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# Hanford Site Radionuclide National Emission Standards for Hazardous Air Pollutants Registered and Unregistered Stack (Powered Exhaust) Source Assessment

Prepared for the U.S. Department of Energy  
Office of Environmental Restoration and  
Waste Management



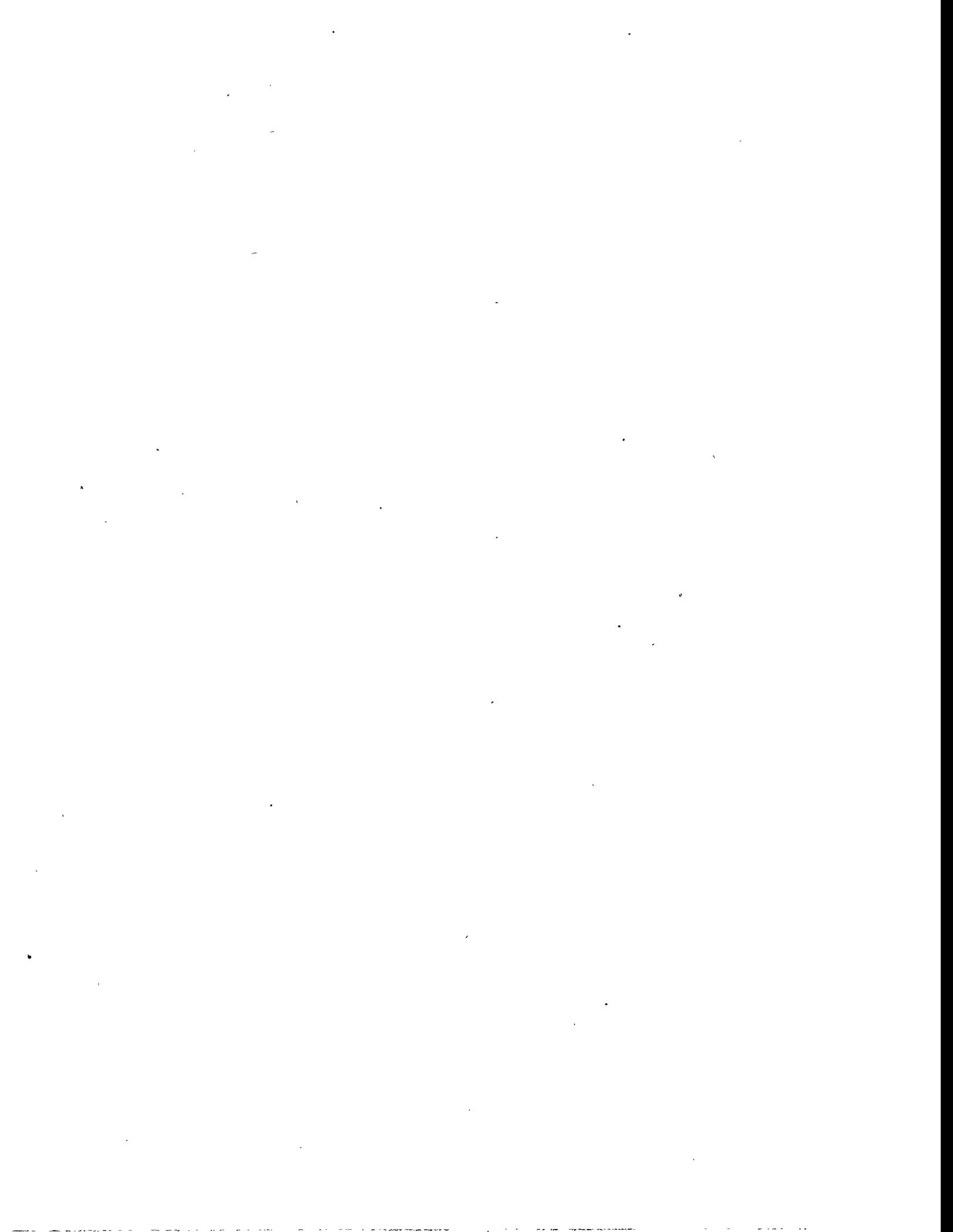
**Westinghouse**  
**Hanford Company** Richland, Washington

Hanford Operations and Engineering Contractor for the  
U.S. Department of Energy under Contract DE-AC06-87RL10930

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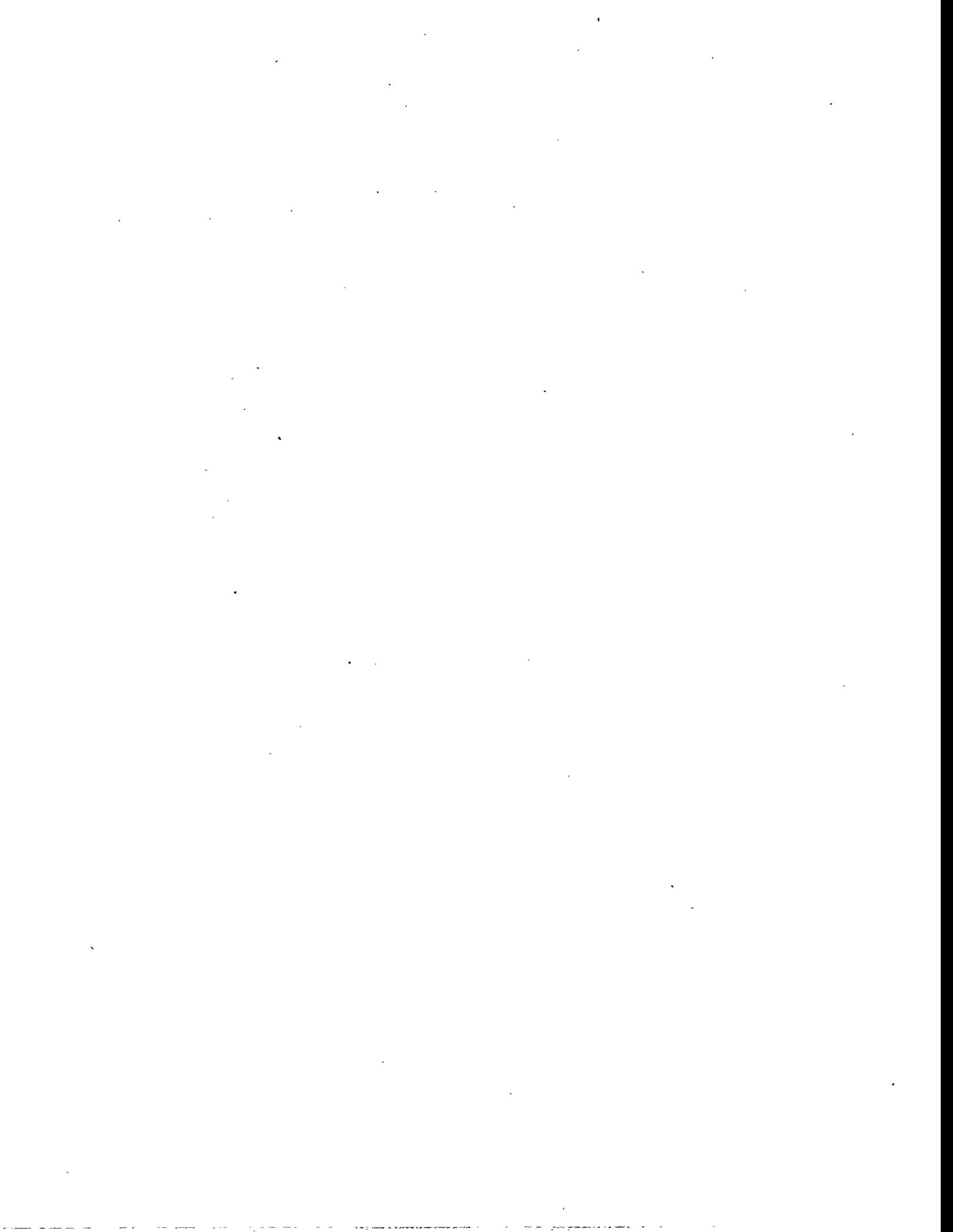
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W. E. Davis

Date Published  
December 1995

Prepared for the U.S. Department of Energy  
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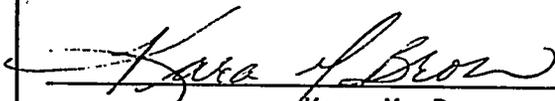
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December 28, 1995

**HANFORD SITE RADIONUCLIDE NATIONAL EMISSION  
STANDARDS FOR HAZARDOUS AIR POLLUTANTS  
REGISTERED AND UNREGISTERED STACK  
(POWERED EXHAUST) SOURCE ASSESSMENT**

**EXECUTIVE SUMMARY**

On February 3, 1993, the U.S. Department of Energy, Richland Operations Office received a Compliance Order and Information Request from the Director of the Air and Toxics Division of the U.S. Environmental Protection Agency (EPA), Region X. The Compliance Order requires the Richland Operations Office to evaluate all radionuclide emission points at the Hanford Site to determine which are subject to the continuous emission measurement requirements listed in Title 40, *Code of Federal Regulations* (CFR), Part 61, Subpart H, and to continuously measure radionuclide emissions in accordance with 40 CFR 61.93. The Information Request required the Richland Operations Office to provide a written Compliance Plan to meet the requirements of the Compliance Order. A Compliance Plan was submitted to the EPA, Region X, on April 30, 1993.

The Compliance Plan set as one of the milestones: "complete assessment of the Hanford Site 84 registered stacks, i.e., registered with the Washington State Department of Health, by December 17, 1993." This milestone was accomplished. The Compliance Plan also called for reaching a Federal Facility Compliance Agreement. This agreement was reached on February 7, 1994, between the U.S. Department of Energy, Richland Operations Office and EPA, Region X.

The Federal Facility Compliance Agreement set a milestone to assess the unregistered stacks (powered exhaust) by August 31, 1994. The milestone was met.

The present assessment provides an update of the status of both the registered and unregistered stacks (powered exhaust) of the Hanford Site, under Westinghouse Hanford Company's management, and their potential radionuclide emissions, i.e., emissions with no control devices in place for calendar year 1995. This evaluation also determines if the effective dose equivalent from any of these stack emissions exceeded 0.1 mrem/yr, which will require the stack to have continuous monitoring [40 CFR 61.93(b)(4)(i)].

This update provides assessments of 71 registered and 23 unregistered stacks; 16 stacks were identified as having potential emissions that would cause an effective dose equivalent greater than 0.1 mrem/yr. These stacks, as noted by 40 CFR 61.93, require continuous compliant monitoring.

**CONTENTS**

1.0	INTRODUCTION . . . . .	1
2.0	SCOPE . . . . .	2
3.0	METHODS FOR CALCULATING POTENTIAL STACK EMISSIONS . . . . .	3
3.1	APPENDIX D RELEASE FACTORS . . . . .	3
3.2	BACK CALCULATIONS BASED ON A DECONTAMINATION FACTOR OF 3,000 <sup>n</sup> . . . . .	3
3.3	NONDESTRUCTIVE ASSESSMENT . . . . .	4
3.4	UPSTREAM OF HEPA FILTER AIR CONCENTRATION MEASUREMENTS . . . . .	4
3.5	SPILL RELEASE FRACTION (296-Z-5) . . . . .	4
4.0	CAP88 DOSE MODELING . . . . .	6
5.0	RESULTS OF DOSE ASSESSMENT . . . . .	7
6.0	REFERENCES . . . . .	8

APPENDICES:

- A REGISTERED STACK ASSESSMENTS
- B UNREGISTERED STACKS ASSESSMENTS

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## 1.0 INTRODUCTION

The U.S. Department of Energy (DOE), Richland Operations Office (RL), is a department, agency, or instrumentality of the executive branch of the Federal Government and must comply with the requirements of the *Clean Air Act* (CAA) and its implementing regulations. On December 15, 1989, the U.S. Environmental Protection Agency (EPA) promulgated in the *Code of Federal Regulations* (CFR) the "National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities" (40 CFR Part 61, Subpart H). Subpart H requires that the emissions of radionuclides from DOE facilities shall not exceed those amounts that would cause any member of the public to receive an effective dose equivalent (EDE) of 10 mrem in a year. In addition, potential emissions of radionuclides from a facility that exceed 0.1 mrem/yr require continuous monitoring.

To determine compliance, 40 CFR 61.93 provides requirements for monitoring of radionuclide emissions from point sources. These monitoring requirements became effective on promulgation of the regulation December 15, 1989. Also, RL, as defined in 40 CFR 61, is an "owner or operator" of a "facility," i.e., the Hanford Site. Some monitoring systems on the Hanford Site that meet the continuous monitoring requirement do not use EPA-approved methods as specified in the regulations. A preliminary assessment revealed that seven stacks would require continuous monitoring: 291-A-1, 291-B-1, 291-T-1, 291-Z-1, 296-A-22, 296-A-40, and 340-NT-EX. On May 7, 1991, RL requested approval of the existing measurement systems for these stacks. On June 3, 1991, the EPA denied approval of these systems.

On February 3, 1993, RL received a Compliance Order and Information Request from the Director of the Air and Toxics Division of the EPA, Region X (McCormick 1993). The Compliance Order requires RL to evaluate all radionuclide emission points at the Hanford Site to determine which are subject to the continuous emission measurement requirements in 40 CFR 61, Subpart H, and to continuously measure radionuclide emissions in accordance with 40 CFR 61.93. The Information Request required RL to provide a written Compliance Plan to meet the requirements of the Compliance Order. A Compliance Plan was submitted to EPA, Region X, on April 30, 1993. The Compliance Plan called for developing a Federal Facility Compliance Agreement (FFCA). An FFCA was negotiated between RL and EPA, Region X, and was entered into on February 7, 1994.

The Compliance Plan set as one of the milestones: "complete assessment of the 84 Hanford Site registered stacks under management by Westinghouse Hanford Company by December 17, 1993." This milestone was met (Davis and Barnett 1994a). In addition, the FFCA set as a milestone the assessment of the unregistered stacks (powered exhaust) by August 31, 1994 (Davis and Barnett 1994b). This milestone also was met.

This update presents the assessment results for the 71 registered stacks and 23 unregistered stacks (powered exhaust) under Westinghouse Hanford Company management control on the Hanford Site for potential emissions, i.e., emissions with no control devices in place for calendar year 1995. This update identifies stacks requiring continuous monitoring, i.e., the EDE from potential emissions >0.1 mrem/yr.

## 2.0 SCOPE

The stack assessment of potential emissions was performed on all registered stacks (Table A-1, Appendix A) and unregistered stacks (powered exhaust (Table B-1, Appendix B) under management by Westinghouse Hanford Company on the Hanford Site. These emission sources represent 71 individual point sources presently registered under *Washington Administrative Code (WAC) 246-247* with the Washington State Department of Health (DOH) and 23 individual point sources not registered with DOH. The methods used in assessing the potential emissions from the stacks are described.

### 3.0 METHODS FOR CALCULATING POTENTIAL STACK EMISSIONS

Potential emissions for the registered stacks were calculated using five methods:

1. Source term estimation based on release factors from Appendix D of 40 CFR 61
2. Back calculations based on a decontamination factor of  $3,000^n$ , where n equals the number of high-efficiency particulate air (HEPA) filter banks in series
3. Nondestructive assessment (NDA)
4. Upstream of HEPA filter air concentration measurements
5. Spill release fraction (296-A-5).

Calculations based on the first two methods are considered extremely conservative, while the calculations made using the last three methods should produce realistic estimates of emissions (Davis and Barnett 1994c). The assessment of stack emissions based on release factors from Appendix D or from back calculations could indicate that the potential emissions would result in an EDE exceeding 0.1 mrem/yr. Calculations using one of the latter methods could result in an EDE of less than 0.1 mrem/yr. If this occurs, the latter methods' results would be accepted over the results from either of the first two methods.

#### 3.1 APPENDIX D RELEASE FACTORS

The potential emissions for a system without control devices can be estimated based on release factors presented in 40 CFR 61, Appendix D: gases = 1, liquids or particulate solids =  $1 \times 10^{-3}$ , and solids =  $1 \times 10^{-6}$ . This method is extremely conservative, because accidents involving liquids and loose particulates have a release fraction orders of magnitude less than the  $1 \times 10^{-3}$  release fraction. In an accident condition for a spill of powder from a 1-m height, a  $4 \times 10^{-5}$  release fraction (Sutter et al. 1981) for 10 micron and less would be used. Likewise, a liquid spill from a 3-m height would use a  $4 \times 10^{-5}$  release fraction (Sutter et al. 1981). For both of these cases, the release fraction is orders of magnitude less than a  $1 \times 10^{-3}$  release fraction used for powders and liquids from Appendix D. In cases where the assessment was performed on waste tanks, if the inventory was covered by supernate, the supernate was evaluated using the release factor for liquids, while the covered salt cake was estimated using a release factor for solids.

#### 3.2 BACK CALCULATIONS BASED ON A DECONTAMINATION FACTOR OF $3,000^n$

This method for estimating potential emissions assumes the *Nuclear Air Cleaning Handbook* (Buchsted et al. 1976) decontamination factor (DF) of 3,000 (DF =  $1/[1.0 - 0.9997]$ ) for a HEPA filter. The method assumes that each

bank in series acts independently of a preceding bank and will remove contamination with the same 3,000 decontamination factor. For a system with  $n$  banks of HEPA filters in series, the decontamination factor is  $3,000^n$ . This method can be extremely conservative for a contaminated system. When processing no longer occurs, the resuspension of contamination downstream of the HEPA filters can dominate the airborne releases from a facility. Multiplying these releases by  $3,000^n$  will overestimate the potential emissions by orders of magnitude (Davis and Barnett 1994).

### 3.3 NONDESTRUCTIVE ASSESSMENT

The NDA method provides a technical basis for measuring potential emissions (Barnett 1994). NDA measures gamma decay of the curie content of the HEPA filters and prefilters. By testing the NDA in the same geometry as the filters, the curie content on the filters can be calculated. It is assumed that the contents would be released to the atmosphere over the time the filters were in place. The drawback to this method is that alpha radiation is not measured by the microspec gamma spectrometer. Also, if the HEPA filters have not been changed out since processing occurred, the curie content of the HEPA filters may reflect essentially the potential release during processing.

### 3.4 UPSTREAM OF HEPA FILTER AIR CONCENTRATION MEASUREMENTS

The upstream air concentrations provide direct information on the potential emissions from a facility. This method can be applied by using continuous air monitoring (CAM) data, inserting an air sample probe for upstream measurements, or radiological analysis of removed HEPA filters. CAM data can be used if the data are taken from the process area, which contains the radionuclide inventory. Air measurements may also be collected in the ventilation system upstream of the HEPA filters. In this case, a sampling port is selected, a probe inserted, and air concentrations are measured. The final method is the sampling of the furthest upstream HEPA filters for the facility. In this case one or more HEPA filters are removed and the radiological content is analyzed either by destructive assay or by a gamma spectrometer. The airflow during the time the HEPA filter is on line is used to determine the annual release rate. These methods all are technically based in that the measurements represent the potential concentrations emitted from a facility without control devices.

### 3.5 SPILL RELEASE FRACTION

In the facility venting to the 296-Z-5 stack, the only potential emissions occur when a canister of  $\text{PuO}_2$  powder is repackaged. No emissions are expected from contamination in the ventilation system for the facility because it is essentially uncontaminated. When a canister is to be repackaged, the double canisters containing 1,500 g of  $\text{PuO}_2$  are opened in a hood and the powder is poured into another canister. The canister is sealed, then put into another canister, which also is sealed. The pouring could cause a  $\text{PuO}_2$  release to the air. To estimate the potential maximum release, observed spill release fractions for depleted uranium oxide spills (Sutter

et al. 1981) were used. A maximum release fraction value of  $4.0 \times 10^{-5}$  was used. This number is extremely conservative because it represents a release fraction for a 1-m release height for the spill. The actual release height is a maximum of 0.15 m. The spill release fraction was only used for the 296-Z-5 stack.

#### 4.0 CAP88 DOSE MODELING

One of the five methods was applied to the 94 registered and unregistered stacks to produce a potential source term for each stack. (A complete list of the radionuclides with curies emissions is provided on individual stack assessment worksheets in Appendices A and B.) Once the potential source terms were determined, the source term, location, and stack height were used in a computer model to predict dose for the maximum exposed individual. The dispersion modeling was performed using an EPA-approved computer model, CAP88, with Hanford Site meteorology (Beres 1990).

