0000	2.132E-16	0.0000	7.165E-18	0.0000	1.333E-18	0.0000	2.261E-15	0.0000
Th-232	1.324E-23	0.0000	5.864E-25	0.0000	2.440E-24	0.0000	7.893E-26	0.0000	1.458E-26	0.0000	2.561E-23	0.0000
U-233	6.595E-15	0.0000	3.117E-17	0.0000	9.807E-16	0.0000	4.140E-17	0.0000	2.125E-16	0.0000	7.955E-15	0.0000
U-234	8.245E-10	0.0002	3.902E-12	0.0000	1.228E-10	0.0000	5.206E-12	0.0000	2.666E-11	0.0000	9.909E-10	0.0002
U-235	2.066E-13	0.0000	9.843E-16	0.0000	3.099E-14	0.0000	1.313E-15	0.0000	6.725E-15	0.0000	2.759E-13	0.0000
U-236	1.379E-12	0.0000	6.510E-15	0.0000	2.049E-13	0.0000	8.683E-15	0.0000	4.447E-14	0.0000	1.657E-12	0.0000
Total	6.019E-08	0.0151	3.987E-10	0.0001	2.098E-08	0.0053	2.742E-09	0.0007	1.594E-08	0.0040	3.989E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.100E+01 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 26 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 27
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

0
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.312E-06	0.3289	3.112E-13	0.0000	0.000E+00	0.0000	2.709E-08	0.0068	2.013E-09	0.0005	3.811E-08	0.0096	3.209E-10	0.0001
Am-241	1.206E-07	0.0302	7.570E-09	0.0019	0.000E+00	0.0000	4.998E-08	0.0125	4.929E-10	0.0001	5.349E-11	0.0000	8.382E-08	0.0210
C-14	4.618E-15	0.0000	1.057E-12	0.0000	0.000E+00	0.0000	1.157E-09	0.0003	2.740E-10	0.0001	2.131E-10	0.0001	1.440E-13	0.0000
Co-60	1.048E-07	0.0263	1.925E-14	0.0000	0.000E+00	0.0000	1.327E-09	0.0003	6.843E-10	0.0002	1.568E-10	0.0000	3.107E-11	0.0000
Eu-152	1.194E-06	0.2994	1.302E-12	0.0000	0.000E+00	0.0000	4.307E-10	0.0001	8.017E-11	0.0000	5.297E-12	0.0000	3.324E-10	0.0001
Eu-154	3.252E-07	0.0815	4.077E-13	0.0000	0.000E+00	0.0000	1.828E-10	0.0000	3.402E-11	0.0000	2.248E-12	0.0000	1.449E-10	0.0000
H-3	0.000E+00	0.0000	2.600E-11	0.0000	0.000E+00	0.0000	5.027E-10	0.0001	7.365E-11	0.0000	1.208E-10	0.0000	1.182E-13	0.0000
Ni-63	0.000E+00	0.0000	1.457E-11	0.0000	0.000E+00	0.0000	1.661E-07	0.0416	2.249E-08	0.0056	2.083E-07	0.0522	6.479E-09	0.0016
Pu-238	1.902E-10	0.0000	5.358E-09	0.0013	0.000E+00	0.0000	3.732E-08	0.0094	7.358E-10	0.0002	2.057E-11	0.0000	6.219E-08	0.0156
Pu-239	4.083E-10	0.0001	4.266E-09	0.0011	0.000E+00	0.0000	3.086E-08	0.0077	6.085E-10	0.0002	1.652E-11	0.0000	5.070E-08	0.0127
Pu-240	3.491E-11	0.0000	1.014E-09	0.0003	0.000E+00	0.0000	7.333E-09	0.0018	1.446E-10	0.0000	3.925E-12	0.0000	1.209E-08	0.0030
Total	3.057E-06	0.7665	1.825E-08	0.0046	0.000E+00	0.0000	3.223E-07	0.0808	2.763E-08	0.0069	2.470E-07	0.0619	2.161E-07	0.0542

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.100E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.379E-06	0.3458
Am-241	6.595E-15	0.0000	3.119E-17	0.0000	0.000E+00	0.0000	9.808E-16	0.0000	4.140E-17	0.0000	2.125E-16	0.0000	2.625E-07	0.0658
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.645E-09	0.0004
Co-60	6.968E-12	0.0000	8.402E-13	0.0000	0.000E+00	0.0000	1.114E-12	0.0000	2.689E-12	0.0000	7.852E-13	0.0000	1.070E-07	0.0268
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.195E-06	0.2996
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.255E-07	0.0816
H-3	5.017E-08	0.0126	1.873E-11	0.0000	0.000E+00	0.0000	1.939E-08	0.0049	1.835E-09	0.0005	5.490E-09	0.0014	7.763E-08	0.0195
Ni-63	9.193E-09	0.0023	3.752E-10	0.0001	0.000E+00	0.0000	1.460E-09	0.0004	8.988E-10	0.0002	1.043E-08	0.0026	4.257E-07	0.1067
Pu-238	8.245E-10	0.0002	3.902E-12	0.0000	0.000E+00	0.0000	1.228E-10	0.0000	5.206E-12	0.0000	2.666E-11	0.0000	1.068E-07	0.0268
Pu-239	2.067E-13	0.0000	9.846E-16	0.0000	0.000E+00	0.0000	3.099E-14	0.0000	1.313E-15	0.0000	6.725E-15	0.0000	8.686E-08	0.0218
Pu-240	1.379E-12	0.0000	6.510E-15	0.0000	0.000E+00	0.0000	2.049E-13	0.0000	8.683E-15	0.0000	4.447E-14	0.0000	2.062E-08	0.0052
Total	6.019E-08	0.0151	3.987E-10	0.0001	0.000E+00	0.0000	2.098E-08	0.0053	2.742E-09	0.0007	1.594E-08	0.0040	3.989E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 27 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 28
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 4.300E+01 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Ac-227	2.660E-14	9.301E-11	5.601E-13	4.561E-13	3.814E-11	2.311E-09	3.840E-11	2.533E-10	1.092E-12	1.843E-12	2.737E-09
Ag-108m	3.533E-04	7.332E+01	5.449E+00	1.031E+02	5.066E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.824E+02
Am-241	8.733E-03	1.209E+01	1.192E-01	1.294E-02	1.252E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.474E+01
C-14	7.092E-13	2.744E-09	6.505E-10	5.057E-10	2.448E-13	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.901E-09
Co-60	1.064E-06	1.178E-01	6.074E-02	1.392E-02	1.526E-03	2.118E-03	1.800E-04	2.391E-04	5.841E-04	1.694E-04	1.973E-01
Eu-152	1.783E-04	6.168E-01	1.148E-01	7.586E-03	2.556E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.948E-01
Eu-154	2.476E-05	8.565E-02	1.594E-02	1.053E-03	3.550E-02	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.381E-01
Gd-152	5.136E-17	1.777E-13	3.308E-14	8.743E-16	7.365E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.853E-13
H-3	2.338E-07	6.247E-06	9.156E-07	1.502E-06	9.609E-10	8.358E-04	2.428E-07	2.513E-04	2.378E-05	7.114E-05	1.191E-03
Ni-63	7.403E-02	5.121E+03	6.936E+02	6.422E+03	1.061E+02	6.810E+02	1.959E+01	7.627E+01	4.711E+01	5.454E+02	1.371E+04
Np-237	1.259E-07	3.482E-03	1.122E-04	1.342E-06	1.806E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.776E-03
Pa-231	7.899E-14	1.091E-09	2.229E-10	5.573E-13	1.133E-10	3.274E-09	1.379E-11	3.801E-10	2.641E-10	1.062E-12	5.361E-09
Pb-210	2.260E-13	3.167E-09	1.066E-10	9.735E-11	3.240E-10	2.959E-09	2.435E-10	3.177E-10	3.364E-11	3.443E-11	7.283E-09
Pu-238	4.634E-03	6.416E+00	1.265E-01	3.433E-03	6.644E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.319E+01
Pu-239	4.266E-03	5.906E+00	1.165E-01	3.161E-03	6.117E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.214E+01
Pu-240	1.012E-03	1.402E+00	2.764E-02	7.501E-04	1.452E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.882E+00
Ra-226	8.474E-13	4.678E-08	1.297E-09	3.033E-09	1.215E-09	1.862E-08	3.126E-10	2.050E-09	2.569E-10	7.386E-10	7.431E-08
Ra-228	9.118E-19	5.014E-14	1.373E-15	3.229E-15	1.307E-15	2.563E-14	4.342E-16	2.870E-15	3.594E-16	1.035E-15	8.638E-14
Th-228	7.868E-19	1.750E-15	5.294E-17	6.674E-18	1.128E-15	7.541E-15	2.561E-16	8.619E-16	1.857E-17	2.667E-18	1.162E-14
Th-229	1.582E-14	2.198E-11	4.374E-13	6.019E-14	2.268E-11	1.212E-10	4.077E-12	1.711E-11	5.646E-13	1.045E-13	1.882E-10
Th-230	1.321E-10	1.834E-07	3.636E-09	4.978E-10	1.895E-07	1.382E-06	4.649E-08	1.840E-07	5.294E-09	9.617E-10	1.996E-06
Th-232	1.319E-18	1.830E-15	3.631E-17	4.973E-18	1.891E-15	1.436E-14	4.836E-16	1.902E-15	5.391E-17	9.723E-18	2.057E-14
U-233	1.152E-11	4.035E-08	1.298E-09	5.932E-09	1.651E-08	1.027E-05	3.599E-08	1.133E-06	4.800E-08	2.459E-07	1.180E-05
U-234	6.324E-07	2.187E-03	6.917E-05	3.228E-04	9.068E-04	9.183E-01	3.219E-03	1.014E-01	4.310E-03	2.203E-02	1.053E+00
U-235	1.705E-10	5.897E-07	1.865E-08	8.704E-08	2.445E-07	2.335E-04	8.183E-07	2.577E-05	1.095E-06	5.600E-06	2.677E-04
U-236	1.218E-09	4.213E-06	1.332E-07	6.218E-07	1.747E-06	1.669E-03	5.850E-06	1.842E-04	7.830E-06	4.003E-05	1.914E-03

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 4.300E+01 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 28 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 29
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years
0 Water Independent Pathways (Inhalation excludes radon)
0

Radio-	Ground		Inhalation		Plant		Meat		Milk		Soil	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.258E-17	0.0000	3.827E-19	0.0000	4.178E-18	0.0000	2.166E-20	0.0000	2.050E-20	0.0000	3.054E-18	0.0000
Ag-108m	1.099E-06	0.4973	2.608E-13	0.0000	2.270E-08	0.0103	1.687E-09	0.0008	3.194E-08	0.0144	2.689E-10	0.0001
Am-241	1.144E-07	0.0517	7.184E-09	0.0033	4.743E-08	0.0215	4.676E-10	0.0002	5.077E-11	0.0000	7.955E-08	0.0360
C-14	5.534E-26	0.0000	1.267E-23	0.0000	1.387E-20	0.0000	3.287E-21	0.0000	2.556E-21	0.0000	1.726E-24	0.0000
Co-60	1.553E-09	0.0007	2.852E-16	0.0000	1.966E-11	0.0000	1.014E-11	0.0000	2.324E-12	0.0000	4.604E-13	0.0000
Eu-152	2.260E-07	0.1022	2.464E-13	0.0000	8.149E-11	0.0000	1.517E-11	0.0000	1.002E-12	0.0000	6.289E-11	0.0000
Eu-154	2.613E-08	0.0118	3.276E-14	0.0000	1.468E-11	0.0000	2.733E-12	0.0000	1.806E-13	0.0000	1.164E-11	0.0000
Gd-152	0.000E+00	0.0000	1.485E-23	0.0000	2.173E-22	0.0000	4.046E-23	0.0000	1.069E-24	0.0000	1.472E-22	0.0000
H-3	0.000E+00	0.0000	1.214E-19	0.0000	2.348E-18	0.0000	3.442E-19	0.0000	5.645E-19	0.0000	5.518E-22	0.0000
Ni-63	0.000E+00	0.0000	1.149E-11	0.0000	1.310E-07	0.0593	1.774E-08	0.0080	1.643E-07	0.0743	5.110E-09	0.0023
Np-237	6.342E-11	0.0000	8.908E-14	0.0000	1.266E-11	0.0000	4.082E-13	0.0000	4.882E-15	0.0000	1.167E-12	0.0000
Pa-231	9.517E-18	0.0000	1.972E-19	0.0000	1.354E-17	0.0000	2.767E-18	0.0000	6.896E-21	0.0000	2.324E-18	0.0000
Pb-210	1.484E-18	0.0000	3.061E-19	0.0000	1.060E-15	0.0000	3.547E-17	0.0000	3.251E-17	0.0000	8.411E-17	0.0000
Pu-238	1.475E-10	0.0001	4.157E-09	0.0019	2.895E-08	0.0131	5.708E-10	0.0003	1.549E-11	0.0000	4.825E-08	0.0218
Pu-239	4.075E-10	0.0002	4.258E-09	0.0019	3.080E-08	0.0139	6.074E-10	0.0003	1.648E-11	0.0000	5.060E-08	0.0229
Pu-240	3.475E-11	0.0000	1.009E-09	0.0005	7.302E-09	0.0033	1.440E-10	0.0001	3.907E-12	0.0000	1.204E-08	0.0054
Ra-226	8.441E-15	0.0000	7.319E-19	0.0000	1.800E-15	0.0000	5.003E-17	0.0000	1.168E-16	0.0000	6.627E-17	0.0000
Ra-228	3.940E-21	0.0000	2.891E-25	0.0000	4.358E-21	0.0000	1.196E-22	0.0000	2.809E-22	0.0000	1.812E-22	0.0000
Th-228	6.102E-21	0.0000	7.118E-24	0.0000	4.611E-23	0.0000	1.383E-24	0.0000	1.745E-25	0.0000	5.787E-23	0.0000
Th-229	2.242E-17	0.0000	2.733E-19	0.0000	1.209E-18	0.0000	2.400E-20	0.0000	3.289E-21	0.0000	2.246E-18	0.0000
Th-230	9.111E-17	0.0000	1.979E-16	0.0000	1.146E-15	0.0000	2.269E-17	0.0000	3.098E-18	0.0000	2.011E-15	0.0000
Th-232	3.984E-25	0.0000	3.133E-24	0.0000	1.335E-23	0.0000	2.643E-25	0.0000	3.610E-26	0.0000	2.397E-23	0.0000
U-233	9.806E-18	0.0000	7.266E-18	0.0000	2.119E-16	0.0000	6.789E-18	0.0000	3.119E-17	0.0000	1.437E-16	0.0000
U-234	9.549E-14	0.0000	2.682E-13	0.0000	7.770E-12	0.0000	2.458E-13	0.0000	1.147E-12	0.0000	5.329E-12	0.0000
U-235	5.824E-14	0.0000	6.816E-17	0.0000	2.279E-15	0.0000	7.206E-17	0.0000	3.363E-16	0.0000	1.580E-15	0.0000
U-236	9.779E-17	0.0000	5.058E-16	0.0000	1.505E-14	0.0000	4.758E-16	0.0000	2.221E-15	0.0000	1.029E-14	0.0000
Total	1.468E-06	0.6641	1.662E-08	0.0075	2.683E-07	0.1214	2.125E-08	0.0096	1.963E-07	0.0888	1.959E-07	0.0886

Attachment 9 Sheet No. 29 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 30
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

Water Dependent Pathways

	Water		Fish		Plant		Meat		Milk		All Pathways**	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.118E-16	0.0000	2.507E-18	0.0000	1.659E-17	0.0000	6.357E-20	0.0000	1.201E-19	0.0000	1.814E-16	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.156E-06	0.5229
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.491E-07	0.1127
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.973E-20	0.0000
Co-60	2.889E-13	0.0000	3.489E-14	0.0000	4.634E-14	0.0000	1.133E-13	0.0000	3.284E-14	0.0000	1.586E-09	0.0007
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.261E-07	0.1023
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.615E-08	0.0118
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.209E-22	0.0000
H-3	2.445E-16	0.0000	9.129E-20	0.0000	9.449E-17	0.0000	8.944E-18	0.0000	2.675E-17	0.0000	3.781E-16	0.0000
Ni-63	1.642E-08	0.0074	6.706E-10	0.0003	2.611E-09	0.0012	1.615E-09	0.0007	1.868E-08	0.0085	3.581E-07	0.1620
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	7.775E-11	0.0000
Pa-231	4.377E-17	0.0000	2.398E-19	0.0000	6.561E-18	0.0000	4.431E-18	0.0000	1.652E-20	0.0000	8.336E-17	0.0000
Pb-210	5.273E-16	0.0000	1.202E-16	0.0000	1.596E-16	0.0000	1.608E-17	0.0000	1.724E-17	0.0000	2.055E-15	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.209E-08	0.0371
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.670E-08	0.0392
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.053E-08	0.0093
Ra-226	7.710E-16	0.0000	1.741E-17	0.0000	1.151E-16	0.0000	1.422E-17	0.0000	4.113E-17	0.0000	1.143E-14	0.0000
Ra-228	2.168E-21	0.0000	5.039E-23	0.0000	3.323E-22	0.0000	4.151E-23	0.0000	1.193E-22	0.0000	1.159E-20	0.0000
Th-228	1.928E-22	0.0000	9.203E-24	0.0000	3.084E-23	0.0000	6.456E-25	0.0000	9.309E-26	0.0000	6.448E-21	0.0000
Th-229	6.964E-18	0.0000	3.180E-19	0.0000	1.247E-18	0.0000	3.493E-20	0.0000	6.317E-21	0.0000	3.474E-17	0.0000
Th-230	9.370E-15	0.0000	4.127E-16	0.0000	1.549E-15	0.0000	3.818E-17	0.0000	6.744E-18	0.0000	1.485E-14	0.0000
Th-232	1.065E-22	0.0000	4.726E-24	0.0000	1.778E-23	0.0000	4.420E-25	0.0000	7.802E-26	0.0000	1.707E-22	0.0000
U-233	5.672E-14	0.0000	2.683E-16	0.0000	8.448E-15	0.0000	3.589E-16	0.0000	1.836E-15	0.0000	6.804E-14	0.0000
U-234	3.412E-09	0.0015	1.616E-11	0.0000	5.090E-10	0.0002	2.168E-11	0.0000	1.107E-10	0.0001	4.085E-09	0.0018
U-235	9.198E-13	0.0000	4.384E-15	0.0000	1.381E-13	0.0000	5.880E-15	0.0000	3.003E-14	0.0000	1.161E-12	0.0000
U-236	6.132E-12	0.0000	2.897E-14	0.0000	9.127E-13	0.0000	3.886E-14	0.0000	1.985E-13	0.0000	7.340E-12	0.0000
Total	1.984E-08	0.0090	6.868E-10	0.0003	3.122E-09	0.0014	1.637E-09	0.0007	1.879E-08	0.0085	2.211E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 4.300E+01 years

0

Radon Pathway	Radionuclides Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 30 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 31
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

0
Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	1.099E-06	0.4973	2.608E-13	0.0000	0.000E+00	0.0000	2.270E-08	0.0103	1.687E-09	0.0008	3.194E-08	0.0144	2.689E-10	0.0001
Am-241	1.145E-07	0.0518	7.184E-09	0.0033	0.000E+00	0.0000	4.745E-08	0.0215	4.680E-10	0.0002	5.077E-11	0.0000	7.955E-08	0.0360
C-14	5.534E-26	0.0000	1.267E-23	0.0000	0.000E+00	0.0000	1.387E-20	0.0000	3.287E-21	0.0000	2.556E-21	0.0000	1.726E-24	0.0000
Co-60	1.553E-09	0.0007	2.852E-16	0.0000	0.000E+00	0.0000	1.966E-11	0.0000	1.014E-11	0.0000	2.324E-12	0.0000	4.604E-13	0.0000
Eu-152	2.260E-07	0.1022	2.464E-13	0.0000	0.000E+00	0.0000	8.149E-11	0.0000	1.517E-11	0.0000	1.002E-12	0.0000	6.289E-11	0.0000
Eu-154	2.613E-08	0.0118	3.276E-14	0.0000	0.000E+00	0.0000	1.468E-11	0.0000	2.733E-12	0.0000	1.806E-13	0.0000	1.164E-11	0.0000
H-3	0.000E+00	0.0000	1.214E-19	0.0000	0.000E+00	0.0000	2.348E-18	0.0000	3.442E-19	0.0000	5.645E-19	0.0000	5.518E-22	0.0000
Ni-63	0.000E+00	0.0000	1.149E-11	0.0000	0.000E+00	0.0000	1.310E-07	0.0593	1.774E-08	0.0080	1.643E-07	0.0743	5.110E-09	0.0023
Pu-238	1.477E-10	0.0001	4.157E-09	0.0019	0.000E+00	0.0000	2.896E-08	0.0131	5.711E-10	0.0003	1.664E-11	0.0000	4.826E-08	0.0218
Pu-239	4.076E-10	0.0002	4.258E-09	0.0019	0.000E+00	0.0000	3.080E-08	0.0139	6.074E-10	0.0003	1.649E-11	0.0000	5.060E-08	0.0229
Pu-240	3.475E-11	0.0000	1.009E-09	0.0005	0.000E+00	0.0000	7.302E-09	0.0033	1.440E-10	0.0001	3.910E-12	0.0000	1.204E-08	0.0054
Total	1.468E-06	0.6641	1.662E-08	0.0075	0.000E+00	0.0000	2.683E-07	0.1214	2.125E-08	0.0096	1.963E-07	0.0888	1.959E-07	0.0886

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 4.300E+01 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.156E-06	0.5229
Am-241	5.673E-14	0.0000	2.686E-16	0.0000	0.000E+00	0.0000	8.450E-15	0.0000	3.589E-16	0.0000	1.836E-15	0.0000	2.492E-07	0.1127
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.973E-20	0.0000
Co-60	2.889E-13	0.0000	3.489E-14	0.0000	0.000E+00	0.0000	4.634E-14	0.0000	1.133E-13	0.0000	3.284E-14	0.0000	1.586E-09	0.0007
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.261E-07	0.1023
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.615E-08	0.0118
H-3	2.445E-16	0.0000	9.129E-20	0.0000	0.000E+00	0.0000	9.449E-17	0.0000	8.944E-18	0.0000	2.675E-17	0.0000	3.781E-16	0.0000
Ni-63	1.642E-08	0.0074	6.706E-10	0.0003	0.000E+00	0.0000	2.611E-09	0.0012	1.615E-09	0.0007	1.868E-08	0.0085	3.581E-07	0.1620
Pu-238	3.412E-09	0.0015	1.616E-11	0.0000	0.000E+00	0.0000	5.090E-10	0.0002	2.168E-11	0.0000	1.107E-10	0.0001	8.618E-08	0.0390
Pu-239	9.200E-13	0.0000	4.387E-15	0.0000	0.000E+00	0.0000	1.381E-13	0.0000	5.884E-15	0.0000	3.003E-14	0.0000	8.670E-08	0.0392
Pu-240	6.132E-12	0.0000	2.897E-14	0.0000	0.000E+00	0.0000	9.127E-13	0.0000	3.886E-14	0.0000	1.985E-13	0.0000	2.054E-08	0.0093
Total	1.984E-08	0.0090	6.868E-10	0.0003	0.000E+00	0.0000	3.122E-09	0.0014	1.637E-09	0.0007	1.879E-08	0.0085	2.211E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 31 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 32
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.350E+02 years

	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					
Radio-Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Total Ingestion*
Ac-227	4.631E-13	1.611E-09	6.504E-12	7.912E-12	6.640E-10	1.255E-07	2.095E-09	1.386E-08	4.522E-11	1.005E-10	1.439E-07
Ag-108m	2.126E-04	4.411E+01	3.278E+00	6.206E+01	3.048E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.098E+02
Am-241	7.514E-03	1.040E+01	1.026E-01	1.114E-02	1.077E+01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.129E+01
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	5.864E-12	6.490E-07	3.347E-07	7.669E-08	8.408E-09	3.689E-08	3.138E-09	4.171E-09	1.025E-08	2.961E-09	1.126E-06
Eu-152	1.487E-06	5.144E-03	9.576E-04	6.327E-05	2.132E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	8.297E-03
Eu-154	1.760E-08	6.088E-05	1.133E-05	7.487E-07	2.523E-05	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.818E-05
Gd-152	5.742E-17	1.986E-13	3.698E-14	9.772E-16	8.232E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.189E-13
H-3	0.000E+00	3.578E-30	0.000E+00	0.000E+00	0.000E+00	5.425E-28	0.000E+00	1.631E-28	1.545E-29	4.619E-29	7.708E-28
Ni-63	3.742E-02	2.589E+03	3.506E+02	3.246E+03	5.365E+01	1.091E+03	3.139E+01	1.223E+02	7.577E+01	8.755E+02	8.434E+03
Np-237	3.670E-07	1.015E-02	3.277E-04	3.917E-06	5.262E-04	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.101E-02
Pa-231	7.131E-13	9.863E-09	2.019E-09	5.008E-12	1.022E-09	8.356E-08	3.474E-10	9.383E-09	6.063E-09	1.957E-11	1.123E-07
Pb-210	1.170E-11	1.629E-07	5.408E-09	4.978E-09	1.678E-08	4.931E-07	4.125E-08	5.456E-08	5.517E-09	5.962E-09	7.905E-07
Pu-238	2.234E-03	3.093E+00	6.100E-02	1.655E-03	3.204E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.360E+00
Pu-239	4.243E-03	5.875E+00	1.158E-01	3.144E-03	6.084E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.208E+01
Pu-240	9.998E-04	1.384E+00	2.729E-02	7.408E-04	1.434E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.846E+00
Ra-226	2.055E-11	1.137E-06	3.170E-08	7.392E-08	2.947E-08	1.391E-06	2.350E-08	1.553E-07	1.931E-08	5.584E-08	2.917E-06
Ra-228	1.061E-17	5.842E-13	1.607E-14	3.771E-14	1.521E-14	8.507E-13	1.438E-14	9.485E-14	1.166E-14	3.394E-14	1.659E-12
Th-228	1.018E-17	2.179E-14	6.462E-16	8.163E-17	1.460E-14	2.833E-13	9.593E-15	3.209E-14	6.456E-16	9.387E-17	3.628E-13
Th-229	4.417E-13	6.122E-10	1.211E-11	1.650E-12	6.333E-10	9.825E-09	3.315E-10	1.176E-09	2.347E-11	3.959E-12	1.262E-08
Th-230	9.572E-10	1.326E-06	2.619E-08	3.562E-09	1.372E-06	2.919E-05	9.857E-07	3.387E-06	5.818E-08	9.417E-09	3.636E-05
Th-232	1.192E-17	1.651E-14	3.262E-16	4.439E-17	1.709E-14	3.471E-13	1.172E-14	4.049E-14	7.142E-16	1.165E-16	4.341E-13
U-233	9.935E-11	3.452E-07	1.099E-08	5.088E-08	1.424E-07	2.532E-04	8.879E-07	2.798E-05	1.194E-06	6.089E-06	2.899E-04
U-234	1.236E-06	4.275E-03	1.353E-04	6.309E-04	1.772E-03	4.758E+00	1.669E-02	5.260E-01	2.248E-02	1.146E-01	5.445E+00
U-235	4.724E-10	1.634E-06	5.170E-08	2.412E-07	6.773E-07	1.600E-03	5.612E-06	1.769E-04	7.554E-06	3.851E-05	1.831E-03
U-236	3.362E-09	1.163E-05	3.680E-07	1.717E-06	4.821E-06	1.140E-02	4.000E-05	1.260E-03	5.384E-05	2.745E-04	1.305E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.350E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 32 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 33
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

0 Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	4.108E-16	0.0000	3.692E-18	0.0000	4.019E-17	0.0000	1.586E-19	0.0000	1.974E-19	0.0000	2.947E-17	0.0000
Ag-108m	6.614E-07	0.5148	1.569E-13	0.0000	1.366E-08	0.0106	1.015E-09	0.0008	1.921E-08	0.0150	1.618E-10	0.0001
Am-241	9.843E-08	0.0766	6.182E-09	0.0048	4.082E-08	0.0318	4.024E-10	0.0003	4.368E-11	0.0000	6.845E-08	0.0533
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	8.558E-15	0.0000	1.572E-21	0.0000	1.083E-16	0.0000	5.587E-17	0.0000	1.280E-17	0.0000	2.537E-18	0.0000
Eu-152	1.885E-09	0.0015	2.055E-15	0.0000	6.797E-13	0.0000	1.265E-13	0.0000	8.360E-15	0.0000	5.245E-13	0.0000
Eu-154	1.857E-11	0.0000	2.328E-17	0.0000	1.044E-14	0.0000	1.942E-15	0.0000	1.283E-16	0.0000	8.272E-15	0.0000
Gd-152	0.000E+00	0.0000	1.568E-23	0.0000	2.295E-22	0.0000	4.272E-23	0.0000	1.129E-24	0.0000	1.554E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	5.807E-12	0.0000	6.621E-08	0.0515	8.968E-09	0.0070	8.303E-08	0.0646	2.583E-09	0.0020
Np-237	1.524E-10	0.0001	2.141E-13	0.0000	3.044E-11	0.0000	9.824E-13	0.0000	1.174E-14	0.0000	2.805E-12	0.0000
Pa-231	5.734E-17	0.0000	1.188E-18	0.0000	8.161E-17	0.0000	1.671E-17	0.0000	4.142E-20	0.0000	1.400E-17	0.0000
Pb-210	3.320E-17	0.0000	6.849E-18	0.0000	2.363E-14	0.0000	7.839E-16	0.0000	7.218E-16	0.0000	1.882E-15	0.0000
Pu-238	7.114E-11	0.0001	2.004E-09	0.0016	1.396E-08	0.0109	2.752E-10	0.0002	7.469E-12	0.0000	2.326E-08	0.0181
Pu-239	4.053E-10	0.0003	4.235E-09	0.0033	3.064E-08	0.0238	6.042E-10	0.0005	1.640E-11	0.0000	5.033E-08	0.0392
Pu-240	3.432E-11	0.0000	9.968E-10	0.0008	7.211E-09	0.0056	1.422E-10	0.0001	3.859E-12	0.0000	1.189E-08	0.0093
Ra-226	1.093E-13	0.0000	9.476E-18	0.0000	2.333E-14	0.0000	6.507E-16	0.0000	1.517E-15	0.0000	8.580E-16	0.0000
Ra-228	2.804E-20	0.0000	2.057E-24	0.0000	3.104E-20	0.0000	8.541E-22	0.0000	2.004E-21	0.0000	1.289E-21	0.0000
Th-228	4.639E-20	0.0000	5.411E-23	0.0000	3.424E-22	0.0000	1.014E-23	0.0000	1.282E-24	0.0000	4.399E-22	0.0000
Th-229	3.322E-16	0.0000	4.050E-18	0.0000	1.789E-17	0.0000	3.537E-19	0.0000	4.818E-20	0.0000	3.329E-17	0.0000
Th-230	4.435E-16	0.0000	9.634E-16	0.0000	5.573E-15	0.0000	1.100E-16	0.0000	1.496E-17	0.0000	9.790E-15	0.0000
Th-232	2.403E-24	0.0000	1.890E-23	0.0000	8.041E-23	0.0000	1.588E-24	0.0000	2.161E-25	0.0000	1.445E-22	0.0000
U-233	5.649E-17	0.0000	4.186E-17	0.0000	1.215E-15	0.0000	3.863E-17	0.0000	1.790E-16	0.0000	8.278E-16	0.0000
U-234	1.548E-13	0.0000	4.347E-13	0.0000	1.260E-11	0.0000	3.987E-13	0.0000	1.860E-12	0.0000	8.639E-12	0.0000
U-235	1.332E-13	0.0000	1.558E-16	0.0000	5.211E-15	0.0000	1.649E-16	0.0000	7.691E-16	0.0000	3.614E-15	0.0000
U-236	2.227E-16	0.0000	1.152E-15	0.0000	3.428E-14	0.0000	1.085E-15	0.0000	5.059E-15	0.0000	2.344E-14	0.0000
Total	7.624E-07	0.5934	1.343E-08	0.0104	1.725E-07	0.1343	1.141E-08	0.0089	1.023E-07	0.0796	1.567E-07	0.1220

Attachment 9 Sheet No. 33 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 34
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

Water Dependent Pathways

Radio-	Water		Fish		Plant		Meat		Milk		All Pathways**	
Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	2.520E-15	0.0000	5.648E-17	0.0000	3.737E-16	0.0000	1.202E-18	0.0000	2.709E-18	0.0000	3.439E-15	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.955E-07	0.5413
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.143E-07	0.1668
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	4.559E-18	0.0000	5.509E-19	0.0000	7.322E-19	0.0000	1.799E-18	0.0000	5.198E-19	0.0000	8.746E-15	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.886E-09	0.0015
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.859E-11	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.444E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.179E-08	0.0170	8.901E-10	0.0007	3.467E-09	0.0027	2.149E-09	0.0017	2.483E-08	0.0193	2.139E-07	0.1665
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.869E-10	0.0001
Pa-231	5.637E-16	0.0000	3.059E-18	0.0000	8.253E-17	0.0000	5.313E-17	0.0000	1.691E-19	0.0000	8.735E-16	0.0000
Pb-210	2.912E-14	0.0000	6.630E-15	0.0000	8.778E-15	0.0000	8.849E-16	0.0000	9.559E-16	0.0000	7.343E-14	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.958E-08	0.0308
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.623E-08	0.0671
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.028E-08	0.0158
Ra-226	2.328E-14	0.0000	5.255E-16	0.0000	3.473E-15	0.0000	4.313E-16	0.0000	1.247E-15	0.0000	1.646E-13	0.0000
Ra-228	3.513E-20	0.0000	8.165E-22	0.0000	5.387E-21	0.0000	6.620E-22	0.0000	1.927E-21	0.0000	1.071E-19	0.0000
Th-228	3.390E-21	0.0000	1.618E-22	0.0000	5.410E-22	0.0000	1.085E-23	0.0000	1.578E-24	0.0000	5.134E-20	0.0000
Th-229	2.299E-16	0.0000	1.052E-17	0.0000	3.695E-17	0.0000	7.055E-19	0.0000	1.176E-19	0.0000	6.661E-16	0.0000
Th-230	9.996E-14	0.0000	4.415E-15	0.0000	1.506E-14	0.0000	2.487E-16	0.0000	3.978E-17	0.0000	1.366E-13	0.0000
Th-232	1.364E-21	0.0000	6.066E-23	0.0000	2.081E-22	0.0000	3.537E-24	0.0000	5.706E-25	0.0000	1.885E-21	0.0000
U-233	7.027E-13	0.0000	3.326E-15	0.0000	1.048E-13	0.0000	4.472E-15	0.0000	2.281E-14	0.0000	8.405E-13	0.0000
U-234	1.076E-08	0.0084	5.098E-11	0.0000	1.607E-09	0.0013	6.867E-11	0.0001	3.499E-10	0.0003	1.286E-08	0.0100
U-235	3.883E-12	0.0000	1.852E-14	0.0000	5.836E-13	0.0000	2.493E-14	0.0000	1.271E-13	0.0000	4.780E-12	0.0000
U-236	2.581E-11	0.0000	1.220E-13	0.0000	3.844E-12	0.0000	1.642E-13	0.0000	8.372E-13	0.0000	3.084E-11	0.0000
Total	3.258E-08	0.0254	9.412E-10	0.0007	5.078E-09	0.0040	2.218E-09	0.0017	2.518E-08	0.0196	1.285E-06	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.350E+02 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 34 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 35
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

0
Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	6.614E-07	0.5148	1.569E-13	0.0000	0.000E+00	0.0000	1.366E-08	0.0106	1.015E-09	0.0008	1.921E-08	0.0150	1.618E-10	0.0001
Am-241	9.858E-08	0.0767	6.182E-09	0.0048	0.000E+00	0.0000	4.085E-08	0.0318	4.034E-10	0.0003	4.370E-11	0.0000	6.845E-08	0.0533
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	8.558E-15	0.0000	1.572E-21	0.0000	0.000E+00	0.0000	1.083E-16	0.0000	5.587E-17	0.0000	1.280E-17	0.0000	2.537E-18	0.0000
Eu-152	1.885E-09	0.0015	2.055E-15	0.0000	0.000E+00	0.0000	6.797E-13	0.0000	1.265E-13	0.0000	8.360E-15	0.0000	5.245E-13	0.0000
Eu-154	1.857E-11	0.0000	2.328E-17	0.0000	0.000E+00	0.0000	1.044E-14	0.0000	1.942E-15	0.0000	1.283E-16	0.0000	8.272E-15	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	5.807E-12	0.0000	0.000E+00	0.0000	6.621E-08	0.0515	8.968E-09	0.0070	8.303E-08	0.0646	2.583E-09	0.0020
Pu-238	7.140E-11	0.0001	2.005E-09	0.0016	0.000E+00	0.0000	1.397E-08	0.0109	2.756E-10	0.0002	9.331E-12	0.0000	2.327E-08	0.0181
Pu-239	4.055E-10	0.0003	4.235E-09	0.0033	0.000E+00	0.0000	3.064E-08	0.0238	6.042E-10	0.0005	1.640E-11	0.0000	5.033E-08	0.0392
Pu-240	3.432E-11	0.0000	9.968E-10	0.0008	0.000E+00	0.0000	7.211E-09	0.0056	1.422E-10	0.0001	3.864E-12	0.0000	1.189E-08	0.0093
Total	7.624E-07	0.5934	1.343E-08	0.0104	0.000E+00	0.0000	1.725E-07	0.1343	1.141E-08	0.0089	1.023E-07	0.0796	1.567E-07	0.1220

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.350E+02 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.955E-07	0.5413
Am-241	7.030E-13	0.0000	3.336E-15	0.0000	0.000E+00	0.0000	1.048E-13	0.0000	4.473E-15	0.0000	2.281E-14	0.0000	2.145E-07	0.1670
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	4.559E-18	0.0000	5.509E-19	0.0000	0.000E+00	0.0000	7.322E-19	0.0000	1.799E-18	0.0000	5.198E-19	0.0000	8.746E-15	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.886E-09	0.0015
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.859E-11	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.179E-08	0.0170	8.901E-10	0.0007	0.000E+00	0.0000	3.467E-09	0.0027	2.149E-09	0.0017	2.483E-08	0.0193	2.139E-07	0.1665
Pu-238	1.076E-08	0.0084	5.099E-11	0.0000	0.000E+00	0.0000	1.607E-09	0.0013	6.867E-11	0.0001	3.500E-10	0.0003	5.244E-08	0.0408
Pu-239	3.886E-12	0.0000	1.858E-14	0.0000	0.000E+00	0.0000	5.840E-13	0.0000	2.498E-14	0.0000	1.271E-13	0.0000	8.624E-08	0.0671
Pu-240	2.581E-11	0.0000	1.220E-13	0.0000	0.000E+00	0.0000	3.844E-12	0.0000	1.642E-13	0.0000	8.372E-13	0.0000	2.031E-08	0.0158
Total	3.258E-08	0.0254	9.412E-10	0.0007	0.000E+00	0.0000	5.078E-09	0.0040	2.218E-09	0.0017	2.518E-08	0.0196	1.285E-06	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 35 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 36
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 3.000E+02 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	2.501E-12	8.690E-09	3.110E-11	4.270E-11	3.586E-09	1.046E-06	1.747E-08	1.156E-07	3.496E-10	8.382E-10	1.193E-06
Ag-108m	8.545E-05	1.773E+01	1.318E+00	2.495E+01	1.225E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.412E+01
Am-241	5.739E-03	7.946E+00	7.834E-02	8.505E-03	8.229E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.626E+01
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	2.170E-21	2.402E-16	1.239E-16	2.839E-17	3.112E-18	3.071E-17	2.613E-18	3.474E-18	8.546E-18	2.468E-18	4.434E-16
Eu-152	2.780E-10	9.617E-07	1.790E-07	1.183E-08	3.986E-07	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.551E-06
Eu-154	3.972E-14	1.374E-10	2.558E-11	1.690E-12	5.695E-11	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.216E-10
Gd-152	5.740E-17	1.986E-13	3.697E-14	9.770E-16	8.230E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.188E-13
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.101E-02	7.615E+02	1.031E+02	9.550E+02	1.578E+01	7.246E+02	2.086E+01	8.125E+01	5.040E+01	5.820E+02	3.295E+03
Np-237	7.170E-07	1.984E-02	6.405E-04	7.654E-06	1.028E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.151E-02
Pa-231	3.032E-12	4.195E-08	8.592E-09	2.127E-11	4.348E-09	4.885E-07	2.024E-09	5.439E-08	3.450E-08	1.040E-10	6.344E-07
Pb-210	1.180E-10	1.640E-06	5.426E-08	5.003E-08	1.692E-07	8.436E-06	7.070E-07	9.356E-07	9.425E-08	1.019E-07	1.219E-05
Pu-238	6.039E-04	8.361E-01	1.649E-02	4.474E-04	8.658E-01	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.719E+00
Pu-239	4.203E-03	5.819E+00	1.147E-01	3.114E-03	6.026E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.196E+01
Pu-240	9.777E-04	1.354E+00	2.669E-02	7.244E-04	1.402E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.783E+00
Ra-226	1.511E-10	8.357E-06	2.334E-07	5.439E-07	2.166E-07	1.596E-05	2.699E-07	1.784E-06	2.219E-07	6.411E-07	2.823E-05
Ra-228	4.834E-17	2.663E-12	7.333E-14	1.720E-13	6.931E-14	5.403E-12	9.132E-14	6.025E-13	7.404E-14	2.155E-13	9.364E-12
Th-228	4.754E-17	1.009E-13	2.979E-15	3.764E-16	6.817E-14	1.863E-12	6.309E-14	2.108E-13	4.186E-15	6.088E-16	2.315E-12
Th-229	4.054E-12	5.615E-09	1.109E-10	1.507E-11	5.812E-09	1.383E-07	4.674E-09	1.577E-08	2.451E-10	3.844E-11	1.706E-07
Th-230	2.864E-09	3.967E-06	7.825E-08	1.063E-08	4.107E-06	1.202E-04	4.064E-06	1.348E-05	1.880E-07	2.835E-08	1.461E-04
Th-232	5.077E-17	7.032E-14	1.388E-15	1.885E-16	7.280E-14	2.002E-12	6.766E-14	2.257E-13	3.272E-15	5.006E-16	2.444E-12
U-233	3.890E-10	1.349E-06	4.280E-08	1.989E-07	5.577E-07	1.361E-03	4.772E-06	1.504E-04	6.426E-06	3.276E-05	1.557E-03
U-234	1.227E-06	4.246E-03	1.344E-04	6.267E-04	1.760E-03	5.643E+00	1.979E-02	6.239E-01	2.668E-02	1.359E-01	6.456E+00
U-235	8.497E-10	2.940E-06	9.302E-08	4.338E-07	1.218E-06	3.404E-03	1.194E-05	3.763E-04	1.609E-05	8.196E-05	3.895E-03
U-236	6.001E-09	2.076E-05	6.570E-07	3.064E-06	8.605E-06	2.409E-02	8.448E-05	2.663E-03	1.138E-04	5.800E-04	2.756E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 3.000E+02 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 36 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 37
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years
0
Water Independent Pathways (Inhalation excludes radon)
0

Radio-Nuclide	Ground		Inhalation		Plant		Meat		Milk		Soil	
	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ac-227	1.915E-15	0.0000	1.721E-17	0.0000	1.871E-16	0.0000	6.665E-19	0.0000	9.194E-19	0.0000	1.374E-16	0.0000
Ag-108m	2.659E-07	0.4063	6.308E-14	0.0000	5.491E-09	0.0084	4.081E-10	0.0006	7.724E-09	0.0118	6.504E-11	0.0001
Am-241	7.518E-08	0.1149	4.722E-09	0.0072	3.117E-08	0.0476	3.073E-10	0.0005	3.337E-11	0.0001	5.228E-08	0.0799
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.168E-24	0.0000	0.000E+00	0.0000	4.010E-26	0.0000	2.068E-26	0.0000	4.739E-27	0.0000	9.388E-28	0.0000
Eu-152	3.523E-13	0.0000	3.842E-19	0.0000	1.271E-16	0.0000	2.365E-17	0.0000	1.563E-18	0.0000	9.806E-17	0.0000
Eu-154	4.191E-17	0.0000	5.255E-23	0.0000	2.356E-20	0.0000	4.385E-21	0.0000	2.897E-22	0.0000	1.867E-20	0.0000
Gd-152	0.000E+00	0.0000	1.567E-23	0.0000	2.293E-22	0.0000	4.269E-23	0.0000	1.128E-24	0.0000	1.553E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	1.708E-12	0.0000	1.948E-08	0.0298	2.638E-09	0.0040	2.443E-08	0.0373	7.599E-10	0.0012
Np-237	2.816E-10	0.0004	3.955E-13	0.0000	5.623E-11	0.0001	1.816E-12	0.0000	2.170E-14	0.0000	5.182E-12	0.0000
Pa-231	2.175E-16	0.0000	4.506E-18	0.0000	3.096E-16	0.0000	6.341E-17	0.0000	1.570E-19	0.0000	5.310E-17	0.0000
Pb-210	2.705E-16	0.0000	5.580E-17	0.0000	1.923E-13	0.0000	6.361E-15	0.0000	5.866E-15	0.0000	1.533E-14	0.0000
Pu-238	1.923E-11	0.0000	5.417E-10	0.0008	3.772E-09	0.0058	7.438E-11	0.0001	2.019E-12	0.0000	6.288E-09	0.0096
Pu-239	4.015E-10	0.0006	4.195E-09	0.0064	3.035E-08	0.0464	5.984E-10	0.0009	1.624E-11	0.0000	4.985E-08	0.0762
Pu-240	3.357E-11	0.0001	9.748E-10	0.0015	7.052E-09	0.0108	1.390E-10	0.0002	3.774E-12	0.0000	1.163E-08	0.0178
Ra-226	6.767E-13	0.0000	5.867E-17	0.0000	1.445E-13	0.0000	4.035E-15	0.0000	9.403E-15	0.0000	5.312E-15	0.0000
Ra-228	1.128E-19	0.0000	8.278E-24	0.0000	1.250E-19	0.0000	3.441E-21	0.0000	8.071E-21	0.0000	5.188E-21	0.0000
Th-228	1.906E-19	0.0000	2.223E-22	0.0000	1.397E-21	0.0000	4.122E-23	0.0000	5.209E-24	0.0000	1.807E-21	0.0000
Th-229	2.557E-15	0.0000	3.118E-17	0.0000	1.376E-16	0.0000	2.717E-18	0.0000	3.694E-19	0.0000	2.563E-16	0.0000
Th-230	1.191E-15	0.0000	2.587E-15	0.0000	1.496E-14	0.0000	2.951E-16	0.0000	4.008E-17	0.0000	2.629E-14	0.0000
Th-232	9.131E-24	0.0000	7.181E-23	0.0000	3.055E-22	0.0000	6.028E-24	0.0000	8.189E-25	0.0000	5.493E-22	0.0000
U-233	1.973E-16	0.0000	1.462E-16	0.0000	4.234E-15	0.0000	1.344E-16	0.0000	6.245E-16	0.0000	2.891E-15	0.0000
U-234	1.462E-13	0.0000	4.107E-13	0.0000	1.190E-11	0.0000	3.767E-13	0.0000	1.757E-12	0.0000	8.161E-12	0.0000
U-235	2.268E-13	0.0000	2.654E-16	0.0000	8.874E-15	0.0000	2.808E-16	0.0000	1.310E-15	0.0000	6.153E-15	0.0000
U-236	3.764E-16	0.0000	1.947E-15	0.0000	5.793E-14	0.0000	1.833E-15	0.0000	8.549E-15	0.0000	3.961E-14	0.0000
Total	3.418E-07	0.5223	1.044E-08	0.0159	9.739E-08	0.1488	4.168E-09	0.0064	3.221E-08	0.0492	1.209E-07	0.1847

Attachment 9 Sheet No. 37 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 38
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	1.626E-14	0.0000	3.646E-16	0.0000	2.412E-15	0.0000	7.339E-18	0.0000	1.749E-17	0.0000	2.132E-14	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.796E-07	0.4272
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.637E-07	0.2501
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.694E-27	0.0000	4.465E-28	0.0000	5.841E-28	0.0000	1.456E-27	0.0000	4.089E-28	0.0000	3.241E-24	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.526E-13	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.196E-17	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.441E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	1.371E-08	0.0209	5.600E-10	0.0009	2.182E-09	0.0033	1.353E-09	0.0021	1.563E-08	0.0239	8.074E-08	0.1234
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.452E-10	0.0005
Pa-231	2.793E-15	0.0000	1.512E-17	0.0000	4.061E-16	0.0000	2.575E-16	0.0000	7.742E-19	0.0000	4.121E-15	0.0000
Pb-210	3.718E-13	0.0000	8.466E-14	0.0000	1.120E-13	0.0000	1.128E-14	0.0000	1.219E-14	0.0000	8.121E-13	0.0000
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.070E-08	0.0163
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.541E-08	0.1305
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.983E-08	0.0303
Ra-226	2.104E-13	0.0000	4.749E-15	0.0000	3.140E-14	0.0000	3.905E-15	0.0000	1.128E-14	0.0000	1.102E-12	0.0000
Ra-228	1.875E-19	0.0000	4.357E-21	0.0000	2.874E-20	0.0000	3.533E-21	0.0000	1.028E-20	0.0000	4.889E-19	0.0000
Th-228	1.862E-20	0.0000	8.884E-22	0.0000	2.969E-21	0.0000	5.892E-23	0.0000	8.569E-24	0.0000	2.166E-19	0.0000
Th-229	2.542E-15	0.0000	1.166E-16	0.0000	3.926E-16	0.0000	6.035E-18	0.0000	9.429E-19	0.0000	6.044E-15	0.0000
Th-230	3.506E-13	0.0000	1.550E-14	0.0000	5.134E-14	0.0000	7.109E-16	0.0000	1.069E-16	0.0000	4.637E-13	0.0000
Th-232	6.711E-21	0.0000	2.987E-22	0.0000	9.952E-22	0.0000	1.431E-23	0.0000	2.182E-24	0.0000	8.964E-21	0.0000
U-233	3.202E-12	0.0000	1.515E-14	0.0000	4.776E-13	0.0000	2.041E-14	0.0000	1.040E-13	0.0000	3.827E-12	0.0000
U-234	1.177E-08	0.0180	5.577E-11	0.0001	1.758E-09	0.0027	7.519E-11	0.0001	3.830E-10	0.0006	1.407E-08	0.0215
U-235	7.595E-12	0.0000	3.622E-14	0.0000	1.142E-12	0.0000	4.881E-14	0.0000	2.487E-13	0.0000	9.315E-12	0.0000
U-236	5.011E-11	0.0001	2.369E-13	0.0000	7.466E-12	0.0000	3.192E-13	0.0000	1.626E-12	0.0000	5.987E-11	0.0001
Total	2.554E-08	0.0390	6.162E-10	0.0009	3.949E-09	0.0060	1.429E-09	0.0022	1.601E-08	0.0245	6.544E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 3.000E+02 years

0 Radionuclides

Radon Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 38 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 39
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

0
Water Independent Pathways (Inhalation excludes radon)

0	Ground		Inhalation		Radon		Plant		Meat		Milk		Soil	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	2.659E-07	0.4063	6.308E-14	0.0000	0.000E+00	0.0000	5.491E-09	0.0084	4.081E-10	0.0006	7.724E-09	0.0118	6.504E-11	0.0001
Am-241	7.546E-08	0.1153	4.722E-09	0.0072	0.000E+00	0.0000	3.123E-08	0.0477	3.092E-10	0.0005	3.339E-11	0.0001	5.229E-08	0.0799
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.168E-24	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.010E-26	0.0000	2.068E-26	0.0000	4.739E-27	0.0000	9.388E-28	0.0000
Eu-152	3.523E-13	0.0000	3.842E-19	0.0000	0.000E+00	0.0000	1.271E-16	0.0000	2.365E-17	0.0000	1.563E-18	0.0000	9.806E-17	0.0000
Eu-154	4.191E-17	0.0000	5.255E-23	0.0000	0.000E+00	0.0000	2.356E-20	0.0000	4.385E-21	0.0000	2.897E-22	0.0000	1.867E-20	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	1.708E-12	0.0000	0.000E+00	0.0000	1.948E-08	0.0298	2.638E-09	0.0040	2.443E-08	0.0373	7.599E-10	0.0012
Pu-238	2.005E-11	0.0000	5.421E-10	0.0008	0.000E+00	0.0000	3.785E-09	0.0058	7.477E-11	0.0001	3.791E-12	0.0000	6.296E-09	0.0096
Pu-239	4.017E-10	0.0006	4.195E-09	0.0064	0.000E+00	0.0000	3.035E-08	0.0464	5.984E-10	0.0009	1.624E-11	0.0000	4.985E-08	0.0762
Pu-240	3.357E-11	0.0001	9.748E-10	0.0015	0.000E+00	0.0000	7.052E-09	0.0108	1.391E-10	0.0002	3.782E-12	0.0000	1.163E-08	0.0178
Total	3.418E-07	0.5223	1.044E-08	0.0159	0.000E+00	0.0000	9.739E-08	0.1488	4.168E-09	0.0064	3.221E-08	0.0492	1.209E-07	0.1847

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 3.000E+02 years

Water Dependent Pathways

	Water		Fish		Radon		Plant		Meat		Milk		All pathways	
Radio-Nuclide	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.	risk	fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.796E-07	0.4272
Am-241	3.204E-12	0.0000	1.527E-14	0.0000	0.000E+00	0.0000	4.780E-13	0.0000	2.041E-14	0.0000	1.040E-13	0.0000	1.640E-07	0.2507
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	3.694E-27	0.0000	4.465E-28	0.0000	0.000E+00	0.0000	5.841E-28	0.0000	1.456E-27	0.0000	4.089E-28	0.0000	3.241E-24	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	3.526E-13	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.196E-17	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	1.371E-08	0.0209	5.600E-10	0.0009	0.000E+00	0.0000	2.182E-09	0.0033	1.353E-09	0.0021	1.563E-08	0.0239	8.074E-08	0.1234
Pu-238	1.177E-08	0.0180	5.588E-11	0.0001	0.000E+00	0.0000	1.758E-09	0.0027	7.520E-11	0.0001	3.830E-10	0.0006	2.477E-08	0.0378
Pu-239	7.615E-12	0.0000	3.660E-14	0.0000	0.000E+00	0.0000	1.144E-12	0.0000	4.907E-14	0.0000	2.487E-13	0.0000	8.542E-08	0.1305
Pu-240	5.011E-11	0.0001	2.369E-13	0.0000	0.000E+00	0.0000	7.466E-12	0.0000	3.192E-13	0.0000	1.626E-12	0.0000	1.989E-08	0.0304
Total	2.554E-08	0.0390	6.162E-10	0.0009	0.000E+00	0.0000	3.949E-09	0.0060	1.429E-09	0.0022	1.601E-08	0.0245	6.544E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 39 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 40
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Amount of Intake Quantities QINT(i,p,t) for Individual Radionuclides (i) and Pathways (p)
As pCi/yr at t= 1.000E+03 years

Radio-	Water Independent Pathways (Inhalation w/o radon)					Water Dependent Pathways					Total
Nuclide	Inhalation	Plant	Meat	Milk	Soil	Water	Fish	Plant	Meat	Milk	Ingestion*
Ac-227	1.871E-11	6.499E-08	2.179E-10	3.194E-10	2.683E-08	8.803E-06	1.470E-07	9.725E-07	2.892E-09	7.055E-09	1.002E-05
Ag-108m	1.789E-06	3.713E-01	2.759E-02	5.223E-01	2.565E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	9.238E-01
Am-241	1.830E-03	2.533E+00	2.498E-02	2.711E-03	2.624E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	5.185E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Eu-152	4.237E-26	1.466E-22	2.729E-23	1.803E-24	6.075E-23	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.364E-22
Eu-154	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Gd-152	5.711E-17	1.976E-13	3.678E-14	9.721E-16	8.189E-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	3.172E-13
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	6.129E-05	4.240E+00	5.742E-01	5.317E+00	8.788E-02	1.441E+01	4.147E-01	1.616E+00	1.003E+00	1.158E+01	3.924E+01
Np-237	1.473E-06	4.077E-02	1.317E-03	1.573E-05	2.113E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	4.422E-02
Pa-231	1.970E-11	2.726E-07	5.585E-08	1.381E-10	2.825E-08	3.731E-06	1.544E-08	4.138E-07	2.603E-07	7.587E-10	4.778E-06
Pb-210	1.415E-09	1.966E-05	6.493E-07	5.993E-07	2.030E-06	1.334E-04	1.118E-05	1.479E-05	1.489E-06	1.609E-06	1.854E-04
Pu-238	2.346E-06	3.248E-03	6.405E-05	1.738E-06	3.364E-03	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	6.678E-03
Pu-239	4.035E-03	5.587E+00	1.102E-01	2.990E-03	5.785E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	1.149E+01
Pu-240	8.893E-04	1.231E+00	2.428E-02	6.589E-04	1.275E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	2.531E+00
Ra-226	1.487E-09	8.227E-05	2.299E-06	5.356E-06	2.132E-06	2.004E-04	3.389E-06	2.241E-05	2.789E-06	8.051E-06	3.291E-04
Ra-228	3.290E-16	1.813E-11	4.994E-13	1.171E-12	4.717E-13	4.258E-11	7.196E-13	4.748E-12	5.837E-13	1.698E-12	7.059E-11
Th-228	3.277E-16	6.926E-13	2.039E-14	2.578E-15	4.699E-13	1.489E-11	5.040E-13	1.684E-12	3.327E-14	4.838E-15	1.830E-11
Th-229	7.562E-11	1.047E-07	2.065E-09	2.804E-10	1.084E-07	3.219E-06	1.088E-07	3.582E-07	4.746E-09	7.008E-10	3.907E-06
Th-230	6.681E-09	9.250E-06	1.824E-07	2.475E-08	9.579E-06	3.213E-04	1.086E-05	3.554E-05	4.506E-07	6.527E-08	3.872E-04
Th-232	3.329E-16	4.610E-13	9.091E-15	1.234E-15	4.774E-13	1.515E-11	5.123E-13	1.681E-12	2.184E-14	3.197E-15	1.832E-11
U-233	1.780E-09	6.165E-06	1.954E-07	9.096E-07	2.552E-06	6.984E-03	2.449E-05	7.720E-04	3.301E-05	1.682E-04	7.991E-03
U-234	2.225E-07	7.698E-04	2.436E-05	1.136E-04	3.190E-04	1.054E+00	3.697E-03	1.165E-01	4.986E-03	2.540E-02	1.206E+00
U-235	1.368E-09	4.733E-06	1.498E-07	6.985E-07	1.961E-06	5.601E-03	1.965E-05	6.192E-04	2.648E-05	1.349E-04	6.409E-03
U-236	9.274E-09	3.209E-05	1.015E-06	4.736E-06	1.330E-05	3.810E-02	1.336E-04	4.212E-03	1.801E-04	9.176E-04	4.359E-02

* Sum of all ingestion pathways, i.e. water independent plant, meat, milk, soil
and water-dependent water, fish, plant, meat, milk pathways

0

Amount of Intake Quantities QINT9(irn,i,t) and QINT9W(irn,i,t) for Inhalation of
Radon and its Decay Products as pCi/yr at t= 1.000E+03 years

0

Radon	Radionuclides							
Pathway	Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 40 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 41
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years
0 Water Independent Pathways (Inhalation excludes radon)
0

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ac-227	1.331E-14	0.0000	1.196E-16	0.0000	1.300E-15	0.0000	4.357E-18	0.0000	6.386E-18	0.0000	9.544E-16	0.0000
Ag-108m	5.568E-09	0.0343	1.321E-15	0.0000	1.150E-10	0.0007	8.544E-12	0.0001	1.617E-10	0.0010	1.362E-12	0.0000
Am-241	2.397E-08	0.1476	1.505E-09	0.0093	9.939E-09	0.0612	9.798E-11	0.0006	1.064E-11	0.0001	1.667E-08	0.1026
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-152	2.946E-29	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Gd-152	0.000E+00	0.0000	1.559E-23	0.0000	2.282E-22	0.0000	4.248E-23	0.0000	1.123E-24	0.0000	1.545E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	9.512E-15	0.0000	1.085E-10	0.0007	1.469E-11	0.0001	1.360E-10	0.0008	4.231E-12	0.0000
Np-237	5.606E-10	0.0035	7.874E-13	0.0000	1.120E-10	0.0007	3.616E-12	0.0000	4.321E-14	0.0000	1.032E-11	0.0001
Pa-231	1.324E-15	0.0000	2.743E-17	0.0000	1.885E-15	0.0000	3.862E-16	0.0000	9.549E-19	0.0000	3.233E-16	0.0000
Pb-210	2.923E-15	0.0000	6.030E-16	0.0000	2.076E-12	0.0000	6.858E-14	0.0000	6.330E-14	0.0000	1.657E-13	0.0000
Pu-238	7.470E-14	0.0000	2.105E-12	0.0000	1.466E-11	0.0001	2.890E-13	0.0000	7.843E-15	0.0000	2.443E-11	0.0002
Pu-239	3.854E-10	0.0024	4.027E-09	0.0248	2.914E-08	0.1794	5.745E-10	0.0035	1.559E-11	0.0001	4.786E-08	0.2947
Pu-240	3.053E-11	0.0002	8.866E-10	0.0055	6.414E-09	0.0395	1.265E-10	0.0008	3.433E-12	0.0000	1.057E-08	0.0651
Ra-226	6.076E-12	0.0000	5.269E-16	0.0000	1.298E-12	0.0000	3.627E-14	0.0000	8.448E-14	0.0000	4.770E-14	0.0000
Ra-228	7.178E-19	0.0000	5.266E-23	0.0000	7.951E-19	0.0000	2.191E-20	0.0000	5.137E-20	0.0000	3.300E-20	0.0000
Th-228	1.227E-18	0.0000	1.431E-21	0.0000	8.955E-21	0.0000	2.637E-22	0.0000	3.334E-23	0.0000	1.163E-20	0.0000
Th-229	4.314E-14	0.0000	5.259E-16	0.0000	2.321E-15	0.0000	4.578E-17	0.0000	6.215E-18	0.0000	4.322E-15	0.0000
Th-230	2.639E-15	0.0000	5.734E-15	0.0000	3.315E-14	0.0000	6.536E-16	0.0000	8.870E-17	0.0000	5.827E-14	0.0000
Th-232	5.610E-23	0.0000	4.412E-22	0.0000	1.876E-21	0.0000	3.701E-23	0.0000	5.023E-24	0.0000	3.375E-21	0.0000
U-233	8.465E-16	0.0000	6.272E-16	0.0000	1.815E-14	0.0000	5.750E-16	0.0000	2.677E-15	0.0000	1.240E-14	0.0000
U-234	2.601E-14	0.0000	7.304E-14	0.0000	2.117E-12	0.0000	6.701E-14	0.0000	3.125E-13	0.0000	1.452E-12	0.0000
U-235	3.549E-13	0.0000	4.153E-16	0.0000	1.389E-14	0.0000	4.395E-16	0.0000	2.050E-15	0.0000	9.631E-15	0.0000
U-236	5.653E-16	0.0000	2.924E-15	0.0000	8.701E-14	0.0000	2.753E-15	0.0000	1.284E-14	0.0000	5.949E-14	0.0000
Total	3.052E-08	0.1879	6.422E-09	0.0395	4.585E-08	0.2823	8.263E-10	0.0051	3.279E-10	0.0020	7.515E-08	0.4627

Attachment 9 Sheet No. 41 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 42
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Excess Cancer Risks CNRS(i,p,t) for Individual Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All Pathways** risk	All Pathways** fract.
Ac-227	1.312E-13	0.0000	2.942E-15	0.0000	1.947E-14	0.0000	5.788E-17	0.0000	1.412E-16	0.0000	1.695E-13	0.0000
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.854E-09	0.0360
Am-241	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.219E-08	0.3213
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	2.946E-29	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Gd-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.419E-22	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.638E-10	0.0016	1.078E-11	0.0001	4.199E-11	0.0003	2.606E-11	0.0002	3.009E-10	0.0019	9.068E-10	0.0056
Np-237	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	6.873E-10	0.0042
Pa-231	1.978E-14	0.0000	1.069E-16	0.0000	2.866E-15	0.0000	1.803E-15	0.0000	5.254E-18	0.0000	2.851E-14	0.0000
Pb-210	5.193E-12	0.0000	1.183E-12	0.0000	1.565E-12	0.0000	1.575E-13	0.0000	1.703E-13	0.0000	1.065E-11	0.0001
Pu-238	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.156E-11	0.0003
Pu-239	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	8.200E-08	0.5049
Pu-240	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	1.804E-08	0.1110
Ra-226	2.372E-12	0.0000	5.354E-14	0.0000	3.540E-13	0.0000	4.406E-14	0.0000	1.272E-13	0.0000	1.049E-11	0.0001
Ra-228	1.357E-18	0.0000	3.153E-20	0.0000	2.080E-19	0.0000	2.558E-20	0.0000	7.442E-20	0.0000	3.315E-18	0.0000
Th-228	1.365E-19	0.0000	6.511E-21	0.0000	2.175E-20	0.0000	4.298E-22	0.0000	6.250E-23	0.0000	1.414E-18	0.0000
Th-229	5.268E-14	0.0000	2.417E-15	0.0000	7.953E-15	0.0000	1.053E-16	0.0000	1.554E-17	0.0000	1.135E-13	0.0000
Th-230	8.810E-13	0.0000	3.896E-14	0.0000	1.274E-13	0.0000	1.615E-15	0.0000	2.339E-16	0.0000	1.150E-12	0.0000
Th-232	4.680E-20	0.0000	2.084E-21	0.0000	6.838E-21	0.0000	8.876E-23	0.0000	1.299E-23	0.0000	6.161E-20	0.0000
U-233	1.523E-11	0.0001	7.207E-14	0.0000	2.272E-12	0.0000	9.713E-14	0.0000	4.949E-13	0.0000	1.820E-11	0.0001
U-234	2.145E-09	0.0132	1.016E-11	0.0001	3.203E-10	0.0020	1.370E-11	0.0001	6.979E-11	0.0004	2.563E-09	0.0158
U-235	1.208E-11	0.0001	5.760E-14	0.0000	1.815E-12	0.0000	7.763E-14	0.0000	3.955E-13	0.0000	1.480E-11	0.0001
U-236	7.658E-11	0.0005	3.620E-13	0.0000	1.141E-11	0.0001	4.879E-13	0.0000	2.486E-12	0.0000	9.149E-11	0.0006
Total	2.521E-09	0.0155	2.271E-11	0.0001	3.799E-10	0.0023	4.063E-11	0.0003	3.743E-10	0.0023	1.624E-07	1.0000

** Sum of water independent ground, inhalation, plant, meat, milk, soil
and water dependent water, fish, plant, meat, milk pathways

0

Excess Cancer Risks CNRS9(irn,i,t) and CNRS9W(irn,i,t) for Inhalation of
Radon and its Decay Products at t= 1.000E+03 years

0

Radon Pathway	Radionuclides Rn-222	Po-218	Pb-214	Bi-214	Rn-220	Po-216	Pb-212	Bi-212
Water-ind.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Water-dep.	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Total	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

Water-ind. == Water-independent Water-dep. == Water-dependent

Attachment 9 Sheet No. 42 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 9

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 43
Intrisk : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

0
0 Water Independent Pathways (Inhalation excludes radon)

Radio-Nuclide	Ground risk	Ground fract.	Inhalation risk	Inhalation fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	Soil risk	Soil fract.
Ag-108m	5.568E-09	0.0343	1.321E-15	0.0000	0.000E+00	0.0000	1.150E-10	0.0007	8.544E-12	0.0001	1.617E-10	0.0010	1.362E-12	0.0000
Am-241	2.453E-08	0.1510	1.506E-09	0.0093	0.000E+00	0.0000	1.005E-08	0.0619	1.016E-10	0.0006	1.068E-11	0.0001	1.668E-08	0.1027
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-152	2.946E-29	0.0000	1.559E-23	0.0000	0.000E+00	0.0000	2.282E-22	0.0000	4.248E-23	0.0000	1.123E-24	0.0000	1.545E-22	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	0.000E+00	0.0000	9.512E-15	0.0000	0.000E+00	0.0000	1.085E-10	0.0007	1.469E-11	0.0001	1.360E-10	0.0008	4.231E-12	0.0000
Pu-238	6.183E-12	0.0000	2.185E-12	0.0000	0.000E+00	0.0000	2.018E-11	0.0001	4.615E-13	0.0000	4.682E-13	0.0000	2.615E-11	0.0002
Pu-239	3.858E-10	0.0024	4.027E-09	0.0248	0.000E+00	0.0000	2.914E-08	0.1794	5.745E-10	0.0035	1.559E-11	0.0001	4.786E-08	0.2947
Pu-240	3.053E-11	0.0002	8.866E-10	0.0055	0.000E+00	0.0000	6.414E-09	0.0395	1.265E-10	0.0008	3.445E-12	0.0000	1.057E-08	0.0651
Total	3.052E-08	0.1879	6.422E-09	0.0395	0.000E+00	0.0000	4.585E-08	0.2823	8.263E-10	0.0051	3.279E-10	0.0020	7.515E-08	0.4627