The CAP88 model can incorporate plume rise from the stack based on the flow rate and stack diameter. After leaving the stack, the plume is modeled to dispersions based on meteorological conditions. Modeled concentrations are decreased based on dry deposition (dry deposition velocity = 1.8 cm/s). Wet deposition is ignored because of the low incident of precipitation on the Hanford Site. The modeled concentrations are used to calculate an EDE for an offsite maximum exposed individual.

Normalized source terms were used in CAP88 for each of the major areas on site, i.e., 100, 200, 300, 400, and 600 Areas. Five-year averaged Hanford Site meteorological data (1983-1987) taken on the site were used to compute normalized air concentrations, i.e.,  $X/Q$ , where  $X$  is the air concentration ( $\text{Ci}/\text{m}^3$ ) normalized by the source term  $Q$  ( $\text{Ci}/\text{s}$ ). Two stack release heights were used: 89 m (200-ft stack with a 100-ft plume rise) and 10 m (33 ft). To model an individual stack the following input was needed: the potential radiological source terms, the stack release height chosen, and the location of the stack in one of the major areas. Potential dose data were produced by the CAP88 model for each registered stack. When the data were analyzed, 15 stacks were identified as having the potential for an emission that would cause an EDE of greater than 0.1 mrem/yr.

## 5.0 RESULTS OF DOSE ASSESSMENT

Results of the dose assessment are provided in Appendices A and B (see Tables A-1 and B-1) for each stack. The 16 stacks, 14 registered and 2 unregistered, with potential emissions to cause an EDE to the MEI of >0.1 mrem/yr and require continuous monitoring are listed in Table 1.

Table 1. Designated Stacks.<sup>a</sup>

Stack number	Registered (Y/N)	Facility	Number of HEPA filters
291-A-1 <sup>b</sup>	Y	PUREX	3
296-A-1	Y	PUREX	3
291-B-1 <sup>b</sup>	Y	B Plant	2
291-Z-1 <sup>b</sup>	Y	PFP	1-3 <sup>c</sup>
296-A-17	Y	Tank Farms	2
296-A-22 <sup>b</sup>	Y	Tank Farms	2
296-A-40 <sup>b</sup>	Y	Tank Farms	2
296-B-28	Y	Tank Farms	2
296-C-05	Y	Tank Farms	2
296-P-16	Y	Tank Farms	2
296-P-26	N	Tank Farms	2
296-S-15	Y	Tank Farms	2
296-S-22	Y	Tank Farms	2
296-T-18	Y	Tank Farms	2
296-U-11	N	Tank Farms	2
340-NT-EX	Y	340 Building	2

<sup>a</sup> Stacks with the potential to exceed 0.1 mrem/yr.

<sup>b</sup> Original seven designated stacks.

<sup>c</sup> Ventilation from different areas undergoes 1, 2, or 3 stages of HEPA filtration.

## 6.0 REFERENCES

- 40 CFR 61, 1992, "National Emission Standards for Hazardous Air Pollutants," *Code of Federal Regulations*, as amended.
- Barnett, J. M., 1994, *Potential Radionuclide Emissions From Stacks on the Hanford Site, Part 2: Dose Assessment Methodology Using Portable Low-Resolution Gamma Spectroscopy*, Proceeding of the 23rd DOE/NRC Nuclear Air Cleaning Conference, July 25-28, 1994, Buffalo, New York.
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WAC 246-247, 1990, "Radiation Protection - Air Emissions," *Washington Administrative Code*, as amended.

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**APPENDIX A**  
**REGISTERED STACK ASSESSMENTS**

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## REGISTERED STACK ASSESSMENTS

A summary table is provided to indicate the assessment method used for each of the 71 registered stacks and the result of the assessment (Table A-1). The most current worksheets have been included in this appendix. When worksheets from prior years have been used for the current assessment, the facilities have determined that emissions have not increased significantly and the inventory in the facility has not increased. (Internal memos attesting to this were signed off by a representative of the facility and are on file with the facility and with Effluent Monitoring.) Because no assessments were performed for calendar year 1995 for the PFP stacks, assessments for calendar year 1993 are included.

The headings on the worksheets indicate whether release factors from Appendix D (40 CFR 61) (back calculations, nondestructive assessment, or upstream air samples) were used to perform the assessment. Note: the assessment of 296-Z-5, where a release fraction of  $4 \times 10^{-5}$ , was used is included in Appendix D, release factor calculations. When worksheets using release factors from Appendix D are used, the inventory at risk is provided and a release fraction is applied to the inventory to provide an estimated emission. For back calculations, the 1992, 1993, or 1994 annual air concentrations<sup>1</sup> are multiplied by a high-efficiency particulate air (HEPA) filter factor  $3,000^n$ , where n indicates the number of banks of HEPA filters in series and if a prefilter exists, by a prefilter factor (3 to 20). The resulting number is the estimate of potential emissions. The worksheet for nondestructive assessment provides the curie content collected on the HEPA filters and the potential annual emissions. Upstream air samples were considered to have been taken for 296-T-11 and 296-T-12 when sampling was performed on the HEPA filters to determine the curie content. From the curie content an annual emission was estimated. For all of the assessments, once the emissions were known, the CAP88 model was applied with an appropriate source release height and location. The CAP88 model then used Hanford Site meteorology for the transport and diffusion to produce an effective dose equivalent to the offsite maximum exposed individual.

Appendix A is divided into 18 sections:

- A1.0 PUREX STACKS
- A2.0 B PLANT
- A3.0 TRUSAF
- A4.0 WASTE SAMPLING AND CHARACTERIZATION FACILITY
- A5.0 WASTE VERIFICATION AND SAMPLING FACILITY
- A6.0 AR AND CR VAULTS
- A7.0 200 EAST AREA TANK FARMS
- A8.0 209-E CRITICAL MASS LABORATORY
- A9.0 200 EAST AREA EVAPORATOR
- A10.0 200 WEST AREA TANK FARMS
- A11.0 200 WEST EVAPORATOR
- A12.0 GROUT
- A13.0 222-S LABORATORY

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<sup>1</sup>WHC, 1993, *Environmental Releases for Calendar Year 1992*, WHC-EP-0527-2, Westinghouse Hanford Company, Richland, Washington.

A14.0 T PLANT  
A15.0 PLUTONIUM FINISHING PLANT  
A16.0 300 AREA  
A17.0 400 AREA  
A18.0 100 AREA

Table A-1. Hanford Site Registered Stacks. (4 sheets)

Stack	HEPA Stages	NESHAP Assessment method				Status of stack
		Appendix D release factors	NDA	Upstream	Back calculations	
PUREX Plant						
291-A-1 <sup>a</sup>	3				$1.6 \times 10^7$	Designated
296-A-1	3	$1.1 \times 10^5$				Designated
296-A-2	1				$< 2.3 \times 10^{-3}$	Minor
296-A-3	1				$< 1.4 \times 10^{-3}$	Minor
296-A-5A	1-2	$1.9 \times 10^{-2}$				Minor
296-A-5B	1-2	$1.9 \times 10^{-2}$				Minor
296-A-6	1				$< 7.4 \times 10^{-3}$	Minor
296-A-7	1				$< 1.0 \times 10^{-2}$	Minor
296-A-8	1				$< 5.2 \times 10^{-3}$	Minor
296-A-10	1				$< 1.1 \times 10^{-2}$	Minor
296-A-14	1				$< 9.9 \times 10^{-3}$	Minor
296-A-24	0				Not in operation	Minor
B Plant						
291-B-1 <sup>a</sup>	2				99.7	Designated
296-B-5	1				$9.8 \times 10^{-4}$	Minor
296-B-10	2	$\leq 1.4 \times 10^{-3}$				Minor
296-B-13	2		$5 \times 10^{-8}$			Minor
TRUSAF						
296-T-11 <sup>b</sup>	2			$1.8 \times 10^{-3}$		Minor
296-T-12 <sup>b</sup>	2			$3.7 \times 10^{-4}$		Minor
Waste Sampling and Characterization Facility						
696-W-1					$3.6 \times 10^{-3}$	Minor
696-W-2					$2.3 \times 10^{-4}$	Minor
Waste Verification and Sampling Facility						
296-W-3 <sup>c</sup>	2		$1.6 \times 10^{-9}$			Minor

Table A-1. Hanford Site Registered Stacks. (4 sheets)

Stack	HEPA Stages	NESHAP Assessment method				Status of stack
		Appendix D release factors	NDA	Upstream	Back calculations	
AR and CR Vaults						
296-A-12 <sup>e</sup>	2	5.4				Designated
296-A-13	2	4.5x10 <sup>-3</sup>				Minor
296-C-05	2	19.0				Designated
200 East Area Tank Farm						
296-A-17	2	226				Designated
296-A-18	2	0.0				Minor
296-A-19	2	0.0				Minor
296-A-20	2	0.0				Minor
296-A-25	2			0.04		Minor
296-A-26	2	1.1x10 <sup>-8</sup>				Minor
296-A-27	2			4.2x10 <sup>-2</sup>		Minor
296-A-28	2	0.0				Minor
296-A-29	2			4.1x10 <sup>-4</sup>		Minor
296-A-30	2	0.0				Minor
296-A-40 <sup>B</sup>	2	47.5				Designated
296-A-41	2	0.0				Minor
296-B-28	2	0.84				Designated
296-P-16	2	1.68				Designated
296-P-17	2	Not in operation				Minor
209-E Critical Mass Laboratory						
296-P-31	2	1.8x10 <sup>-3</sup>				Minor
200 East Area Evaporator						
296-A-21	2	1.9x10 <sup>-6</sup>				Minor
296-A-22 <sup>B</sup>	2	50.2				Designated
200 West Area Tank Farms						
296-P-22	2	0.0				Minor
296-P-23	2			1.5x10 <sup>-3</sup>		Minor
296-S-15	2	270				Designated

Table A-1. Hanford Site Registered Stacks. (4 sheets)

Stack	HEPA Stages	NESHAP Assessment method				Status of stack
		Appendix D release factors	NDA	Upstream	Back calculations	
296-S-22	2	0.95				Designated
296-T-18	2	0.38				Designated
200 West Area Evaporator						
296-S-18	2		0.07			Minor
296-T-17	2		0.07			Minor
Grout						
296-G-1 <sup>e</sup>	2		$3.4 \times 10^{-8}$			Minor
222-S Laboratory						
296-S-16	1		$2.0 \times 10^{-6}$			Minor
296-S-21	2-4	$6.9 \times 10^{-2}$				Minor
T Plant						
291-T-1 <sup>a</sup>	2		$3.7 \times 10^{-3}$			Minor
296-T-13	2		$2.3 \times 10^{-4}$			Minor
Plutonium Finishing Plant (no assessment was performed for CY95 - CY93 results presented)						
291-Z-1 <sup>a</sup>	1-3				$2.4 \times 10^7$	Designated
296-Z-3	2	Minor				Minor
296-Z-5 <sup>f</sup>	2-3	$3.0 \times 10^{-2}$				Minor
296-Z-6	2	$5.4 \times 10^{-2}$				Minor
296-Z-14	5		$4.3 \times 10^{-4}$			Minor
300 Area						
306-E-ULAB	1				$7.6 \times 10^{-3}$	Minor
308-TRIGA	2	$1.7 \times 10^{-6}$				Minor
340-NT-EX <sup>b</sup>	2				167	Designated
377-GEL	3	$9.1 \times 10^{-3}$				Minor
400 Area						
FFTF-CB-EX	0				$1.3 \times 10^{-5}$	Minor
FFTF-RE-SB	0				$9.2 \times 10^{-6}$	Minor
FFTF-HT-TR	0				$8.8 \times 10^{-7}$	Minor

Table A-1. Hanford Site Registered Stacks. (4 sheets)

Stack	HEPA Stages	NESHAP Assessment method				Status of stack
		Appendix D release factors	NDA	Upstream	Back calculations	
100 Areas						
105-KE	0				$2.5 \times 10^{-4}$	Minor
105-KW	0				$4.1 \times 10^{-6}$	Minor
1706-KER	1				$3.6 \times 10^{-4}$	Minor
1706-KE	1-2				$1.4 \times 10^{-4}$	Minor

- CY = calendar year.
- HEPA = high-efficiency particulate air.
- NDA = nondestructive assessment.
- NESHAP = National Emission Standards for Hazardous Air Pollutants.
- PUREX = Plutonium-Uranium Extraction.
- a Original designated stack.
- b 296-T-11 and 296-T-12 used samples taken from the HEPA filters to determine the upstream air concentrations.
- c 296-W-1 is currently being reassessed. CY93 assessment results are presented.
- d 296-A-12 is not currently in operation
- e 296-G-1 did not operate in CY95 - CY93 assessment
- f 296-Z-5 used  $4 \times 10^{-5}$  release fraction for a  $PuO_2$  spill.

**A1.0 PUREX STACKS**

The Plutonium-Uranium Extraction Plant (PUREX) has 12 registered stacks: 291-A-1, 296-A-1, 296-A-2, 296-A-3, 296-A-5A, 296-A-5B, 296-A-6, 296-A-7, 296-A-8, 296-A-10, 296-A-14, and 296-A-24. Two of the stacks are designated stacks: 291-A-1 and 296-A-1.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-1  
 NUMBER OF HEPA FILTER BANKS (n) 3 BACK CALCULATION FACTOR (3000)<sup>3</sup>  
 Annual Air Emissions Report (year) 1992

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u><sup>239,240</sup>Pu</u>	<u>1.0 E-06</u>	<u>(3000)<sup>3</sup></u>	<u>2.7 E+04</u>	<u>6.4 E+04</u>
2. <u><sup>241</sup>Pu</u>	<u>7.1 E-06</u>	<u>(3000)<sup>3</sup></u>	<u>1.9 E+05</u>	<u>7.1 E+03</u>
3. <u><sup>241</sup>Am</u>	<u>3.5 E-07</u>	<u>(3000)<sup>3</sup></u>	<u>9.5 E+03</u>	<u>3.4 E+04</u>
4. <u>Total Beta</u>	<u>&lt;2.4 E-06</u>	<u>(3000)<sup>3</sup></u>	<u>&lt;6.5 E+04</u>	<u>&lt;7.8 E+02</u>
			Total Dose	<u>1.1 E+05</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 89-m Stack

COMMENTS

Three (HEPA) filters with including one (HEPA) filter in gloveboxes.

Using the Minimum Detection Limit (MDL) for Total Beta and assuming

Total Beta = <sup>90</sup>Sr.

EVALUATOR *[Signature]*  
 MANAGER, ENVIRONMENTAL *[Signature]*  
 FACILITY MANAGER *[Signature]*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 4/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-2  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>&lt;3.1 E-07</u>	<u>(3000)</u>	<u>&lt;9.3 E-04</u>	<u>&lt;2.2 E-03</u>
2. <u>Total Beta</u>	<u>&lt;2.4 E-06</u>	<u>(3000)</u>	<u>&lt;7.2 E-03</u>	<u>&lt;8.6 E-05</u>
			Total Dose	<u>&lt;2.3 E-03</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 89-m Stack

COMMENTS

Using the Minimum Detection Limit (MDL) for Total Alpha and Total Beta.  
Assuming <sup>239</sup>Pu and <sup>90</sup>Sr for Total Alpha and Total Beta respectively.

EVALUATOR  
 MANAGER, ENVIRONMENTAL  
 FACILITY MANAGER

*John Shauli*  
*SEL*  
*William*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-3  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>&lt;1.8 E-07</u>	<u>(3000)</u>	<u>&lt;5.4 E-04</u>	<u>&lt;1.3 E-03</u>
2. <u>Total Beta</u>	<u>&lt;1.4 E-06</u>	<u>(3000)</u>	<u>&lt;4.2 E-03</u>	<u>&lt;5.0 E-05</u>
			Total Dose	<u>&lt;1.4 E-03</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 89-m Stack

COMMENTS

Using the Minimum Detection Limit (MDL) for Total Alpha and Total Beta.  
Assuming <sup>239</sup>Pu and <sup>90</sup>Sr for Total Alpha and Total Beta respectively.

EVALUATOR *Janet Shauli*  
 MANAGER, ENVIRONMENTAL *[Signature]*  
 FACILITY MANAGER *C.W. Wollam*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/97

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-5A  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u><sup>239,240</sup>Pu</u>	<u>6.4 E-07</u>	<u>(3000)</u>	<u>1.9 E-03</u>	<u>1.7 E-02</u>
2. <u><sup>241</sup>Am</u>	<u>ND</u>	<u>(3000)</u>	<u>0.0 E+00</u>	<u>0.0 E+00</u>
3. <u>Total Beta</u>	<u>&lt;1.4 E-05</u>	<u>(3000)</u>	<u>&lt;4.2 E-02</u>	<u>&lt;1.8 E-03</u>
			<u>Total Dose</u>	<u>1.9 E-02</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 10-m Stack

COMMENTS

ND = none detected

The Inductive Coupled Plasma (ICP) hood has two (HEPA) filter banks on the exhaust. The Appendix D Source Assessment is attached and the dose is eight orders of magnitude (100,000,000x) lower than the criteria of 0.1 mrem/yr.

Using the Minimum Detection Limit (MDL) for Total Beta and assuming Total Beta = <sup>90</sup>Sr.

EVALUATOR

MANAGER, ENVIRONMENTAL

FACILITY MANAGER

*John Shapli*  
*SEJ*  
*C.D. Wollan*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-5B.  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u><sup>239,240</sup>Pu</u>	<u>6.4 E-07</u>	<u>(3000)</u>	<u>1.9 E-03</u>	<u>1.7 E-02</u>
2. <u><sup>241</sup>Am</u>	<u>ND</u>	<u>(3000)</u>	<u>0.0 E+00</u>	<u>0.0 E+00</u>
3. <u>Total Beta</u>	<u>&lt;1.4 E-05</u>	<u>(3000)</u>	<u>&lt;4.2 E-02</u>	<u>&lt;1.8 E-03</u>
			Total Dose	<u>1.9 E-02</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 10-m Stack

COMMENTS

ND = none detected

The Inductive Coupled Plasma (ICP) hood has two (HEPA) filter banks on the exhaust. The Appendix D Source Assessment is attached and the dose is eight orders of magnitude (100,000,000x) lower than the criteria of 0.1 mrem/yr.

Using the Minimum Detection Limit (MDL) for Total Beta and assuming Total Beta = <sup>90</sup>Sr.

EVALUATOR *John Shauli*  
 MANAGER, ENVIRONMENTAL *R.D. Williams*  
 FACILITY MANAGER *C.D. Williams*

DATE 11-12-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT 296-A-5A and 296-A-5B from (ICP) hood

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>gas</u>	<u>8.58 E-11</u>	<u>1.0</u>	<u>8.58 E-11</u>	<u>7.4 E-10</u>
2. <u>Total Beta</u>	<u>gas</u>	<u>1.14 E-10</u>	<u>1.0</u>	<u>1.14 E-10</u>	<u>5.0 E-12</u>
Total Dose					<u>7.0 E-10</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 10-m Stack

COMMENTS

The source-term is calculated from the concentration of samples in the Inductive Coupled Plasma (ICP) hood.

Total Alpha emissions are <sup>239</sup>Pu and Total Beta emissions are <sup>90</sup>Sr.

EVALUATOR *John J. ...*  
 MANAGER, ENVIRONMENTAL *R.F. ...*  
 FACILITY MANAGER *C.D. ...*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-6  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>&lt;1.0 E-06</u>	<u>(3000)</u>	<u>&lt;3.0 E-03</u>	<u>&lt;7.1 E-03</u>
2. <u>Total Beta</u>	<u>&lt;8.0 E-06</u>	<u>(3000)</u>	<u>&lt;2.4 E-02</u>	<u>&lt;2.9 E-04</u>
			Total Dose	<u>&lt;7.4 E-03</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 89-m Stack

COMMENTS

Using the Minimum Detection Limit (MDL) for Total Alpha and Total Beta.  
Assuming <sup>239</sup>Pu and <sup>90</sup>Sr for Total Alpha and Total Beta respectively.

EVALUATOR *John Stanli*  
 MANAGER, ENVIRONMENTAL *R.L. [Signature]*  
 FACILITY MANAGER *C.D. Wollan*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-7  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992  
 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>&lt;1.4 E-06</u>	<u>(3000)</u>	<u>&lt;4.2 E-03</u>	<u>&lt;1.0 E-02</u>
2. <u>Total Beta</u>	<u>&lt;1.1 E-05</u>	<u>(3000)</u>	<u>&lt;3.3 E-02</u>	<u>&lt;4.0 E-04</u>
			Total Dose	<u>&lt;1.0 E-02</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 89-m Stack

COMMENTS

Using the Minimum Detection Limit (MDL) for Total Alpha and Total Beta.  
Assuming <sup>239</sup>Pu and <sup>90</sup>Sr for Total Alpha and Total Beta respectively.

EVALUATOR *John Shauli*  
 MANAGER, ENVIRONMENTAL *R.D. Wollan*  
 FACILITY MANAGER *C.D. Wollan*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-8  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>&lt;7.0 E-07</u>	<u>(3000)</u>	<u>&lt;2.1 E-03</u>	<u>&lt;5.0 E-03</u>
2. <u>Total Beta</u>	<u>&lt;5.6 E-06</u>	<u>(3000)</u>	<u>&lt;1.7 E-02</u>	<u>&lt;2.0 E-04</u>
			Total Dose	<u>&lt;5.2 E-03</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 89-m Stack

COMMENTS

Using the Minimum Detection Limit (MDL) for Total Alpha and Total Beta.  
Assuming <sup>239</sup>Pu and <sup>90</sup>Sr for Total Alpha and Total Beta respectively.

EVALUATOR *John Threlk*  
 MANAGER, ENVIRONMENTAL *Ray ...*  
 FACILITY MANAGER *C.D. Wallan*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-10  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992  
 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>&lt;4.3 E-07</u>	<u>(3000)</u>	<u>&lt;9.3 E-03</u>	<u>&lt;1.1 E-02</u>
2. <u>Total Beta</u>	<u>&lt;3.3 E-06</u>	<u>(3000)</u>	<u>&lt;1.0 E-02</u>	<u>&lt;4.4 E-04</u>
			Total Dose	<u>&lt;1.1 E-02</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 10-m Stack

COMMENTS

Using the Minimum Detection Limit (MDL) for Total Alpha and Total Beta.

Assuming <sup>239</sup>Pu and <sup>90</sup>Sr for Total Alpha and Total Beta respectively.

EVALUATOR *[Signature]*  
 MANAGER, ENVIRONMENTAL *[Signature]*  
 FACILITY MANAGER *[Signature]*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT Stack 296-A-14  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR (3000)  
 Annual Air Emissions Report (year) 1992  
 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Alpha</u>	<u>&lt;3.6 E-07</u>	<u>(3000)</u>	<u>&lt;1.1 E-03</u>	<u>&lt;9.5 E-03</u>
2. <u>Total Beta</u>	<u>&lt;2.8 E-06</u>	<u>(3000)</u>	<u>&lt;8.4 E-03</u>	<u>&lt;3.7 E-04</u>
			Total Dose	<u>&lt;9.9 E-03</u>

Method Used to Project Dose (CAP88) WHC-EP-0498, 200 East Area 10-m Stack

COMMENTS

Using the Minimum Detection Limit (MDL) for Total Alpha and Total Beta.  
Assuming <sup>239</sup>Pu and <sup>90</sup>Sr for Total Alpha and Total Beta respectively.

EVALUATOR *[Signature]*  
 MANAGER, ENVIRONMENTAL *[Signature]*  
 FACILITY MANAGER C.D. Willam

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY PUREX DISCHARGE POINT 296-A-24  
 NUMBER OF HEPA FILTER BANKS (n) 2 BACK CALCULATION FACTOR (3000)<sup>2</sup>  
 Annual Air Emissions Report (year) 1992  
 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. _____	_____	_____	_____	_____
Total Dose				_____

Method Used to Project Dose (CAP88) \_\_\_\_\_  
 COMMENTS

This stack is no longer in operation (fan is off)

EVALUATOR *John J. Li*  
 MANAGER, ENVIRONMENTAL *R. P. [Signature]*  
 FACILITY MANAGER *C. D. Wollam*

DATE 11-17-93  
 DATE 11-17-93  
 DATE 11/17/93

**A2.0 B PLANT**

B Plant has four registered stacks: 291-B-1, 296-B-5, 296-B-10, and 296-B-13. Only the 291-B-1 stack is a designated stack.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY B Plant DISCHARGE POINT 291-B-1  
 NUMBER OF HEPA FILTER BANKS (n) 2 BACK CALCULATION FACTOR 9.0x10<sup>6</sup>  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)	CAP-88 unit dose factors
1. <u>Sr-90</u>	<u>2.2x10<sup>-5</sup></u>	<u>9.0x10<sup>6</sup></u>	<u>1.98x10<sup>2</sup></u>	<u>2.38</u>	<u>1.2x10<sup>-2</sup></u>
2. <u>Cs-137</u>	<u>5.3x10<sup>-4</sup></u>	<u>9.0x10<sup>6</sup></u>	<u>4.77x10<sup>3</sup></u>	<u>31.2</u>	<u>6.54x10<sup>-3</sup></u>
3. <u>Pu-239,240</u>	<u>3.1x10<sup>-6</sup></u>	<u>9.0x10<sup>6</sup></u>	<u>27.9</u>	<u>66.1</u>	<u>2.37</u>
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
				Total Dose	<u>99.7 mrem/yr</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

Released quantities taken from 1992 Air Emissions Report (DOE/RL-93-36).  
CAP-88 unit dose factors taken from WHC-EP-0498 (p. A3-12).  
Since 291-B-1 is 60m high, 89m dose factors are used instead of 10m values  
Filtration system in use actually contains 3 stages of HEPA filters, but air flow has  
been re-routed to bypass the first stage for several years.

EVALUATOR Thomas G. Beam  
 MANAGER, ENVIRONMENTAL [Signature]  
 FACILITY MANAGER [Signature]

DATE 11/29/93  
 DATE 11/29/93  
 DATE 11-30-93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY B Plant DISCHARGE POINT 296-B-5  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR 3000  
 Annual Air Emissions Report (year) 1992 (3000<sup>n</sup>)

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)	CAP-88 Unit dose factors (mrem/yr-Ci)
1. <u>total alpha</u>	<u>3.6x10<sup>-8</sup> *</u>	<u>3000</u>	<u>1.08x10<sup>-4</sup></u>	<u>9.36x10<sup>-4</sup></u>	<u>8.67x10<sup>0</sup></u>
2. <u>total beta</u>	<u>3.42x10<sup>-7</sup> *</u>	<u>3000</u>	<u>1.03x10<sup>-3</sup></u>	<u>4.49x10<sup>-5</sup></u>	<u>4.38x10<sup>-2</sup></u>
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____

Method Used to Project Dose (CAP88) CAP-88 Total Dose 9.81x10<sup>-4</sup> mrem/yr  
 \* see comments

COMMENTS  
Reported emissions for 296-B-5 (DOE/RL-93-36) were non-detectable. For this assessment, the quantity released was calculated by multiplying the total annual flow through 296-B-5 of 1.8x10<sup>7</sup> m<sup>3</sup> (DOE/RL-93-36) by the minimum detectable concentrations (MDC) from lab analysis for total beta & total alpha. These values were 2.0x10<sup>-5</sup> uCi/mL for alpha & 1.9x10<sup>-14</sup> uCi/mL for beta (WHC-EP-06893, p.7). Unit dose factors (WHC-EP-0498, p. A3-12) were used for the 10m height. 296-B-5 is 3.7m high.

EVALUATOR Thomas H. Beam  
 MANAGER, ENVIRONMENTAL W. H. Staley, Sr.  
 FACILITY MANAGER W. H. Staley, Sr.

DATE 4/19/93  
 DATE 11/19/93  
 DATE 11/19/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY B Plant/WESF DISCHARGE POINT 296-B-10

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)	CAP-88 unit dose fa (mrem/yr)
1. <sup>90</sup> Sr	Solid	8625-30,000	10 <sup>-6</sup>	.009-.03	.0004-.0013	4.38x10 <sup>-1</sup>
2. <sup>137</sup> Cs	Solid	1275-4335	10 <sup>-6</sup>	.0013-.0043	.00003-.0001	2.39x10 <sup>-1</sup>
3.						
4.						
5.						
6.						
7.						
8.						
9.						
10.						
11.						
12.						
13.						
14.						
15.						
16.						

Total Dose .00043-.0014 mrem/yr

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

Quantities taken from 85% <sup>137</sup>Cs & 15% <sup>90</sup>Sr inventory estimate found in  
PNL-3397 "An Estimate of the Radioisotope Inventory Inside the K-3 Ventilation  
Duct, WESF" (Soldat & Brackenbush, 1980). CAP-88 unit dose factors taken from  
WHC-EP-0498 (p. A3-12). Since 296-B-10 is 22.9m high, 10m dose factors were used  
instead of 89m values.

EVALUATOR Thomas J. Beam  
MANAGER, ENVIRONMENTAL Michael Beam  
FACILITY MANAGER [Signature]

DATE 11/19/93  
DATE 11/29/93  
DATE 11-30-93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY B Plant DISCHARGE POINT 296-B-13  
NUMBER OF HEPA FILTER BANKS (n) 2

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Unabated Potential (Curies)	EDE (mrem Ci <sup>-1</sup> y <sup>-1</sup> )	Projected Dose (mrem y <sup>-1</sup> )
1. <u>Cs-137</u>	<u>2.03 · 10<sup>-6</sup></u>	<u>2.39 · 10<sup>-2</sup></u>	<u>4.85 · 10<sup>-8</sup></u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

Total Dose 4.85 · 10<sup>-8</sup>

COMMENTS

No alpha or beta detectable/reported.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR Matthew Parrott

DATE 29 Nov. 1993

MANAGER, ENVIRONMENTAL [Signature]

DATE 11-29-93

FACILITY MANAGER [Signature]

DATE 11/30/93

**A3.0 TRUSAF**

TRUSAF has two registered stacks: 296-T-11 and 296-T-12. None of these stacks are designated stacks.

**STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H**

**UPSTREAM ASSESSMENT**

**FACILITY: 224-T Building**

**DISCHARGE POINT: 296-T-11**

**FACILITY RADIOLOGICAL INVENTORY AT RISK**

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. Total $\alpha$	particle	2.3 E-4	1.8 E-3
2. Total $\beta$	particle	1.5 E-5	3.9 E-7
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____

Total Dose: 1.8 E-3

Method Used to Project Dose (CAP-88): CAP-88

COMMENTS: Total alpha modeled as  $^{241}\text{Am}$  and total beta as  $^{90}\text{Sr}$  for dose calculations. Total alpha release comprises two source values: 1.5 E-5 Ci from CAM data, which is classified under the upstream method, and 2.6 E-4 Ci from the filter box analysis, which is classified under the source-term method.

Evaluator K.M. McDonald Date 12/12/93

RJB Manager, EEM\* [Signature] Date 12-13-93

Facility Manager [Signature] Date 12/13/93

\* EEM = Effluent and Emission Monitoring

STACK ASSESSMENT FOR  
40 CFR 61,-SUBPART H

UPSTREAM ASSESSMENT

FACILITY: 224-T Building

DISCHARGE POINT: 296-T-12

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. Total $\alpha$	particle	4.7 E-5	3.7 E-4
2. Total $\beta$	particle	3.3 E-6	8.6 E-8
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____
7. _____	_____	_____	_____
8. _____	_____	_____	_____
9. _____	_____	_____	_____
10. _____	_____	_____	_____
11. _____	_____	_____	_____
12. _____	_____	_____	_____
13. _____	_____	_____	_____
14. _____	_____	_____	_____
15. _____	_____	_____	_____
16. _____	_____	_____	_____

Total Dose: 3.7 E-4

Method Used to Project Dose (CAP-88): CAP-88

COMMENTS: Total alpha modeled as  $^{241}\text{Am}$  and total beta as  $^{90}\text{Sr}$  for dose calculations. Total alpha release comprises two source values: 1.5 E-5 Ci from CAM data, which is classified under the upstream method, and 2.6 E-4 Ci from the filter box analysis, which is classified under the source-term method.

Evaluator E. M. McDonald

Date 12/13/93

*RJB*

Manager, EEM\* [Signature]

Date 12-13-93

Facility Manager [Signature]

Date 12-13-93

\* EEM = Effluent and Emission Monitoring

**A4.0 WASTE SAMPLING AND CHARACTERIZATION FACILITY**

The Waste Sampling and Characterization Facility has two registered stacks: 696-W-1 and 696-W-2. Neither of these stacks is designated.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY WSCF Laboratory DISCHARGE POINT 696-W-1  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR 4000  
 (3000<sup>n</sup> X 1.33 [25% efficiency prefilter])  
 Air Emissions Data (year) 1995

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total alpha</u>	<u>1.0E-7</u>	<u>4000</u>	<u>6.8E-4</u>	<u>3.5E-3</u>
2. <u>Total beta</u>	<u>5.1E-7</u>	<u>4000</u>	<u>2.0E-3</u>	<u>5.3E-5</u>
Total Dose:				<u>3.6E-3</u>

Method Used to Project Dose (CAP88) CAP88

COMMENTS

Calculations were done using the highest sample concentrations for alpha and beta and based on 250 days of operation.

CALCULATIONS:

Alpha

50,000 cu ft/min x 60 min/hr x 8 hr/day x 250 days/yr = 6.0E+9 cu ft/yr  
 6.0E+9 cu ft/yr x 28317 cc/cu ft = 1.7E+14 cc/yr  
 1.7E+14 cc/yr x 9.8E-16 µCi alpha/cc x 1 Ci/1.0E+6 = 1.7E-7 Ci/yr  
 1.7E-7 Ci/yr x 4000 x 5.15 (off-site dose factor) = 3.5E-3 mrem/yr EDE

Beta

50,000 cu ft/min x 60 min/hr x 8 hr/day x 250 days/yr = 6.0E+9 cu ft/yr  
 6.0E+9 cu ft/yr x 28317 cc/cu ft = 1.7E+14 cc/yr  
 1.7E+14 cc/yr x 3.0E-15 µCi beta/cc x 1 Ci/1.0E+6 = 5.1E-7 Ci/yr  
 5.1E-7 Ci/yr x 4000 x 0.026 (off-site dose factor) = 5.3E-5 mrem/yr EDE

EVALUATOR R. Boom  
 MANAGER, ENVIRONMENTAL W. J. Hall  
 FACILITY MANAGER B. [Signature]

DATE 10/23/95  
 DATE 10/23/95  
 DATE 10/23/95

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY WSCF Laboratory DISCHARGE POINT 696-W-2  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR 4000  
 (3000<sup>n</sup> X 1.33 [25% efficiency prefilter])  
 Air Emissions Data (year) 1995

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total alpha</u>	<u>1.1E-8</u>	<u>4000</u>	<u>4.4E-5</u>	<u>2.3E-4</u>
2. <u>Total beta</u>	<u>2.9E-8</u>	<u>4000</u>	<u>1.2E-4</u>	<u>3.0E-6</u>
			Total Dose	<u>2.3E-4</u>

Method Used to Project Dose (CAP88) CAP88

COMMENTS:

Calculations were done using the highest sample concentrations for alpha and beta and are based on 250 days of operation.

CALCULATIONS:

Alpha

1500 cu ft/min x 60 min/hr x 8 hr/day x 250 days/yr = 1.8E+8 cu ft/yr  
 1.8E+8 cu ft/yr 28,317 cc/cu ft = 5.1E+12 cc/yr  
 5.1E+12 cc/yr x 2.1E-15 µCi alpha/cc x 1 Ci/1.0E+6 µCi = 1.1E-8 Ci/yr  
 1.1E-8 Ci/yr x 4000 x 5.15 (offsite dose factor) = 2.3E-4 mrem/yr EDE

Beta

1500 cu ft/min x 60 min/hr x 8 hr/day x 250 days/yr = 1.8E+8 cu ft/yr  
 1.8E+8 cu ft/yr 28,317 cc/cu ft = 5.1E+12 cc/yr  
 5.1E+12 cc/yr x 5.7E-15 µCi beta/cc x 1 Ci/1.0E+6 µCi = 2.9E-8 Ci/yr  
 2.9E-8 Ci/yr x 4000 x 0.026 (offsite dose factor) = 3.0E-6 mrem/yr EDE

EVALUATOR RJ Boon  
 MANAGER, ENVIRONMENTAL M. J. Hall  
 FACILITY MANAGER B. K. Kelly

DATE 10/23/95  
 DATE 10/23/95  
 DATE 10/23/95

**A5.0 WASTE VERIFICATION AND SAMPLING FACILITY**

The Waste Verification and Sampling Facility has one registered stack: 296-W-3. It is a minor stack. Note: A current assessment is not available for this stack. It is presently being reassessed. The last assessment for 1993 is enclosed.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY Waste Compactor (500) DISCHARGE POINT 296-W-3  
NUMBER OF HEPA FILTER BANKS (n) 2

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Unabated Potential (Curies)	EDE (mrem Ci <sup>-1</sup> y <sup>-1</sup> )	Projected Dose (mrem y <sup>-1</sup> )
1. <u>Cs-137</u>	<u>1.1 · 10<sup>-7</sup></u>	<u>0.0142</u>	<u>1.56 · 10<sup>-9</sup></u>
2. _____	_____	_____	_____
3. _____	_____	_____	_____
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

Total Dose 1.56 · 10<sup>-9</sup>

COMMENTS

No alpha or beta reported/detected.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR J. R. [Signature]  
MANAGER, ENVIRONMENTAL [Signature]  
FACILITY MANAGER [Signature]

DATE 29 Nov. 93  
DATE 11-29-93  
DATE 12-8-93  
12/8/93

**A6.0 AR AND CR VAULTS**

AR and CR Vaults have three registered stacks: 296-A-12, 296-A-13, and 296-C-05. 296-A-12 and 296-C-05 are designated stacks.

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH SOURCE TERM  
 \*\*\*

FACILITY 244-AR Vault DISCHARGE POINT Stack 296-A-12

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	1.2E+05(1)	1.00E-03	1.2E+02	5.2E+00
Sb-125	Particulate	1.2E-03	1.00E-03	1.2E-06	5.0E-09
Cs-137	Particulate	1.9E+03(1)	1.00E-03	1.9E+00	4.6E-02
Eu-154/155	Particulate	1.5E-03	1.00E-03	1.5E-06	6.6E-05
Np-237	Particulate	1.8E-02	1.00E-03	1.8E-05	2.2E-04
U-238	Particulate	3.2E-06	1.00E-03	3.2E-09	9.1E-09
Pu-239/240	Particulate	2.1E+01	1.00E-03	2.1E-02	1.8E-01

Total Dose: 5.4E+00

Method Used to Project Dose: CAP88

COMMENTS

1: DECAYED CORRECTED FOR 18 YRS

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *Gay McAnn* DATE 7/24/95

MANAGER, ENVIRONMENTAL *J. D. Smith* DATE 8-14-95

FACILITY MANAGER *J. Lee* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH AREA SURVEY CONTAMINATION SMEAR DATA  
 \*\*\*

FACILITY 244-AR Vault Canyon DISCHARGE POINT Stack 296-A-13

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	1.04E-01	1.00E-03	1.04E-04	4.5E-03
Y-90(1)	Particulate	1.04E-01	1.00E-03	1.04E-04	3.9E-05

Total Dose: 4.5E-03

Method Used to Project Dose: CAP88

COMMENTS

1: Y-90 is assumed to be in secular equilibrium with Sr-90.

STACK STATUS:    DESIGNATED   X   NON-DESIGNATED

EVALUATOR *[Signature]* DATE 2/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-11-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 244-CR Vault DISCHARGE POINT Stack 296-C-05

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	4.86E-01	1.00E-03	4.86E-04	1.27E-06
Co-60	Particulate	2.97E+03	1.00E-03	2.97E+00	8.61E-02
Sr-89/90	Particulate	3.51E+06	1.00E-03	3.51E+03	1.54E+02
Y-90	Particulate	3.51E+06	1.00E-03	3.51E+03	1.32E+00
Tc-99	Particulate	4.59E+02	1.00E-03	4.59E-01	5.00E-04
I-129	Gas	5.68E-02	1.00E+00	5.68E-02	1.65E-02
Cs-137	Particulate	1.22E+05	1.00E-03	1.22E+02	2.92E+00
Pu-239/240	Particulate	1.03E+03	1.00E-03	1.03E+00	8.93E+00
Am-241	Particulate	1.51E+03	1.00E-03	1.51E+00	1.98E+01

Total Dose: 187

Static:  $[(1.87E+2 \text{ mrem/year})(13.5 \text{ Kgal}/133 \text{ Kgal})] = 19.0$

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *Guy M. ...* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

**A7.0 200 EAST AREA TANK FARMS**

The 200 East Area tank farms have 15 registered stacks: 296-A-17, 296-A-18, 296-A-19, 296-A-20, 296-A-25, 296-A-26, 296-A-27, 296-A-28, 296-A-29, 296-A-30, 296-A-40, 296-A-41, 296-B-28, 296-P-16, and 296-P-17. Five of the registered stacks are designated stacks: 296-A-17, 296-A-22, 296-A-40, 296-B-28, and 296-P-16.