0

Total Excess Cancer Risk CNRSI(i,p,t)*** for Initially Existent Radionuclides (i) and Pathways (p)
and Fraction of Total Risk at t= 1.000E+03 years

Water Dependent Pathways

Radio-Nuclide	Water risk	Water fract.	Fish risk	Fish fract.	Radon risk	Radon fract.	Plant risk	Plant fract.	Meat risk	Meat fract.	Milk risk	Milk fract.	All pathways risk	All pathways fract.
Ag-108m	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	5.854E-09	0.0360
Am-241	1.528E-11	0.0001	7.449E-14	0.0000	0.000E+00	0.0000	2.280E-12	0.0000	9.724E-14	0.0000	4.949E-13	0.0000	5.289E-08	0.3256
C-14	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Co-60	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Eu-152	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	4.419E-22	0.0000
Eu-154	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
H-3	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000	0.000E+00	0.0000
Ni-63	2.638E-10	0.0016	1.078E-11	0.0001	0.000E+00	0.0000	4.199E-11	0.0003	2.606E-11	0.0002	3.009E-10	0.0019	9.068E-10	0.0056
Pu-238	2.153E-09	0.0133	1.144E-11	0.0001	0.000E+00	0.0000	3.224E-10	0.0020	1.391E-11	0.0001	7.009E-11	0.0004	2.627E-09	0.0162
Pu-239	1.223E-11	0.0001	6.065E-14	0.0000	0.000E+00	0.0000	1.838E-12	0.0000	7.950E-14	0.0000	3.957E-13	0.0000	8.202E-08	0.5050
Pu-240	7.658E-11	0.0005	3.620E-13	0.0000	0.000E+00	0.0000	1.141E-11	0.0001	4.879E-13	0.0000	2.486E-12	0.0000	1.813E-08	0.1116
Total	2.521E-09	0.0155	2.271E-11	0.0001	0.000E+00	0.0000	3.799E-10	0.0023	4.063E-11	0.0003	3.743E-10	0.0023	1.624E-07	1.0000

***CNRSI(i,p,t) includes contribution from decay daughter radionuclides

Attachment 9 Sheet No. 43 of 43
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 1
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Table of Contents

Part IV: Concentration of Radionuclides

Concentration of radionuclides in different media
Time= 0.000E+00 2
Time= 1.000E+00 4
Time= 3.000E+00 6
Time= 7.000E+00 8
Time= 1.100E+01 10
Time= 4.300E+01 12
Time= 1.350E+02 14
Time= 3.000E+02 16
Time= 1.000E+03 18

Attachment 10 Sheet No. 1 of 19
Originator: S. W. Clark Date 7/11/07
Chk'd By M. W. Perrott Date 7/12/07
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 2
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 0.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	1.100E-02	1.100E-02	1.395E-07	0.000E+00	0.000E+00
Am-241	2.300E-01	2.300E-01	2.917E-06	0.000E+00	0.000E+00
C-14	1.900E+00	1.900E+00	2.409E-05	0.000E+00	0.000E+00
Co-60	7.500E-03	7.500E-03	9.511E-08	0.000E+00	0.000E+00
Eu-152	4.100E-02	4.100E-02	5.199E-07	0.000E+00	0.000E+00
Eu-154	1.800E-02	1.800E-02	2.283E-07	0.000E+00	0.000E+00
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	2.500E+00	2.500E+00	3.170E-05	0.000E+00	0.000E+00
Ni-63	2.500E+00	2.500E+00	3.170E-05	0.000E+00	0.000E+00
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	1.600E-01	1.600E-01	2.029E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.331E-06	0.000E+00	0.000E+00
Pu-240	2.500E-02	2.500E-02	3.170E-07	0.000E+00	0.000E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 2.065E+01 pCi/ml
Concentration of gaseous H-3 in air = 4.055E+00 pCi/m**3
Concentration of gaseous C-14 in air = 9.789E+00 pCi/m**3

Attachment 10 Sheet No. 2 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 3
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 0.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ag-108m	0.000E+00	1.650E+00	1.650E+00	1.650E+00	1.650E+00	3.531E-01	2.406E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	2.302E-01	2.308E-01	2.308E-01	2.308E-01	6.535E-03	2.554E-04	0.000E+00	0.000E+00
C-14	0.000E+00	2.182E+04	4.910E+03	1.844E+04	8.293E+03	1.310E+04	3.819E+03	0.000E+00	0.000E+00
Co-60	0.000E+00	6.000E-01	6.000E-01	6.000E-01	6.000E-01	8.910E-01	7.350E-02	0.000E+00	0.000E+00
Eu-152	0.000E+00	1.025E-01	1.026E-01	1.026E-01	1.026E-01	5.496E-02	1.307E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	4.501E-02	4.506E-02	4.507E-02	4.507E-02	2.413E-02	5.739E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
H-3	0.000E+00	1.650E+04	1.650E+04	1.650E+04	1.650E+04	6.453E+03	3.919E+03	0.000E+00	0.000E+00
Ni-63	0.000E+00	1.250E+02	1.250E+02	1.250E+02	1.250E+02	4.875E+01	1.625E+02	0.000E+00	0.000E+00
Np-237	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pa-231	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pb-210	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Pu-238	0.000E+00	1.601E-01	1.605E-01	1.606E-01	1.606E-01	9.092E-03	8.883E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.051E-01	1.053E-01	1.054E-01	1.054E-01	5.967E-03	5.830E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.502E-02	2.508E-02	2.509E-02	2.509E-02	1.421E-03	1.388E-05	0.000E+00	0.000E+00
Ra-226	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ra-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-228	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-229	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-230	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Th-232	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-233	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-234	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-235	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
U-236	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 10 Sheet No. 3 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 4
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 1.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	1.151E-17	1.151E-17	1.459E-22	6.339E-16	1.293E-17
Ag-108m	1.094E-02	1.094E-02	1.387E-07	0.000E+00	0.000E+00
Am-241	2.296E-01	2.296E-01	2.912E-06	0.000E+00	0.000E+00
C-14	8.701E-01	8.701E-01	1.103E-05	0.000E+00	0.000E+00
Co-60	6.575E-03	6.575E-03	8.338E-08	1.693E-05	3.454E-07
Eu-152	3.892E-02	3.892E-02	4.936E-07	0.000E+00	0.000E+00
Eu-154	1.664E-02	1.664E-02	2.110E-07	0.000E+00	0.000E+00
Gd-152	7.159E-17	7.159E-17	9.078E-22	0.000E+00	0.000E+00
H-3	1.377E+00	1.377E+00	1.746E-05	1.047E+03	2.137E+01
Ni-63	2.482E+00	2.482E+00	3.147E-05	2.950E-02	6.019E-04
Np-237	7.444E-08	7.444E-08	9.439E-13	0.000E+00	0.000E+00
Pa-231	1.093E-15	1.093E-15	1.386E-20	3.124E-16	6.374E-18
Pb-210	2.272E-18	2.272E-18	2.881E-23	7.991E-16	1.630E-17
Pu-238	1.587E-01	1.587E-01	2.013E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.331E-06	0.000E+00	0.000E+00
Pu-240	2.500E-02	2.500E-02	3.170E-07	0.000E+00	0.000E+00
Ra-226	2.940E-16	2.940E-16	3.728E-21	1.149E-15	2.343E-17
Ra-228	7.114E-22	7.114E-22	9.021E-27	1.220E-24	2.489E-26
Th-228	6.039E-23	6.039E-23	7.658E-28	1.430E-26	2.918E-28
Th-229	5.122E-18	5.122E-18	6.495E-23	1.525E-16	3.112E-18
Th-230	2.034E-12	2.034E-12	2.580E-17	2.638E-14	5.382E-16
Th-232	1.824E-20	1.824E-20	2.313E-25	0.000E+00	0.000E+00
U-233	1.627E-13	1.627E-13	2.063E-18	1.805E-13	3.683E-15
U-234	4.512E-07	4.512E-07	5.721E-12	7.885E-07	1.609E-08
U-235	1.033E-10	1.033E-10	1.309E-15	1.802E-10	3.677E-12
U-236	7.390E-10	7.390E-10	9.371E-15	1.290E-09	2.632E-11

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.137E+01 pCi/ml
Concentration of gaseous H-3 in air = 2.234E+00 pCi/m**3
Concentration of gaseous C-14 in air = 4.483E+00 pCi/m**3

Attachment 10 Sheet No. 4 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 5
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 1.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	6.170E-16	5.594E-16	3.806E-15	3.517E-15	1.989E-15	1.655E-17	4.223E-18	1.583E-16	1.055E-14
Ag-108m	0.000E+00	1.641E+00	1.641E+00	1.641E+00	1.641E+00	3.512E-01	2.393E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	2.298E-01	2.304E-01	2.305E-01	2.305E-01	6.524E-03	2.550E-04	0.000E+00	0.000E+00
C-14	0.000E+00	1.030E+04	2.254E+03	9.705E+03	4.191E+03	6.891E+03	1.929E+03	0.000E+00	0.000E+00
Co-60	1.680E-05	5.260E-01	5.261E-01	5.299E-01	5.263E-01	7.813E-01	6.445E-02	9.828E-05	6.552E-05
Eu-152	0.000E+00	9.733E-02	9.743E-02	9.772E-02	9.746E-02	5.217E-02	1.241E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	4.160E-02	4.165E-02	4.183E-02	4.166E-02	2.230E-02	5.304E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.790E-16	1.792E-16	1.697E-16	1.788E-16	9.597E-17	9.167E-19	0.000E+00	0.000E+00
H-3	1.045E+03	1.311E+04	1.488E+04	1.164E+04	1.141E+04	4.824E+03	3.428E+03	2.105E+01	2.105E+01
Ni-63	2.937E-02	1.241E+02	1.243E+02	1.243E+02	1.243E+02	4.845E+01	1.616E+02	5.834E-02	5.834E-02
Np-237	0.000E+00	1.435E-06	1.485E-06	1.233E-06	1.311E-06	1.192E-07	5.463E-10	0.000E+00	0.000E+00
Pa-231	3.155E-16	1.078E-14	1.289E-14	1.177E-14	1.249E-14	6.541E-15	1.143E-17	6.783E-17	6.744E-16
Pb-210	7.649E-16	5.083E-16	4.626E-15	3.909E-15	4.160E-15	2.262E-16	1.041E-16	3.471E-15	1.159E-15
Pu-238	0.000E+00	1.588E-01	1.593E-01	1.594E-01	1.593E-01	9.020E-03	8.813E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.051E-01	1.053E-01	1.054E-01	1.054E-01	5.966E-03	5.829E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.501E-02	2.508E-02	2.509E-02	2.509E-02	1.420E-03	1.388E-05	0.000E+00	0.000E+00
Ra-226	1.100E-15	1.120E-14	1.831E-14	1.229E-14	1.398E-14	9.852E-16	1.083E-15	8.355E-16	4.178E-15
Ra-228	1.241E-24	2.534E-20	2.824E-20	1.618E-20	1.938E-20	1.382E-21	1.418E-21	1.458E-24	7.565E-24
Th-228	1.505E-26	4.008E-22	8.801E-23	7.249E-22	8.709E-22	3.434E-23	1.795E-24	3.149E-26	1.581E-25
Th-229	1.529E-16	2.112E-16	9.695E-16	8.092E-16	9.088E-16	6.892E-18	4.177E-19	3.156E-16	1.578E-15
Th-230	4.549E-14	2.643E-12	2.463E-12	6.631E-12	7.451E-12	2.305E-13	1.650E-14	7.741E-14	4.137E-13
Th-232	0.000E+00	2.027E-20	1.845E-20	5.775E-20	6.481E-20	1.388E-21	8.945E-23	0.000E+00	0.000E+00
U-233	1.788E-13	8.207E-13	1.537E-12	1.587E-12	1.824E-12	9.241E-14	1.257E-13	3.437E-14	2.062E-13
U-234	7.842E-07	2.053E-06	6.035E-06	4.593E-06	5.140E-06	1.920E-07	3.795E-07	1.547E-07	9.281E-07
U-235	1.792E-10	4.695E-10	1.380E-09	1.050E-09	1.175E-09	4.390E-11	8.677E-11	3.535E-11	2.121E-10
U-236	1.283E-09	3.360E-09	9.873E-09	7.512E-09	8.407E-09	3.141E-10	6.210E-10	2.530E-10	1.518E-09

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 10 Sheet No. 5 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 6
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 3.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	3.054E-16	3.054E-16	3.872E-21	1.719E-15	3.508E-17
Ag-108m	1.082E-02	1.082E-02	1.372E-07	0.000E+00	0.000E+00
Am-241	2.289E-01	2.289E-01	2.902E-06	0.000E+00	0.000E+00
C-14	1.824E-01	1.824E-01	2.313E-06	0.000E+00	0.000E+00
Co-60	5.053E-03	5.053E-03	6.408E-08	3.904E-05	7.964E-07
Eu-152	3.507E-02	3.507E-02	4.448E-07	0.000E+00	0.000E+00
Eu-154	1.421E-02	1.421E-02	1.802E-07	0.000E+00	0.000E+00
Gd-152	2.041E-16	2.041E-16	2.588E-21	0.000E+00	0.000E+00
H-3	4.177E-01	4.177E-01	5.297E-06	1.800E+03	3.672E+01
Ni-63	2.445E+00	2.445E+00	3.100E-05	8.722E-02	1.780E-03
Np-237	2.229E-07	2.229E-07	2.827E-12	0.000E+00	0.000E+00
Pa-231	9.817E-15	9.817E-15	1.245E-19	2.206E-15	4.501E-17
Pb-210	1.809E-16	1.809E-16	2.294E-21	3.455E-15	7.048E-17
Pu-238	1.562E-01	1.562E-01	1.981E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.331E-06	0.000E+00	0.000E+00
Pu-240	2.499E-02	2.499E-02	3.169E-07	0.000E+00	0.000E+00
Ra-226	7.893E-15	7.893E-15	1.001E-19	5.263E-15	1.074E-16
Ra-228	1.810E-20	1.810E-20	2.295E-25	2.461E-19	5.020E-21
Th-228	4.078E-21	4.078E-21	5.171E-26	8.605E-20	1.756E-21
Th-229	1.380E-16	1.380E-16	1.750E-21	4.665E-16	9.518E-18
Th-230	1.818E-11	1.818E-11	2.305E-16	7.038E-13	1.436E-14
Th-232	1.638E-19	1.638E-19	2.077E-24	9.057E-20	1.848E-21
U-233	1.460E-12	1.460E-12	1.851E-17	4.959E-12	1.012E-13
U-234	1.339E-06	1.339E-06	1.698E-11	7.046E-06	1.438E-07
U-235	3.089E-10	3.089E-10	3.917E-15	1.619E-09	3.303E-11
U-236	2.211E-09	2.211E-09	2.803E-14	1.159E-08	2.364E-10

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 3.450E+00 pCi/ml
Concentration of gaseous H-3 in air = 6.775E-01 pCi/m**3
Concentration of gaseous C-14 in air = 9.397E-01 pCi/m**3

Attachment 10 Sheet No. 6 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 7
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 3.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.732E-15	3.290E-15	1.175E-14	1.326E-14	1.139E-14	1.414E-16	2.116E-17	5.514E-16	3.674E-14
Ag-108m	0.000E+00	1.623E+00	1.623E+00	1.623E+00	1.623E+00	3.473E-01	2.367E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	2.290E-01	2.296E-01	2.297E-01	2.297E-01	6.503E-03	2.541E-04	0.000E+00	0.000E+00
C-14	0.000E+00	2.159E+03	4.724E+02	2.035E+03	8.785E+02	1.445E+03	4.044E+02	0.000E+00	0.000E+00
Co-60	3.894E-05	4.043E-01	4.045E-01	4.074E-01	4.047E-01	6.007E-01	4.956E-02	2.348E-04	1.566E-04
Eu-152	0.000E+00	8.771E-02	8.780E-02	8.807E-02	8.783E-02	4.702E-02	1.118E-03	0.000E+00	0.000E+00
Eu-154	0.000E+00	3.554E-02	3.557E-02	3.573E-02	3.559E-02	1.905E-02	4.531E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	5.103E-16	5.108E-16	5.023E-16	5.105E-16	2.735E-16	2.606E-18	0.000E+00	0.000E+00
H-3	1.799E+03	9.571E+03	1.273E+04	6.178E+03	6.099E+03	2.920E+03	2.688E+03	3.663E+01	3.663E+01
Ni-63	8.710E-02	1.224E+02	1.228E+02	1.229E+02	1.228E+02	4.789E+01	1.598E+02	1.761E-01	1.761E-01
Np-237	0.000E+00	4.405E-06	4.456E-06	4.205E-06	4.282E-06	3.955E-07	1.735E-09	0.000E+00	0.000E+00
Pa-231	2.301E-15	1.010E-13	1.131E-13	1.286E-13	1.325E-13	6.831E-14	9.806E-17	5.834E-16	5.756E-15
Pb-210	3.443E-15	6.389E-15	2.343E-14	2.691E-14	2.399E-14	1.698E-15	5.894E-16	2.061E-14	6.886E-15
Pu-238	0.000E+00	1.563E-01	1.568E-01	1.569E-01	1.568E-01	8.878E-03	8.674E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.051E-01	1.053E-01	1.054E-01	1.054E-01	5.966E-03	5.829E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.501E-02	2.507E-02	2.508E-02	2.508E-02	1.420E-03	1.387E-05	0.000E+00	0.000E+00
Ra-226	5.246E-15	3.108E-13	3.480E-13	3.019E-13	3.130E-13	2.455E-14	2.199E-14	5.257E-15	2.629E-14
Ra-228	2.430E-19	9.680E-19	2.238E-18	2.074E-18	2.054E-18	1.586E-19	1.604E-19	2.300E-19	1.150E-18
Th-228	8.516E-20	1.106E-19	5.349E-19	5.915E-19	5.727E-19	7.592E-21	3.937E-22	1.614E-19	8.069E-19
Th-229	4.605E-16	6.983E-16	2.999E-15	2.514E-15	5.614E-15	3.174E-17	2.792E-18	8.587E-16	4.295E-15
Th-230	8.753E-13	2.309E-11	2.487E-11	7.220E-11	7.493E-11	2.063E-12	1.319E-13	1.655E-12	8.518E-12
Th-232	9.105E-20	3.000E-19	7.406E-19	1.157E-18	1.163E-18	2.237E-20	1.389E-21	1.719E-19	8.616E-19
U-233	4.946E-12	1.056E-11	3.475E-11	3.382E-11	3.583E-11	1.196E-12	2.093E-12	9.939E-13	5.963E-12
U-234	7.033E-06	1.232E-05	4.752E-05	4.599E-05	4.768E-05	1.403E-06	2.649E-06	1.419E-06	8.514E-06
U-235	1.616E-09	2.833E-09	1.092E-08	1.056E-08	1.095E-08	3.226E-10	6.089E-10	3.260E-10	1.956E-09
U-236	1.156E-08	2.027E-08	7.816E-08	7.560E-08	7.838E-08	2.308E-09	4.357E-09	2.333E-09	1.400E-08

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 10 Sheet No. 7 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 8
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 7.000E+00 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	3.748E-15	3.748E-15	4.753E-20	8.145E-15	1.662E-16
Ag-108m	1.058E-02	1.058E-02	1.342E-07	0.000E+00	0.000E+00
Am-241	2.274E-01	2.274E-01	2.883E-06	0.000E+00	0.000E+00
C-14	7.997E-03	7.997E-03	1.014E-07	0.000E+00	0.000E+00
Co-60	2.985E-03	2.985E-03	3.785E-08	5.382E-05	1.098E-06
Eu-152	2.848E-02	2.848E-02	3.612E-07	0.000E+00	0.000E+00
Eu-154	1.037E-02	1.037E-02	1.315E-07	0.000E+00	0.000E+00
Gd-152	4.310E-16	4.310E-16	5.466E-21	0.000E+00	0.000E+00
H-3	3.837E-02	3.837E-02	4.866E-07	1.752E+03	3.575E+01
Ni-63	2.374E+00	2.374E+00	3.010E-05	1.976E-01	4.032E-03
Np-237	5.185E-07	5.185E-07	6.575E-12	0.000E+00	0.000E+00
Pa-231	5.324E-14	5.324E-14	6.751E-19	2.187E-14	4.462E-16
Pb-210	5.186E-15	5.186E-15	6.577E-20	1.202E-14	2.451E-16
Pu-238	1.514E-01	1.514E-01	1.919E-06	0.000E+00	0.000E+00
Pu-239	1.050E-01	1.050E-01	1.331E-06	0.000E+00	0.000E+00
Pu-240	2.498E-02	2.498E-02	3.167E-07	0.000E+00	0.000E+00
Ra-226	9.915E-14	9.915E-14	1.257E-18	3.134E-14	6.395E-16
Ra-228	2.052E-19	2.052E-19	2.603E-24	6.757E-19	1.378E-20
Th-228	8.686E-20	8.686E-20	1.101E-24	2.320E-19	4.733E-21
Th-229	1.745E-15	1.745E-15	2.213E-20	1.365E-15	2.786E-17
Th-230	9.757E-11	9.757E-11	1.237E-15	8.840E-12	1.804E-13
Th-232	8.884E-19	8.884E-19	1.127E-23	3.139E-19	6.405E-21
U-233	7.900E-12	7.900E-12	1.002E-16	6.322E-11	1.290E-12
U-234	3.059E-06	3.059E-06	3.879E-11	3.782E-05	7.716E-07
U-235	7.168E-10	7.168E-10	9.089E-15	8.780E-09	1.791E-10
U-236	5.128E-09	5.128E-09	6.503E-14	6.282E-08	1.282E-09

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 3.169E-01 pCi/ml
Concentration of gaseous H-3 in air = 6.224E-02 pCi/m**3
Concentration of gaseous C-14 in air = 4.120E-02 pCi/m**3

Attachment 10 Sheet No. 8 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 9
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 7.000E+00 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	8.065E-15	1.911E-14	5.966E-14	5.883E-14	5.720E-14	8.365E-16	1.259E-16	2.322E-15	1.546E-13
Ag-108m	0.000E+00	1.587E+00	1.587E+00	1.588E+00	1.588E+00	3.397E-01	2.315E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	2.275E-01	2.281E-01	2.282E-01	2.282E-01	6.461E-03	2.525E-04	0.000E+00	0.000E+00
C-14	0.000E+00	9.466E+01	2.071E+01	8.921E+01	3.852E+01	6.335E+01	1.773E+01	0.000E+00	0.000E+00
Co-60	5.376E-05	2.389E-01	2.391E-01	2.409E-01	2.392E-01	3.552E-01	2.931E-02	3.270E-04	2.180E-04
Eu-152	0.000E+00	7.123E-02	7.131E-02	7.152E-02	7.133E-02	3.818E-02	9.082E-04	0.000E+00	0.000E+00
Eu-154	0.000E+00	2.593E-02	2.596E-02	2.607E-02	2.597E-02	1.390E-02	3.306E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.078E-15	1.079E-15	1.072E-15	1.079E-15	5.778E-16	5.500E-18	0.000E+00	0.000E+00
H-3	1.752E+03	6.869E+03	9.961E+03	3.401E+03	3.386E+03	1.827E+03	2.012E+03	3.574E+01	3.574E+01
Ni-63	1.975E-01	1.189E+02	1.199E+02	1.200E+02	1.200E+02	4.678E+01	1.564E+02	4.015E-01	4.015E-01
Np-237	0.000E+00	1.032E-05	1.037E-05	1.012E-05	1.019E-05	9.454E-07	4.099E-09	0.000E+00	0.000E+00
Pa-231	2.232E-14	5.656E-13	6.756E-13	8.008E-13	8.129E-13	4.105E-13	5.503E-16	5.100E-15	5.249E-14
Pb-210	1.215E-14	7.359E-14	1.295E-13	1.335E-13	1.567E-13	1.036E-14	3.974E-15	7.913E-14	2.647E-14
Pu-238	0.000E+00	1.515E-01	1.519E-01	1.520E-01	1.519E-01	8.601E-03	8.404E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.050E-01	1.053E-01	1.053E-01	1.053E-01	5.964E-03	5.827E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.499E-02	2.506E-02	2.507E-02	2.507E-02	1.419E-03	1.387E-05	0.000E+00	0.000E+00
Ra-226	3.151E-14	3.948E-12	4.162E-12	3.875E-12	3.987E-12	3.138E-13	2.739E-13	3.320E-14	1.660E-13
Ra-228	6.769E-19	8.975E-18	1.248E-17	1.253E-17	1.282E-17	9.819E-19	9.159E-19	6.986E-19	3.493E-18
Th-228	2.329E-19	5.185E-19	1.566E-18	2.267E-18	2.336E-18	3.979E-20	1.953E-21	4.814E-19	2.407E-18
Th-229	1.371E-15	3.741E-15	1.041E-14	1.524E-14	1.745E-14	2.590E-16	1.614E-17	2.661E-15	1.333E-14
Th-230	9.761E-12	1.288E-10	1.652E-10	4.380E-10	4.451E-10	1.130E-11	6.963E-13	1.922E-11	9.740E-11
Th-232	3.227E-19	1.488E-18	2.978E-18	5.594E-18	5.832E-18	1.150E-19	7.017E-21	6.573E-19	3.298E-18
U-233	6.314E-11	1.027E-10	4.166E-10	4.259E-10	4.360E-10	1.244E-11	2.281E-11	1.278E-11	7.669E-11
U-234	3.779E-05	5.669E-05	2.453E-04	2.548E-04	2.587E-04	7.040E-06	1.308E-05	7.674E-06	4.604E-05
U-235	8.773E-09	1.318E-08	5.695E-08	5.913E-08	6.004E-08	1.635E-09	3.038E-09	1.781E-09	1.069E-08
U-236	6.277E-08	9.427E-08	4.075E-07	4.231E-07	4.296E-07	1.170E-08	2.174E-08	1.274E-08	7.647E-08

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 10 Sheet No. 9 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 10
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 1.100E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	1.406E-14	1.406E-14	1.783E-19	2.204E-14	4.497E-16
Ag-108m	1.035E-02	1.035E-02	1.313E-07	0.000E+00	0.000E+00
Am-241	2.259E-01	2.259E-01	2.865E-06	0.000E+00	0.000E+00
C-14	3.496E-04	3.496E-04	4.433E-09	0.000E+00	0.000E+00
Co-60	1.763E-03	1.763E-03	2.236E-08	4.997E-05	1.019E-06
Eu-152	2.313E-02	2.313E-02	2.933E-07	0.000E+00	0.000E+00
Eu-154	7.566E-03	7.566E-03	9.594E-08	0.000E+00	0.000E+00
Gd-152	6.153E-16	6.153E-16	7.803E-21	0.000E+00	0.000E+00
H-3	3.519E-03	3.519E-03	4.462E-08	2.343E+02	4.781E+00
Ni-63	2.304E+00	2.304E+00	2.922E-05	3.016E-01	6.154E-03
Np-237	8.120E-07	8.120E-07	1.030E-11	0.000E+00	0.000E+00
Pa-231	1.309E-13	1.309E-13	1.660E-18	7.841E-14	1.600E-15
Pb-210	3.060E-14	3.060E-14	3.880E-19	2.387E-14	4.869E-16
Pu-238	1.466E-01	1.466E-01	1.859E-06	0.000E+00	0.000E+00
Pu-239	1.049E-01	1.049E-01	1.331E-06	0.000E+00	0.000E+00
Pu-240	2.496E-02	2.496E-02	3.165E-07	0.000E+00	0.000E+00
Ra-226	3.805E-13	3.805E-13	4.825E-18	9.646E-14	1.968E-15
Ra-228	7.164E-19	7.164E-19	9.084E-24	1.283E-18	2.618E-20
Th-228	3.951E-19	3.951E-19	5.011E-24	4.117E-19	8.399E-21
Th-229	6.740E-15	6.740E-15	8.547E-20	2.395E-15	4.887E-17
Th-230	2.375E-10	2.375E-10	3.012E-15	3.394E-11	6.925E-13
Th-232	2.185E-18	2.185E-18	2.771E-23	6.672E-19	1.361E-20
U-233	1.939E-11	1.939E-11	2.459E-16	2.442E-10	4.982E-12
U-234	4.705E-06	4.705E-06	5.966E-11	9.208E-05	1.879E-06
U-235	1.120E-09	1.120E-09	1.420E-14	2.160E-08	4.406E-10
U-236	8.012E-09	8.012E-09	1.016E-13	1.545E-07	3.152E-09

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 2.906E-02 pCi/ml
Concentration of gaseous H-3 in air = 5.708E-03 pCi/m**3
Concentration of gaseous C-14 in air = 1.801E-03 pCi/m**3

Attachment 10 Sheet No. 10 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 11
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 1.100E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	2.207E-14	6.582E-14	1.744E-13	1.723E-13	1.889E-13	2.280E-15	4.191E-16	6.804E-15	4.530E-13
Ag-108m	0.000E+00	1.553E+00	1.553E+00	1.553E+00	1.553E+00	3.323E-01	2.264E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	2.261E-01	2.267E-01	2.267E-01	2.267E-01	6.419E-03	2.508E-04	0.000E+00	0.000E+00
C-14	0.000E+00	4.138E+00	9.055E-01	3.901E+00	1.684E+00	2.770E+00	7.753E-01	0.000E+00	0.000E+00
Co-60	4.994E-05	1.411E-01	1.414E-01	1.424E-01	1.414E-01	2.100E-01	1.733E-02	3.044E-04	2.029E-04
Eu-152	0.000E+00	5.785E-02	5.791E-02	5.808E-02	5.792E-02	3.101E-02	7.376E-04	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.892E-02	1.894E-02	1.902E-02	1.895E-02	1.014E-02	2.412E-04	0.000E+00	0.000E+00
Gd-152	0.000E+00	1.539E-15	1.540E-15	1.535E-15	1.540E-15	8.249E-16	7.850E-18	0.000E+00	0.000E+00
H-3	2.347E+02	9.282E+02	1.325E+03	4.871E+02	4.722E+02	2.591E+02	2.742E+02	4.831E+00	4.831E+00
Ni-63	3.015E-01	1.156E+02	1.171E+02	1.173E+02	1.173E+02	4.570E+01	1.530E+02	6.137E-01	6.137E-01
Np-237	0.000E+00	1.619E-05	1.624E-05	1.599E-05	1.607E-05	1.492E-06	6.449E-09	0.000E+00	0.000E+00
Pa-231	7.962E-14	1.430E-12	1.818E-12	2.166E-12	2.197E-12	1.085E-12	1.418E-15	1.772E-14	1.860E-13
Pb-210	2.426E-14	3.581E-13	4.623E-13	5.572E-13	5.797E-13	4.559E-14	1.542E-14	1.624E-13	5.442E-14
Pu-238	0.000E+00	1.467E-01	1.471E-01	1.472E-01	1.472E-01	8.333E-03	8.141E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.050E-01	1.053E-01	1.053E-01	1.053E-01	5.963E-03	5.826E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.498E-02	2.505E-02	2.505E-02	2.505E-02	1.419E-03	1.386E-05	0.000E+00	0.000E+00
Ra-226	9.776E-14	1.522E-11	1.584E-11	1.543E-11	1.576E-11	1.243E-12	1.072E-12	1.080E-13	5.400E-13
Ra-228	1.287E-18	3.003E-17	3.678E-17	3.602E-17	3.634E-17	2.852E-18	2.562E-18	1.336E-18	6.681E-18
Th-228	4.139E-19	1.358E-18	3.043E-18	4.717E-18	4.723E-18	1.088E-19	5.156E-21	8.626E-19	4.313E-18
Th-229	2.467E-15	1.132E-14	2.274E-14	4.384E-14	4.012E-14	8.794E-16	5.174E-17	5.089E-15	2.554E-14
Th-230	3.618E-11	3.285E-10	4.802E-10	1.162E-09	1.175E-09	2.813E-11	1.712E-12	7.212E-11	3.638E-10
Th-232	6.892E-19	3.513E-18	6.669E-18	1.322E-17	1.331E-17	2.778E-19	1.672E-20	1.408E-18	7.069E-18
U-233	2.440E-10	3.680E-10	1.583E-09	1.656E-09	1.680E-09	4.600E-11	8.466E-11	4.957E-11	2.974E-10
U-234	9.204E-05	1.317E-04	5.906E-04	6.256E-04	6.316E-04	1.681E-05	3.108E-05	1.872E-05	1.123E-04
U-235	2.158E-08	3.093E-08	1.385E-07	1.467E-07	1.481E-07	3.944E-09	7.295E-09	4.390E-09	2.634E-08
U-236	1.544E-07	2.213E-07	9.913E-07	1.049E-06	1.060E-06	2.822E-08	5.219E-08	3.141E-08	1.885E-07

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 10 Sheet No. 11 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 12
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 4.300E+01 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	6.531E-13	6.531E-13	8.282E-18	3.168E-12	6.463E-14
Ag-108m	8.675E-03	8.675E-03	1.100E-07	0.000E+00	0.000E+00
Am-241	2.144E-01	2.144E-01	2.719E-06	0.000E+00	0.000E+00
C-14	4.192E-15	4.192E-15	5.315E-20	0.000E+00	0.000E+00
Co-60	2.613E-05	2.613E-05	3.313E-10	2.902E-06	5.920E-08
Eu-152	4.377E-03	4.377E-03	5.550E-08	0.000E+00	0.000E+00
Eu-154	6.078E-04	6.078E-04	7.708E-09	0.000E+00	0.000E+00
Gd-152	1.261E-15	1.261E-15	1.599E-20	0.000E+00	0.000E+00
H-3	1.645E-11	1.645E-11	2.086E-16	1.143E-06	2.332E-08
Ni-63	1.817E+00	1.817E+00	2.305E-05	9.329E-01	1.903E-02
Np-237	3.092E-06	3.092E-06	3.921E-11	0.000E+00	0.000E+00
Pa-231	1.939E-12	1.939E-12	2.459E-17	4.468E-12	9.116E-14
Pb-210	5.547E-12	5.547E-12	7.035E-17	4.063E-12	8.290E-14
Pu-238	1.138E-01	1.138E-01	1.443E-06	0.000E+00	0.000E+00
Pu-239	1.047E-01	1.047E-01	1.328E-06	0.000E+00	0.000E+00
Pu-240	2.485E-02	2.485E-02	3.152E-07	0.000E+00	0.000E+00
Ra-226	2.081E-11	2.081E-11	2.638E-16	2.555E-11	5.212E-13
Ra-228	2.239E-17	2.239E-17	2.839E-22	3.511E-17	7.163E-19
Th-228	1.932E-17	1.932E-17	2.450E-22	1.030E-17	2.102E-19
Th-229	3.883E-13	3.883E-13	4.924E-18	1.623E-13	3.311E-15
Th-230	3.244E-09	3.244E-09	4.114E-14	1.863E-09	3.801E-11
Th-232	3.238E-17	3.238E-17	4.105E-22	1.935E-17	3.949E-19
U-233	2.827E-10	2.827E-10	3.585E-15	1.408E-08	2.872E-10
U-234	1.553E-05	1.553E-05	1.969E-10	1.258E-03	2.567E-05
U-235	4.187E-09	4.187E-09	5.309E-14	3.199E-07	6.526E-09
U-236	2.991E-08	2.991E-08	3.793E-13	2.287E-06	4.665E-08

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 1.359E-10 pCi/ml
Concentration of gaseous H-3 in air = 2.669E-11 pCi/m**3
Concentration of gaseous C-14 in air = 2.160E-14 pCi/m**3

Attachment 10 Sheet No. 12 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 13
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 4.300E+01 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	3.165E-12	5.767E-12	2.154E-11	2.322E-11	2.331E-11	8.443E-14	4.229E-14	9.639E-13	6.423E-11
Ag-108m	0.000E+00	1.301E+00	1.301E+00	1.302E+00	1.301E+00	2.785E-01	1.898E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	2.146E-01	2.151E-01	2.152E-01	2.152E-01	6.092E-03	2.381E-04	0.000E+00	0.000E+00
C-14	0.000E+00	4.963E-11	1.086E-11	4.682E-11	2.021E-11	3.324E-11	9.303E-12	0.000E+00	0.000E+00
Co-60	2.901E-06	2.094E-03	2.109E-03	2.125E-03	2.111E-03	3.134E-03	2.592E-04	1.774E-05	1.183E-05
Eu-152	0.000E+00	1.095E-02	1.096E-02	1.099E-02	1.096E-02	5.867E-03	1.396E-04	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.520E-03	1.522E-03	1.528E-03	1.522E-03	8.148E-04	1.938E-05	0.000E+00	0.000E+00
Gd-152	0.000E+00	3.154E-15	3.157E-15	3.156E-15	3.157E-15	1.690E-15	1.608E-17	0.000E+00	0.000E+00
H-3	1.145E-06	4.524E-06	6.462E-06	2.372E-06	2.299E-06	1.262E-06	1.336E-06	2.357E-08	2.357E-08
Ni-63	9.329E-01	9.212E+01	9.678E+01	9.732E+01	9.729E+01	3.785E+01	1.282E+02	1.902E+00	1.902E+00
Np-237	0.000E+00	6.179E-05	6.185E-05	6.161E-05	6.168E-05	5.734E-06	2.469E-08	0.000E+00	0.000E+00
Pa-231	4.485E-12	2.558E-11	4.775E-11	5.550E-11	5.565E-11	2.489E-11	2.980E-14	9.358E-13	1.016E-11
Pb-210	4.053E-12	6.137E-11	8.100E-11	8.602E-11	8.441E-11	7.165E-12	2.424E-12	2.435E-11	8.188E-12
Pu-238	0.000E+00	1.139E-01	1.142E-01	1.142E-01	1.142E-01	6.465E-03	6.317E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.048E-01	1.051E-01	1.051E-01	1.051E-01	5.952E-03	5.815E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.487E-02	2.494E-02	2.495E-02	2.495E-02	1.412E-03	1.380E-05	0.000E+00	0.000E+00
Ra-226	2.551E-11	8.635E-10	9.930E-10	9.972E-10	9.984E-10	7.943E-11	6.939E-11	2.583E-11	1.292E-10
Ra-228	3.511E-17	9.364E-16	1.117E-15	1.120E-15	1.121E-15	8.853E-17	7.845E-17	3.588E-17	1.794E-16
Th-228	1.033E-17	4.539E-17	8.541E-17	1.372E-16	1.367E-16	3.654E-18	1.719E-19	2.117E-17	1.058E-16
Th-229	1.660E-13	6.749E-13	1.457E-12	2.649E-12	2.648E-12	5.121E-14	3.029E-15	3.367E-13	1.689E-12
Th-230	1.894E-09	6.302E-09	1.536E-08	2.571E-08	2.579E-08	4.564E-10	2.685E-11	3.841E-09	1.925E-08
Th-232	1.967E-17	6.399E-17	1.582E-16	2.644E-16	2.643E-16	4.610E-18	2.704E-19	3.995E-17	2.002E-16
U-233	1.407E-08	1.914E-08	8.924E-08	9.653E-08	9.688E-08	2.519E-09	4.633E-09	2.868E-09	1.721E-08
U-234	1.258E-03	1.688E-03	7.953E-03	8.642E-03	8.662E-03	2.238E-04	4.112E-04	2.565E-04	1.539E-03
U-235	3.198E-07	4.296E-07	2.023E-06	2.197E-06	2.202E-06	5.692E-08	1.046E-07	6.520E-08	3.912E-07
U-236	2.286E-06	3.071E-06	1.446E-05	1.570E-05	1.574E-05	4.069E-07	7.479E-07	4.661E-07	2.797E-06

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 10 Sheet No. 13 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 14
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 1.350E+02 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	1.137E-11	1.137E-11	1.442E-16	1.719E-10	3.508E-12
Ag-108m	5.219E-03	5.219E-03	6.618E-08	0.000E+00	0.000E+00
Am-241	1.845E-01	1.845E-01	2.339E-06	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	1.440E-10	1.440E-10	1.826E-15	5.053E-11	1.031E-12
Eu-152	3.651E-05	3.651E-05	4.629E-10	0.000E+00	0.000E+00
Eu-154	4.320E-07	4.320E-07	5.478E-12	0.000E+00	0.000E+00
Gd-152	1.410E-15	1.410E-15	1.788E-20	0.000E+00	0.000E+00
H-3	9.421E-36	9.421E-36	1.195E-40	7.420E-31	1.514E-32
Ni-63	9.187E-01	9.187E-01	1.165E-05	1.494E+00	3.048E-02
Np-237	9.011E-06	9.011E-06	1.143E-10	0.000E+00	0.000E+00
Pa-231	1.751E-11	1.751E-11	2.220E-16	1.143E-10	2.333E-12
Pb-210	2.873E-10	2.873E-10	3.644E-15	6.756E-10	1.378E-11
Pu-238	5.486E-02	5.486E-02	6.956E-07	0.000E+00	0.000E+00
Pu-239	1.042E-01	1.042E-01	1.321E-06	0.000E+00	0.000E+00
Pu-240	2.455E-02	2.455E-02	3.113E-07	0.000E+00	0.000E+00
Ra-226	5.046E-10	5.046E-10	6.399E-15	1.906E-09	3.889E-11
Ra-228	2.604E-16	2.604E-16	3.303E-21	1.166E-15	2.378E-17
Th-228	2.500E-16	2.500E-16	3.170E-21	3.873E-16	7.902E-18
Th-229	1.084E-11	1.084E-11	1.375E-16	1.337E-11	2.728E-13
Th-230	2.350E-08	2.350E-08	2.980E-13	3.983E-08	8.125E-10
Th-232	2.926E-16	2.926E-16	3.710E-21	4.734E-16	9.658E-18
U-233	2.439E-09	2.439E-09	3.093E-14	3.469E-07	7.077E-09
U-234	3.034E-05	3.034E-05	3.847E-10	6.519E-03	1.330E-04
U-235	1.160E-08	1.160E-08	1.471E-13	2.192E-06	4.472E-08
U-236	8.255E-08	8.255E-08	1.047E-12	1.562E-05	3.187E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 7.781E-35 pCi/ml
Concentration of gaseous H-3 in air = 1.528E-35 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 10 Sheet No. 14 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 15
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 1.350E+02 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.719E-10	2.541E-10	1.110E-09	1.208E-09	1.210E-09	2.644E-12	1.994E-12	5.258E-11	3.504E-09
Ag-108m	0.000E+00	7.828E-01	7.828E-01	7.831E-01	7.829E-01	1.675E-01	1.142E+00	0.000E+00	0.000E+00
Am-241	0.000E+00	1.846E-01	1.851E-01	1.852E-01	1.852E-01	5.242E-03	2.049E-04	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	5.053E-11	1.159E-08	1.184E-08	1.195E-08	1.187E-08	1.763E-08	1.465E-09	3.092E-10	2.061E-10
Eu-152	0.000E+00	9.129E-05	9.139E-05	9.166E-05	9.141E-05	4.894E-05	1.164E-06	0.000E+00	0.000E+00
Eu-154	0.000E+00	1.080E-06	1.081E-06	1.086E-06	1.082E-06	5.791E-07	1.377E-08	0.000E+00	0.000E+00
Gd-152	0.000E+00	3.525E-15	3.529E-15	3.529E-15	3.529E-15	1.890E-15	1.798E-17	0.000E+00	0.000E+00
H-3	7.431E-31	2.928E-30	4.186E-30	1.532E-30	1.484E-30	8.164E-31	8.655E-31	1.530E-32	1.530E-32
Ni-63	1.494E+00	4.793E+01	5.538E+01	5.625E+01	5.624E+01	2.179E+01	7.583E+01	3.047E+00	3.047E+00
Np-237	0.000E+00	1.802E-04	1.802E-04	1.800E-04	1.801E-04	1.675E-05	7.206E-08	0.000E+00	0.000E+00
Pa-231	1.145E-10	3.279E-10	8.967E-10	1.001E-09	1.002E-09	4.130E-10	4.521E-13	2.350E-11	2.576E-10
Pb-210	6.755E-10	3.779E-09	7.129E-09	7.595E-09	7.610E-09	5.583E-10	2.013E-10	4.125E-09	1.380E-09
Pu-238	0.000E+00	5.489E-02	5.504E-02	5.508E-02	5.506E-02	3.117E-03	3.046E-05	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.043E-01	1.045E-01	1.046E-01	1.046E-01	5.920E-03	5.784E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.456E-02	2.463E-02	2.464E-02	2.464E-02	1.395E-03	1.363E-05	0.000E+00	0.000E+00
Ra-226	1.906E-09	2.270E-08	3.222E-08	3.323E-08	3.328E-08	2.607E-09	2.387E-09	1.942E-09	9.712E-09
Ra-228	1.165E-15	1.191E-14	1.777E-14	1.820E-14	1.822E-14	1.417E-15	1.318E-15	1.188E-15	5.941E-15
Th-228	3.881E-16	9.132E-16	2.707E-15	3.592E-15	3.594E-15	6.602E-17	3.229E-18	7.928E-16	3.964E-15
Th-229	1.346E-11	3.016E-11	9.611E-11	1.311E-10	1.313E-10	1.818E-12	1.032E-13	2.739E-11	1.371E-10
Th-230	3.998E-08	7.892E-08	2.761E-07	3.482E-07	3.485E-07	4.311E-09	2.388E-10	8.145E-08	4.075E-07
Th-232	4.755E-16	9.555E-16	3.298E-15	4.219E-15	4.222E-15	5.317E-17	2.959E-18	9.686E-16	4.846E-15
U-233	3.469E-07	4.612E-07	2.189E-06	2.390E-06	2.392E-06	6.155E-08	1.130E-07	7.075E-08	4.245E-07
U-234	6.518E-03	8.632E-03	4.109E-02	4.497E-02	4.498E-02	1.156E-03	2.119E-03	1.330E-03	7.979E-03
U-235	2.192E-06	2.906E-06	1.382E-05	1.511E-05	1.512E-05	3.887E-07	7.129E-07	4.471E-07	2.683E-06
U-236	1.562E-05	2.071E-05	9.851E-05	1.077E-04	1.078E-04	2.770E-06	5.081E-06	3.187E-06	1.912E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 16
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in environmental media
at t = 3.000E+02 years

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	6.140E-11	6.140E-11	7.786E-16	1.433E-09	2.924E-11
Ag-108m	2.098E-03	2.098E-03	2.660E-08	0.000E+00	0.000E+00
Am-241	1.409E-01	1.409E-01	1.787E-06	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	5.328E-20	5.328E-20	6.757E-25	4.207E-20	8.583E-22
Eu-152	6.825E-09	6.825E-09	8.654E-14	0.000E+00	0.000E+00
Eu-154	9.751E-13	9.751E-13	1.237E-17	0.000E+00	0.000E+00
Gd-152	1.409E-15	1.409E-15	1.787E-20	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	2.703E-01	2.703E-01	3.427E-06	9.926E-01	2.025E-02
Np-237	1.760E-05	1.760E-05	2.232E-10	0.000E+00	0.000E+00
Pa-231	7.445E-11	7.445E-11	9.441E-16	6.689E-10	1.365E-11
Pb-210	2.897E-09	2.897E-09	3.674E-14	1.156E-08	2.358E-10
Pu-238	1.483E-02	1.483E-02	1.880E-07	0.000E+00	0.000E+00
Pu-239	1.032E-01	1.032E-01	1.308E-06	0.000E+00	0.000E+00
Pu-240	2.400E-02	2.400E-02	3.044E-07	0.000E+00	0.000E+00
Ra-226	3.709E-09	3.709E-09	4.703E-14	2.186E-08	4.460E-10
Ra-228	1.187E-15	1.187E-15	1.505E-20	7.403E-15	1.510E-16
Th-228	1.167E-15	1.167E-15	1.480E-20	2.548E-15	5.198E-17
Th-229	9.952E-11	9.952E-11	1.262E-15	1.890E-10	3.857E-12
Th-230	7.032E-08	7.032E-08	8.918E-13	1.645E-07	3.356E-09
Th-232	1.247E-15	1.247E-15	1.581E-20	2.738E-15	5.586E-17
U-233	9.549E-09	9.549E-09	1.211E-13	1.864E-06	3.803E-08
U-234	3.013E-05	3.013E-05	3.821E-10	7.731E-03	1.577E-04
U-235	2.086E-08	2.086E-08	2.645E-13	4.663E-06	9.513E-08
U-236	1.473E-07	1.473E-07	1.868E-12	3.300E-05	6.732E-07

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture = 0.000E+00 pCi/ml
Concentration of gaseous H-3 in air = 0.000E+00 pCi/m**3
Concentration of gaseous C-14 in air = 0.000E+00 pCi/m**3

Attachment 10 Sheet No. 16 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

1RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 17
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 3.000E+02 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.433E-09	2.034E-09	9.172E-09	1.000E-08	1.001E-08	1.946E-11	1.621E-11	4.384E-10	2.922E-08
Ag-108m	0.000E+00	3.147E-01	3.147E-01	3.148E-01	3.147E-01	6.735E-02	4.589E-01	0.000E+00	0.000E+00
Am-241	0.000E+00	1.410E-01	1.414E-01	1.414E-01	1.414E-01	4.004E-03	1.565E-04	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	4.207E-20	4.319E-18	4.530E-18	4.586E-18	4.555E-18	6.767E-18	5.676E-19	2.575E-19	1.716E-19
Eu-152	0.000E+00	1.707E-08	1.708E-08	1.714E-08	1.709E-08	9.149E-09	2.176E-10	0.000E+00	0.000E+00
Eu-154	0.000E+00	2.438E-12	2.441E-12	2.452E-12	2.442E-12	1.307E-12	3.109E-14	0.000E+00	0.000E+00
Gd-152	0.000E+00	3.524E-15	3.528E-15	3.528E-15	3.528E-15	1.889E-15	1.797E-17	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	9.926E-01	1.484E+01	1.979E+01	2.037E+01	2.036E+01	7.846E+00	2.828E+01	2.025E+00	2.025E+00
Np-237	0.000E+00	3.520E-04	3.521E-04	3.520E-04	3.520E-04	3.273E-05	1.408E-07	0.000E+00	0.000E+00
Pa-231	6.692E-10	1.630E-09	4.960E-09	5.436E-09	5.438E-09	2.202E-09	2.305E-12	1.368E-10	1.503E-09
Pb-210	1.156E-08	4.433E-08	1.018E-07	1.092E-07	1.093E-07	7.589E-09	2.794E-09	7.069E-08	2.363E-08
Pu-238	0.000E+00	1.484E-02	1.487E-02	1.489E-02	1.488E-02	8.425E-04	8.231E-06	0.000E+00	0.000E+00
Pu-239	0.000E+00	1.033E-01	1.035E-01	1.036E-01	1.036E-01	5.863E-03	5.729E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.402E-02	2.408E-02	2.409E-02	2.409E-02	1.364E-03	1.333E-05	0.000E+00	0.000E+00
Ra-226	2.186E-08	1.774E-07	2.864E-07	2.989E-07	2.990E-07	2.327E-08	2.180E-08	2.230E-08	1.115E-07
Ra-228	7.402E-15	5.706E-14	9.420E-14	9.730E-14	9.733E-14	7.531E-15	7.129E-15	7.547E-15	3.773E-14
Th-228	2.553E-15	5.243E-15	1.731E-14	2.220E-14	2.221E-14	3.661E-16	1.813E-17	5.214E-15	2.607E-14
Th-229	1.895E-10	3.571E-10	1.295E-09	1.553E-09	1.554E-09	1.819E-11	9.845E-13	3.863E-10	1.932E-09
Th-230	1.647E-07	2.900E-07	1.108E-06	1.264E-06	1.264E-06	1.361E-08	7.171E-10	3.358E-07	1.679E-06
Th-232	2.742E-15	4.928E-15	1.853E-14	2.152E-14	2.152E-14	2.381E-16	1.268E-17	5.592E-15	2.797E-14
U-233	1.864E-06	2.471E-06	1.175E-05	1.286E-05	1.286E-05	3.306E-07	6.063E-07	3.802E-07	2.281E-06
U-234	7.731E-03	1.023E-02	4.872E-02	5.337E-02	5.337E-02	1.371E-03	2.512E-03	1.577E-03	9.463E-03
U-235	4.663E-06	6.173E-06	2.939E-05	3.218E-05	3.218E-05	8.268E-07	1.516E-06	9.512E-07	5.707E-06
U-236	3.299E-05	4.368E-05	2.080E-04	2.277E-04	2.277E-04	5.851E-06	1.073E-05	6.731E-06	4.039E-05

*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

Attachment 10 Sheet No. 17 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

```
1RESRAD, Version 6.3      T« Limit = 180 days        07/10/2007  13:31  Page  18
 Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
 File    : 118-F-1_OB-BCL.RAD

      Concentration of radionuclides in environmental media
                  at t = 1.000E+03 years
```

Radio-Nuclide	Contaminated Zone pCi/g	Surface Soil* pCi/g	Air Particulate pCi/m**3	Well Water pCi/L	Surface Water pCi/L
Ac-227	4.595E-10	4.595E-10	5.826E-15	1.206E-08	2.460E-10
Ag-108m	4.393E-05	4.393E-05	5.571E-10	0.000E+00	0.000E+00
Am-241	4.492E-02	4.492E-02	5.697E-07	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Eu-152	1.040E-24	1.040E-24	1.319E-29	0.000E+00	0.000E+00
Eu-154	1.083E-36	1.083E-36	1.373E-41	0.000E+00	0.000E+00
Gd-152	1.402E-15	1.402E-15	1.778E-20	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.505E-03	1.505E-03	1.908E-08	1.974E-02	4.027E-04
Np-237	3.618E-05	3.618E-05	4.587E-10	0.000E+00	0.000E+00
Pa-231	4.837E-10	4.837E-10	6.134E-15	5.110E-09	1.043E-10
Pb-210	3.475E-08	3.475E-08	4.407E-13	1.827E-07	3.728E-09
Pu-238	5.760E-05	5.760E-05	7.304E-10	0.000E+00	0.000E+00
Pu-239	9.907E-02	9.907E-02	1.256E-06	0.000E+00	0.000E+00
Pu-240	2.183E-02	2.183E-02	2.769E-07	0.000E+00	0.000E+00
Ra-226	3.650E-08	3.650E-08	4.629E-13	2.746E-07	5.602E-09
Ra-228	8.077E-15	8.077E-15	1.024E-19	5.834E-14	1.190E-15
Th-228	8.046E-15	8.046E-15	1.020E-19	2.036E-14	4.153E-16
Th-229	1.857E-09	1.857E-09	2.354E-14	4.407E-09	8.990E-11
Th-230	1.640E-07	1.640E-07	2.080E-12	4.401E-07	8.978E-09
Th-232	8.174E-15	8.174E-15	1.037E-19	2.075E-14	4.233E-16
U-233	4.370E-08	4.370E-08	5.542E-13	9.567E-06	1.952E-07
U-234	5.462E-06	5.462E-06	6.927E-11	1.444E-03	2.946E-05
U-235	3.358E-08	3.358E-08	4.259E-13	7.673E-06	1.565E-07
U-236	2.277E-07	2.277E-07	2.887E-12	5.219E-05	1.065E-06

*The Surface Soil is the top layer of soil within the user specified mixing zone/depth.

```
 Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters,
 i.e. using parameters appearing in the input screen when the pathways are active.
Concentration of H-3 in soil moisture =  0.000E+00 pCi/ml
Concentration of gaseous H-3 in air   =  0.000E+00 pCi/m**3
Concentration of gaseous C-14 in air  =  0.000E+00 pCi/m**3
```

Attachment 10 Sheet No. 18 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

ATTACHMENT 10

RESRAD, Version 6.3 T« Limit = 180 days 07/10/2007 13:31 Page 19
Concent : 118-F-1 Overburden/Below Cleanup Levels Stockpile Material RESRAD Calculation
File : 118-F-1_OB-BCL.RAD

Concentration of radionuclides in foodstuff media
at t = 1.000E+03 years*

Radio-Nuclide	Drinking Water pCi/L	Nonleafy Vegetable pCi/kg	Leafy Vegetable pCi/kg	Fodder Meat pCi/kg	Fodder Milk pCi/kg	Meat pCi/kg	Milk pCi/L	Fish pCi/kg	Crustacea pCi/kg
Ac-227	1.206E-08	1.697E-08	7.702E-08	8.408E-08	8.408E-08	1.589E-10	1.357E-10	3.689E-09	2.459E-07
Ag-108m	0.000E+00	6.590E-03	6.590E-03	6.592E-03	6.590E-03	1.410E-03	9.610E-03	0.000E+00	0.000E+00
Am-241	0.000E+00	4.495E-02	4.507E-02	4.509E-02	4.509E-02	1.276E-03	4.988E-05	0.000E+00	0.000E+00
C-14	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Co-60	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Eu-152	0.000E+00	2.601E-24	2.604E-24	2.612E-24	2.605E-24	1.394E-24	3.317E-26	0.000E+00	0.000E+00
Eu-154	0.000E+00	2.708E-36	2.711E-36	2.723E-36	2.712E-36	1.452E-36	3.453E-38	0.000E+00	0.000E+00
Gd-152	0.000E+00	3.507E-15	3.510E-15	3.511E-15	3.511E-15	1.880E-15	1.788E-17	0.000E+00	0.000E+00
H-3	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00	0.000E+00
Ni-63	1.974E-02	1.016E-01	2.000E-01	2.115E-01	2.115E-01	8.059E-02	3.108E-01	4.027E-02	4.027E-02
Np-237	0.000E+00	7.235E-04	7.236E-04	7.236E-04	7.236E-04	6.729E-05	2.894E-07	0.000E+00	0.000E+00
Pa-231	5.110E-09	1.157E-08	3.702E-08	4.020E-08	4.021E-08	1.616E-08	1.650E-11	1.043E-09	1.147E-08
Pb-210	1.827E-07	5.895E-07	1.499E-06	1.614E-06	1.614E-06	1.093E-07	4.063E-08	1.118E-06	3.734E-07
Pu-238	0.000E+00	5.764E-05	5.779E-05	5.784E-05	5.781E-05	3.273E-06	3.198E-08	0.000E+00	0.000E+00
Pu-239	0.000E+00	9.914E-02	9.940E-02	9.943E-02	9.943E-02	5.629E-03	5.500E-05	0.000E+00	0.000E+00
Pu-240	0.000E+00	2.185E-02	2.191E-02	2.191E-02	2.191E-02	1.241E-03	1.212E-05	0.000E+00	0.000E+00
Ra-226	2.746E-07	1.825E-06	3.194E-06	3.354E-06	3.354E-06	2.600E-07	2.467E-07	2.801E-07	1.400E-06
Ra-228	5.832E-14	3.989E-13	6.913E-13	7.170E-13	7.170E-13	5.535E-14	5.279E-14	5.947E-14	2.973E-13
Th-228	2.039E-14	3.985E-14	1.369E-13	1.736E-13	1.736E-13	2.743E-15	1.364E-16	4.166E-14	2.083E-13
Th-229	4.409E-09	7.689E-09	2.962E-08	3.301E-08	3.301E-08	3.481E-10	1.805E-11	8.993E-09	4.497E-08
Th-230	4.401E-07	7.423E-07	2.934E-06	3.209E-06	3.209E-06	3.235E-08	1.656E-09	8.979E-07	4.489E-06
Th-232	2.076E-14	3.555E-14	1.388E-13	1.534E-13	1.534E-13	1.581E-15	8.153E-17	4.234E-14	2.117E-13
U-233	9.567E-06	1.267E-05	6.030E-05	6.604E-05	6.605E-05	1.697E-06	3.111E-06	1.952E-06	1.171E-05
U-234	1.444E-03	1.910E-03	9.100E-03	9.972E-03	9.971E-03	2.560E-04	4.693E-04	2.946E-04	1.768E-03
U-235	7.673E-06	1.016E-05	4.836E-05	5.297E-05	5.297E-05	1.361E-06	2.495E-06	1.565E-06	9.392E-06
U-236	5.219E-05	6.909E-05	3.290E-04	3.603E-04	3.603E-04	9.257E-06	1.697E-05	1.065E-05	6.389E-05

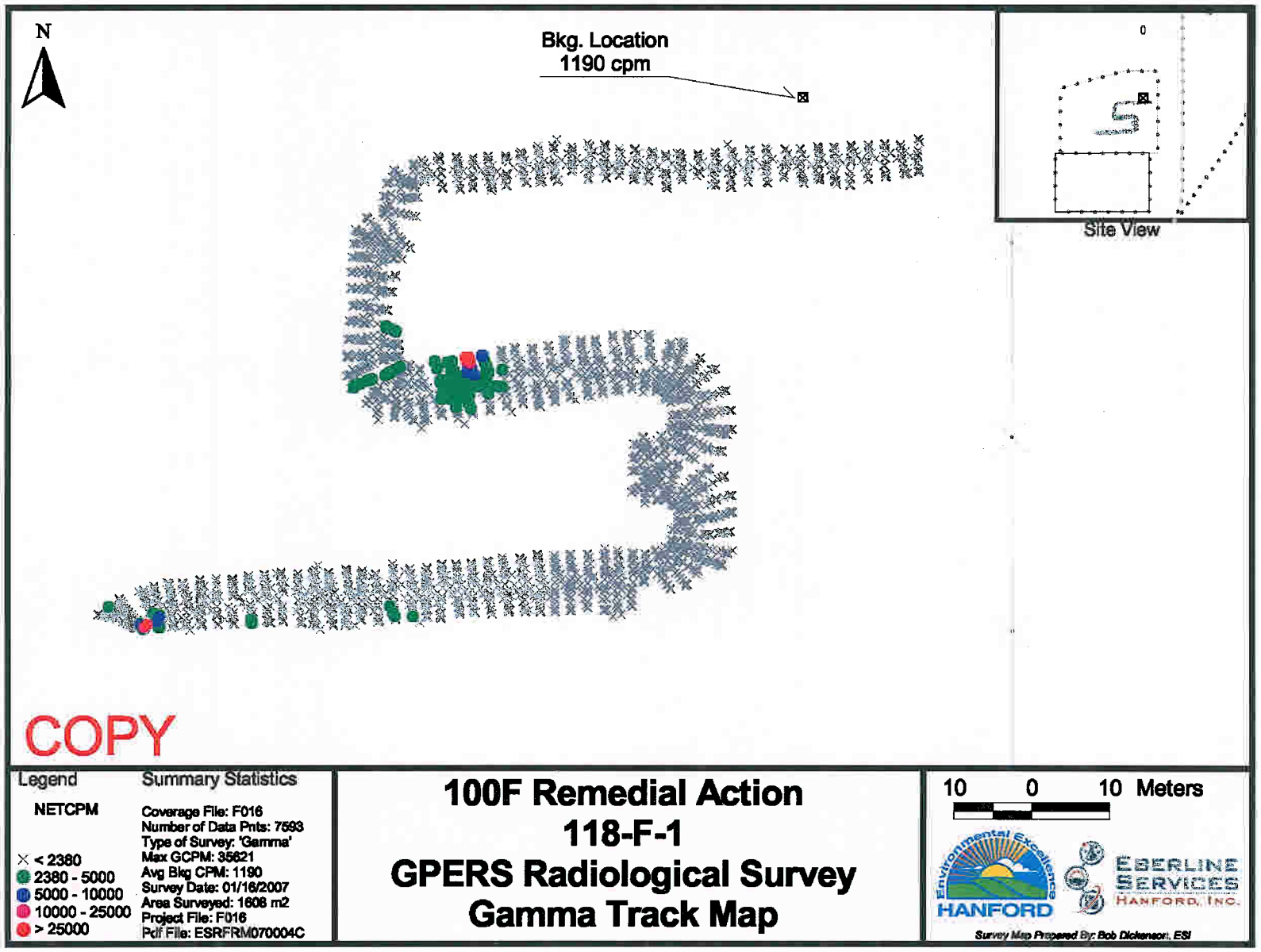
*Concentrations are at consumption time and include radioactive decay and ingrowth during storage time.
For livestock fodder, consumption time is t minus meat or milk storage time.

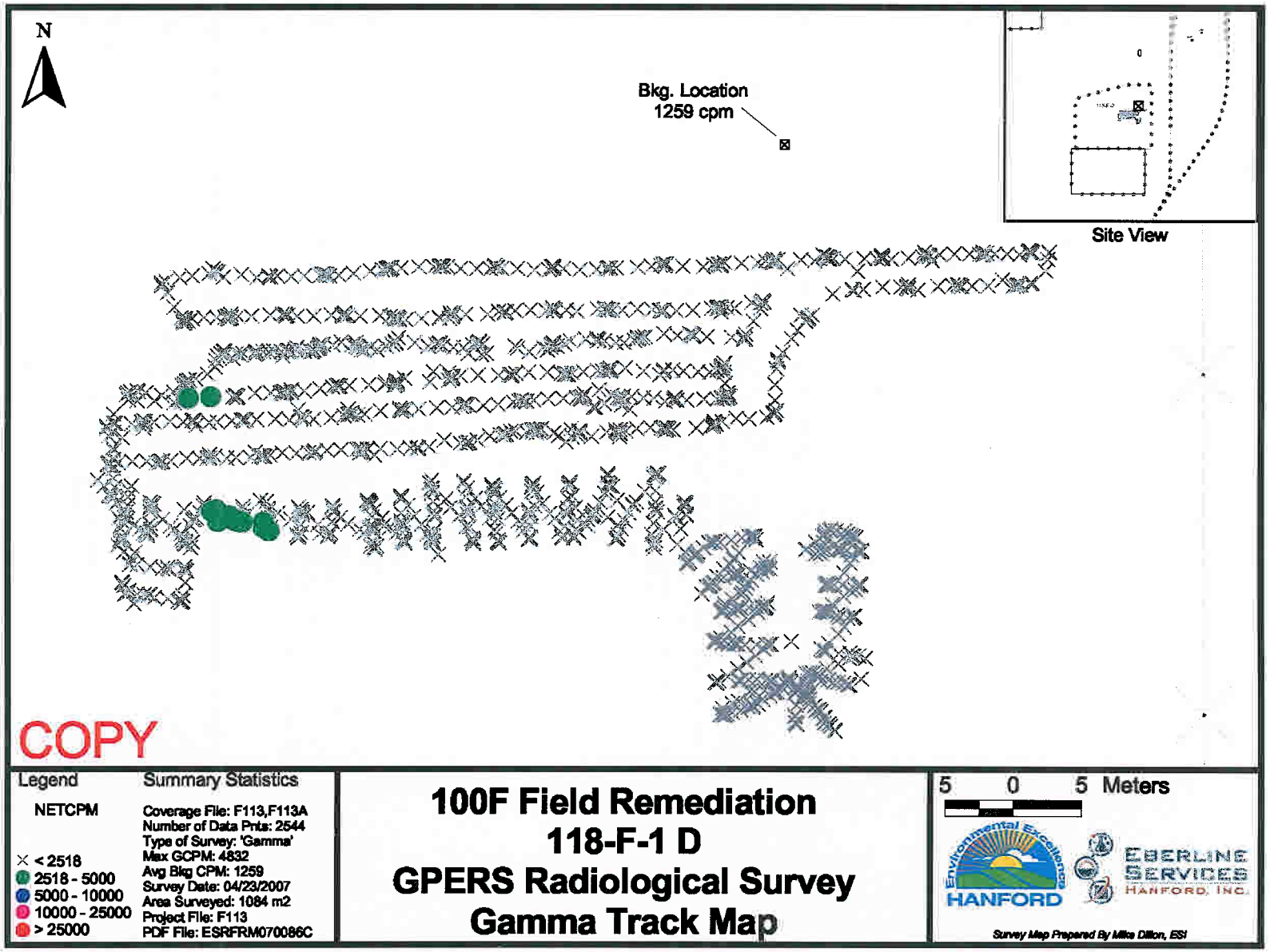
Concentrations in the media occurring in pathways that are suppressed are calculated using the current input parameters, i.e. using parameters appearing in the input screen when the pathways are active.