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-AZ/Primary DISCHARGE POINT Stack 296-A-17

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)(2)	Release Factor(2)	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	4.97E+00	1.00E-03	4.97E-03	1.30E-05
Co-60	Particulate	1.74E+03	1.00E-03	1.74E+00	5.05E-02
Sr-89/90	Particulate	3.95E+04	1.00E-03	3.95E+01	1.73E+00
Y-90	Particulate	3.95E+04	1.00E-03	3.95E+01	1.49E-02
Tc-99	Particulate	1.29E+05	1.00E-03	1.29E+02	1.41E-01
I-129	Gas	2.48E+00	1.00E+00	2.48E+00	7.22E-01
Cs-134	Particulate	2.89E+00	1.00E-03	2.89E-03	9.05E-05
Cs-137	Particulate	9.24E+06	1.00E-03	9.24E+03	2.21E+02
Eu-154(1)	Particulate	1.88E+04	1.00E-03	1.88E+01	8.23E-01
Nat.U	Particulate	1.88E+00	1.00E-03	1.88E-03	5.34E-03
Np-237	Particulate	2.44E-01	1.00E-03	2.44E-04	2.90E-03
Pu-238	Particulate	2.63E-01	1.00E-03	2.63E-04	2.11E-03
Pu-239/240	Particulate	2.50E+00	1.00E-03	2.50E-03	2.17E-02
Pu-241	Particulate	1.18E+01	1.00E-03	1.18E-02	1.63E-03
Am-241	Particulate	1.46E+02	1.00E-03	1.46E-01	1.91E+00

Total Dose: 226

Method Used to Project Dose: CAP88

COMMENTS

1: Sr-90 used as the beta emitter; dose factors were not included in the radionuclide library for this specific radionuclide.

2: Supernatant data used; sludge/slurry contribution is less than 1% of the supernatant contribution to the total dose.

STACK STATUS:  X  DESIGNATED      NON-DESIGNATED

EVALUATOR  Guy Mc Connell  DATE  7/24/95

MANAGER, ENVIRONMENTAL  [Signature]  DATE  8-14-95

FACILITY MANAGER  [Signature]  DATE  8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-AY-101 Annulus DISCHARGE POINT Stack 296-A-18

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
--------------	-------------------------------	----------------------	-------------------	---	--------------------------------

NONE

Total Dose: 0.00

STACK STATUS:    \_\_\_ DESIGNATED    X NON-DESIGNATED

EVALUATOR *Guy McAnnam*                      DATE 7/24/95

MANAGER, ENVIRONMENTAL *A. Smith*                      DATE 8-14-95

FACILITY MANAGER *J. Lee*                      DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH SOURCE TERM  
 \*\*\*

FACILITY 241-AY-102 Annulus DISCHARGE POINT Stack 296-A-19

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
--------------	-------------------------------	----------------------	-------------------	---	--------------------------------

NONE

Total Dose: 0.00

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *Guy Mc...* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-AZ Tank Annulus DISCHARGE POINT Stack 296-A-20

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
--------------	-------------------------------	----------------------	-------------------	---	--------------------------------

NONE

Total Dose: 0.00

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED  
 USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS  
 \*\*\*

FACILITY 244-A DCRT DISCHARGE POINT Stack 296-A-25

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem)
Sr-90	Particulate	1.51E-01	6.63E-03
Y-90	Particulate	1.51E-01	5.70E-05
Cs-137	Particulate	3.40E-01	8.12E-03
Pu-238	Particulate	1.16E-04	9.28E-04
Pu-239	Particulate	1.40E-03	1.21E-02
Pu-240	Particulate	3.15E-04	2.73E-03
Pu-241	Particulate	1.36E-02	1.86E-04
Am-241	Particulate	7.44E-06	9.74E-05

Total Dose: 0.0309

Potential emissions = 0.0309 mrem/289 days \* 365 days/yr = 0.039 mrem/yr

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR [Signature] DATE 7/24/95

MANAGER, ENVIRONMENTAL [Signature] DATE 8-14-95

FACILITY MANAGER [Signature] DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH AREA SURVEY CONTAMINATION SMEAR DATA  
 \*\*\*

FACILITY 204-AR Unloading Facility DISCHARGE POINT Stack 296-A-26

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	2.5E-04	1.00E-03	2.5E-07	1.09E-08
Y-90	Particulate	2.5E-04	1.00E-03	2.5E-07	9.34E-11

Total Dose: 1.1E-08

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED  
 USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS  
 \*\*\*

FACILITY AW Tank Farm DISCHARGE POINT Stack 296-A-27

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity (curies)	Projected Dose (mrem/yr)
H-3	Gas	4.21E-01(1)	9.05E-06
Co-60	Particulate	7.86E-06	2.28E-07
Sr-90	Particulate	2.26E-01	9.90E-03
Y-90	Particulate	2.26E-01	8.52E-05
Cs-134	Particulate	1.49E-04	4.66E-06
Cs-137	Particulate	1.89E-01	4.52E-03
Pu-238	Particulate	1.77E-04	1.42E-03
Pu-239	Particulate	2.15E-03	1.86E-02
Pu-240	Particulate	4.83E-04	4.19E-03
Pu-241	Particulate	2.08E-02	2.87E-03
Am-241	Particulate	1.14E-05	1.51E-04
Pu-242	Particulate	2.89E-08	2.51E-07

Total Dose: 4.18E-02

Method Used to Project Dose: CAP88

COMMENTS

1: From WHC-SD-WM-EMP-032, "Tritium Emissions From 200 East Area Double Shell Tanks"

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH SOURCE TERM  
 \*\*\*

FACILITY 241-AW Tank Annulus DISCHARGE POINT Stack 296-A-28

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
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NONE

Total Dose: 0.00

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *Gregory W. Cannon* DATE 7/24/95

MANAGER, ENVIRONMENTAL *R. Smith* DATE 8-14-95

FACILITY MANAGER *J. Lee* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED  
 USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS  
 \*\*\*

FACILITY AN Tank Farm Primary DISCHARGE POINT Stack 296-A-29

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
H-3	Gas	8.14E-02(1)	1.75E-06
Sr-90	Particulate	5.27E-03	2.31E-04
Y-90	Particulate	5.27E-03	1.99E-06
Cs-137	Particulate	3.31E-03	7.91E-05
Pu-238	Particulate	6.20E-07	4.97E-06
Pu-239	Particulate	7.56E-06	6.55E-05
Pu-240	Particulate	1.69E-06	1.47E-05
Pu-241	Particulate	7.02E-05	9.69E-06
Am-241	Particulate	3.99E-08	5.23E-07
Pu-242	Particulate	1.74E-11	1.51E-10

Total Dose: 4.09E-04

Method Used to Project Dose: CAP88

COMMENTS

1: From WHC-SD-WM-EMP-032, "Tritium Emissions From 200 East Area Double Shell Tanks"

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR [Signature] DATE 7/24/95

MANAGER, ENVIRONMENTAL [Signature] DATE 8-14-95

FACILITY MANAGER [Signature] DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-AN Tank Annulus DISCHARGE POINT Stack 296-A-30

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
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NONE

Total Dose: 0.00

STACK STATUS:       DESIGNATED      X   NON-DESIGNATED

EVALUATOR *Gary M. Cannon*    DATE 7/24/95

MANAGER, ENVIRONMENTAL *A. Smith*    DATE 8-14-95

FACILITY MANAGER *J. Lee*    DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY AP Tank Farm Primary DISCHARGE POINT Stack 296-A-40

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
H-3	Gas	2.10E+02	1.00E+00	2.10E+02	4.61E-03
C-14	Particulate	2.65E+01	1.00E-03	2.65E-02	6.95E-05
Co-60	Particulate	3.20E+02	1.00E-03	3.20E-01	9.27E-03
Se-79	Particulate	4.79E-02	1.00E-03	4.79E-05	3.16E-09
Sr-89/90	Particulate	6.70E+03	1.00E-03	6.70E+00	2.93E-01
Y-90	Particulate	6.70E+03	1.00E-03	6.70E+00	2.53E-03
Tc-99	Particulate	5.85E+02	1.00E-03	5.85E-01	6.38E-04
I-129	Gas	4.73E-01	1.00E+00	4.73E-01	1.38E-01
Cs-134	Particulate	1.67E+03	1.00E-03	1.67E+00	5.24E-02
Cs-137	Particulate	1.71E+06	1.00E-03	1.71E+03	4.08E+01
Ce-144	Particulate	4.31E+03	1.00E-03	4.31E+00	5.90E-02
Pm-147	Particulate	1.74E+00	1.00E-03	1.74E-03	1.98E-06
U-234	Particulate	2.81E-02	1.00E-03	2.81E-05	8.96E-05
U-235	Particulate	1.45E-03	1.00E-03	1.45E-06	4.29E-06
U-238	Particulate	5.39E-03	1.00E-03	5.39E-06	1.53E-05
Np-237	Particulate	2.83E+00	1.00E-03	2.83E-03	3.37E-02
Pu-238	Particulate	3.81E-02	1.00E-03	3.81E-05	3.06E-04
Pu-239/240	Particulate	5.62E-01	1.00E-03	5.62E-04	4.87E-03
Am-241	Particulate	9.13E+00	1.00E-03	9.13E-03	1.20E-01
Cm-244	Particulate	1.49E-01	1.00E-03	1.49E-01	1.03E-03

Method Used to Project Dose: CAP88

Total Dose: 41.5

Operational Dose(1): (8/7)(41.5 mrem/yr) = 47.5

COMMENTS

1: Radiological inventory data were available for only 7 of 8 tanks; therefore, the calculated potential offsite dose based on 7 tanks must be adjusted by a factor of 8/7.

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-AP Tank Annulus DISCHARGE POINT Stack 296-A-41

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
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NONE

Total Dose: 0.00

STACK STATUS:    \_\_\_ DESIGNATED    X NON-DESIGNATED

EVALUATOR *Guy Mc Cormack*                      DATE 7/24/95

MANAGER, ENVIRONMENTAL *A. Smith*                      DATE 8-14-95

FACILITY MANAGER *J. Lee*                      DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 244-BX DCRT DISCHARGE POINT Stack 296-B-28

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	1.490E+02	1.E-03	1.490E-01	3.904E-04
Se-79	Particulate	6.590E+00	1.E-03	6.590E-03	2.886E-04
Sr-89/90	Particulate	5.320E+03	1.E-03	5.320E+00	2.330E-01
Y-90	Particulate	5.320E+03	1.E-03	5.320E+00	2.006E-03
Tc-99	Particulate	2.220E+02	1.E-03	2.220E-01	2.420E-04
Ru/Rh-106	Gas	6.060E-03	1.E+00	6.060E-03	1.267E-05
Sb-125	Particulate	3.110E+00	1.E-03	3.110E-03	1.291E-05
I-129	Gas	3.810E-01	1.E+00	3.810E-01	1.109E-01
Cs-137	Particulate	4.080E+04	1.E-03	4.080E+01	9.751E-01
Ce-144	Particulate	1.490E-05	1.E-03	1.490E-08	2.041E-10
Eu-154	Particulate	4.140E+01	1.E-03	4.140E-02	1.813E-03
Nat-U	Particulate	5.810E-01	1.E-03	5.810E-04	1.650E-03
Np-237	Particulate	6.780E-01	1.E-03	6.780E-04	8.068E-03
Pu-238	Particulate	7.260E-01	1.E-03	7.260E-04	5.823E-03
Pu-239/240	Particulate	3.170E+01	1.E-03	3.170E-02	2.748E-01
Pu-241	Particulate	4.260E+01	1.E-03	4.260E-02	5.879E-03
Am-241	Particulate	7.400E+01	1.E-03	7.400E-02	9.694E-01
Cm-242/244	Particulate	6.560E-01	1.E-03	6.560E-04	4.553E-03

Total Dose: 2.59

Static:  $[(2.59 \text{ mrem/yr})(26.0 \text{ Kgal/80 Kgal})] = 0.84$

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *Gregory M. ...* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-11-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-C-104/105/106 Portable DISCHARGE POINT Stack 296-P-16

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)(1)	Release Factor(1)	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	2.69E-01	1.00E-03	2.69E-04	7.05E-07
Co-60	Particulate	1.92E+01	1.00E-03	1.92E-02	5.57E-04
Sr-89/90	Particulate	3.70E+02	1.00E-03	3.70E-01	1.62E-02
Y-90	Particulate	3.70E+02	1.00E-03	3.70E-01	1.39E-04
Tc-99	Particulate	2.20E+01	1.00E-03	2.20E-02	2.40E-05
I-129	Gas	1.21E-02	1.00E+00	1.21E-02	3.52E-03
Cs-137	Particulate	2.71E+04	1.00E-03	2.71E+01	6.48E-01
Nat.U	Particulate	2.84E-02	1.00E-03	2.84E-05	8.07E-05
Pu-239/240	Particulate	6.02E+01	1.00E-03	6.02E-02	5.22E-01
Am-241	Particulate	1.14E+00	1.00E-03	1.14E-03	1.49E-02

Supernatant Dose: 1.21E+00  
Sludge/Slurry Dose: 0.47E+00  
Total Dose: 1.68E+00

Method Used to Project Dose: CAP88

COMMENTS

1: Supernatant data is listed; sludge/slurry contribution is approximately 35% of the supernatant contribution to the total dose.

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-A-104/105/106 DISCHARGE POINT Stack 296-P-17

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	7.08E+02	1.00E-03	7.08E-01	1.85E-03
Se-79 (1)	Particulate	2.97E-01	1.00E-03	2.97E-04	1.30E-05
Sr-89/90	Particulate	3.78E+06	1.00E-03	3.78E+03	1.66E+02
Y-90	Particulate	3.78E+06	1.00E-03	3.78E+03	1.43E+00
Tc-99	Particulate	1.00E+01	1.00E-03	1.00E-02	1.09E-05
Ru/Rh-106	Gas	8.16E-02	1.00E+00	8.16E-02	1.71E-03
I-129	Gas	1.00E-02	1.00E+00	1.00E-02	2.91E-03
Cs-137	Particulate	3.78E+04	1.00E-03	3.78E+01	9.03E-01
Nat.U	Particulate	6.05E+00	1.00E-03	6.05E-03	1.72E-02
Np-237	Particulate	4.64E-02	1.00E-03	4.64E-05	5.52E-04
Pu-238	Particulate	6.81E+01	1.00E-03	6.81E-02	5.46E-01
Pu-239/240	Particulate	2.00E+03	1.00E-03	2.00E+00	1.73E+01
Pu-241	Particulate	3.24E+03	1.00E-03	3.24E+00	4.47E-01
Am-241	Particulate	1.19E+03	1.00E-03	1.19E+00	1.56E+01
Cm-242/244	Particulate	6.57E-03	1.00E-03	6.57E-06	4.56E-05

Method Used to Project Dose: CAP88

Total Dose: 202

COMMENTS

1: This system is currently not in operation. If the exhausters would be routinely operated again, the system would become designated.

STACK STATUS:  DESIGNATED  NON-DESIGNATED(1)

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

**A8.0 209-E CRITICAL MASS LABORATORY**

The 209-E Critical Mass Laboratory has one registered stack: 296-P-31.  
The stack is a minor stack.

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY Building 209-E DISCHARGE POINT Stack 296-P-31

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
60-Co	Particulate	8.37E-04	1.E-03	8.37E-07	2.43E-08
89/90-Sr	Particulate	1.99E+01	1.E-03	1.99E-02	8.72E-04
90-Y	Particulate	1.99E+01	1.E-03	1.99E-02	7.50E-06
137-Cs	Particulate	4.59E-02	1.E-03	4.59E-05	1.10E-06
152-Eu	Particulate	9.45E-06	1.E-03	9.45E-09	4.14E-10
154-Eu	Particulate	8.37E-04	1.E-03	8.37E-07	3.67E-08
155-Eu	Particulate	1.65E-02	1.E-03	1.65E-05	7.23E-07
Nat-U*	Solid	5.04E-06	1.E-06	5.04E-09	1.43E-11
238-Pu	Particulate	2.35E-04	1.E-03	2.35E-07	1.88E-06
239-Pu	Particulate	3.44E-03	1.E-03	3.44E-06	2.98E-05
240-Pu*	Solid	9.58E+01	1.E-06	9.58E-02	8.31E-04
240-Pu	Particulate	8.01E-04	1.E-03	8.01E-07	6.94E-06
241-Pu	Particulate	4.55E-02	1.E-03	4.55E-05	6.27E-06
241-Am	Particulate	1.16E-03	1.E-03	1.16E-06	1.52E-05
TOTAL				1.77E-03	

\* 209-E residual

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:     \_\_\_ DESIGNATED     X NON-DESIGNATED

EVALUATOR *[Signature]*     DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]*     DATE 8-14-95

FACILITY MANAGER *[Signature]*     DATE 8-14-95

**A9.0 200 EAST AREA EVAPORATOR**

The 200 East Area Evaporator has two registered stacks: 296-A-21 and 296-A-22. 296-A-22 is a designated stack.

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH AREA SURVEY CONTAMINATION SMEAR DATA  
 \*\*\*

FACILITY 242-A Evaporator Building DISCHARGE POINT Stack 296-A-21

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	4.3E-02	1.00E-03	4.3E-05	1.9E-06
Y-90	Particulate	4.3E-02	1.00E-03	4.3E-05	1.6E-08

Total Dose: 1.9E-06

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:     DESIGNATED   X   NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 242-A Evaporator Vessel DISCHARGE POINT Stack 296-A-22

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	3.50E+01	1.00E-03	3.50E-02	9.17E-05
Co-60	Particulate	1.27E+02	1.00E-03	1.27E-01	3.69E-03
Se-79(1)	Particulate	1.05E+01	1.00E-03	1.05E-02	4.60E-04
Sr-89/90	Particulate	2.83E+04	1.00E-03	2.83E+01	1.24E+00
Y-90	Particulate	2.83E+04	1.00E-03	2.83E+01	1.07E-02
Tc-99	Particulate	2.70E+02	1.00E-03	2.70E-01	2.94E-04
Ru/Rh-106	Gas(2)	2.01E+03	1.00E+00	2.01E+03	4.19E+01
I-129	Gas	3.50E-01	1.00E+00	3.50E-01	1.02E-01
Cs-134	Particulate	1.10E+03	1.00E-03	1.10E+00	3.46E-02
Cs-137	Particulate	1.94E+05	1.00E-03	1.94E+02	4.63E+00
Eu-154(1)	Particulate	1.09E+03	1.00E-03	1.09E+00	4.77E-02
Pu-238	Particulate	1.80E-01	1.00E-03	1.80E-04	1.44E-03
Pu-239/240	Particulate	2.16E+01	1.00E-03	2.16E-02	1.87E-01
Pu-241	Particulate	1.83E+03	1.00E-03	1.83E+00	2.53E-01
Am-241	Particulate	1.34E+02	1.00E-03	1.34E-01	1.76E+00
Cm-242/244	Particulate	1.63E+00	1.00E-03	1.63E-03	1.13E-02

Total Dose: 50.2

Method Used to Project Dose: CAP88

COMMENTS

1: Sr-90 used as the beta emitter; dose factors were not included in the radionuclide library for this specific radionuclide.

2: This assumption leads to a conservative estimate.

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

A10.0 200 WEST AREA TANK FARMS

The 200 West Area tank farms have five registered stacks: 296-P-22, 296-P-23, 296-S-15, 296-S-22, and 296-T-18. Two are designated: 296-S-15 and 296-S-22.

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH SOURCE TERM  
 \*\*\*

FACILITY 241-SY Tank Annulus DISCHARGE POINT, Stack 296-P-22

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
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NONE

Total Dose: 0.00

STACK STATUS:    DESIGNATED   X   NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED  
 USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS  
 \*\*\*

FACILITY SY Tank Farm Primary DISCHARGE POINT Stack 296-P-23

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-90	Particulate	9.62E-03	2.5E-04
Y-90	Particulate	9.62E-03	2.1E-06
Cs-137	Particulate	3.98E-02	5.7E-04
Eu-154	Particulate	8.38E-06	2.2E-07
Pu-238	Particulate	7.62E-06	3.6E-05
Pu-239	Particulate	9.22E-05	4.7E-04
Pu-240	Particulate	2.08E-05	1.1E-04
Pu-241	Particulate	9.07E-04	7.4E-05
Pu-242	Particulate	1.24E-09	6.4E-09
Am-241	Particulate	4.90E-07	3.8E-06

Total Dose: 1.5E-03

Method Used to Project Dose: CAP88

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-SX Tank Farm DISCHARGE POINT Stack 296-S-15

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)(2)	Release Factor(2)	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	8.13E+02	1.00E-03	8.13E-01	1.34E-03
Se-79(1)	Particulate	8.95E+01	1.00E-03	8.95E-02	2.33E-03
Sr-89/90	Particulate	6.66E+06	1.00E-03	6.66E+03	1.73E+02
Y-90	Particulate	6.66E+06	1.00E-03	6.66E+03	1.48E+00
Tc-99	Particulate	3.10E+03	1.00E-03	3.10E+00	2.00E-03
Ru/Rh-106	Gas	5.58E-02	1.00E+00	5.58E-02	6.70E-04
Sb-125	Particulate	8.37E+01	1.00E-03	8.37E-02	2.07E-04
I-129	Gas	4.58E+00	1.00E+00	4.58E+00	5.22E-01
Cs-134	Particulate	2.17E+00	1.00E-03	2.17E-03	4.04E-05
Cs-137	Particulate	1.90E+06	1.00E-03	1.90E+03	2.70E+01
Eu-154(1)	Particulate	9.49E+02	1.00E-03	9.49E-01	2.47E-02
Nat.U	Particulate	1.07E+01	1.00E-03	1.07E-02	1.81E-02
Np-237	Particulate	3.45E+00	1.00E-03	3.45E-03	2.43E-02
Pu-238	Particulate	1.19E+02	1.00E-03	1.19E-01	5.66E-01
Pu-239/240	Particulate	2.33E+03	1.00E-03	2.33E+00	1.20E+01
Pu-241	Particulate	2.72E+03	1.00E-03	2.72E+00	2.22E-01
Am-241	Particulate	7.01E+03	1.00E-03	7.01E+00	5.46E+01
Cm-242/244	Particulate	1.29E+01	1.00E-03	1.29E-02	5.31E-02

Method Used to Project Dose: CAP88

Total Dose: 270

COMMENTS

1: Sr-90 used as the beta emitter; dose factors were not included in the radionuclide library for this specific radionuclide.

2: Supernatant data used; sludge/slurry contribution is less than 1% of the supernatant contribution to the total dose.

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR [Signature] DATE 7/24/95

MANAGER, ENVIRONMENTAL [Signature] DATE 8-14-95

FACILITY MANAGER [Signature] DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM

\*\*\*

FACILITY 244-S DCRT DISCHARGE POINT Stack 296-S-22

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
14-C	Particulate	4.570E+02	1.E-03	4.570E-01	7.541E-04
79-Se	Particulate	4.080E+01	1.E-03	4.080E-02	1.061E-03
89/90-Sr	Particulate	1.230E+06	1.E-03	1.230E+03	3.198E+01
90-Y	Particulate	1.230E+06	1.E-03	1.230E+03	2.731E-01
99-Tc	Particulate	1.310E+03	1.E-03	1.310E+00	8.450E-04
106-Ru/Rh	Gas	3.100E-05	1.E+00	3.100E-05	3.720E-07
129-I	Gas	2.140E+00	1.E+00	2.140E+00	2.440E-01
137-Cs	Particulate	1.730E+06	1.E-03	1.730E+03	2.457E+01
Nat-U	Particulate	3.500E-01	1.E-03	3.500E-04	5.915E-04
237-Np	Particulate	1.570E+00	1.E-03	1.570E-03	1.107E-02
238-Pu	Particulate	1.290E+01	1.E-03	1.290E-02	6.140E-02
239/240-Pu	Particulate	7.680E+01	1.E-03	7.680E-02	3.955E-01
241-Pu	Particulate	5.340E+01	1.E-03	5.340E-02	4.363E-03
241-Am	Particulate	1.520E+03	1.E-03	1.520E+00	1.184E+01
242/244-Cm	Particulate	4.840E+00	1.E-03	4.840E-03	1.994E-02

Total Dose: 69.40

Static: [(69.40 mrem/yr)(16.2 Kgal/1190 Kgal)] = 0.95

Method Used to Project Dose: CAP88

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED USING  
 RELEASE FACTORS FROM APPENDIX D  
 WITH SOURCE TERM  
 \*\*\*

FACILITY 244-TX DCRT DISCHARGE POINT Stack 296-T-18

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	3.43E+00	1.00E-03	3.43E-03	8.9E-05
Cs-137	Particulate	6.36E+03	1.00E-03	6.36E+00	9.0E-02
Pu-239/240	Particulate	4.09E+01	1.00E-03	4.09E-02	2.1E-01
Am-241	Particulate	9.95E+00	1.00E-03	9.95E-03	7.8E-02

Total Dose: 0.38

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

**A11.0 200 WEST AREA EVAPORATOR**

The 200 West Area Evaporator has two registered stacks: 296-S-18 and 296-T-17. Neither is designated.



POTENTIAL EMISSIONS DETERMINED  
USING AREA SURVEY AIR SAMPLE DATA  
\*\*\*

FACILITY 242-T Evaporator Building DISCHARGE POINT Stack 296-T-17

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-90	Particulate	1.34E+00	3.48E-02
Am-241	Particulate	4.82E-03	3.76E-02

Total Dose: 0.0724

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS:      DESIGNATED   X   NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

**A12.0 GROUT**

Grout did not operate in calendar years 1994 and 1995. It has one registered stack: 296-G-1. It is not a designated stack.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY Grout DISCHARGE POINT 296-6-1  
NUMBER OF HEPA FILTER BANKS (n) 2

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Unabated Potential (Curies)	EDE (mrem Ci <sup>-1</sup> y <sup>-1</sup> )	Projected Dose (mrem y <sup>-1</sup> )
1. <u>Cs-137</u>	<u>3.48 · 10<sup>-7</sup></u>	<u>0.0339</u>	<u>8.3 · 10<sup>-7</sup></u>
2. <u>Co-60</u>	<u>8.60 · 10<sup>-7</sup></u>	<u>0.029</u>	<u>2.5 · 10<sup>-8</sup></u>
3. <u>Mn-54</u>	<u>1.76 · 10<sup>-7</sup></u>	<u>5.51 · 10<sup>-3</sup></u>	<u>9.7 · 10<sup>-10</sup></u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

Total Dose 3.4 · 10<sup>-8</sup>

COMMENTS

No alpha or beta reported.  
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EVALUATOR [Signature] DATE 29 Nov 1993  
MANAGER, ENVIRONMENTAL [Signature] DATE 11-29-93  
~~FACILITY~~ MANAGER [Signature] DATE 11-30-93

A13.0 222-S LABORATORY

The 222-S Laboratory has two registered stacks: 296-S-16 and 296-S-21. Neither of the stacks is designated.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY 222 S Laboratory DISCHARGE POINT 290-5-16  
NUMBER OF HEPA FILTER BANKS (n) 1

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Unabated Potential (Curies)	EDE (mrem Ci <sup>-1</sup> y <sup>-1</sup> )	Projected Dose (mrem y <sup>-1</sup> )
1. <u>Cs-137</u>	<u>9.74 · 10<sup>-6</sup></u>	<u>0.0142</u>	<u>1.38 · 10<sup>-7</sup></u>
2. <u>total β (Sr-90)</u>	<u>9.79 · 10<sup>-6</sup></u>	<u>0.026</u>	<u>2.55 · 10<sup>-7</sup></u>
3. <u>total α (Pu-239)</u>	<u>3.14 · 10<sup>-7</sup></u>	<u>5.15</u>	<u>1.62 · 10<sup>-6</sup></u>
4. _____	_____	_____	_____
5. _____	_____	_____	_____
6. _____	_____	_____	_____

Total Dose 2.02 · 10<sup>-6</sup>

COMMENTS

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EVALUATOR *[Signature]*  
MANAGER, ENVIRONMENTAL *[Signature]*  
FACILITY MANAGER *[Signature]*

DATE 29 Nov '93  
DATE 11-29-93  
DATE 12/2/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

RELEASE FACTORS FROM APPENDIX D  
SOURCE ASSESSMENT

FACILITY 222-S DISCHARGE POINT 296-S-21

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>H-3</u>	<u>Liquid</u>	<u>3.3 E+0</u>	<u>1.0 E-3</u>	<u>3.3 E-3</u>	<u>4.6 E-8</u>
2. <u>C-14</u>	<u>Liquid</u>	<u>1.0 E-1</u>	<u>1.0 E-3</u>	<u>1.0 E-4</u>	<u>1.4 E-9</u>
3. <u>Sr-90</u>	<u>Liquid</u>	<u>3.9 E+2</u>	<u>1.0 E-3</u>	<u>3.9 E-1</u>	<u>1.0 E-2</u>
4. <u>Tc-99</u>	<u>Liquid</u>	<u>8.3 E-1</u>	<u>1.0 E-3</u>	<u>8.3 E-4</u>	<u>5.4 E-7</u>
5. <u>I-129</u>	<u>Liquid</u>	<u>7.7 E-1</u>	<u>1.0 E-3</u>	<u>7.7 E-4</u>	<u>8.8 E-5</u>
6. <u>Cs-137</u>	<u>Liquid</u>	<u>1.0 E+3</u>	<u>1.0 E-3</u>	<u>1.0 E+0</u>	<u>1.4 E-2</u>
7. <u>Pm-147</u>	<u>Liquid</u>	<u>1.2 E+2</u>	<u>1.0 E-3</u>	<u>1.2 E-1</u>	<u>8.1 E-5</u>
8. <u>Pu-238</u>	<u>Liquid</u>	<u>3.5 E-1</u>	<u>1.0 E-3</u>	<u>3.5 E-4</u>	<u>1.7 E-3</u>
9. <u>Pu-239</u>	<u>Liquid</u>	<u>3.0 E+0</u>	<u>1.0 E-3</u>	<u>3.0 E-3</u>	<u>1.5 E-2</u>
10. <u>Am-241</u>	<u>Liquid</u>	<u>2.4 E+0</u>	<u>1.0 E-3</u>	<u>2.4 E-3</u>	<u>1.9 E-2</u>
11. <u>U-233</u>	<u>Liquid</u>	<u>2.4 E-1</u>	<u>1.0 E-3</u>	<u>2.4 E-4</u>	<u>4.6 E-4</u>
12. <u>U-235</u>	<u>Liquid</u>	<u>1.3 E-3</u>	<u>1.0 E-3</u>	<u>1.3 E-6</u>	<u>2.3 E-6</u>
13. <u>U-238</u>	<u>Liquid</u>	<u>2.2 E-2</u>	<u>1.0 E-3</u>	<u>2.2 E-5</u>	<u>3.7 E-5</u>
14. <u>Y-90</u>	<u>Liquid</u>	<u>3.9 E+2</u>	<u>1.0 E-3</u>	<u>3.9 E-1</u>	<u>8.6 E-5</u>
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
Total Dose					<u>6.0 E-2</u>

Method Used to Project Dose (CAP88) Yes

COMMENTS

Quantity (curies) based on WHC-SD-CP-MA-002, Rev.1 core equivalent sample determination. Projected dose calculation determined using cap 88 unit dose factors.

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EVALUATOR Greg Collins  
MANAGER, ENVIRONMENTAL Mike Hart  
FACILITY MANAGER Rob Marshall

DATE 6-29-95  
DATE 6-29-95  
DATE 6-29-95

**A14.0 T PLANT**

T Plant has two registered stacks: 291-T-1 and 296-T-13. Neither stack is designated.

PERIODIC MEASUREMENT STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY T Plant DISCHARGE POINT 291-T-1 Main Stack

NUMBER OF HEPA FILTER STAGES (n) 2

Emission values reported in the 'Radionuclide Air Emissions Report for the Hanford Site, CY 1993.' CAP88 dose conversion values obtained from 'Unit Dose Calculation Methods & Summary of FEMP Determinations (WHC-EP-0498, 10/29/91).'

Radionuclide	Unabated Potential (Curies)	EDE (mrem Ci <sup>-1</sup> y <sup>-1</sup> )	Projected Dose (mrem y <sup>-1</sup> )
1. <u>Sr-90</u>	<u>3.4E-5</u>	<u>0.026</u>	<u>8.8E-7</u>
2. <u>Cs-137</u>	<u>2.5E-5</u>	<u>0.014</u>	<u>3.6E-7</u>
3. <u>Pu-239/240</u>	<u>2.3E-5</u>	<u>5.15</u>	<u>1.2E-4</u>
4. <u>Am-241</u>	<u>4.8E-6</u>	<u>7.79</u>	<u>3.7E-5</u>

Total Dose 1.57E-4

COMMENTS

The periodic confirmatory measurement was made on 9/27/94. The NDA measured Cs-137 activity was 1.5E-8 Ci. The total dose is the summation of the measured and emitted unabated potential in curies times the EDE.

EVALUATOR *John Barnett*

DATE 12 Oct 94

MANAGER, ENVIRONMENTAL *[Signature]*

DATE 10-25-94

FACILITY MANAGER *[Signature]*

DATE 10/26/94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY T Plant DISCHARGE POINT 296-T-13  
NUMBER OF HEPA FILTER BANKS (n) 2

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Unabated Potential (Curies)	EDE (mrem Ci <sup>-1</sup> y <sup>-1</sup> )	Projected Dose (mrem y <sup>-1</sup> )
1. <u>Cs-137</u>	<u>1.35 · 10<sup>-4</sup></u>	<u>4.28 · 10<sup>-3</sup></u>	<u>5.78 · 10<sup>-7</sup></u>
2. <u>Sr-90</u>	<u>1.25 · 10<sup>-4</sup></u>	<u>7.82 · 10<sup>-3</sup></u>	<u>9.78 · 10<sup>-7</sup></u>
3. <u>Pu-239/240</u>	<u>1.66 · 10<sup>-4</sup></u>	<u>1.55</u>	<u>2.57 · 10<sup>-4</sup></u>
4. <u>Am-241</u>	<u>1.5 · 10<sup>-5</sup></u>	<u>2.35</u>	<u>3.53 · 10<sup>-5</sup></u>
5. _____	_____	_____	_____
6. _____	_____	_____	_____

Total Dose 2.94 · 10<sup>-4</sup>

COMMENTS

Dose assessment based on 89% of the 291-T-1 NDA  
unabated potential as reported in WHC-SD-WM-EP-292,  
Rev. 0. EDE values are for an 89m height as per  
WHC-EP-0499 pages 1 and A3-14.

EVALUATOR *James H. Barrett*  
MANAGER, ENVIRONMENTAL *J. Smith*  
FACILITY MANAGER *[Signature]*

DATE 2 Dec. '93  
DATE 12-2-93  
DATE 12/2/93

**A15.0 PLUTONIUM FINISHING PLANT**

The Plutonium Finishing Plant has five registered stacks: 291-Z-1, 296-Z-3, 296-Z-5, 296-Z-6, and 296-Z-14. Only the 291-Z-1 stack is designated. An assessment was not performed for these stacks in calendar year 1995. The calendar year 1993 assessments are presented.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY: Plutonium Finishing Plant DISCHARGE POINT: 291-Z-1

NUMBER OF HEPA FILTER BANKS (n) 3 BACK CALCULATION FACTOR : 2.7E+10  
(3000<sup>n</sup>)

Annual Air Emissions Report (year) 1992

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. Pu <sup>239</sup> , Pu <sup>239</sup>	4.2 E-04	2.7 E+10	1.13 E+7	1.76 E+07
2. Pu <sup>241</sup>	2.9 E-03	2.7 E+10	7.83 E+7	1.93 E+06
3. Am <sup>241</sup>	7.2 E-05	2.7 E+10	1.94 E+7	4.57 E+06
4. Total Beta	3.4 E-04	2.7 E+10	9.18 E+7	4.18 E+03
			Total Dose	2.41 E+07

Method Used to Project Dose (CAP88) CAP88

COMMENTS

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EVALUATOR *D. R. Smith*  
 MANAGER, ENVIRONMENTAL *[Signature]*  
 FACILITY MANAGER *[Signature]*  
 EEM *[Signature]*

DATE 12-12-93  
 DATE 12-13-93  
 DATE 12/14/93  
 12-14-93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY 241-Z DISCHARGE POINT 296-Z-3 Stack     

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration ( $\mu$ curies/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. Pu-238	_____	_____	1.3E-04	6.69	8.70E-04
2. Pu-239	_____	_____	4.3E-03	7.47	3.21E-02
3. Pu-240	_____	_____	1.0E-03	7.46	7.46E-03
4. Pu-241	_____	_____	2.3E-02	0.15	3.45E-03
5. Pu-242	_____	_____	6.0E-08	7.11	4.83E-07
6. Am-241	_____	_____	5.8E-04	7.69	4.46E-03
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
				Total Dose	<u>0.048</u>

Method Used to Project Dose (CAP88) CAP88

COMMENTS

The Potential Release values were obtained by performing a Non Destructive Assay (NDA) of the two primary HEPA filters that service the 296-Z-3 stack. The values were annualized by dividing by the number of years the filters have been in place (2.7 years).

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EVALUATOR MCP [Signature]  
MANAGER, ENVIRONMENTAL [Signature]  
FACILITY MANAGER [Signature]

DATE 8/22/94  
DATE 8/22/94  
DATE 8/22/94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

MODIFIED SOURCE ASSESSMENT

FACILITY 2736-ZB DISCHARGE POINT 296-Z-5

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. Pu-238	Particle	10.97	4.0E <sup>-5</sup>	4.39E-4	2.09E-4
2. Pu-239	Particle	42.91	4.0E <sup>-5</sup>	1.72E-3	8.84E-3
3. Pu-240	Particle	19.53	4.0E <sup>-5</sup>	7.81E-4	4.02E-3
4. Pu-241	Particle	1065.03	4.0E <sup>-5</sup>	4.26E-2	3.48E-3
5. Am-241	Particle	36.88	4.0E <sup>-5</sup>	1.48E-3	1.15E-2
Total Dose					<u>2.99E-2</u>

Method Used to Project Dose (CAP88) \_\_\_\_\_

COMMENTS

The source term for this facility is based upon a two year average of materials which were repackaged to support safe long term storage. The partition factor of 4.0E-5 is derived from studies performed by Sutter, Johnston, and Mishima in 1981 (NUREG/CR2139). This study spilled Depleted Uranium Oxide (DUO) powders in a quiescent test chamber to determine the release fraction for very dense materials such as plutonium. The highest fraction of respirable particles (less than or equal to 10 um) was measured at 0.004% or a factor of 4.0E-5. The study examined 1-kilogram spills of DUO powder from a height of 1 meter. The results of this study are widely recognized and employed. The Mishima study closely approximates the work of repackaging plutonium oxides in the 2736-ZB repacking glovebox in that fine powders are poured from a slightly elevated container. Where the study spilled from 1 meter the glovebox working height is only 3-6 inches. Once the transfer of material is complete the new canister is mechanically sealed for safe storage and the glovebox is cleaned. Hence only the spill fraction is subject to release as only nuisance contamination levels persist in the glovebox afterward.

EVALUATOR D. Alison / *D Alison* DATE 11-16-93

MANAGER, ENVIRONMENTAL D.J. McBride / *D J McBride* DATE 11-17-93  
*A. Smith 11-19-93*

FACILITY MANAGER E. C. Vogt / *E C Vogt* DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY 2736-Z, 2736-ZA DISCHARGE POINT 296-Z-6

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Pu-238</u>	<u>Solid</u>	<u>1259</u>	<u>10<sup>-6</sup></u>	<u>1.26E-3</u>	<u>5.99E-3</u>
2. <u>Pu-239</u>	<u>Solid</u>	<u>1688</u>	<u>10<sup>-6</sup></u>	<u>1.688E-3</u>	<u>8.69E-3</u>
3. <u>Pu-240</u>	<u>Solid</u>	<u>1414</u>	<u>10<sup>-6</sup></u>	<u>1.414E-3</u>	<u>7.27E-3</u>
4. <u>Pu-241</u>	<u>Solid</u>	<u>90156</u>	<u>10<sup>-6</sup></u>	<u>9.016E-2</u>	<u>7.37E-3</u>
5. <u>Am-241</u>	<u>Solid</u>	<u>3201</u>	<u>10<sup>-6</sup></u>	<u>3.201E-3</u>	<u>2.49e-2</u>
Total Dose					<u>5.43e-2</u>

Method Used to Project Dose (CAP88)     

COMMENTS

The source term for this vent is based solely on canisters containing various mixtures of plutonium locked in a polymer matrix, comonly refered to as polycubes. These canisters require a vent to allow for evolved gases to vent. The remainder of materials stored in the 2736-Z vaults are exempt from the assessment as they are contained within multiple, mechanically sealed containers for long-term, safe storage.