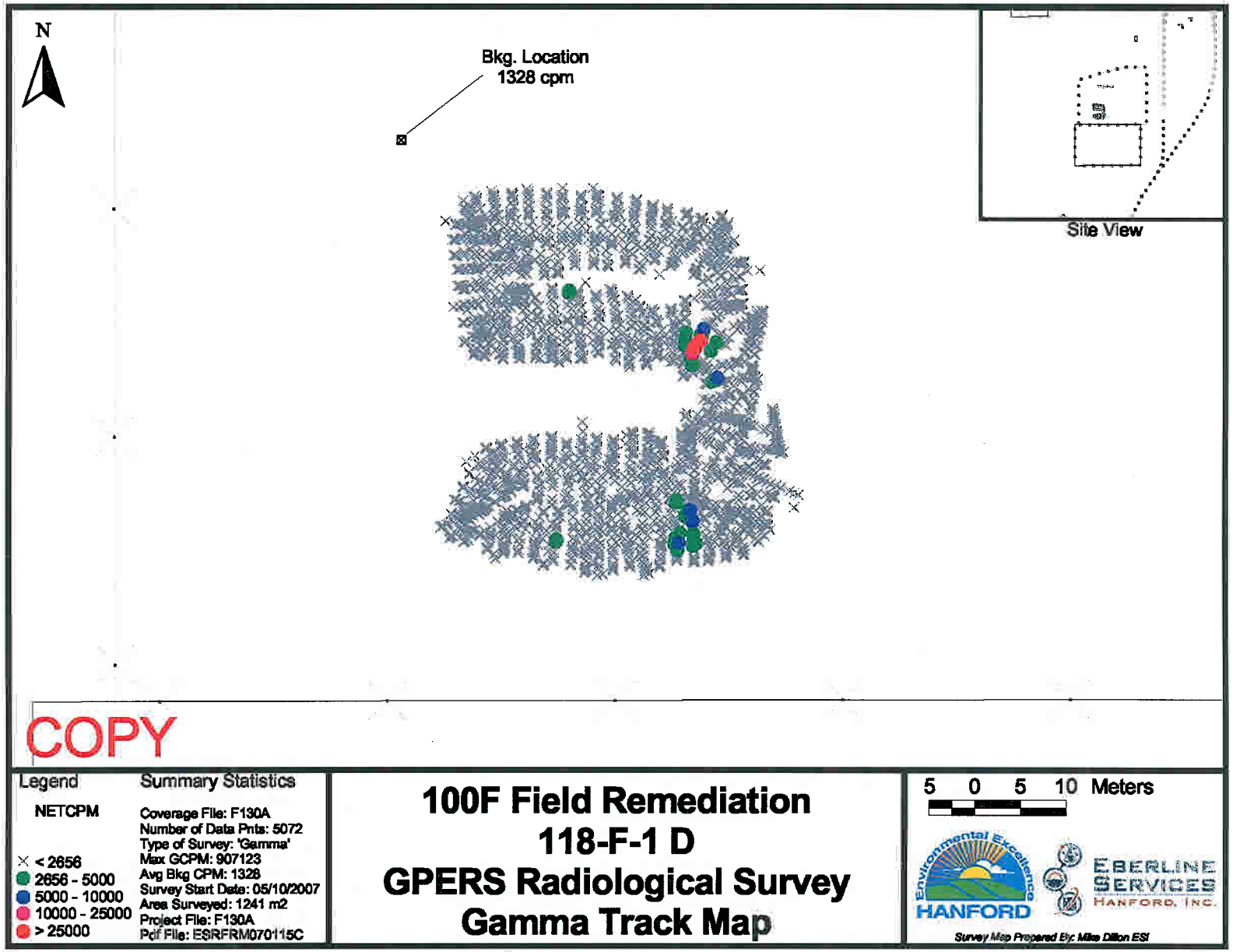
Attachment 10 Sheet No. 19 of 19
Originator: S. W. Clark Date
Chk'd By M. W. Perrott Date
Calc. No. 0100F-CA-V0280 Rev. No. 0

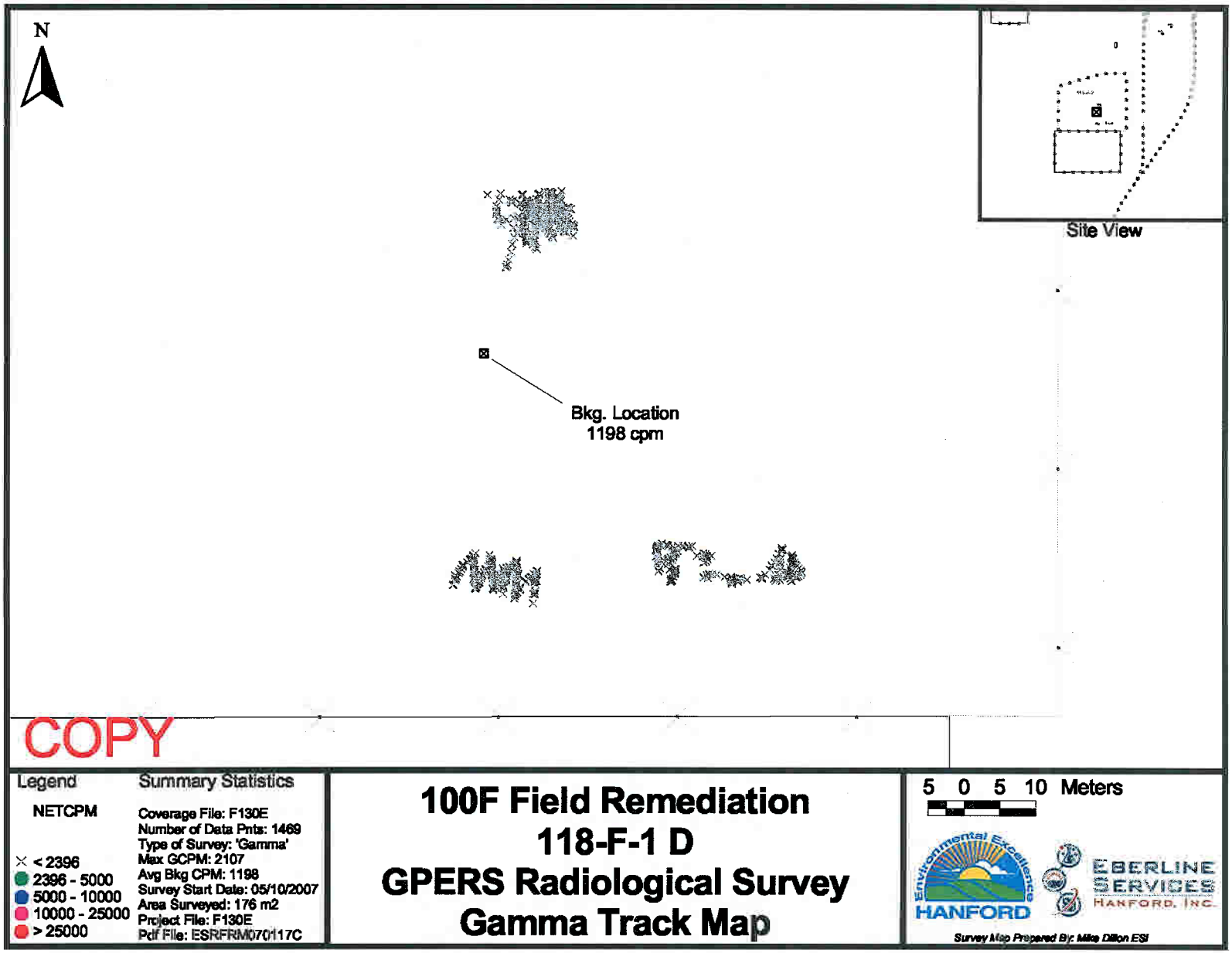
APPENDIX C

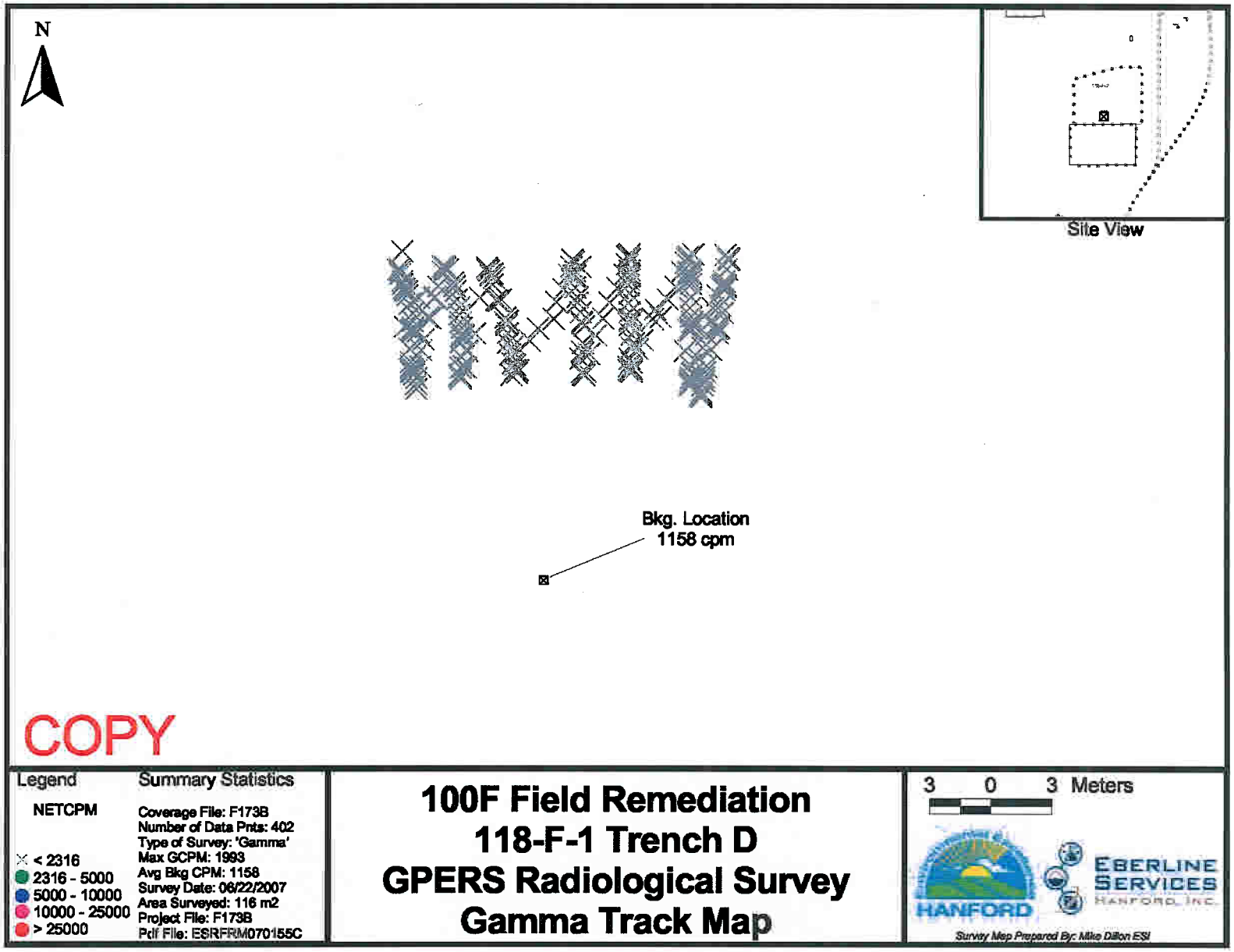
GPERS RADIOLOGICAL SURVEY GAMMA TRACK MAPS

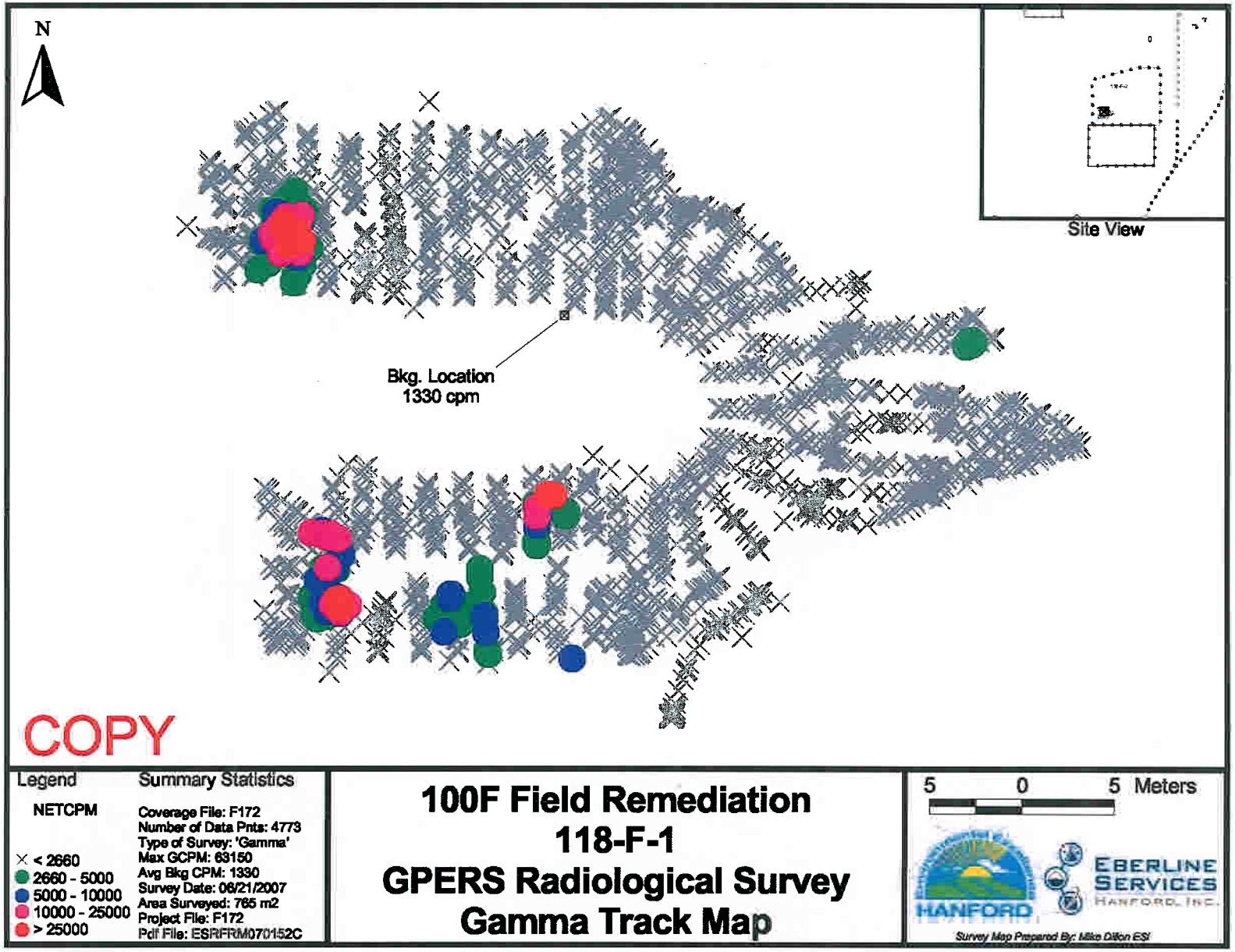

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Bkg. Location
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Site View
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Legend
NETCPM
< 2380
2380 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F016
Number of Data Pnts: 7593
Type of Survey: 'Gamma'
Max GCPM: 35621
Avg Bkg CPM: 1190
Survey Date: 01/16/2007
Area Surveyed: 1608 m2
Project File: F016
Pdf File: ESRFRM070004C
100F Remedial Action
118-F-1
GPERS Radiological Survey
Gamma Track Map
10 0 10 Meters
HANFORD
ESERLINE SERVICES
HANFORD, INC.
Survey Map Prepared By: Bob Dickenson, ESI

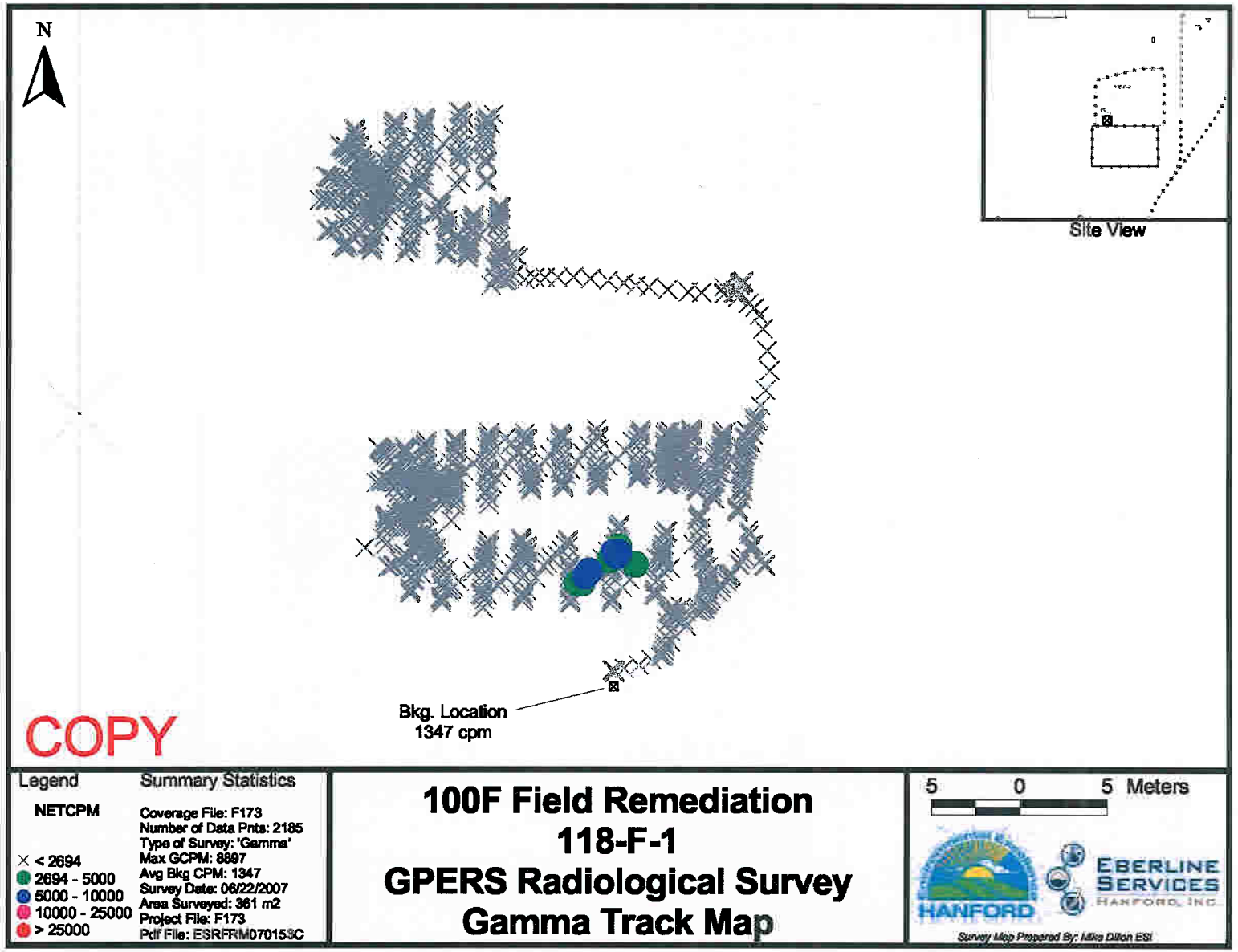

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Bkg. Location
1259 cpm
Site View
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Legend
NETCPM
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2518 - 5000
5000 - 10000
10000 - 25000
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Summary Statistics
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Number of Data Pnts: 2544
Type of Survey: 'Gamma'
Max GCPM: 4832
Avg Bkg CPM: 1259
Survey Date: 04/23/2007
Area Surveyed: 1084 m2
Project File: F113
PDF File: ESRFRM070086C
100F Field Remediation
118-F-1 D
GPERS Radiological Survey
Gamma Track Map
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Environmental Excellence
HANFORD
EBERLINE SERVICES
HANFORD, INC.
Survey Map Prepared By Mike Dillon, ESI

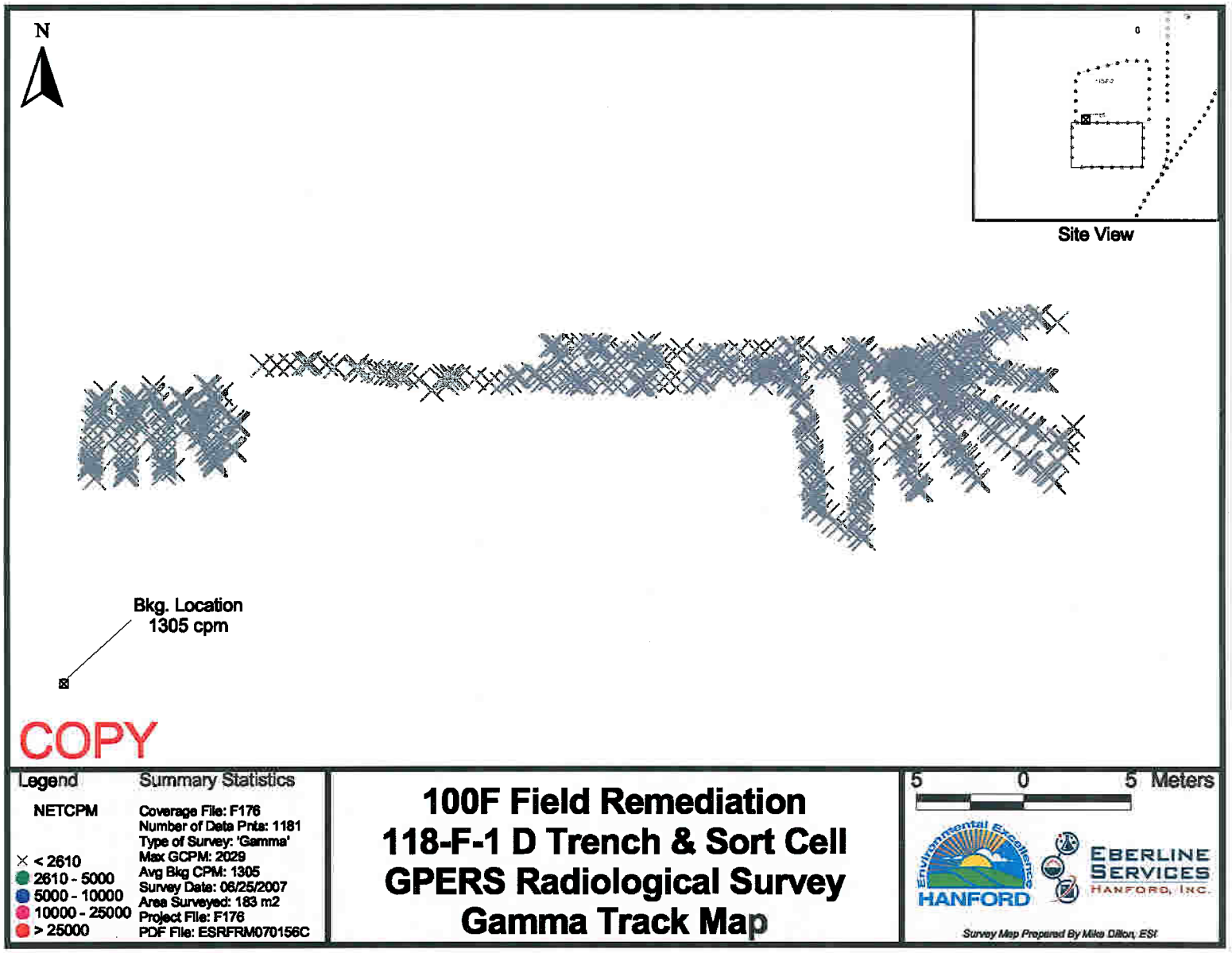

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Legend
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Summary Statistics
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Number of Data Pnts: 5072
Type of Survey: 'Gamma'
Max GCPM: 907123
Avg Bkg CPM: 1328
Survey Start Date: 05/10/2007
Area Surveyed: 1241 m2
Project File: F130A
Pdf File: ESRFRM070115C
100F Field Remediation
118-F-1 D
GPERS Radiological Survey
Gamma Track Map
5 0 5 10 Meters
Environmental Excellence
HANFORD
EBERLINE SERVICES
HANFORD, INC.
Survey Map Prepared By: Mike Dillon ESI

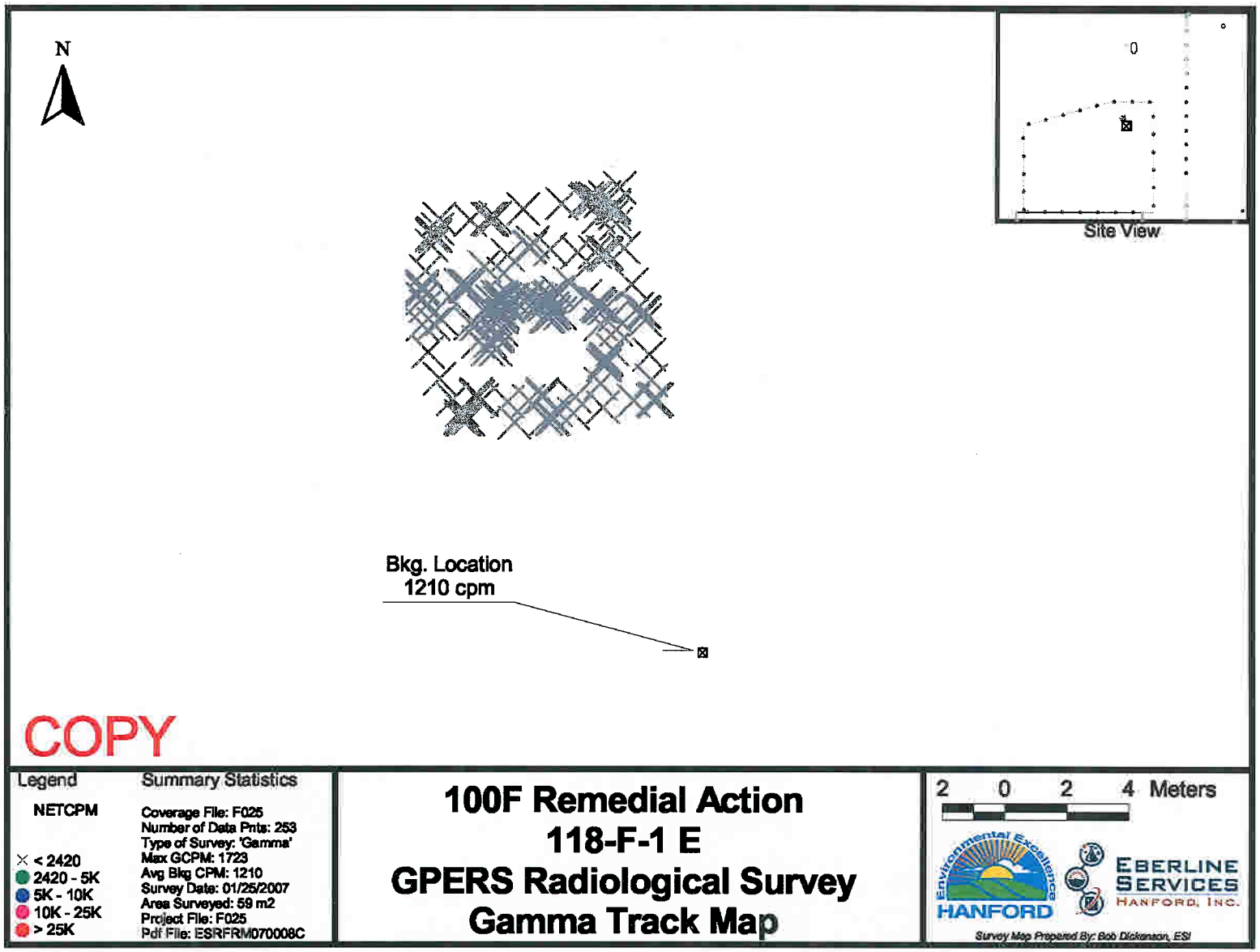

N
Site View
Bkg. Location
1198 cpm
COPY
Legend
NETCPM
< 2396
2396 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F130E
Number of Data Pnts: 1469
Type of Survey: 'Gamma'
Max GCPM: 2107
Avg Bkg CPM: 1198
Survey Start Date: 05/10/2007
Area Surveyed: 176 m2
Project File: F130E
Pdf File: ESRFRM070117C
100F Field Remediation
118-F-1 D
GPERS Radiological Survey
Gamma Track Map
5 0 5 10 Meters
Environmental Excellence
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EBERLINE SERVICES
HANFORD, INC.
Survey Map Prepared By: Mike Dillon ESI

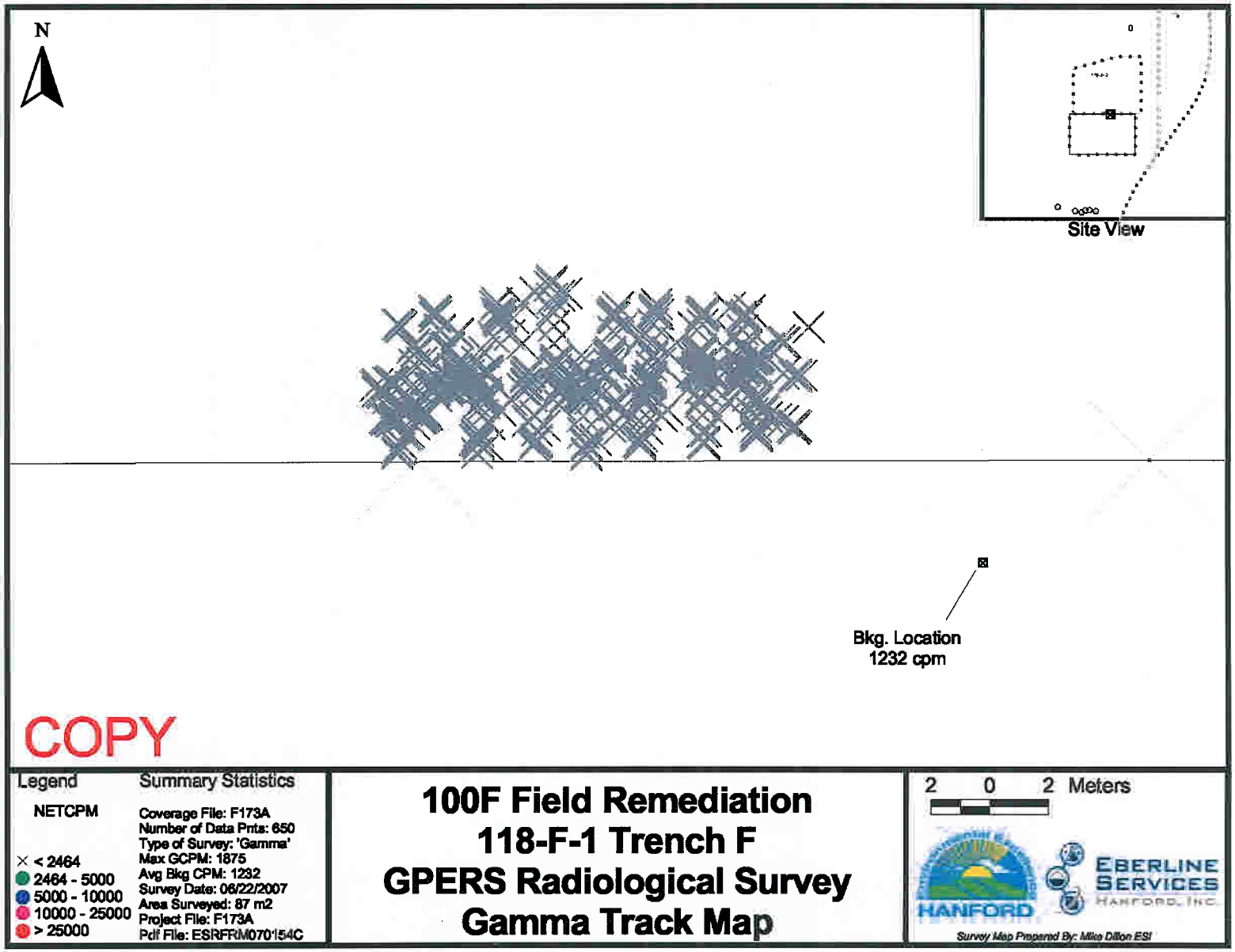

N
Site View
Bkg. Location
1158 cpm
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Legend
NETCPM
< 2316
2316 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F173B
Number of Data Pnts: 402
Type of Survey: 'Gamma'
Max GCPM: 1993
Avg Bkg CPM: 1158
Survey Date: 06/22/2007
Area Surveyed: 116 m2
Project File: F173B
Pdf File: ESRFRM070155C
100F Field Remediation
118-F-1 Trench D
GPERS Radiological Survey
Gamma Track Map
3 0 3 Meters
HANFORD
EBERLINE SERVICES
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Survey Map Prepared By: Mike Dillon ESI