EVALUATOR D. Alison/ *D Alison*

DATE 11-15-93

MANAGER, ENVIRONMENTAL D.J. McBride/ *D McBride*  
*A. D. Smith 11-19-93*

DATE 11-15-93

FACILITY MANAGER E. C. Vogt/ *E Vogt*

DATE 11/17/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY 232-Z DISCHARGE POINT 296-Z-14

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Pu-238</u>	<u>Solid</u>	<u>6.31</u>	<u>10<sup>-6</sup></u>	<u>6.31E-6</u>	<u>3.0E-5</u>
2. <u>Pu-239</u>	<u>Solid</u>	<u>24.67</u>	<u>10<sup>-6</sup></u>	<u>24.7E-5</u>	<u>1.27E-4</u>
3. <u>Pu-240</u>	<u>Solid</u>	<u>11.23</u>	<u>10<sup>-6</sup></u>	<u>1.12E-5</u>	<u>5.8E-5</u>
4. <u>Pu-241</u>	<u>Solid</u>	<u>612.26</u>	<u>10<sup>-6</sup></u>	<u>6.12E-4</u>	<u>5.0E-5</u>
5. <u>Am-241</u>	<u>Solid</u>	<u>21.20</u>	<u>10<sup>-6</sup></u>	<u>2.12E-5</u>	<u>1.65E-4</u>
Total Dose					<u>4.30E-4</u>

Method Used to Project Dose (CAP88) \_\_\_\_\_

COMMENTS

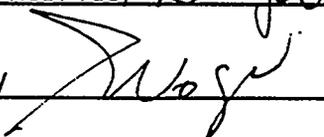
The source term for this vent is based upon contamination which is contained within various ducts and glovebox/hood arrangements within the 232-Z building. This facility has been in layup since the early 1960's. The material in the ductwork is assumed to be highly agglomerated and adherent to the walls of the host structure. This assumption is supported by prior work performed on similar ductwork/piping at the Plutonium Finishing Plant. Plutonium materials removed from existing ducts/piping for (or to support) remediation work has demonstrated that the material is not readily available as it is a solid material.

EVALUATOR D. Alison 

DATE 11-16-93

MANAGER, ENVIRONMENTAL D.J. McBride 

DATE 11-17-93

FACILITY MANAGER E. C. Vogt 

DATE 11/17/93

A16.0 300 AREA

The 300 Area has four registered stacks: 306-E-ULAB, 308 TRIGA, 340-NT-EX, and 377-GEL. Only the 340-NT-EX stack is a designated stack.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY 306 DISCHARGE POINT 306E-ULAB  
NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR 3000  
(3000<sup>n</sup>)  
Annual Air Emissions Report (year) 1992

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>U-238</u>	<u>4.2E-8</u>	<u>3000</u>	<u>1.3E-4</u>	<u>7.1E-3</u>
2. <u>Sr-90</u>	<u>1.8E-7</u>	<u>3000</u>	<u>5.4E-4</u>	<u>4.7E-4</u>
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____

Total Dose 7.6E-3

Method Used to Project Dose (CAP88) WHC-EP-0498

COMMENTS

Data obtained from "Radionuclide Air Emissions Report for the Hanford Site"  
CY 1992

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\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR \_\_\_\_\_  
MANAGER, ENVIRONMENTAL \_\_\_\_\_  
FACILITY MANAGER J. L. Krogners

DATE 11/12/93  
DATE \_\_\_\_\_  
DATE 11/12/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY 308 DISCHARGE POINT 308-TRIGA

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <sup>51</sup> Cr	Solid	2.784E-13	1.0E-6	2.784E-19	3.508E-22
2. <sup>54</sup> Mn	Solid	4.7655	1.0E-6	4.7655E-6	5.242E-7
3. <sup>55</sup> Fe	Solid	1.7509E+2	1.0E-6	1.75E-4	6.755E-7
4. <sup>59</sup> Fe	Solid	9.126E-9	1.0E-6	9.126E-15	5.822E-16
5. <sup>58</sup> Co	Solid	2.7E-4	1.0E-6	2.7E-10	1.736E-11
6. <sup>60</sup> Co	Solid	0.3897	1.0E-6	3.897E-7	2.256E-7
7. <sup>63</sup> Ni	Solid	10.0174	1.0E-6	1.002E-5	4.058E-8
8. <sup>65</sup> Zn	Solid	1.2004	1.0E-6	1.2004E-6	2.2327E-7
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
Total Dose					1.689E-6

Method Used to Project Dose (CAP88) WHC-EP-0498

COMMENTS

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 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
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EVALUATOR J. W. Rich *JWR*  
 MANAGER, ENVIRONMENTAL  
 FACILITY MANAGER J. M. Steffen *JMS*

DATE 11/16/93  
 DATE \_\_\_\_\_  
 DATE 11/14/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY 340 DISCHARGE POINT 340-NT-EX  
 NUMBER OF HEPA FILTER BANKS (n) 2 BACK CALCULATION FACTOR 4.5E+7  
 (3000<sup>n</sup>)  
 Annual Air Emissions Report (year) 1992

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. Pu-239,240	<u>2.1E-8</u>	<u>4.5E+7</u>	<u>9.45E-1</u>	<u>1.63E+2</u>
2. Sr-90	<u>8.9E-8</u>	<u>4.5E+7</u>	<u>4.01</u>	<u>3.5</u>
3.				
4.				
5.				
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8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
			Total Dose	<u>167</u>

Method Used to Project Dose (CAP88) WHC-EP-0498

COMMENTS

340 has one bank of prefilters and one bank of charcoal filters  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

EVALUATOR [Signature]  
 MANAGER, ENVIRONMENTAL \_\_\_\_\_  
 FACILITY MANAGER [Signature]

DATE 11/12/93  
 DATE \_\_\_\_\_  
 DATE 11/13/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY 377 DISCHARGE POINT 377-GEL

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Pu-239</u>	<u>particulate</u>	<u>.0525</u>	<u>.001</u>	<u>5.3E-5</u>	<u>9.1E-3</u>
2. <u>Sr-90</u>	<u>particulate</u>	<u>.0053</u>	<u>.001</u>	<u>5.3E-6</u>	<u>4.6E-6</u>
3. <u>H-3</u>	<u>gas</u>	<u>1.2E-5</u>	<u>1</u>	<u>1.2E-5</u>	<u>4.8E-9</u>
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
Total Dose					<u>9.1E-3</u>

Method Used to Project Dose (CAP88) obtained from WHC-EP-0498

COMMENTS

Source of this information was obtained from: Internal Memo 88420-92-209, L. P. Diediker to H. L. Benny, "377 Facility Stack Monitoring," dated December 14, 1992.

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\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR J. Perry  
MANAGER, ENVIRONMENTAL  
FACILITY MANAGER H. Benny

DATE 11/12/93  
DATE \_\_\_\_\_  
DATE 11/12/93

**A17.0 400 AREA**

The 400 Area has four registered stacks: FFTF-CB-EX, FFTF-RE-SB, FFTF-HT-TR, and 437-MN&ST. None of the stacks is designated.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY FFTF DISCHARGE POINT FFTF-CB-EX  
 NUMBER OF HEPA FILTER BANKS (n) 0 BACK CALCULATION FACTOR 1  
 (3000<sup>n</sup>)  
 Annual Air Emissions Report (year) 1992

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. Pu-239,240	1.1E-06	1	1.1E-06	1.265E-05
2. Cs-137	6.7E-06	1	6.7E-06	2.124E-07
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				

Total Dose 1.29E-5

Method Used to Project Dose (CAP88) CAP88 from WHC-EP-0498

COMMENTS

Data taken from "RADIONUCLIDE AIR EMISSIONS REPORT FOR THE  
 HANFORD SITE" CALENDER YEAR 1992

EVALUATOR NR DAHL  
 MANAGER, ENVIRONMENTAL PC MILLER  
 FACILITY MANAGER SV DOEBLER

DATE 8/28/95  
 DATE 8/28/95  
 DATE 8/29/95

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY FFTF DISCHARGE POINT FFTF-RE-SB  
 NUMBER OF HEPA FILTER BANKS (n) 0 BACK CALCULATION FACTOR 1  
 (3000<sup>n</sup>)  
 Annual Air Emissions Report (year) 1992

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. Pu-239,240	<u>7.8E-07</u>	<u>1</u>	<u>7.8E-07</u>	<u>8.97E-06</u>
2. Cs-137	<u>5.2E-06</u>	<u>1</u>	<u>5.2E-06</u>	<u>1.65E-07</u>
3.				
4.				
5.				
6.				
7.				
8.				
9.				
10.				
11.				
12.				
13.				
14.				
15.				
16.				
Total Dose				<u>9.2E-06</u>

Method Used to Project Dose (CAP88) CAP88 from WHC-EP-0498

COMMENTS

Data taken from "RADIONUCLIDE AIR EMISSIONS REPORT FOR THE  
HANFORD SITE" CALENDER YEAR 1992

EVALUATOR NR DAHL  
 MANAGER, ENVIRONMENTAL PC MILLER  
 FACILITY MANAGER GB GRIFFIN

DATE 11/10/93  
 DATE 11/10/93  
 DATE 11/10/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY FFTF DISCHARGE POINT FFTF-HT-TR  
 NUMBER OF HEPA FILTER BANKS (n) 0 BACK CALCULATION FACTOR 1  
 (3000<sup>n</sup>)  
 Annual Air Emissions Report (year) 1992

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Pu-239,240</u>	<u>7.5E-08</u>	<u>1</u>	<u>7.5E-08</u>	<u>8.625E-07</u>
2. <u>Cs-137</u>	<u>4.6E-07</u>	<u>1</u>	<u>4.6E-07</u>	<u>1.458E-08</u>
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____
Total Dose				<u>8.8E-07</u>

Method Used to Project Dose (CAP88) CAP88 from WHC-EP-0498

COMMENTS

Data taken from "RADIONUCLIDE AIR EMISSIONS REPORT FOR THE  
HANFORD SITE" CALENDER YEAR 1992

EVALUATOR NR DAHL  
 MANAGER, ENVIRONMENTAL PC MILLER  
 FACILITY MANAGER GB GRIFFIN

DATE 11/10/93  
 DATE 11/02/93  
 DATE 11/10/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY MASF - 400 Area DISCHARGE POINT 437-MNA ST  
NUMBER OF HEPA FILTER BANKS (n) 2

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Unabated Potential (Curies)	EDE (mrem Ci <sup>-1</sup> y <sup>-1</sup> )	Projected Dose (mrem y <sup>-1</sup> )
1. <u>Cs-137</u>	<u>7.69 · 10<sup>-5</sup></u>	<u>0.0317</u>	<u>2.4 · 10<sup>-6</sup></u>
2. <u>Co-60</u>	<u>1.3 · 10<sup>-4</sup></u>	<u>0.0395</u>	<u>5.0 · 10<sup>-6</sup></u>
3. <u>Mn-54</u>	<u>0.2</u>	<u>7.29 · 10<sup>-3</sup></u>	<u>1.5 · 10<sup>-3</sup></u>
4. <u>Total (Rn-220)</u>	<u>7.8 · 10<sup>-5</sup></u>	<u>0.058</u>	<u>4.5 · 10<sup>-6</sup></u>
5. <u>Total (Rn-229)</u>	<u>2.0 · 10<sup>-5</sup></u>	<u>11.5</u>	<u>2.3 · 10<sup>-4</sup></u>
6. _____	_____	_____	_____

Total Dose 1.7 · 10<sup>-3</sup>

COMMENTS

measured activity back calculated for ten years and  
this value is used as the annual unabated potential.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR *John Michael Bennett*

DATE 29 Nov '93

MANAGER, ENVIRONMENTAL *A. Smith*

DATE 11-29-93

FACILITY MANAGER *Chapman*

DATE 12-2-93

A18.0 100 AREA

The 100 Area has four registered stacks: 105-KE, 105-KW, 1706-KER, and 1706-KE. None of the stacks is designated.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000\*\*n) SOURCE ASSESSMENT

FACILITY: K-BASINS

DISCHARGE POINT: 105-KB

NUMBER OF HEPA FILTER BANKS (n): 0

BACK CALCULATION FACTOR (BCF): 1

Annual Air Emissions Report: 1994

Item	Radionuclide	Release (Ci)	BCF	Potential Release (Ci)	Dose Factor (mr/Ci)	Projected Dose (mr/yr)
1	Co-60	3.6E-07	1	3.6E-07	4.28E-02	1.5E-08
2	Sr-90	4.6E-05	1	4.6E-05	6.45E-02	3.0E-06
3	Ru-106	2.3E-06	1	2.3E-06	3.08E-02	7.1E-08
4	Sb-125	9.1E-07	1	9.1E-07	6.13E-03	5.6E-09
5	Cs-137	9.6E-05	1	9.6E-05	3.53E-02	3.4E-06
6	Bu-154	1.6E-06	1	1.6E-06	2.69E-02	4.3E-08
7	Bu-155	1.1E-06	1	1.1E-06	2.73E-03	3.0E-09
8	Pu-238	1.2E-06	1	1.2E-06	1.18E+01	1.4E-05
9	Pu-239/240	7.7E-06	1	7.7E-06	1.28E+01	9.9E-05
10	Am-241	5.6E-06	1	5.6E-06	1.94E+01	1.1E-04

TOTAL DOSE

2.3E-04

Method Used to Project Dose: CAP-88 Dose Estimate. Location to the Individual at the Hanford Site Boundary 9900 Meters West. Ten Meter Stack Height Assumed. Reference: WHC-EP-0498, Table C-7

Certain data from Revision 1 to CAPDR.WR1, December 1991, P.D. Rittman.

Comments: None

Evaluator: R.G. Gant



Date:

10/17/95

Reviewed: D.J. Watson, ECO K Basins



STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000\*\*n) SOURCE ASSESSMENT

FACILITY: K-BASINS

DISCHARGE POINT: 105-KW

NUMBER OF HEPA FILTER BANKS (n): 0  
BACK CALCULATION FACTOR (BCF): 1

Annual Air Emissions Report: 1994

Item	Radionuclide	Release (Ci)	BCF	Potential Release (Ci)	Dose Factor (mr/Ci)	Projected Dose (mr/yr)
1	Co-60	3.4E-07	1	3.4E-07	4.28E-02	1.5E-08
2	Sr-90	7.9E-07	1	7.9E-07	6.45E-02	5.1E-08
3	Ru-106	2.7E-06	1	2.7E-06	3.08E-02	8.3E-08
4	Sb-125	1.0E-07	1	1.0E-07	6.13E-03	6.1E-10
4	Cs-134	3.2E-07	1	3.2E-07	4.62E-02	1.5E-08
5	Cs-137	5.5E-06	1	5.5E-06	3.53E-02	1.9E-07
6	Bu-154	8.4E-08	1	8.4E-08	2.69E-02	2.3E-09
7	Bu-155	1.2E-07	1	1.2E-07	2.73E-03	3.3E-10
8	Pu-238	2.9E-07	1	2.9E-07	1.18E+01	3.4E-06
9	Pu-239/240	2.8E-08	1	2.8E-08	1.28E+01	3.6E-07
10	Am-241	2.0E-08	1	2.0E-08	1.94E+01	3.9E-07
TOTAL DOSE						4.5E-06

Method Used to Project Dose: CAP-88 Dose Estimate. Location to the Individual at the Hanford Site Boundary 9900 Meters West. Ten Meter Stack Height Assumed. Reference: WHC-EP-0498, Table C-7  
Certain data from Revision 1 to CAPDR.WR1, December 1991, P.D. Rittman.

Comments: None

Evaluator: R.G. Gant

Date: 10/17/95

Reviewed: D.J. Watson, ECO K Basins

*D.J. Watson* 10-17-95

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATON (3000\*\*n) SOURCE ASSESSMENT

FACILITY: K-BASINS

DISCHARGE POINT: 1706-KER

NUMBER OF HEPA FILTER BANKS (n): 1  
BACK CALCULATION FACTOR (BCF): 3000

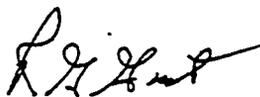
Annual Air Emissions Report: 1991

Item	Radionuclide	Release (Ci)	BCF	Potential Release (Ci)	Dose Factor (mr/Ci)	Projected Dose (mr/yr)
1	Sr-90	1.9E-08	3000	5.7E-05	6.45E-02	3.7E-06
2	Ru-106	2.4E-06	3000	7.2E-03	3.08E-02	2.2E-04
3	Cs-134	1.8E-07	3000	5.4E-04	4.62E-02	2.5E-05
4	Pu-238	4.2E-10	3000	1.3E-06	1.18E+01	1.5E-05
5	Pu-239/240	2.4E-09	3000	7.2E-06	1.28E+01	9.2E-05
TOTAL DOSE						3.6E-04

Method Used to Project Dose: CAP-88 Dose Estimate. Location to the Individual at the Hanford Site Boundary 9900 Meters West. Ten Meter Stack Height Assumed. Reference: WHC-EP-0498, Table C-7  
Certain data from Revision 1 to CAPDR.WR1, December 1991, P.D. Rittman.

Comments: Did not operate in 1992

Evaluator: R.G. Gant



Date: 11/15/93

Reviewed: B.L. Curn, EEM



J.P. Schmidt, ECO, K Basins

 11/15/93

J.E. Truax, Manager, K Basins

 11/15/93

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000\*\*n) SOURCE ASSESSMENT

FACILITY: K-BASINS

DISCHARGE POINT: 1706-KE

NUMBER OF HEPA FILTER BANKS (n): 1  
BACK CALCULATION FACTOR (BCF): 3000

Annual Air Emissions Report: 1992

Item	Radionuclide	Release (Ci)	BCF	Potential Release (Ci)	Dose Factor (mr/Ci)	Projected Dose (mr/yr)
1	Sr-90	1.0E-07	3000	3.0E-04	6.45E-02	1.9E-05
2	Ru-106	6.2E-08	3000	1.9E-04	3.08E-02	5.7E-06
3	Pu-238	4.5E-10	3000	1.4E-06	1.18E+01	1.6E-05
4	Pu-239/240	2.5E-09	3000	7.5E-06	1.28E+01	9.6E-05
TOTAL DOSE						1.4E-04

Method Used to Project Dose: CAP-88 Dose Estimate. Location to the Individual at the Hanford Site Boundary 9900 Meters West. Ten Meter Stack Height Assumed. Reference: WHC-EP-0498, Table C-7  
Certain data from Revision 1 to CAPDR.WR1, December 1991, P.D. Rittman.

Comments: None

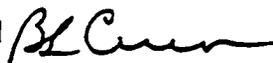
Evaluator: R.G. Gant



Date:

11/15/93

Reviewed: B.L. Curn, EEM



J.P. Schmidt, ECO, K Basins



11/15/93

J.E. Truax, Manager, K Basins



11/15/93

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**APPENDIX B**  
**UNREGISTERED STACK ASSESSMENT**

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**UNREGISTERED STACK ASSESSMENTS**

A summary table is provided to indicate the assessment method used for each of the 23 unregistered stacks and the result of the assessment (Table B-1). The most current worksheets have been included in this appendix. However, when worksheets from prior years have been used for the current assessment, the facilities have determined that emissions have not increased significantly and the inventory in the facility has not increased. (Internal memos attesting to this were signed off by a representative of the facility and are on file with the facility and with Effluent Monitoring.) The headings on the worksheets indicate whether release factors from Appendix D, back calculations, nondestructive assessment, or upstream air samples were used to perform the assessment. When worksheets using release factors from Appendix D are used, the inventory at risk is provided and a release fraction is applied to the inventory to provide an estimated emission. For back calculations, the 1992, 1993, or 1994 annual air concentrations<sup>2</sup> are multiplied by a high-efficiency particulate air (HEPA) filter factor  $3,000^n$ , where n indicates the number of banks of HEPA filters in series and if a prefilter exists, by a prefilter factor (3 to 20). The resulting number is the estimate of potential emissions. The worksheet for nondestructive assessment provides the curie content collected on the HEPA filters and the potential annual emissions. From the curie content an annual emission was estimated. For all of the assessments, the CAP88 model was applied with an appropriate source release height and location. The CAP88 model then used Hanford Site meteorology for the transport and diffusion to produce an effective dose equivalent to the offsite maximum exposed individual.

Appendix B is divided into 7 sections:

- B1.0 B PLANT
- B2.0 TANK FARMS
- B3.0 222-S LABORATORY
- B4.0 T PLANT
- B5.0 300 AREA
- B6.0 400 AREA
- B7.0 100 AREA

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<sup>2</sup>WHC, 1993, *Environmental Releases for Calendar Year 1992*, WHC-EP-0527-2, Westinghouse Hanford Company, Richland, Washington.