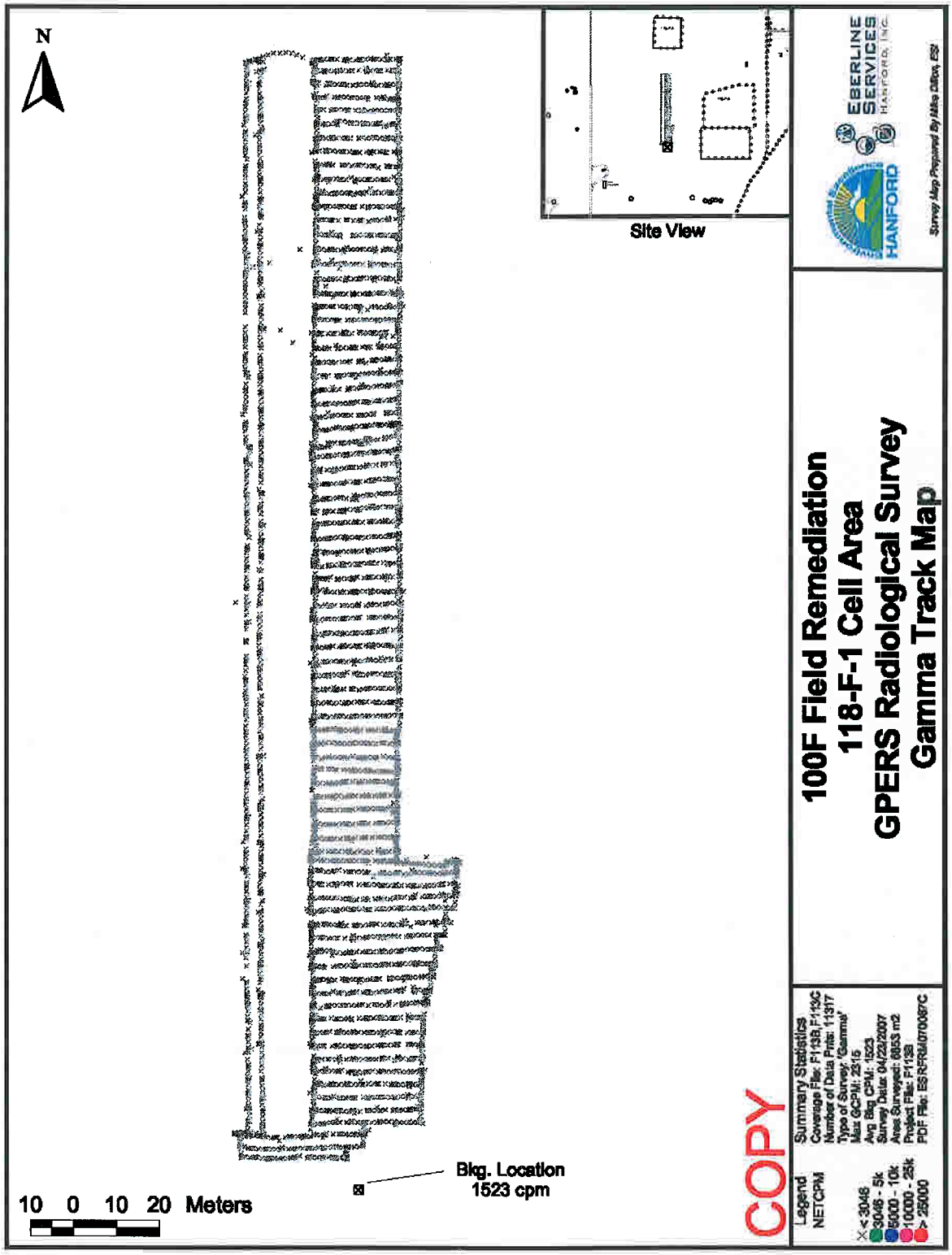

N
Site View
Bkg. Location
1330 cpm
COPY
Legend
NETCPM
< 2660
2660 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F172
Number of Data Pnts: 4773
Type of Survey: 'Gamma'
Max GCPM: 63150
Avg Bkg CPM: 1330
Survey Date: 06/21/2007
Area Surveyed: 765 m2
Project File: F172
Pdf File: ESRFRM070152C
100F Field Remediation
118-F-1
GPERS Radiological Survey
Gamma Track Map
5 0 5 Meters
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Survey Map Prepared By: Mike Dillon ESI

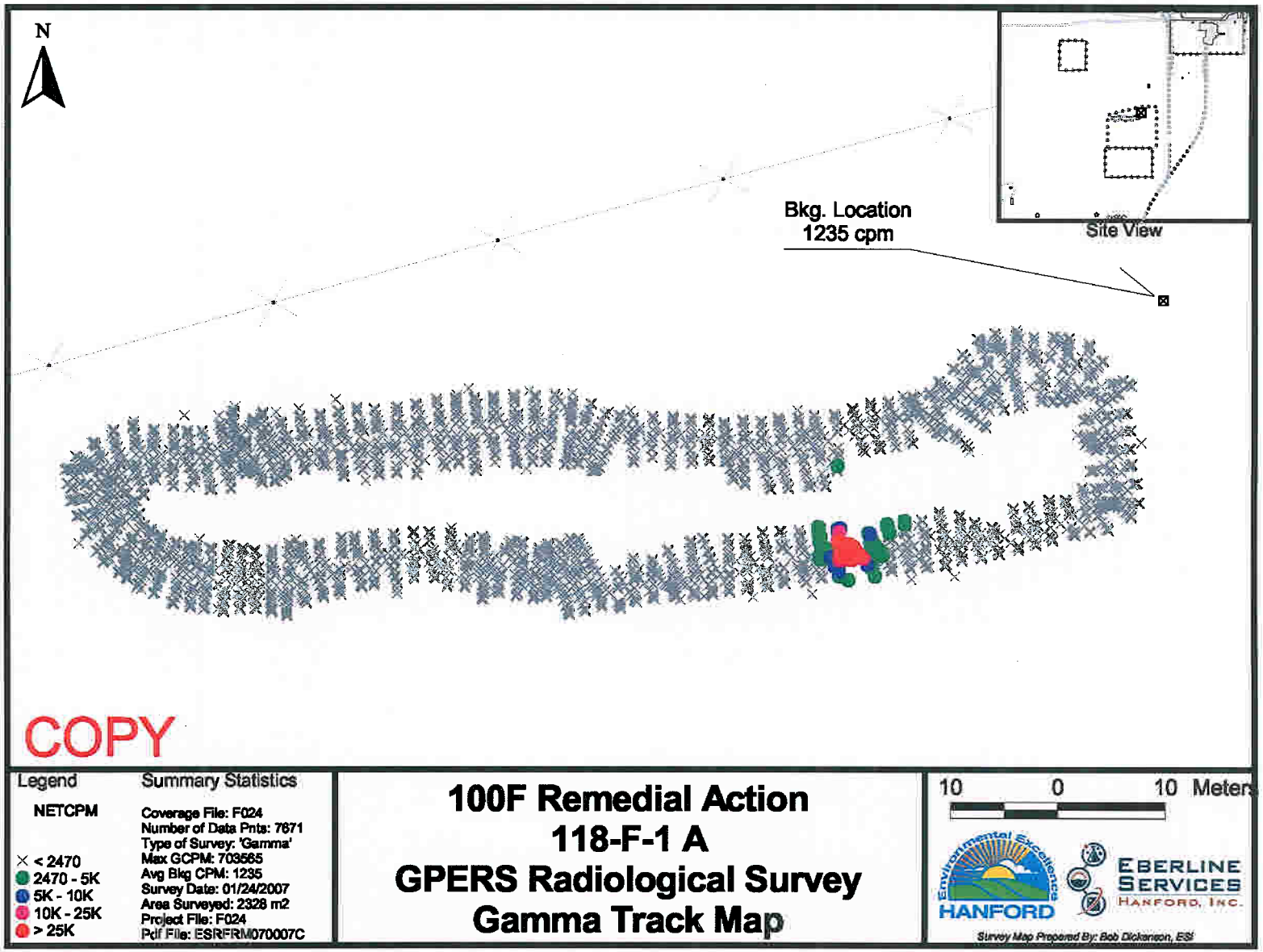

N
Site View
Bkg. Location
1347 cpm
COPY
Legend
NETCPM
< 2694
2694 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F173
Number of Data Pnts: 2185
Type of Survey: 'Gamma'
Max GCPM: 8897
Avg Bkg CPM: 1347
Survey Date: 06/22/2007
Area Surveyed: 361 m2
Project File: F173
Pdf File: ESRFRM070153C
100F Field Remediation
118-F-1
GPERS Radiological Survey
Gamma Track Map
5 0 5 Meters
HANFORD
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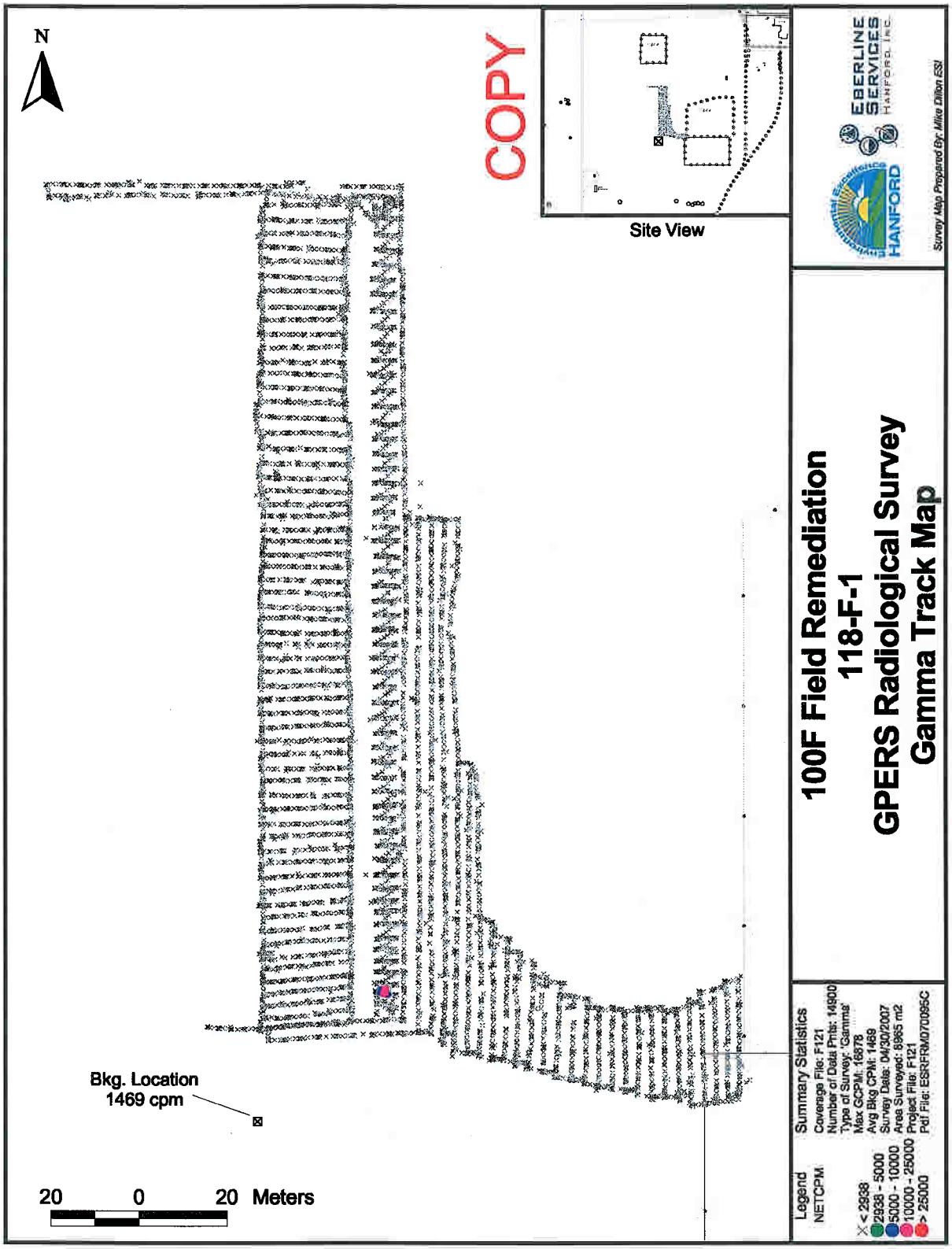

N
Site View
Bkg. Location
1305 cpm
COPY
Legend
NETCPM
< 2610
2610 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F176
Number of Data Pnts: 1181
Type of Survey: 'Gamma'
Max GCPM: 2029
Avg Bkg CPM: 1305
Survey Date: 06/25/2007
Area Surveyed: 183 m2
Project File: F176
PDF File: ESRFRM070156C
100F Field Remediation
118-F-1 D Trench & Sort Cell
GPERS Radiological Survey
Gamma Track Map
5 0 5 Meters
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Survey Map Prepared By Mike Dillon, ESI

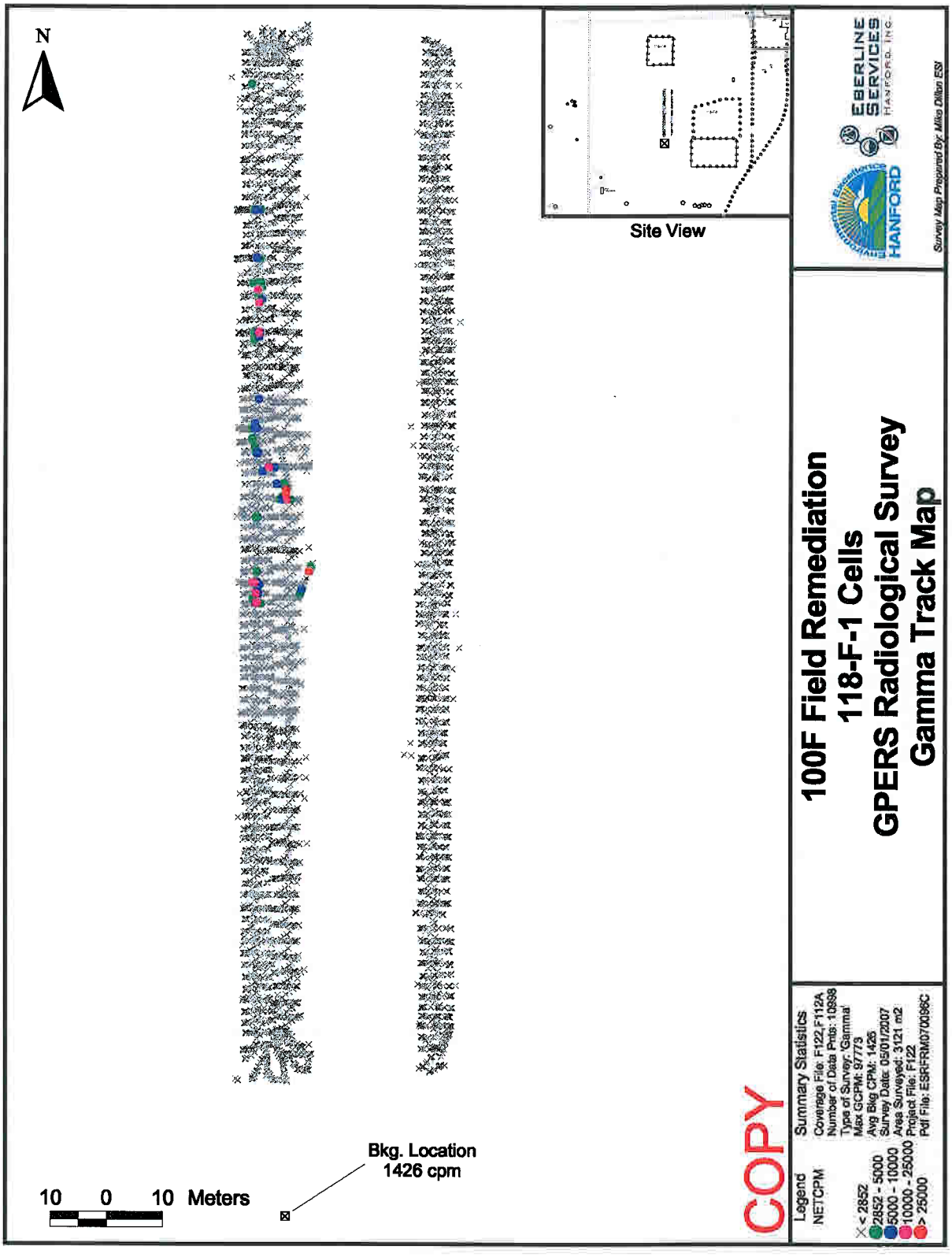

N
Site View
Bkg. Location
1210 cpm
COPY
Legend
NETCPM
< 2420
2420 - 5K
5K - 10K
10K - 25K
> 25K
Summary Statistics
Coverage File: F025
Number of Data Pnts: 253
Type of Survey: 'Gamma'
Max GCPM: 1723
Avg Bkg CPM: 1210
Survey Date: 01/25/2007
Area Surveyed: 59 m2
Project File: F025
Pdf File: ESRFRM070008C
100F Remedial Action
118-F-1 E
GPERS Radiological Survey
Gamma Track Map
2 0 2 4 Meters
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Survey Map Prepared By: Bob Dickenson, ESI

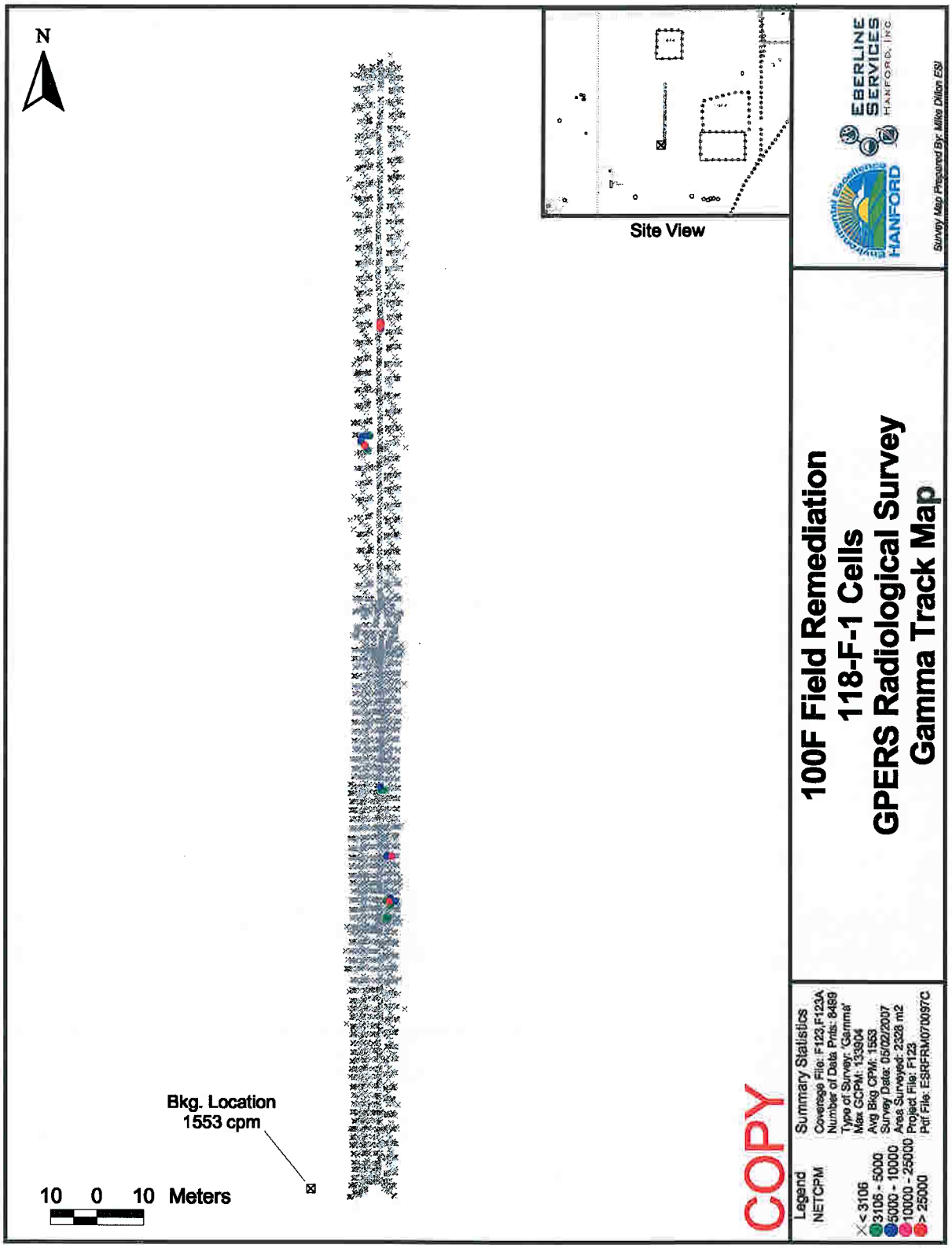

N
Site View
Bkg. Location
1232 cpm
COPY
Legend
NETCPM
< 2464
2464 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F173A
Number of Data Pnts: 650
Type of Survey: 'Gamma'
Max GCPM: 1875
Avg Bkg CPM: 1232
Survey Date: 06/22/2007
Area Surveyed: 87 m2
Project File: F173A
Pdf File: ESRFRM070154C
100F Field Remediation
118-F-1 Trench F
GPERS Radiological Survey
Gamma Track Map
2 0 2 Meters
HANFORD
EBERLINE SERVICES
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Survey Map Prepared By: Mike Dillon ESI

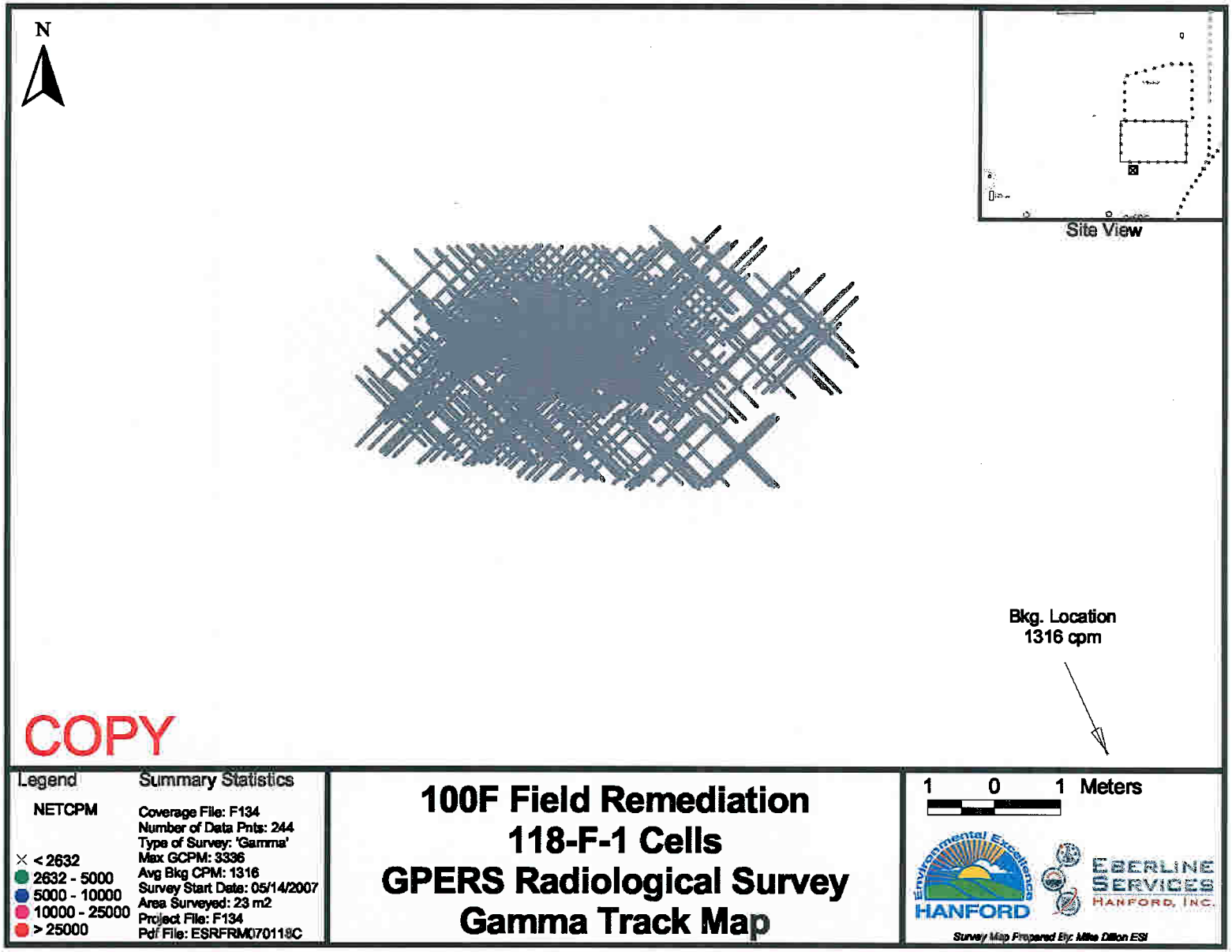

N
Site View
EBERLINE SERVICES
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Survey Map Prepared By Mike Dillon, RSI
100F Field Remediation
118-F-1 Cell Area
GPERS Radiological Survey
Gamma Track Map
COPY
Summary Statistics
Coverage File: F113B, F113C
Number of Data Pnts: 113117
Type of Survey: 'Gamma'
Max GCPM: 2315
Avg Bkg CPM: 1523
Survey Date: 04/22/2007
Areas Surveyed: 6853 m2
Project File: F113B
PDF File: ESRFR&I070067C
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5000 - 10k
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Bkg. Location
1523 cpm
10 0 10 20 Meters

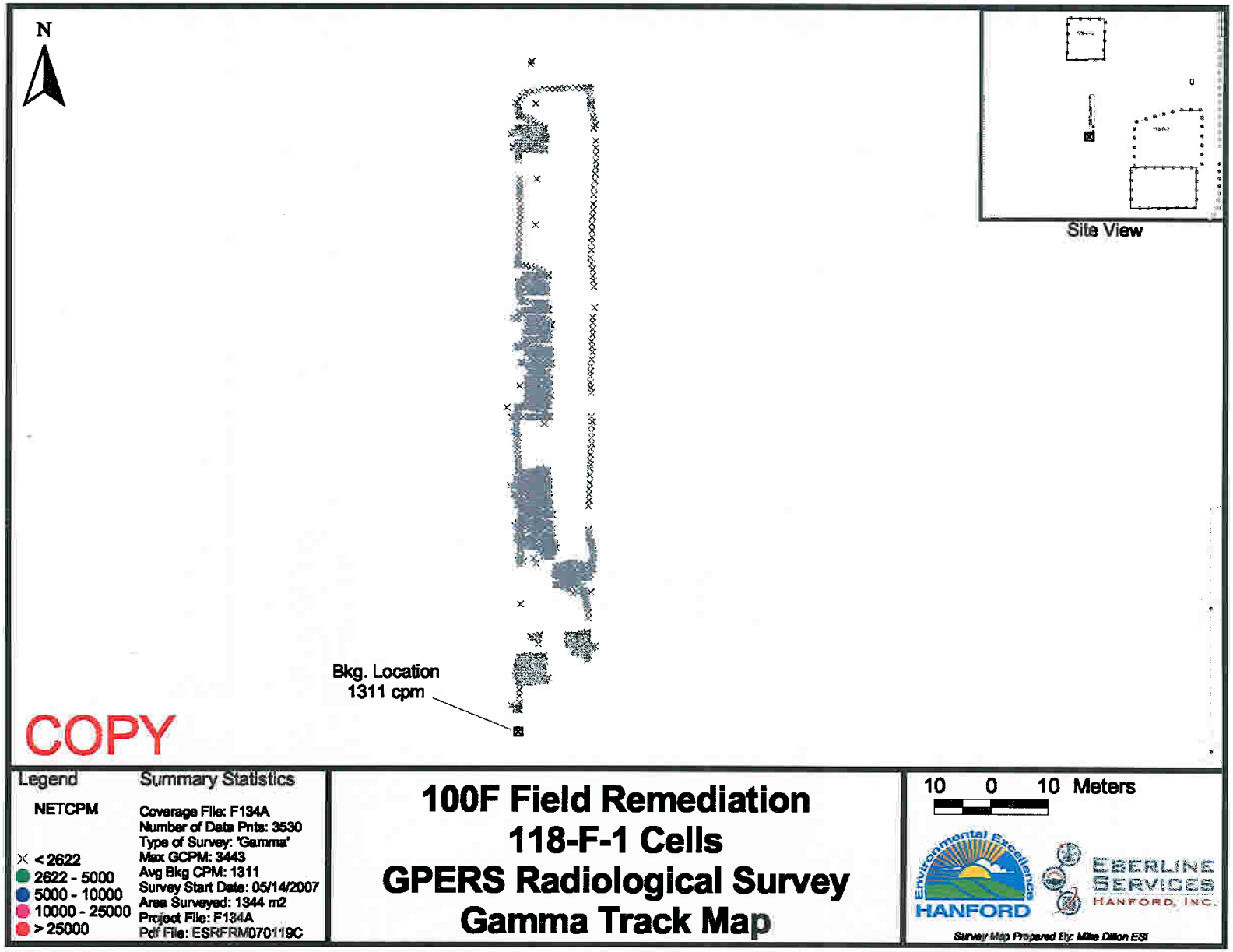

N
Bkg. Location
1235 cpm
Site View
COPY
Legend
NETCPM
< 2470
2470 - 5K
5K - 10K
10K - 25K
> 25K
Summary Statistics
Coverage File: F024
Number of Data Pnts: 7671
Type of Survey: 'Gamma'
Max GCPM: 703565
Avg Bkg CPM: 1235
Survey Date: 01/24/2007
Area Surveyed: 2328 m2
Project File: F024
Pdf File: ESRFRM070007C
100F Remedial Action
118-F-1 A
GPERS Radiological Survey
Gamma Track Map
10 0 10 Meters
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Survey Map Prepared By: Bob Dickenson, ESI

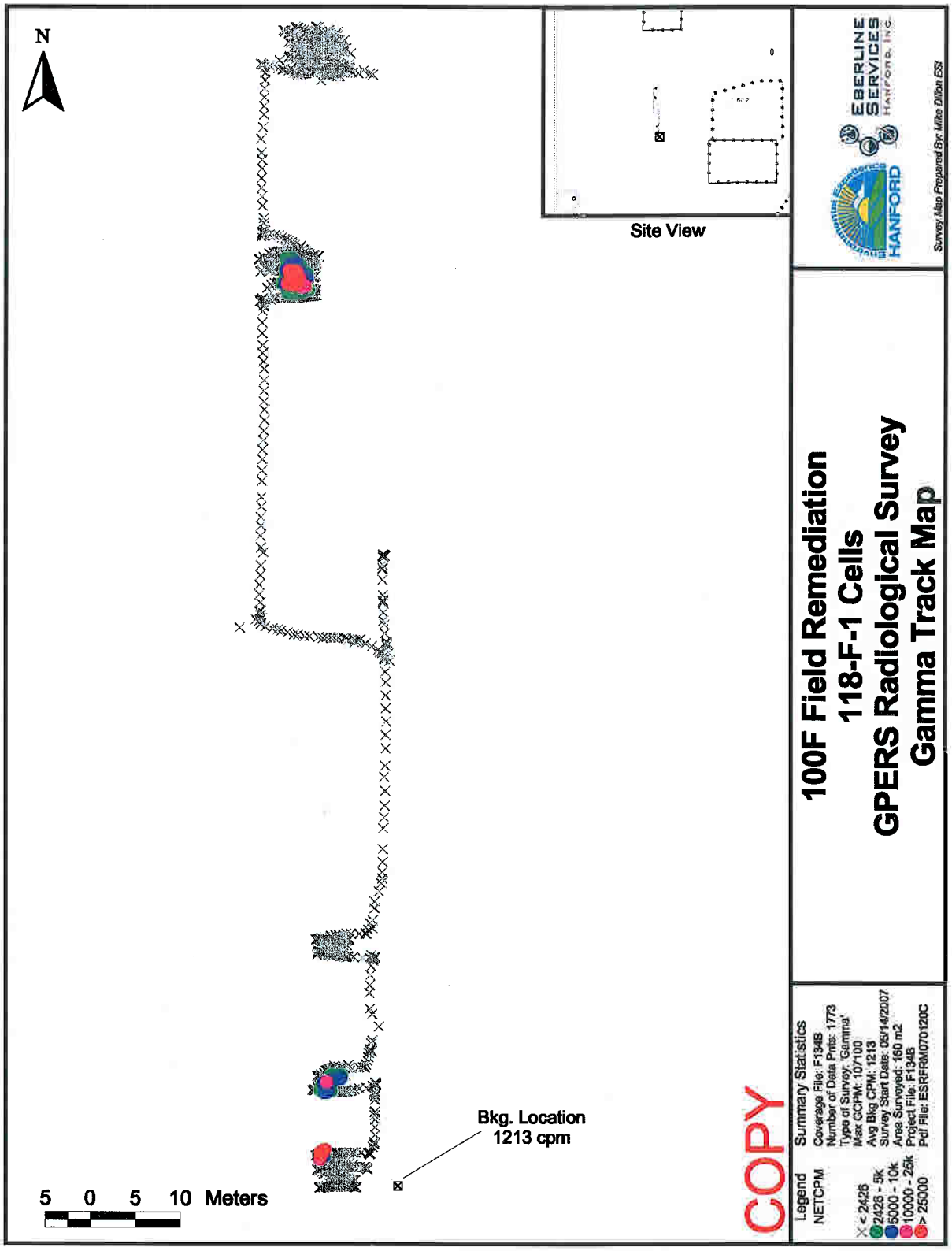

N
COPY
Site View
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Survey Map Prepared By: Mike Dillon ESI
100F Field Remediation
118-F-1
GPERS Radiological Survey
Gamma Track Map
Summary Statistics
Coverage File: F121
Number of Data Pnts: 14900
Type of Survey: 'Gamma'
Max GCPM: 16078
Avg Bkg CPM: 1469
Survey Data: 04/30/2007
Area Surveyed: 8965 m2
Project File: F121
Pdf File: ESRFRM070095C
Legend
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2938 - 5000
5000 - 10000
10000 - 25000
> 25000
Bkg. Location
1469 cpm
20 0 20 Meters