Table B-1. Hanford Site Unregistered Stacks. (2 sheets)

Stack	HEPA Filter Stages	NESHAP Assessment method				Status of stack
		Appendix D release factors	NDA	Upstream	Back calculations	
B Plant						
296-B-12	2	$4 \times 10^{-4}$ $3$ - $1 \times 10^{-}$				Minor
296-B-22	1			$3 \times 10^{-5}$		Minor
296-B-23	1			$7 \times 10^{-5}$		Minor
296-B-24	1			$9 \times 10^{-5}$		Minor
296-B-25	1			$3 \times 10^{-5}$		Minor
296-B-26	1			$5 \times 10^{-5}$		Minor
296-B-27	1			$7 \times 10^{-5}$		Minor
Tank Farms						
296-P-26	2	$2 \times 10^2$				Designated
296-P-28	2			$2 \times 10^{-3}$		Minor
296-P-32		$1 \times 10^{-2}$				Minor
296-P-33		$1 \times 10^{-2}$				Minor
296-P-34		$1 \times 10^{-2}$				Minor
296-U-11	2	$4 \times 10^{-1}$				Designated
222-S Laboratory						
296-S-23			$2 \times 10^{-9}$			Minor
T Plant						
296-T-7	1				$5 \times 10^{-5}$	Minor

Table B-1. Hanford Site Unregistered Stacks. (2 sheets)

Stack	HEPA Filter Stages	NESHAP Assessment method				Status of stack
		Appendix D release factors	NDA	Upstream	Back calculations	
300 Area						
304-CON-EX	0	$9.4 \times 10^{-3}$				Minor
309-PRTR	1			$6 \times 10^{-5}$		Minor
309-RTF-EX	1		$9 \times 10^{-9}$			Minor
340-B-BLDG	1		$7 \times 10^{-4}$			Minor
340-DECON	3		$6 \times 10^{-2}$			Minor
400 Area						
437-1-61	2		$2 \times 10^{-8}$			Minor
100 Areas						
183 KE	0	Below Detection Limit				Minor
1706-KEL	0		$7 \times 10^{-9}$			Minor

HEPA = high-efficiency particulate air.  
 NDA = nondestructive assessment.  
 NESHAP = National Emission Standards for Hazardous Air Pollutants.  
 a Limiting Inventory assessment (see Section 3.6)

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**B1.0 B PLANT**

B Plant has seven unregistered stacks: 296-B-12, 296-B-22, 296-B-23, 296-B-24, 296-B-25, 296-B-26, and 296-B-27. None of the stacks is designated.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H  
RELEASE FACTORS FROM APPENDIX D  
SOURCE ASSESSMENT

FACILITY B-Plant/WESF DISCHARGE POINT 296-B-12

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected** Dose (mrem/yr)
1. <u><sup>90</sup>Sr</u>	<u>Solid</u>	<u>8,625-30,000</u>	<u>10<sup>-6</sup></u>	<u>.009-.03</u>	<u>.0004-.0013</u>
2. <u><sup>137</sup>Cs</u>	<u>Solid</u>	<u>1,275-4,335</u>	<u>10<sup>-6</sup></u>	<u>.0013-.0043</u>	<u>.00003-.0001</u>
3. _____	_____	_____	_____	_____	_____
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5. _____	_____	_____	_____	_____	_____
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8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
Method Used to Project Dose (CAP88) <u>CAP-88</u>					Total Dose: <u>.00043-.0014 mrem/yr</u>

COMMENTS

Stack 296-B-12 is the emergency steam jet for Stack 296-B-10. Quantities taken from 85% <sup>137</sup>Cs and 15% <sup>90</sup>Sr inventory estimate found in PNL-3397 "An Estimate of the Radioisotope Inventory Inside the K-3 Ventilation Duct, WESF" (Soldat and Brackenbrush, 1980). CAP-88 unit dose factors taken from WHC-EP-0498 (pg. A3-12), the values used were for the 10 meter stacks.

\*\* = CAP-88 unit dose factor used for <sup>90</sup>Sr was 4.38E-2 and for <sup>137</sup>Cs was 2.39E-2 mrem/yr\*Ci.

EVALUATOR *James M. P. Jones*  
 MANAGER, ENVIRONMENTAL *Y. H. Johnson*  
 FACILITY MANAGER *D. [Signature]*  
*A. [Signature]*

DATE 5-4-94  
 DATE 5/4/94  
 DATE 5/5/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-22 YEAR: 1992

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>3.32E-14</u>	<u>1.19E14</u>	<u>3.95E-6</u>	<u>8.67</u>	<u>3.42E-5</u>
2. LL Beta	<u>1.13E-13</u>	<u>1.19E14</u>	<u>13.45E-6</u>	<u>4.38E-2</u>	<u>5.89E-7</u>
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Total Dose:					<u>3.48E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88 Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculated the potential dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr were used to yield conservative values for potential dose. CAP-88 dose factors were taken from WHC-EP-0498 (pg. A3-1), the values used were for the 10 meter stacks.

EVALUATOR Jim M. Rida  
MANAGER, ENVIRONMENTAL PH. Holman  
FACILITY MANAGER [Signature]

DATE 5-4-94  
DATE 5/4/94  
DATE 5/6/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-23 YEAR: 1992

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>3.27E-14</u>	<u>2.38E14</u>	<u>7.78E-6</u>	<u>8.67</u>	<u>6.75E-5</u>
2. LL Beta	<u>1.56E-13</u>	<u>2.38E14</u>	<u>37.13E-6</u>	<u>4.38E-2</u>	<u>1.63E-6</u>
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16.					
Total Dose:					<u>6.91E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88  
Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculated the potential  
dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr  
were used to yield conservative values for potential dose. The air  
concentration values are the result of averaging two samples. CAP-88 dose  
factors were taken from WHC-EP-0498 (pg. A3-1), the values used were for the  
10 meter stacks.

EVALUATOR Jane M. Ridge  
MANAGER, ENVIRONMENTAL Analysis  
FACILITY MANAGER [Signature]

DATE 5-4-94  
DATE 5/4/94  
DATE 5/5/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-24 YEAR: 1992

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration ( $\mu$ curies/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>4.49E-14</u>	<u>2.38E14</u>	<u>10.67E-6</u>	<u>8.67</u>	<u>9.25E-5</u>
2. LL Beta	<u>1.72E-13</u>	<u>2.38E14</u>	<u>40.94E-6</u>	<u>4.38E-2</u>	<u>1.79E-6</u>
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16.					
Total Dose:					<u>9.43E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88  
Unit Dose Factors for  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$  were used to calculated the potential  
dose for long lived alpha and long lived beta, respectively.  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$   
were used to yield conservative values for potential dose. The air  
concentration values are the result of averaging two samples. CAP-88 dose  
factors were taken from WHC-EP-0498 (pg. A3-1), the values used were for the  
10 meter stacks.

EVALUATOR *John M. Pidge*  
MANAGER, ENVIRONMENTAL *Mitokg sm*  
FACILITY MANAGER *[Signature]*

DATE 5-4-94  
DATE 5/4/94  
DATE 5/5/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-25 YEAR: 1992

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>2.93E-14</u>	<u>1.19E14</u>	<u>3.49E-6</u>	<u>8.67</u>	<u>3.02E-5</u>
2. LL Beta	<u>1.64E-13</u>	<u>1.19E14</u>	<u>19.51E-6</u>	<u>4.38E-2</u>	<u>8.55E-7</u>
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16.					
Total Dose:					<u>3.11E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88 Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculate the potential dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr were used to yield conservative values for potential dose. CAP-88 dose factors were taken from WHC-EP-0498 (pg. A3-1), the values used were for the 10 meter stacks.

EVALUATOR Jim M. Ridge  
MANAGER, ENVIRONMENTAL Health  
FACILITY MANAGER [Signature]

DATE 5-4-94  
DATE 5/4/94  
DATE 5/5/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-26 YEAR: 1992

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>4.29E-14</u>	<u>1.19E14</u>	<u>5.11E-6</u>	<u>8.67</u>	<u>4.43E-5</u>
2. LL Beta	<u>1.33E-13</u>	<u>1.19E14</u>	<u>15.83E-6</u>	<u>4.38E-2</u>	<u>6.93E-7</u>
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16.					

Total Dose: 4.50E-5

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88 Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculated the potential dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr were used to yield conservative values for potential dose. CAP-88 dose factors were taken from WHC-EP-0498 (pg. A3-1), the values used were for the 10 meter stacks.

EVALUATOR Jim M. Pickett  
MANAGER, ENVIRONMENTAL Philip J. ...  
FACILITY MANAGER ...

DATE 5-4-94  
DATE 5/4/94  
DATE 5/5/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-27 YEAR: 1992

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. <u>LL Alpha</u>	<u>3.39E-14</u>	<u>2.38E14</u>	<u>8.07E-6</u>	<u>8.67</u>	<u>7.00E-5</u>
2. <u>LL Beta</u>	<u>1.40E-13</u>	<u>2.38E14</u>	<u>33.32E-6</u>	<u>4.38E-2</u>	<u>1.46E-6</u>
3. _____	_____	_____	_____	_____	_____
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5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
Total Dose:					<u>7.15E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS  
LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88  
Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculated the potential  
dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr  
were used to yield conservative values for potential dose. The air  
concentration values are the result of averaging two samples. CAP-88 dose  
factors were taken from WHC-EP-0498 (pg. A3-1), the values used were for the  
10 meter stacks.

EVALUATOR Jim M. Piche  
 MANAGER, ENVIRONMENTAL ASB/ADEN  
 FACILITY MANAGER [Signature]

DATE 5-4-94  
 DATE 5/14/94  
 DATE 5/15/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-22 YEAR: 1993

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration ( $\mu$ curies/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	2.09E-14	1.19E14	2.49E-6	8.67	2.16E-5
2. LL Beta	1.19E-13	1.19E14	14.16E-6	4.38E-2	6.20E-7
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14.					
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16.					

Total Dose: 2.22E-5

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88 Unit Dose Factors for  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$  were used to calculated the potential dose for long lived alpha and long lived beta, respectively.  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$  were used to yield conservative values for potential dose. CAP-88 dose factors were taken from WHC-EP-0498 (pg. A3-12), the values used were for the 10 meter stacks.

EVALUATOR [Signature]  
MANAGER, ENVIRONMENTAL [Signature]  
FACILITY MANAGER [Signature]

DATE 5-4-94  
DATE 5/4/94  
DATE 5/5/94  
5-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-23 YEAR: 1993

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration ( $\mu$ curies/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>3.31E-14</u>	<u>2.38E14</u>	<u>7.88E-6</u>	<u>8.67</u>	<u>6.83E-5</u>
2. LL Beta	<u>1.42E-13</u>	<u>2.38E14</u>	<u>33.80E-6</u>	<u>4.38E-2</u>	<u>1.48E-6</u>
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12.					
13.					
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15.					
16.					
Total Dose:					<u>6.98E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88  
Unit Dose Factors for  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$  were used to calculated the potential  
dose for long lived alpha and long lived beta, respectively.  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$   
were used to yield conservative values for potential dose. The air  
concentration values are the result of averaging two samples. CAP-88 dose  
factors were taken from WHC-EP-0498 (pg. A3-12), the values used were for the  
10 meter stacks.

EVALUATOR J. M. Rich  
MANAGER, ENVIRONMENTAL Control  
FACILITY MANAGER D. B. G.

DATE 5-4-94  
DATE 5/1/94  
DATE 5/5/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-24 YEAR: 1993

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>3.08E-14</u>	<u>2.38E14</u>	<u>7.33E-6</u>	<u>8.67</u>	<u>6.36E-5</u>
2. LL Beta	<u>1.41E-13</u>	<u>2.38E14</u>	<u>33.58E-6</u>	<u>4.38E-2</u>	<u>1.47E-6</u>
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12.					
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15.					
16.					
Total Dose:					<u>6.51E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88  
Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculate the potential  
dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr  
were used to yield conservative values for potential dose. The air  
concentration values are the result of averaging two samples. CAP-88 dose  
factors were taken from WHC-EP-0498 (pg. A3-12), the values used were for the  
10 meter stacks.

EVALUATOR Jim M. Rieck  
MANAGER, ENVIRONMENTAL Division  
FACILITY MANAGER Division

DATE 5-4-94  
DATE 5/14/94  
DATE 6/6/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-25 YEAR: 1993

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration ( $\mu$ curies/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	3.30E-14	1.19E14	3.93E-6	8.67	3.41E-5
2. LL Beta	1.66E-13	1.19E14	19.75E-6	4.38E-2	8.65E-7
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
Total Dose:					3.50E-5

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88 Unit Dose Factors for  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$  were used to calculate the potential dose for long lived alpha and long lived beta, respectively.  $^{239}\text{Pu}$  and  $^{90}\text{Sr}$  were used to yield conservative values for potential dose. CAP-88 dose factors were taken from WHC-EP-0498 (pg. A3-12), the values used were for the 10 meter stacks.

EVALUATOR Jim M. Riche  
MANAGER, ENVIRONMENTAL Bill Hall  
FACILITY MANAGER [Signature]

DATE 5-4-94  
DATE 5/19/94  
DATE 5/19/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-26 YEAR: 1993

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>2.28E-14</u>	<u>1.19E14</u>	<u>2.71E-6</u>	<u>8.67</u>	<u>2.35E-5</u>
2. LL Beta	<u>1.24E-13</u>	<u>1.19E14</u>	<u>14.76E-6</u>	<u>4.38E-2</u>	<u>6.46E-7</u>
3. _____	_____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____

Total Dose: 2.41E-5

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88 Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculate the potential dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr were used to yield conservative values for potential dose. CAP-88 dose factors were taken from WHC-EP-0498 (pg. A3-12), the values used were for the 10 meter stacks.

EVALUATOR Jim M. Pidgeon  
MANAGER, ENVIRONMENTAL Michael J. ...  
FACILITY MANAGER ...

DATE 5-4-94  
DATE 5/11/94  
DATE 6/8/94  
6-6-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

UPSTREAM AIR SAMPLE  
SOURCE ASSESSMENT

FACILITY: B-Plant DISCHARGE POINT: 296-B-27 YEAR: 1993

POTENTIAL RADIOLOGICAL RELEASE

Radionuclide	Air Concentration (μcuries/ml)	Annual Volume (ml)	Potential Release (curies)	Unit Dose Factor	Potential Dose (mrem/yr)
1. LL Alpha	<u>3.74E-14</u>	<u>2.38E14</u>	<u>8.90E-6</u>	<u>8.67</u>	<u>7.72E-5</u>
2. LL Beta	<u>2.23E-13</u>	<u>2.38E14</u>	<u>53.07E-6</u>	<u>4.38E-2</u>	<u>2.32E-6</u>
3.					
4.					
5.					
6.					
7.					
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
Total Dose:					<u>7.95E-5</u>

Method Used to Project Dose (CAP88) CAP-88

COMMENTS

LL = Long Lived: Radon was suppressed when sample was analyzed. The Cap-88:  
Unit Dose Factors for <sup>239</sup>Pu and <sup>90</sup>Sr were used to calculated the potential  
dose for long lived alpha and long lived beta, respectively. <sup>239</sup>Pu and <sup>90</sup>Sr  
were used to yield conservative values for potential dose. The air  
concentration values are the result of averaging two samples. CAP-88 dose  
factors were taken from WHC-EP-0498 (pg. A3-12), the values used were for the  
10 meter stacks.

EVALUATOR J. M. Pich  
MANAGER, ENVIRONMENTAL AS/EP/20  
FACILITY MANAGER AS/EP/20

DATE 5-4-94  
DATE 5/14/94  
DATE 5/15/94  
6-6-94

## B2.0 TANK FARMS

Tank farms has six unregistered stacks: 296-P-26, 296-P-28, 296-P-32, 296-P-33, 296-P-34, 296-S-25, and 296-U-11. (The 296-P-32, 296-P-33, and 296-P-34 stacks are for the rotary-mode core samplers.) 296-U-11 is the only designated stack.

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 241-AY/AZ Backup DISCHARGE POINT Stack 296-P-26

FACILITY POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)(2)	Release Factor(2)	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	4.97E+00	1.00E-03	4.97E-03	1.30E-05
Co-60	Particulate	1.74E+03	1.00E-03	1.74E+00	5.05E-02
Sr-89/90	Particulate	3.95E+04	1.00E-03	3.95E+01	1.73E+00
Y-90	Particulate	3.95E+04	1.00E-03	3.95E+01	1.49E-02
Tc-99	Particulate	1.29E+05	1.00E-03	1.29E+02	1.41E-01
I-129	Gas	2.48E+00	1.00E+00	2.48E+00	7.22E-01
Cs-134	Particulate	2.89E+00	1.00E-03	2.89E-03	9.05E-05
Cs-137	Particulate	9.24E+06	1.00E-03	9.24E+03	2.21E+02
Eu-154(1)	Particulate	1.88E+04	1.00E-03	1.88E+01	8.23E-01
Nat.U	Particulate	1.88E+00	1.00E-03	1.88E-03	5.34E-03
Np-237	Particulate	2.44E-01	1.00E-03	2.44E-04	2.90E-03
Pu-238	Particulate	2.63E-01	1.00E-03	2.63E-04	2.11E-03
Pu-239/240	Particulate	2.50E+00	1.00E-03	2.50E-03	2.17E-02
Pu-241	Particulate	1.18E+01	1.00E-03	1.18E-02	1.63E-03
Am-241	Particulate	1.46E+02	1.00E-03	1.46E-01	1.91E+00

Total Dose: 226

Method Used to Project Dose: CAP88

COMMENTS

- 1: Sr-90 used as the beta emitter; dose factors were not included in the radionuclide library for this specific radionuclide.
- 2: Supernatant data used; sludge/slurry contribution is less than 1% of the supernatant contribution to the total dose.

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

POTENTIAL EMISSIONS DETERMINED  
 USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS  
 \*\*\*

FACILITY SY Tank Farm Backup DISCHARGE POINT Stack 296-P-28

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-90	Particulate	9.62E-03	2.5E-04
Y-90	Particulate	9.62E-03	2.1E-06
Cs-137	Particulate	3.98E-02	5.7E-04
Eu-154	Particulate	8.38E-06	2.2E-07
Pu-238	Particulate	7.62E-06	3.6E-05
Pu-239	Particulate	9.22E-05	4.7E-04
Pu-240	Particulate	2.08E-05	1.1E-04
Pu-241	Particulate	9.07E-04	7.4E-05
Pu-242	Particulate	1.24E-09	6.4E-09
Am-241	Particulate	4.90E-07	3.8E-06

Total Dose: 1.5E-03

Method Used to Project Dose: CAP88

STACK STATUS:      DESIGNATED   X   NON-DESIGNATED

EVALUATOR [Signature] DATE 7/24/95

MANAGER, ENVIRONMENTAL [Signature] DATE 8-14-95

FACILITY MANAGER [Signature] DATE 8-14-95

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

SOURCE ASSESSMENT  
(BEST ENGINEERING JUDGEMENT)

FACILITY Rotarty Mode Core Samplers DISCHARGE POINTS 296-P-32, 296-P-33  
296-P-34

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Annual Unabated Emissions (Ci/year)	Unit Dose Factor (mrem/Ci)	Projected Dose (mrem/yr) 200-E
1. <u>Sr-90</u>	<u>Solid</u>	<u>1.490E-01</u>	<u>4.400E-02</u>	<u>6.566E-03</u>
2. <u>Cs-137</u>	<u>"</u>	<u>1.011E-01</u>	<u>2.400E-02</u>	<u>2.426E-03</u>
3. <u>Am-241</u>	<u>"</u>	<u>1.112E-04</u>	<u>1.300E+01</u>	<u>1.445E-03</u>
4. <u>Pu-239</u>	<u>"</u>	<u>7.013E-05</u>	<u>8.700E+00</u>	<u>6.101E-04</u>
5. <u>Pu-240</u>	<u>"</u>	<u>1.636E-05</u>	<u>8.700E+00</u>	<u>1.424E-04</u>
6. <u>Pu-238</u>	<u>"</u>	<u>4.252E-06</u>	<u>8.000E+00</u>	<u>3.401E-05</u>
7. <u>Pu-241</u>	<u>"</u>	<u>1.914E-04</u>	<u>1.400E-01</u>	<u>2.679E-05</u>
8. <u>U-238</u>	<u>"</u>	<u>2.206E-06</u>	<u>2.800E+00</u>	<u>6.177E-06</u>
9. <u>Np-237</u>	<u>"</u>	<u>1.870E-07</u>	<u>1.200E+01</u>	<u>2.244E-06</u>
10. <u>Cm-244</u>	<u>"</u>	<u>2.659E-07</u>	<u>6.900E+00</u>	<u>1.835E-06</u>
11. <u>Am-243</u>	<u>"</u>	<u>5.800E-08</u>	<u>1.300E+01</u>	<u>7.540E-07</u>
12. <u>U-235</u>	<u>"</u>	<u>9.380E-08</u>	<u>3.000E+00</u>	<u>2.814E-07</u>
13. <u>Ni-63</u>	<u>"</u>	<u>7.626E-04</u>	<u>2.000E-04</u>	<u>1.525E-07</u>
14. <u>C-14</u>	<u>"</u>	<u>4.441E-05</u>	<u>2.600E-03</u>	<u>1.155E-07</u>
15. <u>Tc-99</u>	<u>"</u>	<u>9.248E-05</u>	<u>1.100E-03</u>	<u>1.017E-07</u>
16. <u>Cm-242</u>	<u>"</u>	<u>1.170E-07</u>	<u>4.200E-01</u>	<u>4.915E-08</u>
17. <u>I-129</u>	<u>"</u>	<u>1.408E-07</u>	<u>2.900E-01</u>	<u>4.084E-08</u>
18. <u>Sn-126</u>	<u>"</u>	<u>1.826E-06</u>	<u>8.600E-03</u>	<u>1.571E-08</u>

Total Dose 1.126E-02

Method Used to Project Dose (CAP88) CAP88

COMMENTS

Calculations were taken from DOE/RL-94-118, which is the NOC for the Tank Farm Rotary Mode Core Samplers and was published in May of 1995. The NOC calculations were based on each unit extracting 30 cores at 13 segments per core or 390 segments/yr. Actual segments extracted as of the assessment preparation date was 19. Therefore, the ratio 19/390 was applied to the NOC emissions and dose figures resulting in the above total dose.