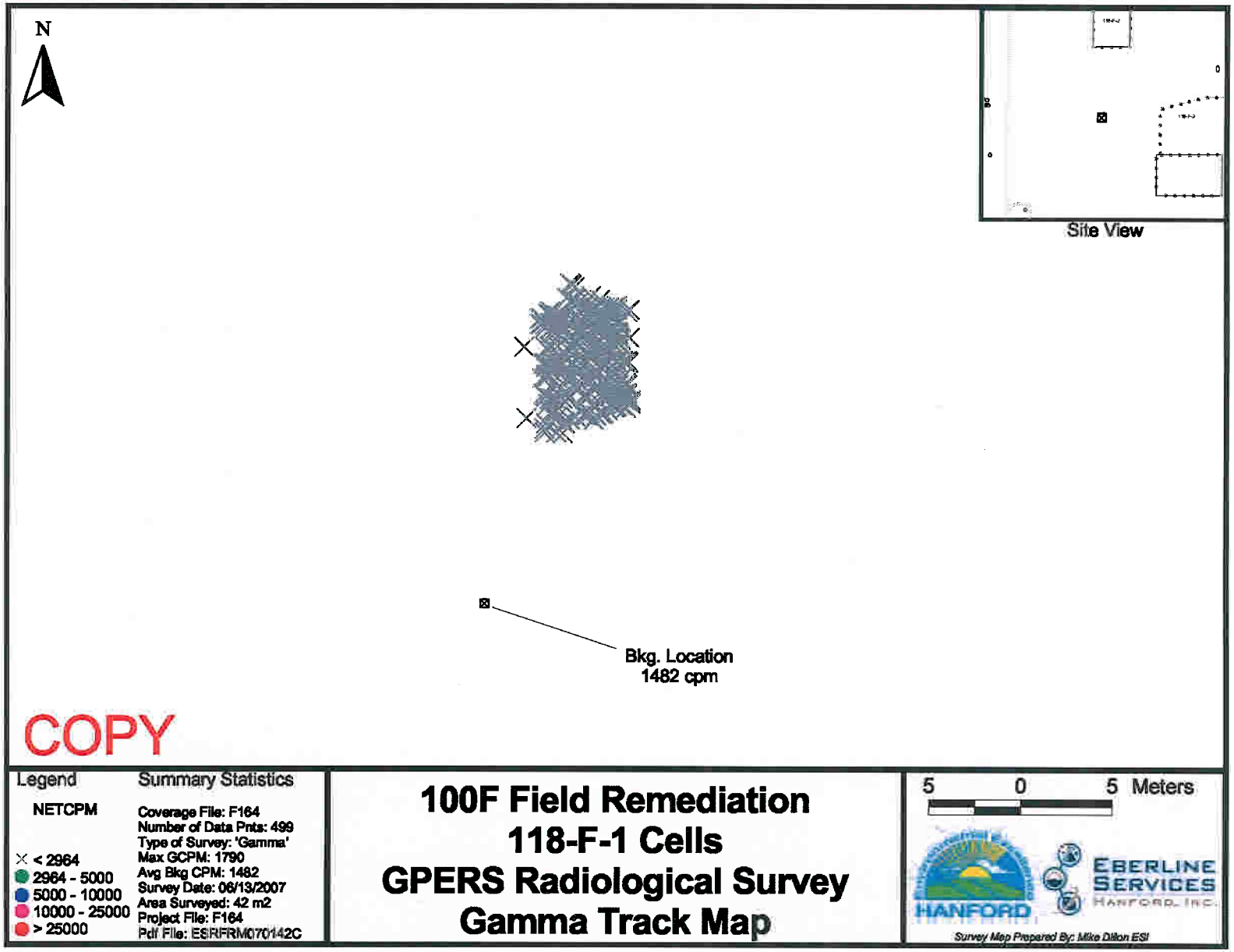

N
Site View
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Survey Map Prepared By: Mike Dillon ESI
100F Field Remediation
118-F-1 Cells
GPERS Radiological Survey
Gamma Track Map
COPY
Legend
NETCPM
< 2852
2852 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F122,F112A
Number of Data Pnts: 10898
Type of Survey: 'Gamma'
Max GCPM: 97773
Avg Bkg CPM: 1426
Survey Date: 05/01/2007
Area Surveyed: 3121 m2
Project File: F122
Pdf File: ESRFRM07008SC
Bkg. Location
1426 cpm
10 0 10 Meters

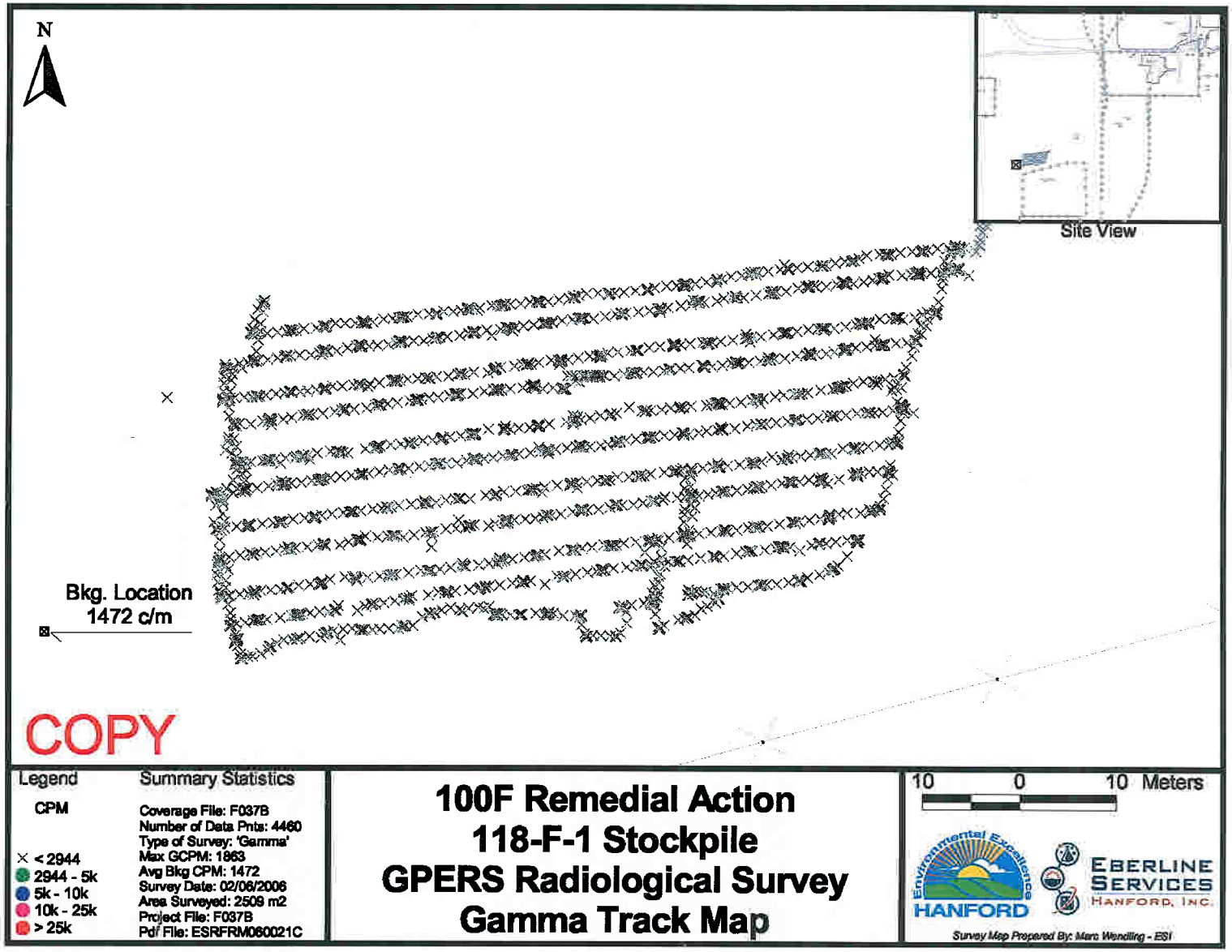

N
Site View
Bkg. Location
1553 cpm
10 0 10 Meters
COPY
100F Field Remediation
118-F-1 Cells
GPERS Radiological Survey
Gamma Track Map
EBERLINE SERVICES
HANFORD, INC
HANFORD
Survey Map Prepared By: Mike Dillon ESI
Legend
NETCPM
< 3106
3106 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F123,F123A
Number of Data Pnts: 8489
Type of Survey: 'Gamma'
Max CCPM: 133904
Avg Bkg CPM: 1553
Survey Date: 05/02/2007
Area Surveyed: 2328 m2
Project File: F123
Pdf File: ESRFRM070097C

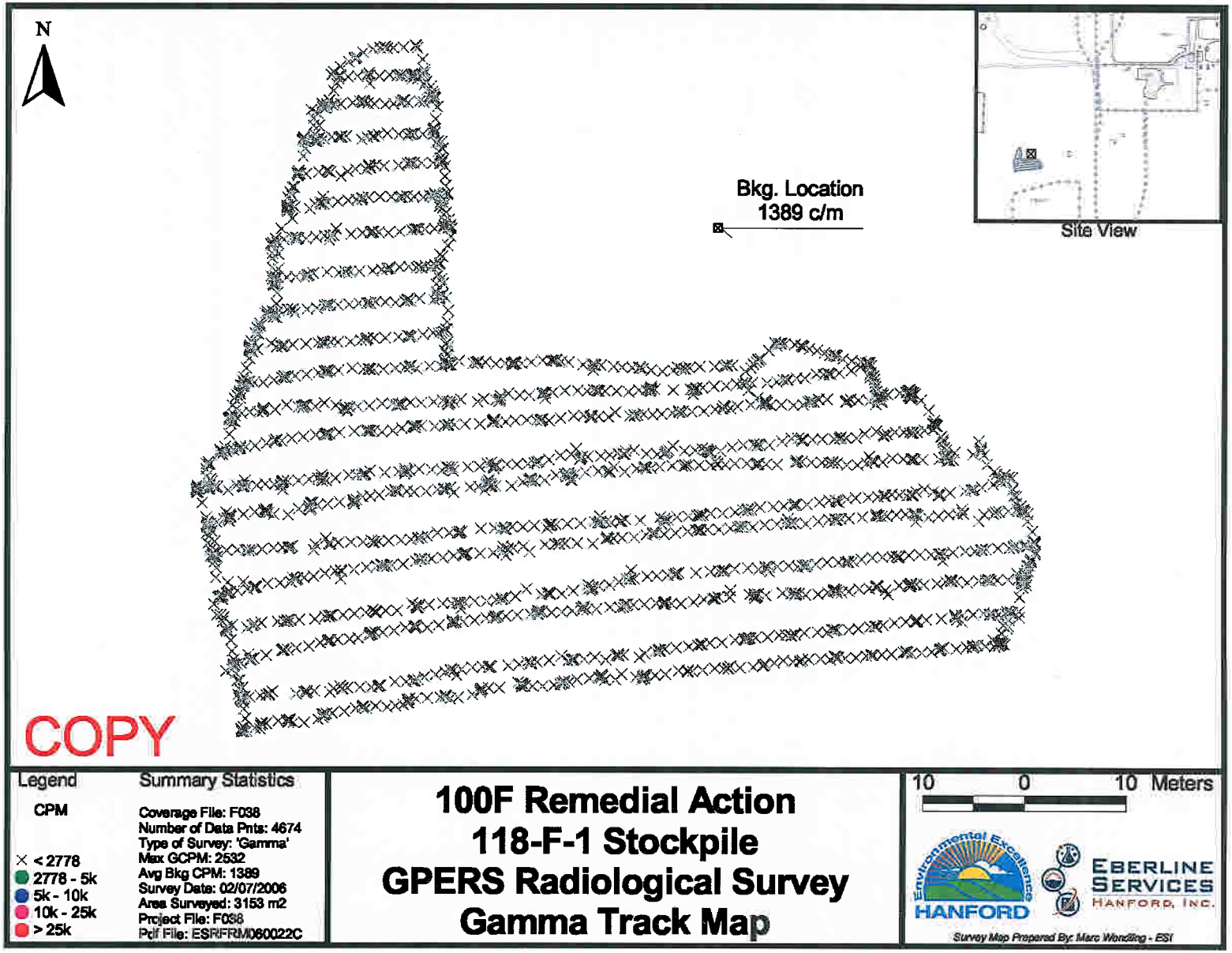

N
Site View
Bkg. Location
1316 cpm
COPY
Legend
NETCPM
< 2632
2632 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F134
Number of Data Pnts: 244
Type of Survey: 'Gamma'
Max GCPM: 3336
Avg Bkg CPM: 1316
Survey Start Date: 05/14/2007
Area Surveyed: 23 m2
Project File: F134
Pdf File: ESRFRM070118C
100F Field Remediation
118-F-1 Cells
GPERS Radiological Survey
Gamma Track Map
1 0 1 Meters
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Survey Map Prepared By: Mike Dillon ESI

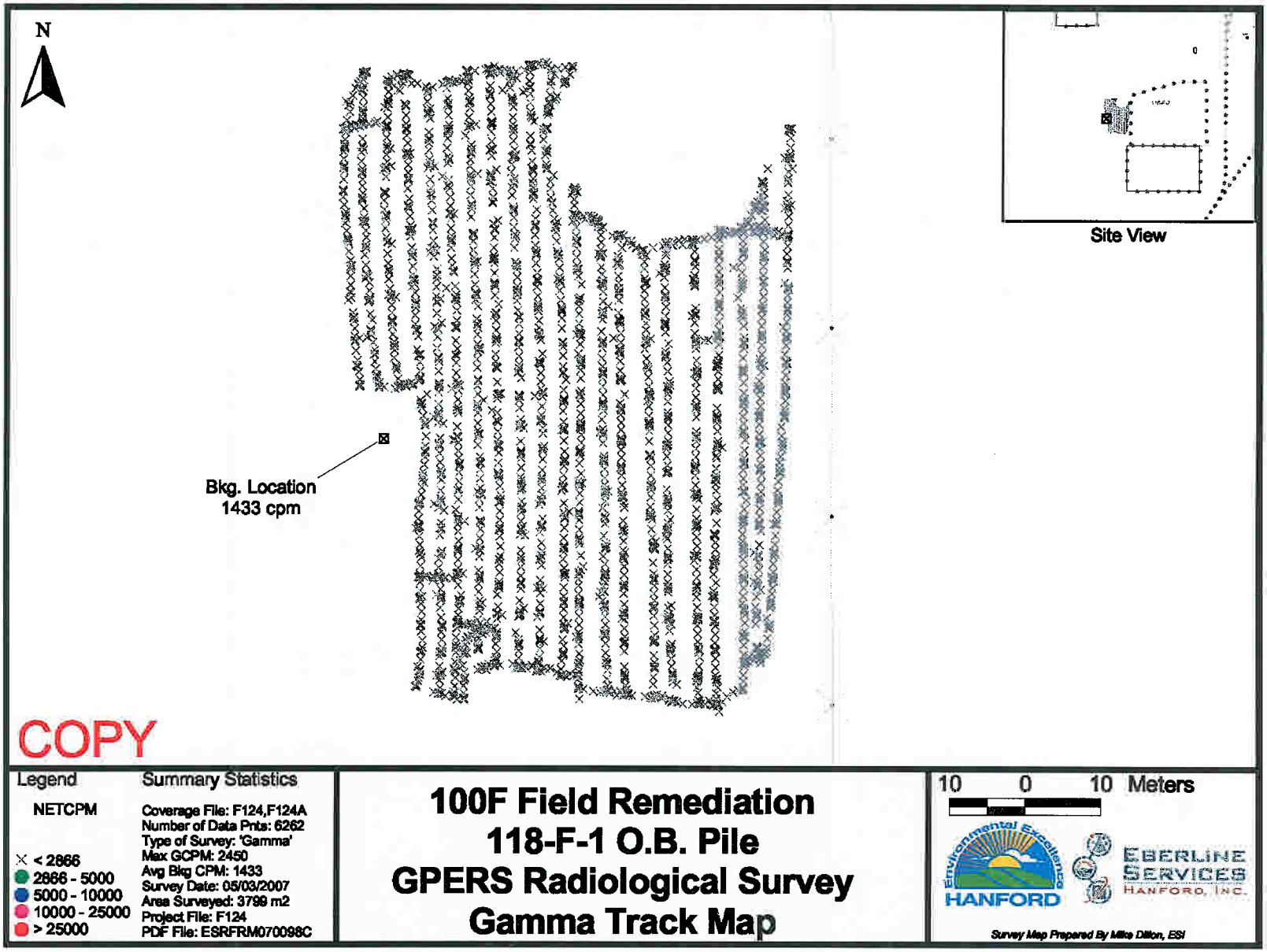

N
Site View
Bkg. Location
1311 cpm
COPY
Legend
NETCPM
< 2622
2622 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F134A
Number of Data Pnts: 3530
Type of Survey: 'Gamma'
Max GCPM: 3443
Avg Bkg CPM: 1311
Survey Start Date: 05/14/2007
Area Surveyed: 1344 m2
Project File: F134A
Pdf File: ESRFRM070119C
100F Field Remediation
118-F-1 Cells
GPERS Radiological Survey
Gamma Track Map
10 0 10 Meters
Environmental Excellence
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Survey Map Prepared By: Mike Dillon ESI

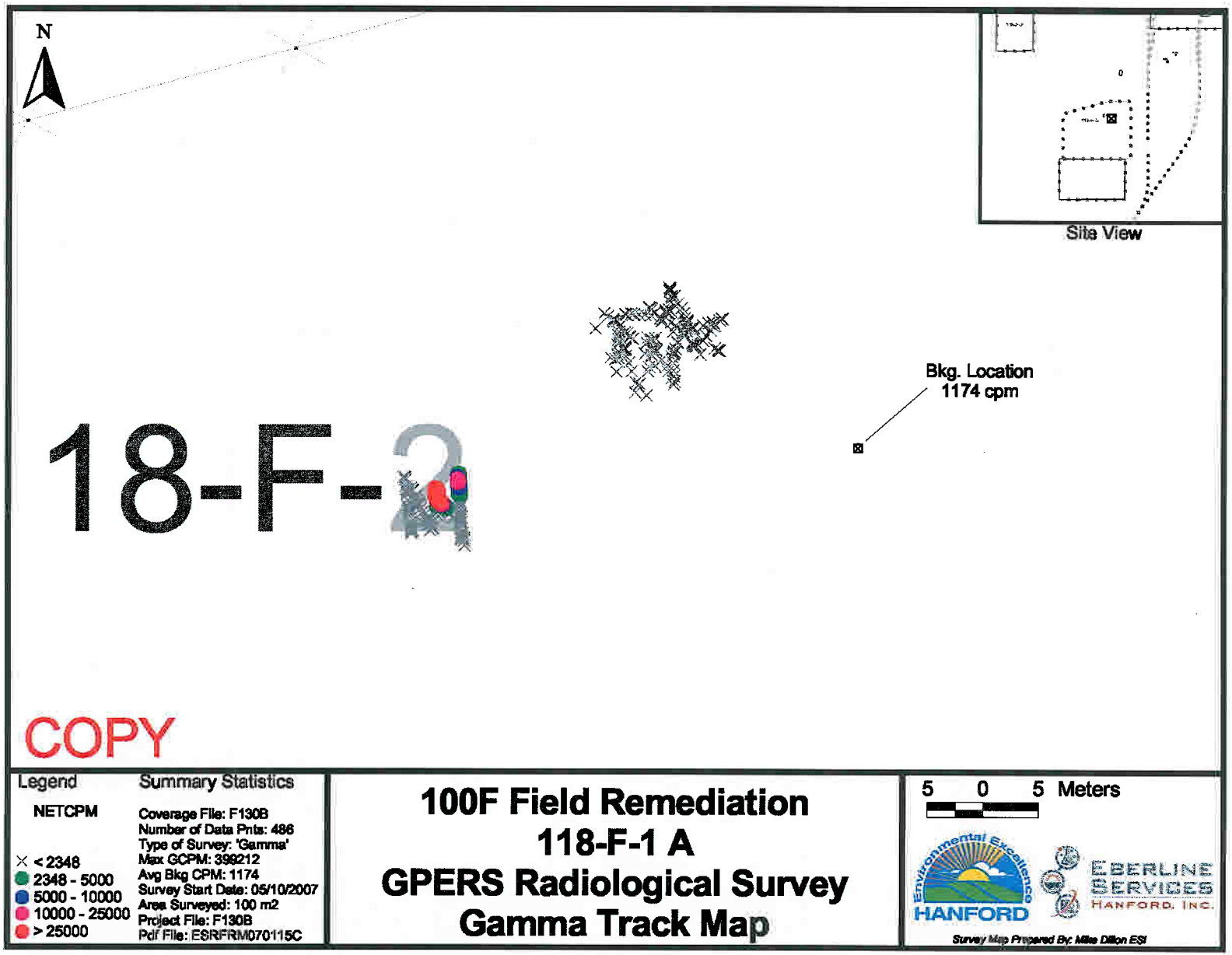

N
Site View
Bkg. Location
1213 cpm
5 0 5 10 Meters
COPY
100F Field Remediation
118-F-1 Cells
GPERS Radiological Survey
Gamma Track Map
EBERLINE SERVICES
HANFORD
Survey Map Prepared By: Mike Dillon ESI
Legend
NETCPM
< 2426
2426 - 5k
5000 - 10k
10000 - 25k
> 25000
Summary Statistics
Coverage File: F134B
Number of Data Pnts: 1773
Type of Survey: 'Gamma'
Max GCPM: 107100
Avg Bkg CPM: 1213
Survey Start Date: 05/14/2007
Area Surveyed: 160 m2
Project File: F134B
Pdf File: ESRFRM070120C

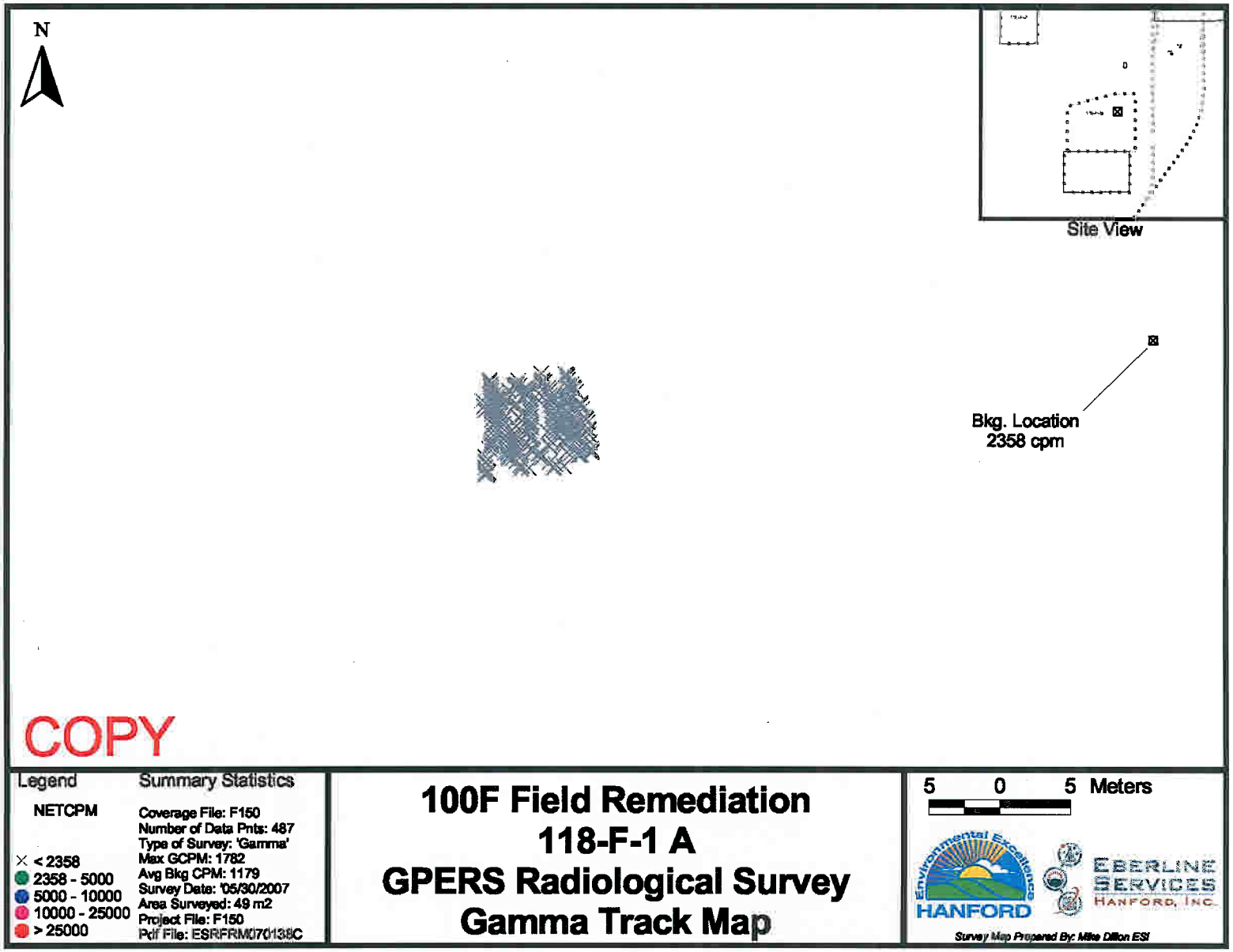

N
Site View
Bkg. Location
1482 cpm
COPY
Legend
NETCPM
< 2964
2964 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F164
Number of Data Pnts: 499
Type of Survey: 'Gamma'
Max GCPM: 1790
Avg Bkg CPM: 1482
Survey Date: 06/13/2007
Area Surveyed: 42 m2
Project File: F164
Pdf File: ES\RFRM\070142C
100F Field Remediation
118-F-1 Cells
GPERS Radiological Survey
Gamma Track Map
5 0 5 Meters
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Survey Map Prepared By: Mike Dillon ESI

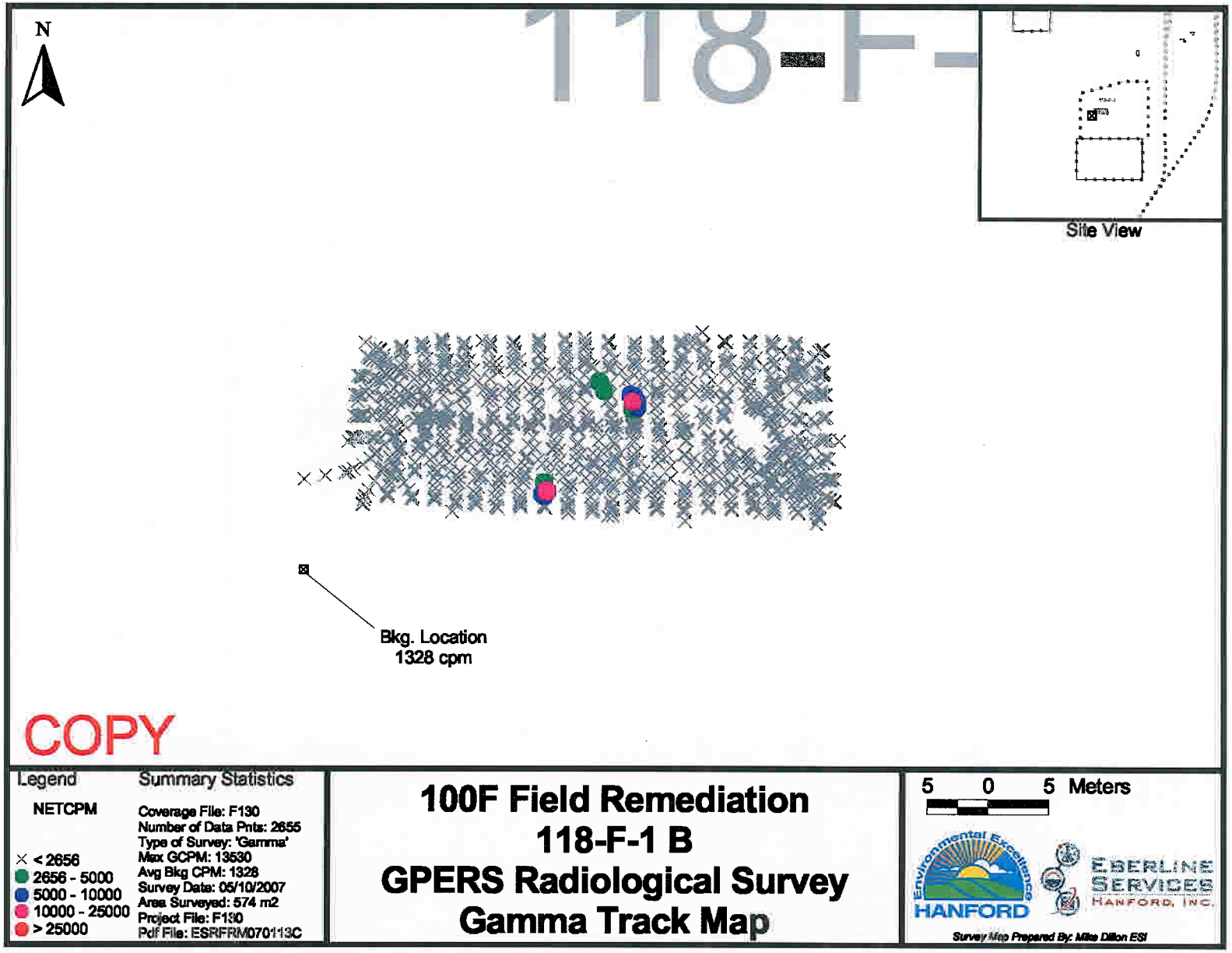

N
Site View
Bkg. Location
1472 c/m
COPY
Legend
CPM
< 2944
2944 - 5k
5k - 10k
10k - 25k
> 25k
Summary Statistics
Coverage File: F037B
Number of Data Pnts: 4460
Type of Survey: 'Gamma'
Max GCPM: 1863
Avg Bkg CPM: 1472
Survey Date: 02/06/2006
Area Surveyed: 2509 m2
Project File: F037B
Pdf File: ESRFRM060021C
100F Remedial Action
118-F-1 Stockpile
GPERS Radiological Survey
Gamma Track Map
10 0 10 Meters
Environmental Excellence
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Survey Map Prepared By: Marc Wendling - ESI

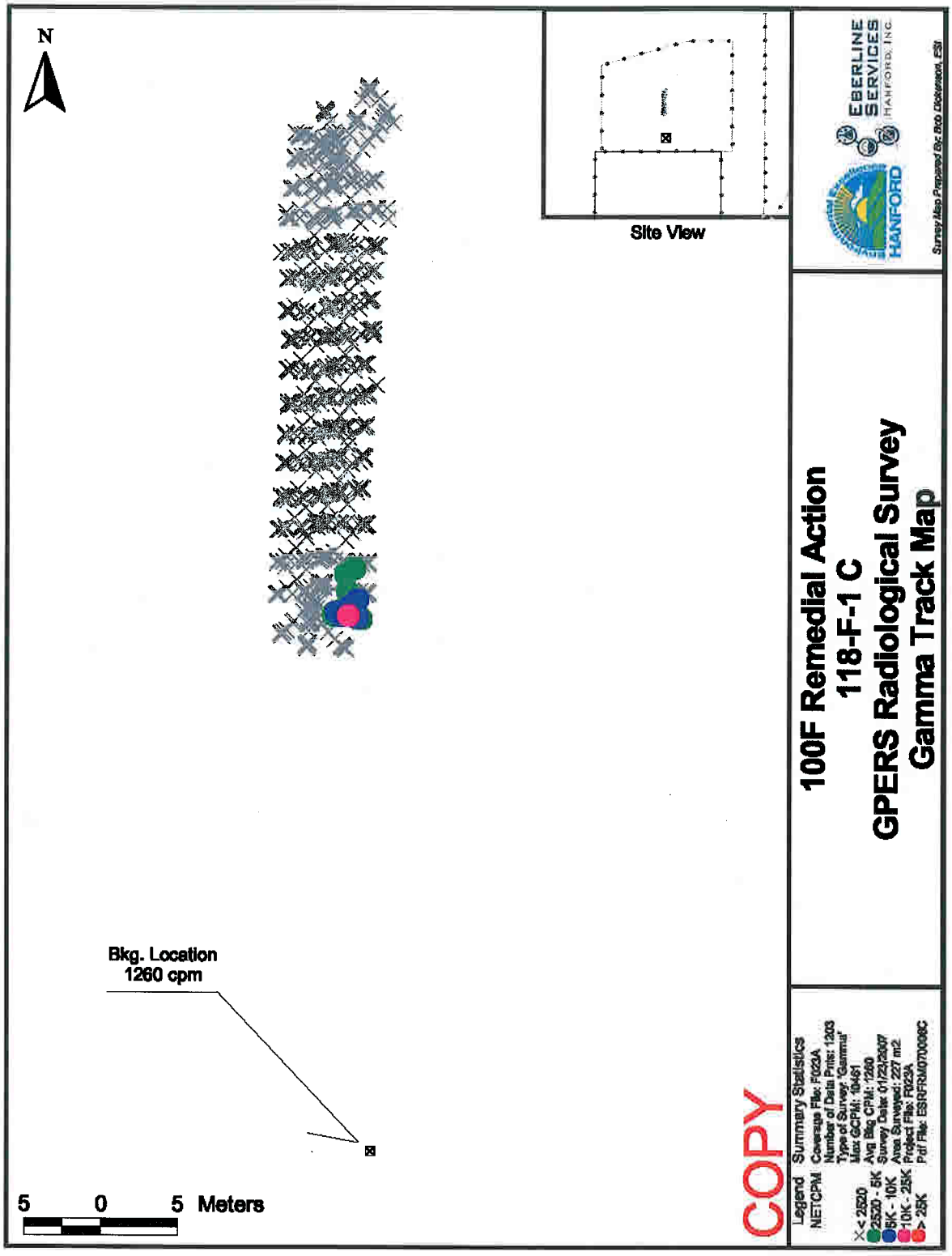

N
Bkg. Location
1389 c/m
Site View
COPY
Legend
CPM
< 2778
2778 - 5k
5k - 10k
10k - 25k
> 25k
Summary Statistics
Coverage File: F038
Number of Data Pnts: 4674
Type of Survey: 'Gamma'
Max GCPM: 2532
Avg Bkg CPM: 1389
Survey Date: 02/07/2006
Area Surveyed: 3153 m2
Project File: F038
Pdf File: ESRFRM060022C
100F Remedial Action
118-F-1 Stockpile
GPERS Radiological Survey
Gamma Track Map
10 0 10 Meters
Environmental Excellence
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Survey Map Prepared By: Marc Wonzing - ESI

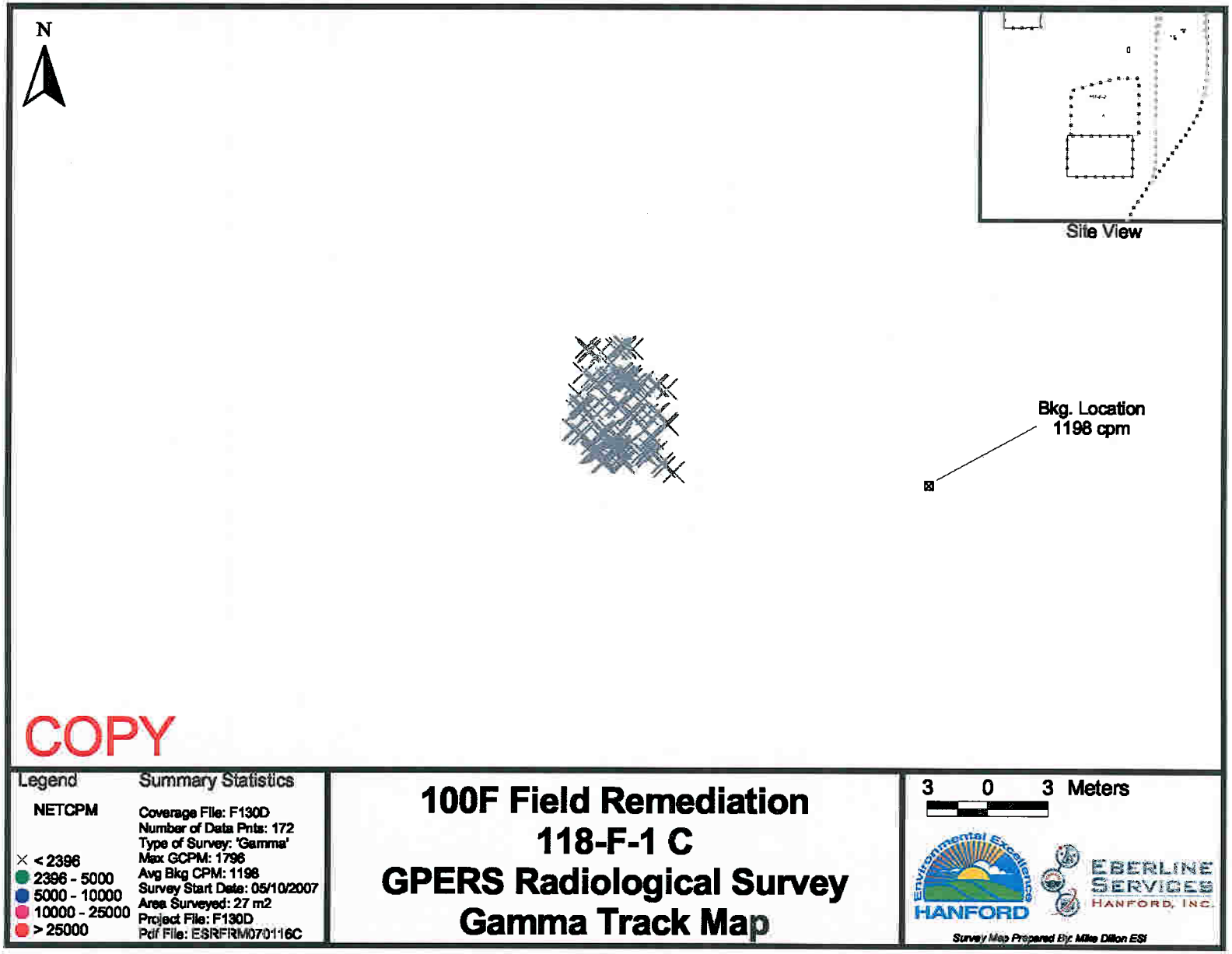

N
Site View
Bkg. Location
1433 cpm
COPY
Legend
NETCPM
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2866 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F124,F124A
Number of Data Pnts: 6262
Type of Survey: 'Gamma'
Max GCPM: 2450
Avg Bkg CPM: 1433
Survey Date: 05/03/2007
Area Surveyed: 3799 m2
Project File: F124
PDF File: ESRFRM070098C
100F Field Remediation
118-F-1 O.B. Pile
GPERS Radiological Survey
Gamma Track Map
10 0 10 Meters
Environmental Excellence
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EBERLINE SERVICES
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Survey Map Prepared By Mike Dillon, ESI

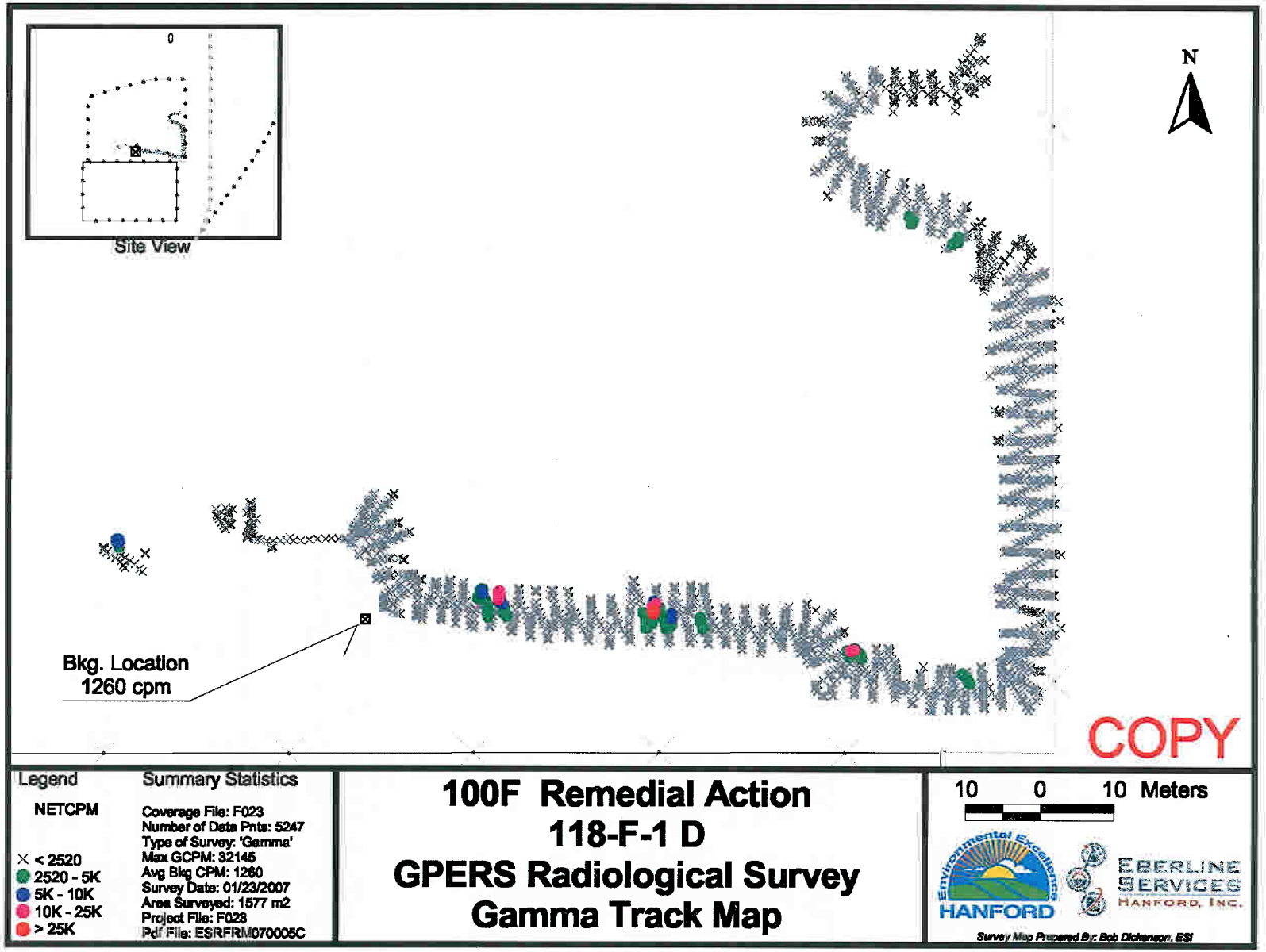

N
Site View
Bkg. Location
1174 cpm
18-F-2
COPY
Legend
NETCPM
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2348 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F130B
Number of Data Pnts: 486
Type of Survey: 'Gamma'
Max GCPM: 399212
Avg Bkg CPM: 1174
Survey Start Date: 05/10/2007
Area Surveyed: 100 m2
Project File: F130B
Pdf File: ESRFRM070115C
100F Field Remediation
118-F-1 A
GPERS Radiological Survey
Gamma Track Map
5 0 5 Meters
Environmental Excellence
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EBERLINE SERVICES
HANFORD, INC.
Survey Map Prepared By: Mike Dillon ESI

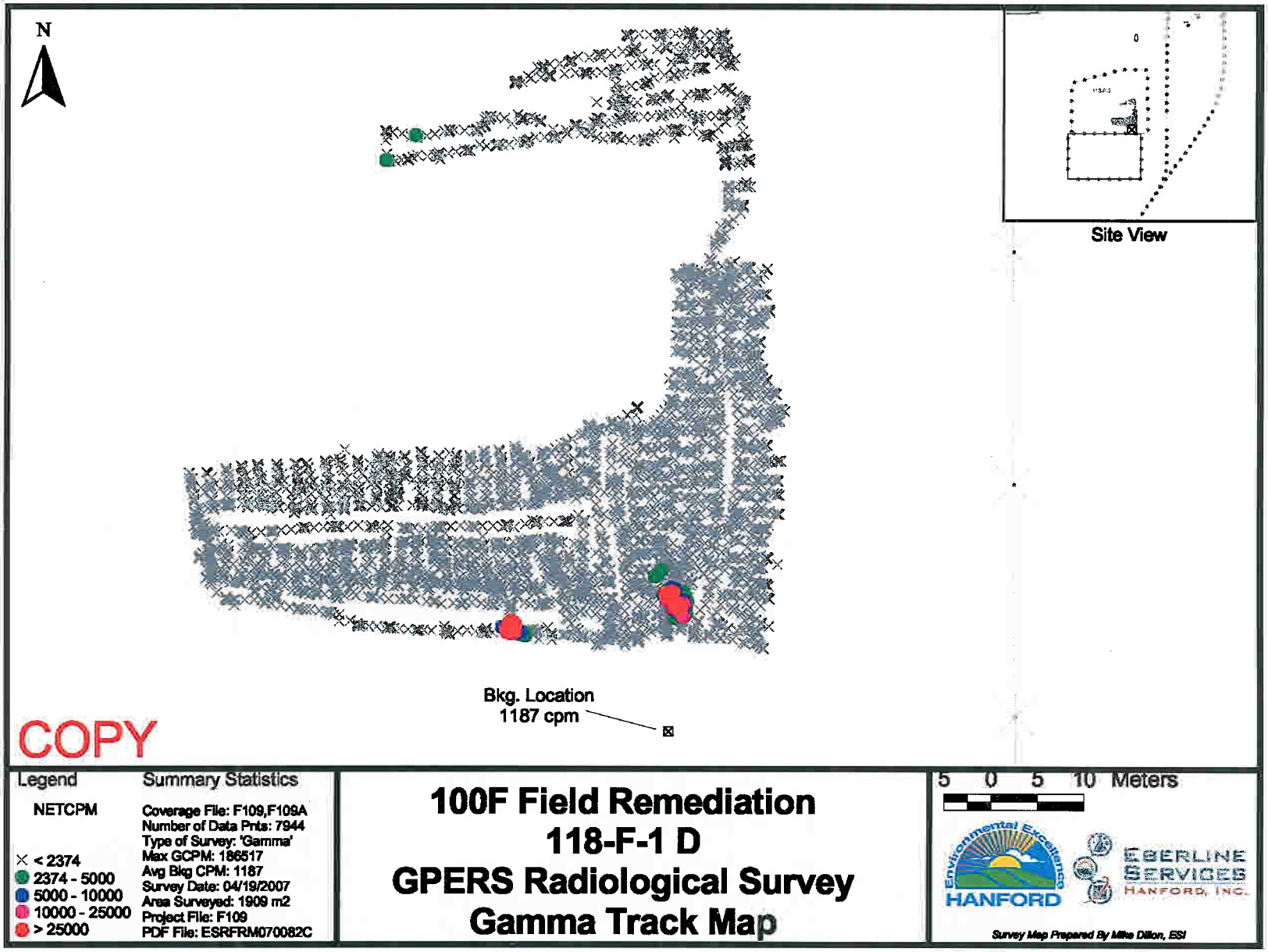

N
Site View
Bkg. Location
2358 cpm
COPY
Legend
NETCPM
< 2358
2358 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F150
Number of Data Pnts: 487
Type of Survey: 'Gamma'
Max GCPM: 1782
Avg Bkg CPM: 1179
Survey Date: '05/30/2007
Area Surveyed: 49 m2
Project File: F150
Pdf File: ESRFRM070138C
100F Field Remediation
118-F-1 A
GPERS Radiological Survey
Gamma Track Map
5 0 5 Meters
Environmental Excellence
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EBERLINE SERVICES
HANFORD, INC.
Survey Map Prepared By: Mike Dillon ESI


N
118-F-
Site View
Bkg. Location
1328 cpm
COPY
Legend
NETCPM
< 2656
2656 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F130
Number of Data Pnts: 2655
Type of Survey: 'Gamma'
Max GCPM: 13530
Avg Bkg CPM: 1328
Survey Date: 05/10/2007
Area Surveyed: 574 m2
Project File: F130
Pdf File: ESRFRM070113C
100F Field Remediation
118-F-1 B
GPERS Radiological Survey
Gamma Track Map
5 0 5 Meters
Environmental Excellence
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Survey Map Prepared By: Mike Dillon ESI


N
Site View
EBERLINE SERVICES
HANFORD, INC.
HANFORD
Survey Map Prepared By: Bob Dickerson, ESI
100F Remedial Action
118-F-1 C
GPERS Radiological Survey
Gamma Track Map
Summary Statistics
Coverage File: F023A
Number of Data Points: 1203
Type of Survey: 'Gamma'
Max GCPM: 10461
Avg Bkg CPM: 1260
Survey Date: 01/22/2007
Area Surveyed: 227 m2
Project File: F023A
Prof File: ESRFRM070008C
Legend
NETCPM
< 2520
2520 - 5K
5K - 10K
10K - 25K
> 25K
COPY
Bkg. Location
1260 cpm
5 0 5 Meters


N
Site View
Bkg. Location
1198 cpm
COPY
Legend
NETCPM
< 2396
2396 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F130D
Number of Data Pnts: 172
Type of Survey: 'Gamma'
Max GCPM: 1796
Avg Bkg CPM: 1198
Survey Start Date: 05/10/2007
Area Surveyed: 27 m2
Project File: F130D
Pdf File: ESRFRM070116C
100F Field Remediation
118-F-1 C
GPERS Radiological Survey
Gamma Track Map
3 0 3 Meters
Environmental Excellence
HANFORD
EBERLINE SERVICES
HANFORD, INC.
Survey Map Prepared By: Mike Dillon ESI


Site View
N
Bkg. Location
1260 cpm
COPY
Legend
NETCPM
< 2520
2520 - 5K
5K - 10K
10K - 25K
> 25K
Summary Statistics
Coverage File: F023
Number of Data Pnts: 5247
Type of Survey: 'Gamma'
Max GCPM: 32145
Avg Bkg CPM: 1260
Survey Date: 01/23/2007
Area Surveyed: 1577 m2
Project File: F023
Pdf File: ESRFRM070005C
100F Remedial Action
118-F-1 D
GPERS Radiological Survey
Gamma Track Map
10 0 10 Meters
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N
Site View
Bkg. Location
1187 cpm
COPY
Legend
NETCPM
< 2374
2374 - 5000
5000 - 10000
10000 - 25000
> 25000
Summary Statistics
Coverage File: F109,F109A
Number of Data Pnts: 7944
Type of Survey: 'Gamma'
Max GCPM: 186517
Avg Bkg CPM: 1187
Survey Date: 04/19/2007
Area Surveyed: 1909 m2
Project File: F109
PDF File: ESRFRM070082C
100F Field Remediation
118-F-1 D
GPERS Radiological Survey
Gamma Track Map
5 0 5 10 Meters
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APPENDIX D

DATA QUALITY ASSESSMENT

Verification Sampling Data Quality Assessment

A data quality assessment (DQA) was performed to compare the verification sampling approach and resulting analytical data with the sampling and data requirements and site specific data quality objectives specified in the *100 Area Burial Grounds Remedial Action Sampling and Analysis Plan* (SAP) (DOE-RL 2001).

A review of the sample design (WCH, 2006a), the field logbooks (WCH 2006b, c), and applicable analytical data packages has been performed as part of this DQA. All samples were collected per the sample design. To ensure quality data, the SAP data assurance requirements and the data validation procedures for chemical and radiochemical analysis (BHI 2000a, 2000b) are used as appropriate. This review involves evaluation of the data to determine if they are of the right type, quality, and quantity to support the intended use (i.e., closeout decisions). The DQA completes the data life cycle (i.e., planning, implementation, and assessment) that was initiated by the data quality objectives process (EPA 2000).

The closeout sampling approach for the 118-F-1 Burial Ground included a sample design with multiple subunit areas. Verification sample data collected at the 118-F-1 waste site(s) were provided by the laboratories in 6 sample delivery groups (SDGs), and one separate SDG for focus asbestos samples. This DQA addresses the SDGs by the subunits as they were designed in the Site Specific Instruction. As the 118-F-1 waste site(s) are comprised of multiple decision units, samples from several decision units may compose any one SDG. Refer to Appendix B for a breakdown of samples by decision unit/sampling location. Unless other wise noted, deficiencies listed below are specific to the individual SDG, but apply to all samples within that SDG.

For the below contaminant level (BCL) stockpiles, verification sample data was provided in two SDGs: SDG K0775, and SDG J00109. For the shallow zone, verification sample data was provided in four SDGs: SDG K0779, SDG K0841, SDG K0781, and SDG J00110. SDG K0779 was submitted for third-party validation. The verification sample data for the process trenches at 118-F-1 Burial Ground are provided in two SDGs: SDG K0781 and SDG J00111. Verification sample data for bulk asbestos was provided in SDG 07-A2525. Major deficiencies were identified in the analytical data set, rendering some data unacceptable for decision-making purposes. Major and minor deficiencies are discussed below.

Below Contamination Level (BCL) Stockpiles

SDG K0775

This SDG comprises seventeen field samples collected from BCL stockpiles (J15249 through J15265). These samples were analyzed for ICP metals, mercury, and by alpha spectroscopy, beta counting, gamma spectroscopy, and liquid scintillation counting, as directed in the sample design (WCH, 2006a). One field duplicate pair is included in this SDG (J15261/J15262). No major deficiencies were found in SDG K0775. Minor deficiencies are as follows:

In the ICP metals analysis, the LCS recovery for silicon is below the acceptance criteria at 29.5%. Associated sample results for silicon are likely biased low. Silicon is not a COPC for the 100-F-1 waste site(s), and the silicon data do not impact completeness of the verification sampling data.

In addition, the MS recoveries for three ICP metals (aluminum, iron, and antimony) are out of acceptance criteria. For aluminum and iron, the spiking concentration is insignificant compared to the native concentration in the sample from which the MS was prepared. For these analytes, the deficiency in the MS is a reflection of the analytical variability of the native concentration rather than a measure of the recovery from the sample. To confirm quantitation, post digestion spikes and serial dilutions were prepared, and the results for the analytes are in the range of 101.2% and 104%. Antimony did not have mismatched spike and native concentrations in the original MS. The original MS recovery for antimony is 53.2%. Sample results for antimony are considered estimated and flagged "J". The data are useable for decision-making purposes.

The analytes barium, calcium, chromium, iron, manganese, sodium, silicon, and zinc are reported in the MB at concentrations that are below the CRQLs, however, the sample results are greater than 5 times the MB concentration. The data are useable for decision-making purposes.

The relative percent difference (RPD) value for molybdenum is above the laboratory acceptance criteria at 38%. The duplicate pair is near the detection limit, analysis of RPDs is not considered to be useful in the precision determination. The data are usable for decision-making purposes.

In the radionuclides, the RPD calculated for uranium-233/234 in the laboratory duplicate pair for sample J15249 is above the acceptance criteria of 30%, at 42%. The RPD calculated for radium-228 and thorium-232 in the laboratory duplicate pair for sample J15264 are above the acceptance criteria of 30%, with both results at 33%. Elevated relative percent differences (RPDs) in environmental soil samples are attributed to natural heterogeneities in the soil matrix from which the sample and duplicate are prepared. The data are useable for decision-making purposes.

SDG J00109

This SDG comprises one field sample (J152D7), a split of sample J15261from SDG K0775. This sample was analyzed at Severn Trent Laboratories, Inc., with the analyses including ICP metals, mercury, and gamma spectroscopy. Initial data results from the of split sample J152D7 showed significantly greater results of lead and cadmium than seen in the primary sample, or any other samples. Based on this review of the data, the laboratory was requested to reanalyze the sample. Results from the second analysis

correlate well with the other data and replaced the original data for J152D7. No major deficiencies were found in SDG J00109. Minor deficiencies are as follows:

In the ICP metals analysis, the analytes calcium, lead, and silicon are reported in the MB at concentrations that are below the CRQLs, however, the sample results are greater than 5 times the MB concentration, and the data are useable for decision-making purposes.

In addition, the MS recoveries for seven ICP metals (aluminum, cadmium, copper, iron, lead, silicon, and zinc) are out of acceptance criteria. For these analytes, the spiking concentration is insignificant compared to the native concentration in the sample from which the MS was prepared. Therefore, the deficiency in the MS is a reflection of the analytical variability of the native concentration rather than a measure of the recovery from the sample. The data are useable for decision-making purposes.

In the gamma spectroscopy analysis, there was insufficient material to perform a duplicate analysis. The sample was recounted on a different detector to provide a laboratory duplicate. Plutonium-238 and curium-243/244 were detected in the MB. The data are useable for decision-making purposes.

In the alpha spectroscopy analysis, the RPD calculated for uranium-234 in the laboratory duplicate pair is above the acceptance criteria at 78.1%. Each sample result is just above the detection limit. When the duplicate pair is near the detection limit, analysis of RPDs is not considered to be useful in the precision determination. The data are useable for decision-making purposes.

Shallow Zone

SDG K0779

This SDG comprises 12 field samples (J15266 – J15268, J15271 – J15274, J15276-J15280) collected from the shallow zone, and three focus samples associated with the graphite chip/dust area discovered in the burial ground (J152J4 – J152J6). These samples were analyzed for ICP metals, mercury, and by alpha spectroscopy, beta counting, gamma spectroscopy, and liquid scintillation counting. One field duplicate pair is included in this SDG (J15272/J15273). SDG K0779 was submitted for formal third-party validation. A major deficiency was found in SDG K0779. Major and minor deficiencies are as follows:

For the radionuclide analysis, six analytes exceeded the RQL. Under the WCH statement of work, no qualification is required, and these small exceedances were not qualified by third-party validation.

No matrix spike analysis was performed for tritium and carbon-14, and no laboratory control sample (LCS) analysis was performed for curium-242, in SDG K0779. Third-party validation has qualified the analytical data for tritium, carbon-14, and curium-242

in all samples for SDG K0779 as estimated with "J" flags. The data are useable for decision-making purposes.

In the ICP metals analysis, the LCS recovery for silicon is below the acceptance criteria at 10.8%. Third-party validation has qualified the analytical data for silicon in SDG K0779 as estimate and flagged "J". The data are useable for decision-making purposes.

The MS recoveries for five ICP metals (aluminum, iron, manganese, antimony, and silicon) are out of acceptance criteria. For most of these analytes, the spiking concentration is insignificant compared to the native concentration in the sample from which the MS was prepared. For these analytes, the deficiency in the MS is a reflection of the analytical variability of the native concentration rather than a measure of the recovery from the sample. To confirm quantitation, post digestion spikes and serial dilutions were prepared, and the results for the analytes are in the range of 88.9% and 101.9%. Antimony did not have mismatched spike and native concentrations in the original MS. The original MS recovery for antimony is 57.6%, and third-party validation has qualified antimony sample results for SDG K0779 as estimated and flagged "J". The data are useable for decision-making purposes.

The analytes barium, calcium, and potassium are reported in the MB at concentrations that are below the CRQLs, however, the sample results are greater than 5 times the MB concentration, and the data are useable for decision-making purposes.

SDG J00110

This SDG comprises one split sample: sample J152D8 is a split of sample J15272 from SDG K0779. This SDG was analyzed for ICP metals, mercury, and by alpha spectroscopy, beta counting, gamma spectroscopy, and liquid scintillation counting. No major deficiencies were found in SDG J00087. Minor deficiencies are as follows:

The analytes calcium, lead, and silicon are reported in the MB at concentrations that are below the CRQLs, however, the sample results are greater than 5 times the MB concentration. The data are useable for decision-making purposes.

The MS recoveries for six ICP metals (aluminum, cadmium, copper, lead, iron, silicon, and zinc) are out of acceptance criteria. For all six ICP metals, the spiking concentration is insignificant compared to the native concentration in the sample from which the MS was prepared. For these analytes, the deficiency in the MS is a reflection of the analytical variability of the native concentration rather than a measure of the recovery from the sample. All ICP metals data for SDG J00110 are useable for decision-making purposes.

In the gamma spectroscopy analysis, the laboratory reported that there was insufficient sample size to prepare a laboratory duplicate of sample J152D7. The duplicate result was obtained by recounting sample J152D7 on a second detector.

The RPD calculated for alpha spectroscopy results in the laboratory duplicate pair are above the acceptance criteria for the sample results reported below the detection limit. For nickel-63, each of the samples results is below the detection limit. When the duplicate pair is below the detection limit, analysis of RPDs is not considered to be useful in the precision determination. The data are useable for decision-making purposes.

The radionuclides plutonium-238 and curium-243/244 are reported in the MB at a concentration similar to the MDL. Plutonium-238 in sample J152D7 is reported below the detection limit. Sample J152D7 has a curium-243/244 result similar to the result reported for the MB. The MB curium-243/244 result indicates that the J152D7 curium-243/244 result may be biased high. The J152D7 curium-243/244 result is considered estimated and flagged "J". The data are useable for decision-making purposes.

SDG K0841

This SDG comprises seven shallow zone samples (J15269, J15270, J15281, J15282, J15661, J15688, and J15689). These samples were analyzed for ICP metals, mercury, and by alpha spectroscopy, beta counting, gamma spectroscopy, and liquid scintillation counting. No major deficiencies were found in SDG K0841. Minor deficiencies are as follows:

In the ICP metals analysis, the LCS recovery for silicon is below the acceptance criteria at 38.6%. The silicon data are considered estimated and flagged "J". The data are useable for decision-making purposes.

The MS recoveries for five ICP metals (aluminum, iron, antimony, and silicon) are out of acceptance criteria. For aluminum and iron, the spiking concentration is insignificant compared to the native concentration in the sample from which the MS was prepared. For these analytes, the deficiency in the MS is a reflection of the analytical variability of the native concentration rather than a measure of the recovery from the sample. To confirm quantitation, post digestion spikes and serial dilutions were prepared, and the results for the analytes are in the range of 98.2% and 101.1%. Antimony and silicon did not have mismatched spike and native concentrations in the original MS. The original MS recovery for antimony is 76.8%, and sample results are considered estimated and flagged "J". The original MS recovery for silicon is 28.6%, and silicon data are qualified as estimated and flagged "J". The data are useable for decision-making purposes.

The analytes barium, calcium, copper, iron, magnesium, sodium, silicon, and zinc are reported in the MB at concentrations that are below the CRQLs, however, the sample results are greater than 5 times the MB concentration, and the data are useable for decision-making purposes.

Process Trenches

SDG K0781

This SDG comprises five field samples collected from process trenches (J15283-J15288), and one shallow zone field sample (J15275). Sample J15288 was replaced with sample J15688, and sample J15275 was replaced with sample J15661, both of which are reported in SDG K0841. These samples were analyzed for ICP metals, mercury, and by alpha spectroscopy, beta counting, gamma spectroscopy, and liquid scintillation counting. One field duplicate pair is included in this SDG (J15286/J15287). A major deficiency was found in SDG K0781. Major and minor deficiencies are as follows:

The analytes barium, calcium, magnesium, sodium, and silicon are reported in the MB at concentrations that are below the CRQLs. However, the sample results are greater than 5 times the MB concentration, and the data are useable for decision-making purposes.

In addition, the MS recoveries for five ICP metals (aluminum, iron, manganese, antimony, and silicon) are out of acceptance criteria. For most of these analytes, the spiking concentration is insignificant compared to the native concentration in the sample from which the MS was prepared. For these analytes, the deficiency in the MS is a reflection of the analytical variability of the native concentration rather than a measure of the recovery from the sample. To confirm quantitation, post digestion spikes and serial dilutions were prepared, and the results for the analytes are in the range of 96.4% to 104.7%. Antimony had a native concentration in the original MS below the detection limit. The original MS recovery for antimony is 59.2%. The antimony results in SDG K0781 are considered estimated and flagged "J". The data are useable for decision-making purposes.

Also, in the ICP metals analysis, the LCS recovery for silicon is below the acceptance criteria at 1%. Silicon is not a COPC for the 100-F-1 waste site(s).

The RPDs calculated for silicon in the laboratory duplicate pair (sample J15275, and J15725 [duplicate]), are above the acceptance criteria with the value of 39.4%. Elevated RPDs in environmental soil samples are attributed to heterogeneities in the sample matrix and not to deficiencies in the analytical methodologies. However, because there are multiple QC issues with the silicon samples, the silicon results for SDG K0781 are considered estimated and flagged "R".

In the alpha spectroscopy analysis, the RPDs calculated for uranium-238 in the laboratory duplicate pair is above the acceptance criteria at 37%. Each sample result is just above the detection limit. When the duplicate pair is near the detection limit, analysis of RPDs is not considered to be useful in the precision determination. The data are useable for decision-making purposes.

SDG J00111

This SDG comprises one field sample (J152D9), a split of sample J15286 in SDG K0781. This sample was analyzed for ICP metals, mercury, and by alpha spectroscopy, beta counting, gamma spectroscopy, and liquid scintillation counting. No major deficiencies were found in SDG J00111. Minor deficiencies are as follows:

The MS recoveries for seven ICP metals (aluminum, chromium, iron, magnesium, manganese, silicon, and antimony) are out of acceptance criteria. For aluminum, iron, and manganese, the spiking concentration is insignificant compared to the native concentration in the sample from which the MS was prepared. For these analytes, the deficiency in the MS is a reflection of the analytical variability of the native concentration rather than a measure of the recovery from the sample. Four of the analytes that did not have mismatched spike and native concentrations in the original MS have low MS recoveries. Antimony has MS and MSD recoveries of 53% and 51%, respectively. Chromium has MS and MSD recoveries of 73% and 72%, respectively. Magnesium has MS and MSD recoveries of 64% and 61%, respectively. Silicon has a MS and MSD recoveries of 44% and 78%, respectively. Antimony, chromium, and magnesium, and silicon are considered estimated and flagged "J". All ICP metals data for SDG J00111 are useable for decision-making purposes.

In the ICP metals analysis, the LCS recovery for silicon is above the acceptance criteria at 61%. Silicon data for SDG J00111 are considered estimated and flagged "J".

In the radionuclides, the RPDs calculated for uranium-234 and uranium-238 in the laboratory duplicate pair for sample J152D9 are above the acceptance criteria of 30%, at 72.2% and 56.1%, respectively. Elevated RPDs in environmental soil samples are attributed to natural heterogeneities in the soil matrix from which the sample and duplicate are prepared. The data are useable for decision-making purposes.

Bulk Asbestos SDG

Six bulk asbestos samples were collected from 118-F-1 Burial Ground (J152H8, J152H9, J152J0 – J152J3) and reported in SDG 07-A-2525. No major or minor deficiencies were found in SDG 07-A-2525.

FIELD QUALITY ASSURANCE/QUALITY CONTROL

RPD evaluations of main sample(s) versus the laboratory duplicate(s) are routinely performed and reported by the laboratory. Any deficiencies in those calculations are reported by SDG in the previous sections.

Field QA/QC measures are used to assess potential sources of error and cross contamination of samples that could bias results. Field QA/QC samples, listed in the

field logbooks (WCH 2006a, c), are summarized in Table 2. The main and QA/QC sample results are presented in Appendix A.

Table 2. Field Quality Assurance/Quality Control Samples.

Sample Area	Main Sample	Duplicate Sample	Split Sample
BCL D3	J15261	J15262	J152D7
Area 2 B7	J15272	J15273	J152D8
Process Trenches A4	J15286	J15287	J152D9

Field duplicate samples are collected to provide a relative measure of the degree of local heterogeneity in the sampling medium, unlike laboratory duplicates that are used to evaluate precision in the analytical process. The field duplicates are evaluated by computing the RPD of the duplicate samples for each COC. Only analytes with values above five times the detection limits for both the main and duplicate samples are compared. RPDs for the analytes for the field main and field duplicate samples for the 118-F-1 burial ground are not calculated because an evaluation of the data shows the analytes are not detected in both the main and duplicate sample at more than 5 times the target detection limit. RPDs of analytes detected at low concentrations (less than five times the detection limit) are not considered to be indicative of the analytical system performance. The data are useable for decision making purposes. The 95% upper confidence limit (UCL) calculation brief in Appendix B provides details on duplicate pair evaluation and RPD calculation. The data are suitable for the intended purpose of cleanup verification.

Split samples are collected to provide a relative measure of the variability in the sampling, sample handling, and analytical techniques used by commercial laboratories. The field main and split samples are evaluated by computing the RPD of the split samples for each COC to determine the usability of the verification data. The U.S. Environmental Protection Agency Contract Laboratory Program duplicate sample comparison methodology, *USEPA Contract Laboratory Program National Functional Guidelines for Inorganic Data Review* (EPA 1994), is used as an initial test of the data from the splits. Only analytes that had values above five times the CRQL for both the main and split sample are compared. RPDs for the analytes for the field main and split samples for the 118-F-1 burial ground are not calculated because an evaluation of the data shows the analytes are not detected in both the main and duplicate sample at more than 5 times the target detection limit. RPDs of analytes detected at low concentrations (less than five times the detection limit) are not considered to be indicative of the analytical system performance. The data are useable for decision making purposes. The 95% UCL calculation brief in Appendix B provides details on split pair RPD calculation. The RPD acceptance criteria for project-split samples is ≤ 30% (less than or equal to 30%).

A secondary check of the data variability is used when one or both of the samples being evaluated (main and duplicate) is less than 5 times the target detection limit (TDL), including undetected analytes. In these cases, a control limit of ± 2 times the TDL is used (Appendix B) to indicate that a visual check of the data is required by the reviewer. For the excavation shallow zone duplicate sample (J15273) and split sample (J152D8), the cesium-137, uranium-238, and lead results required this check. For the BCL duplicate sample (J15262) and split sample (J152D7), the cesium-137, uranium-238, and lead results required this check. For the process trench duplicate sample (J15287) and split sample (J152D9), the cesium-137, cobalt-60, europium-152, uranium-238, and lead results required this check. The nickel-63 result for the process trench split sample (J152D9) also required this check. All of these results are attributed to heterogeneities in the sample matrix from which the samples were collected. A visual inspection of all of the data is also performed. No additional major or minor deficiencies are noted. The data are useable for decision-making purposes.

Summary

Limited, random, or sample matrix-specific influenced batch quality control (QC) issues such as those discussed above, are a potential for any analysis. The number and types seen in these data sets are within expectations for the matrix types and analyses performed. The DQA review of the 118-F-1 verification sampling data found that the analytical results are accurate within the standard errors associated with the analytical methods, sampling, and sample handling. The DQA review for 118-F-1 waste site concludes that the reviewed data are of the right type, quality, and quantity to support the intended use. Detection limits, precision, accuracy, and sampling data group completeness were assessed to determine if any analytical results should be rejected as a result of QA and QC deficiencies. The analytical data were found acceptable for decision-making purposes, with the exception of the sample results reported for silicon within SDG K0781. The verification sample analytical data are stored in the ENRE project-specific database prior to being submitted for inclusion in the HEIS database. The verification sample analytical data are also summarized in Appendix B.

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