EVALUATOR

*Ciri waldo*

DATE 11/15/95

MANAGER,  
ENVIRONMENTAL

*wie ghee*

DATE 11/15/95

FACILITY MANAGER

*Judith Burton*

DATE 11/15/95

POTENTIAL EMISSIONS DETERMINED USING  
RELEASE FACTORS FROM APPENDIX D  
WITH SOURCE TERM  
\*\*\*

FACILITY 244-U DCRT DISCHARGE POINT Stack 296-U-11

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
C-14	Particulate	1.24E-02	1.00E-03	1.24E-05	2.05E-08
Co-60	Particulate	1.15E+02	1.00E-03	1.15E-01	1.98E-03
Se-79(1)	Particulate	4.39E-04	1.00E-03	4.39E-07	1.14E-08
Sr-89/90	Particulate	3.45E+04	1.00E-03	3.45E+01	8.97E-01
Y-90	Particulate	3.45E+04	1.00E-03	3.45E+01	7.66E-03
Tc-99	Particulate	1.46E-02	1.00E-03	1.46E-05	9.42E-09
Ru/Rh-106	Gas	9.70E-03	1.00E+00	9.70E-03	1.16E-04
I-129	Gas	2.53E-05	1.00E+00	2.53E-05	2.88E-06
Cs-137	Particulate	5.47E+04	1.00E-03	5.47E+01	7.77E-01
Ce-144	Particulate	1.15E-03	1.00E-03	1.15E-06	9.36E-09
Eu-154(1)	Particulate	7.49E+02	1.00E-03	7.49E-01	1.95E-02
Nat.U	Particulate	1.46E+00	1.00E-03	1.46E-03	2.47E-03
Np-237	Particulate	9.30E-05	1.00E-03	9.30E-08	6.56E-07
Pu-238	Particulate	1.99E+00	1.00E-03	1.99E-03	9.47E-03
Pu-239/240	Particulate	3.02E+01	1.00E-03	3.02E-02	1.56E-01
Pu-241	Particulate	1.20E+01	1.00E-03	1.20E-02	9.80E-04
Am-241	Particulate	9.84E-04	1.00E-03	9.84E-07	7.67E-06
Cm-242/244	Particulate	1.37E-05	1.00E-03	1.37E-08	5.64E-08

Method Used to Project Dose: CAP88

Total Dose: 1.87E+00

Static:  $[(1.871 \text{ mrem/yr})(26 \text{ Kgal}/131 \text{ Kgal})] = 0.371$

COMMENTS

1. Sr-90 used as the beta emitter; dose factors were not included in the radionuclide library for this specific radionuclide.

STACK STATUS:  DESIGNATED  NON-DESIGNATED

EVALUATOR *[Signature]* DATE 7/24/95

MANAGER, ENVIRONMENTAL *[Signature]* DATE 8-14-95

FACILITY MANAGER *[Signature]* DATE 8-14-95

**B3.0 222-S LABORATORY**

The 222-S Laboratory has one unregistered stack: 296-S-23. It is a minor stack.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY 222 S LABORATORIES DISCHARGE POINT 296-S-23  
NUMBER OF HEPA FILTER BANKS (n) 2

Emission and Effective Dose Equivalent (CAP88) values reported in the  
Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Empirical Quantity (Curies)	Emitted Quantity (Curies)	Unabated Potential (Curies)	Projected Dose (mrem/yr)
1. <u>Cs-137</u>	<u><math>6.3 \cdot 10^{-8}</math></u>	<u>—</u>	<u><math>6.3 \cdot 10^{-8}</math></u>	<u><math>1.5 \cdot 10^{-9}</math> (EPE = 0.0239)</u>
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
			Total Dose	<u><math>1.5 \cdot 10^{-9}</math></u>

COMMENTS

No recorded emissions. Stack is unregistered.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR JM Bennett  
MANAGER, ENVIRONMENTAL [Signature]  
FACILITY MANAGER Mc Thompson  
(for) R. Marshall

DATE 18 July 94  
DATE 7-20-94  
DATE 7/27/94

**B4.0 T PLANT**

T Plant has one unregistered stack: 296-T-7. It is a minor stack.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

BACK CALCULATION (3000<sup>n</sup>) SOURCE ASSESSMENT

FACILITY 2706-T (T-Plant) DISCHARGE POINT 296-T-7  
 NUMBER OF HEPA FILTER BANKS (n) 1 BACK CALCULATION FACTOR 3000  
 (3000<sup>n</sup>)  
 Annual Air Emissions Report (year) 1993

Radionuclide	Quantity Released (Curies)	Back Calculation Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Total Beta</u>	<u>6.85 E-7</u>	<u>3000</u>	<u>2.06 E-3</u>	<u>5.34 E-5</u>
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____
			<u>Total Dose</u>	<u>5.34 E-5</u>

Method Used to Project Dose (CAP88) CAP88

COMMENTS:

Calculations based on 40 hrs/wk of operation and an average flow of 10,200 CFM  
Used Minimum Detectable Concentrations from 222-S Lab  
296-T-7 is currently an unregistered stack  
No alpha contamination present in the 2706-T Facility

Calculations:

10,200 cu ft/min x 60 min/hr x 8 hr/day x 260 days/yr = 1.27 E+9 cu ft/yr  
 1.27 E+9 cu ft/yr x 28,317 cc/cu ft = 3.60 E+13 cc/yr  
 3.60 E+13 cc/yr x 1.9 E-14  $\mu$ ci/cc (MDC) x 1 ci/1.0 E+6  $\mu$ ci = 6.85 E-7 ci/yr  
 6.85 E-7 ci/yr x 3000 x 0.026 (CAP88 Factor) = 5.34 E-5 mrem/yr EDE

EVALUATOR

RJ Brown

DATE 4/1/94

MANAGER, ENVIRONMENTAL

[Signature]

DATE 4-4-94

FACILITY MANAGER

[Signature]

DATE 4/1/94

**B5.0 300 AREA**

The 300 Area has five unregistered stacks: 304-CON-EX, 309-PRTR, 309-RTF-EX, 340-B-BLDG, and 340-DECON. None of these is a designated stack.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY 304 DISCHARGE POINT 304-CON-EX

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>U-234</u>	<u>Particulate</u>	<u>0.0884</u>	<u>0.001</u>	<u>8.84E-5</u>	<u>5.62E-3</u>
2. <u>U-235</u>	<u>Particulate</u>	<u>0.00336</u>	<u>0.001</u>	<u>3.36E-6</u>	<u>1.99E-4</u>
3. <u>U-236</u>	<u>Particulate</u>	<u>0.00542</u>	<u>0.001</u>	<u>5.42E-6</u>	<u>3.26E-4</u>
4. <u>U-238</u>	<u>Particulate</u>	<u>0.0576</u>	<u>0.001</u>	<u>5.76E-5</u>	<u>3.26E-3</u>
5. <u>Tc-99</u>	<u>Particulate</u>	<u>0.0254</u>	<u>0.001</u>	<u>2.54E-5</u>	<u>5.50E-7</u>
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
Total Dose					<u>9.4E-3</u>

Method Used to Project Dose (CAP88) WHC-EP-0498

COMMENTS

A discussion of the 304 Concretion operations is provided in Correspondence No. 9355841D, M. J. Silvia to R. G. Holt, "Notice of Construction for Building 304, Concretion Facility Modification," dated September 27, 1993.

EVALUATOR J. K. Perry  
MANAGER, ENVIRONMENTAL  
FACILITY MANAGER

*[Handwritten signature]*  
*[Handwritten signature]*  
*[Handwritten signature]*

DATE 4/14/94  
DATE 4/22/94  
DATE 4-21-94

per  
+2/22/94  
4/22/94  
1:10 PM

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

SOURCE ASSESSMENT BASED ON UNMITIGATED EMISSIONS  
SAMPLE DATA

FACILITY 309 DISCHARGE POINT 309-PRTR

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Physical/ Chemical Form	Airborne Conc'n (ci/cc)	Annual Exhaust Volume (cc/yr)	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
1. <u>Pu-239</u>	<u>particulate</u>	<u>4.3E-21</u>	<u>8.5E+13</u>	<u>3.7E-7</u>	<u>6.3E-5</u>
2. <u>Sr-90</u>	<u>particulate</u>	<u>1.3E-20</u>	<u>8.5E+13</u>	<u>1.1E-6</u>	<u>9.6E-7</u>
3. <u>Co-60</u>	<u>particulate</u>	<u>5.1E-21</u>	<u>8.5E+13</u>	<u>4.3E-7</u>	<u>2.5E-7</u>
4. <u>Cs-137</u>	<u>particulate</u>	<u>1.2E-20</u>	<u>8.5E+13</u>	<u>1.0E-6</u>	<u>4.9E-7</u>
5. _____	_____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____	_____
8. _____	_____	_____	_____	_____	_____
9. _____	_____	_____	_____	_____	_____
10. _____	_____	_____	_____	_____	_____
11. _____	_____	_____	_____	_____	_____
12. _____	_____	_____	_____	_____	_____
13. _____	_____	_____	_____	_____	_____
14. _____	_____	_____	_____	_____	_____
15. _____	_____	_____	_____	_____	_____
16. _____	_____	_____	_____	_____	_____
Total Dose					<u>6.5E-5</u>

COMMENTS

Between 3/30/95 and 4/20/95, the water seal for the subject stack exhaust system HEPA filter was lost due to a decrease in the volume of water necessary for maintaining the seal. During this period of time, particulate samples were collected from the airborne effluent. Consequently, the sample results represent unmitigated particulate emissions from the subject stack. The sample results are used above to calculate the unmitigated annual potential EDE received by the off-site MEI.

EVALUATOR Jon K. Perry  
 MANAGER, ENVIRONMENTAL  
 FACILITY MANAGER

DATE 5/8/95  
 DATE 5-17-95  
 DATE 5/11/95

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY 309 Building DISCHARGE POINT 309-RTF-EX  
NUMBER OF HEPA FILTER BANKS (n) 1

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Empirical Quantity (Curies)	Emitted Quantity (Curies)	Unabated Potential (Curies)	Projected Dose (mrem/yr)
1. <u>CS-137</u>	<u><math>1.9 \cdot 10^{-8}</math></u>	<u>-</u>	<u><math>1.9 \cdot 10^{-8}</math></u>	<u><math>9.0 \cdot 10^{-9}</math> (EDF = 0.477)</u>
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
Total Dose				<u><math>9.0 \cdot 10^{-9}</math></u>

COMMENTS

No recorded emissions. Stack is unregistered.  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR JM Barnett  
MANAGER, ENVIRONMENTAL [Signature]  
FACILITY MANAGER [Signature]

DATE 18 July 94  
DATE 7-20-94  
DATE 7-22-94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY 340 DISCHARGE POINT 340-B  
NUMBER OF HEPA FILTER BANKS (n) 1

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Empirical Quantity (Curies)	Emitted Quantity (Curies)	Unabated Potential (Curies)	Projected Dose (mrem/yr)	EDE
1. <u>Sr-90</u>	<u><math>1.8 \cdot 10^{-5}</math></u>	<u><math>4.8 \cdot 10^{-7}</math></u>	<u><math>1.8 \cdot 10^{-5}</math></u>	<u><math>1.5 \cdot 10^{-5}</math></u>	<u>0.872</u>
2. <u>Cs-137</u>	<u><math>6.5 \cdot 10^{-6}</math></u>	<u><math>1.8 \cdot 10^{-7}</math></u>	<u><math>6.7 \cdot 10^{-6}</math></u>	<u><math>3.3 \cdot 10^{-6}</math></u>	<u>0.472</u>
3. <u>Pu-239</u>	<u><math>3.7 \cdot 10^{-6}</math></u>	<u><math>1.0 \cdot 10^{-7}</math></u>	<u><math>3.8 \cdot 10^{-6}</math></u>	<u><math>6.5 \cdot 10^{-4}</math></u>	<u>173</u>
4. _____	_____	_____	_____	_____	
5. _____	_____	_____	_____	_____	
6. _____	_____	_____	_____	_____	
7. _____	_____	_____	_____	_____	
				Total Dose	<u><math>6.6 \cdot 10^{-4}</math></u>

COMMENTS  
The two-sigma error is 50%.  
The emitted quantity is the minimum detectable activity  
because no emissions were reported above that level.

EVALUATOR [Signature]  
 MANAGER, ENVIRONMENTAL [Signature]  
 FACILITY MANAGER [Signature]

DATE 3/29/94  
 DATE 3-29-94  
 DATE 3/31/94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY 340 DISCHARGE POINT 340-DECON  
NUMBER OF HEPA FILTER BANKS (n) 3

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Empirical Quantity (Curies)	Emitted Quantity (Curies)	Unabated Potential (Curies)	Projected Dose (mrem/yr)	EDE
1. <u>Sr-90</u>	<u><math>1.6 \cdot 10^{-3}</math></u>	<u><math>4.8 \cdot 10^{-7}</math></u>	<u><math>1.6 \cdot 10^{-3}</math></u>	<u><del>1.4</del> <math>1.4 \cdot 10^{-3}</math></u>	<u>0.872</u>
2. <u>Cs-137</u>	<u><math>5.9 \cdot 10^{-4}</math></u>	<u><math>1.8 \cdot 10^{-7}</math></u>	<u><math>5.9 \cdot 10^{-4}</math></u>	<u><math>2.8 \cdot 10^{-4}</math></u>	<u>0.477</u>
3. <u>Pu-239</u>	<u><math>3.4 \cdot 10^{-4}</math></u>	<u><math>1.0 \cdot 10^{-7}</math></u>	<u><math>3.4 \cdot 10^{-4}</math></u>	<u><math>5.9 \cdot 10^{-2}</math></u>	<u>173</u>
4. _____	_____	_____	_____	_____	
5. _____	_____	_____	_____	_____	
6. _____	_____	_____	_____	_____	
7. _____	_____	_____	_____	_____	
Total Dose				<u>0.06</u>	

COMMENTS

The two-sigma error is 61%.  
The emitted quantity is the minimum detectable activity because  
no emissions were reported above that level.

EVALUATOR Matthew Bennett  
MANAGER, ENVIRONMENTAL [Signature]  
FACILITY MANAGER [Signature]

DATE 3/29/94  
DATE 3-29-94  
DATE 3/31/94

**B6.0 400 AREA**

The 400 Area has one unregistered stack: 437-1-61. This stack is not a designated stack.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY MASF - 400 Area DISCHARGE POINT 437-1-61  
NUMBER OF HEPA FILTER BANKS (n) 2 Unregistered

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Empirical Quantity (Curies)	Emitted Quantity (Curies)	Unabated Potential (Curies)	Projected Dose (mrem/yr)	
1. <u>Cs-137</u>	<u><math>5.6 \cdot 10^{-7}</math></u>	<u>&lt; detect.</u>	<u><math>5.6 \cdot 10^{-7}</math></u>	<u><math>1.8 \cdot 10^{-8}</math></u>	<u>EDE = 0.0317</u>
2. _____	_____	_____	_____	_____	
3. _____	_____	_____	_____	_____	
4. _____	_____	_____	_____	_____	
5. _____	_____	_____	_____	_____	
6. _____	_____	_____	_____	_____	
7. _____	_____	_____	_____	_____	
Total Dose				<u><math>1.8 \cdot 10^{-8}</math></u>	

COMMENTS

Cs-137 detection threshold: MDC =  $7.0 \cdot 10^{-15}$   $\mu\text{Ci} \cdot \text{cc}^{-1}$ .  
No alpha or beta emissions expected.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR *[Signature]*  
MANAGER, ENVIRONMENTAL *[Signature]*  
FACILITY MANAGER *[Signature]*

DATE 26 April 1994  
DATE 4-26-94  
DATE 4-27-94

**B7.0 100 AREA**

The 100 Area has two unregistered stacks: 1706-KEL and 183 KE Radiological Counting Laboratory. Both are minor.

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

NONDESTRUCTIVE ASSESSMENT [NDA]  
(In Situ Gamma Spectroscopy)

FACILITY 100 R Area DISCHARGE POINT 1706-KEL  
NUMBER OF HEPA FILTER BANKS (n) 1

Emission and Effective Dose Equivalent (CAP88) values reported in the Radionuclide Air Emissions Report for the Hanford Site, CY 1992.

Radionuclide	Empirical Quantity (Curies)	Emitted Quantity (Curies)	Unabated Potential (Curies)	Projected Dose (mrem/yr)
1. <u>Cs-137</u>	<u><math>2.0 \cdot 10^{-7}</math></u>	<u>0</u>	<u><math>2.0 \cdot 10^{-7}</math></u>	<u><math>7.0 \cdot 10^{-9}</math></u>
2. _____	_____	_____	_____	_____
3. _____	_____	_____	_____	_____
4. _____	_____	_____	_____	_____
5. _____	_____	_____	_____	_____
6. _____	_____	_____	_____	_____
7. _____	_____	_____	_____	_____
Total Dose				<u><math>7.0 \cdot 10^{-9}</math></u>

COMMENTS

Cs-137 EDE = 0.0353  
No emissions recorded or other isotopes expected  
in air stream.

EVALUATOR JRM Bennett  
MANAGER, ENVIRONMENTAL A. Smith  
FACILITY MANAGER R.B. Thomas

DATE 2 Aug 94  
DATE 8-2-94  
DATE 8/2/94

STACK ASSESSMENT FOR  
40 CFR 61, SUBPART H

APPENDIX D  
SOURCE ASSESSMENT

FACILITY 183 KE Lab DISCHARGE POINT 183 KE Lab

FACILITY RADIOLOGICAL INVENTORY AT RISK

Radionuclide	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Unit Dose Conversion Factor	Projected Dose (mrem/yr)
1. Am-241	1.08E-7	1E-3	1.08E-10	1.93E+1	2.1E-9
2. Co-60	3.62E-8	1E-3	3.62E-11	4.28E-2	1.5E-12
3. Cs-137	2.11E-5	1E-3	2.11E-08	3.53E-2	7.4E-10
4. Pu-238	4.83E-9	1E-3	4.83E-12	1.18E+1	5.7E-11
5. Pu-239	2.20E-8	1E-3	2.20E-11	1.28E+1	2.8E-10
6. Sr-90	1.35E-5	1E-3	1.35E-8	6.45E-2	8.7E-10
7. H-3	7.76E-6	1E-3	7.76E-9	3.36E-5	2.6E-13
8.					
9.					
10.					
11.					
12.					
13.					
14.					
15.					
16.					
Total Dose					4.0E-9

Method Used to Project Dose - CAP88

COMMENTS

This a conservative estimate assuming liquid from the K-Basins of 5 ml each.  
442 samples processed from 1/1/95 to 10/31/95.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

EVALUATOR *[Signature]* DATE 12/19/95  
 ENVIRONMENTAL CONTROL OFFICER *[Signature]* DATE 12-18-95  
 EM W. Davis for L.P. Duda 12/20/95

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