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Title/Desc:
TFARM STACK NESHAP DESIGNATION DETERMINATIONS

Pages: 160

COMPLETE

ENGINEERING CHANGE NOTICE

1. ECN 627944

Proj. ECN

2. ECN Category (mark one)	3. Originator's Name, Organization, MSIN, and Telephone No.	3a. USQ Required?	4. Date
Supplemental [] Direct Revision [X] Change ECN [] Temporary [] Standby [] Supersedure [] Cancel/Void []	Gary M. Crummel, EE, R1-51, 373-5175	[] Yes [X] No	January 16, 1996
	5. Project Title/No./Work Order No.	6. Bldg./Sys./Fac. No.	7. Approval Designator
	NA	200 EAST & WEST TANK FARMS & EVAPORATOR	EQ
	8. Document Numbers Changed by this ECN (includes sheet no. and rev.)	9. Related ECN No(s).	10. Related PO No.
	WHC-SD-WM-EMP-031, Rev 1	NONE	NONE

11a. Modification Work	11b. Work Package No.	11c. Modification Work Complete	11d. Restored to Original Condi- tion (Temp. or Standby ECN only)
[] Yes (fill out Blk. 11b) [X] No (NA Blks. 11b, 11c, 11d)	NA	NA Cog. Engineer Signature & Date	NA Cog. Engineer Signature & Date

12. Description of Change

This revision incorporates and/or updates assessments for the following facilities:

- 241-AY/AZ stacks 296-A-17 and 296-P-26
- 244-A DCRT stack 296-A-25
- 241-C-103 mixer stack 296-C-07
- 241-SX stack 296-S-15
- 244-S DCRT stack 296-S-22
- 241-SY, the new stack 296-S-25
- 213-W stack 296-W-03

13a. Justification (mark one)

Criteria Change []	Design Improvement []	Environmental [X]	Facility Deactivation []
As-Found []	Facilitate Const []	Const. Error/Omission []	Design Error/Omission []

13b. Justification Details

New information became available which made these updates/inclusions possible.

14. Distribution (include name, MSIN, and no. of copies)

D. D. Bachand	R1-51	R. E. Larson	T4-07
S. P. Biglin	R1-43	Johan Lohrasbi	S5-05
L. E. Borneman	R1-52	R. J. Nicklas	R1-43
G. M. Crummel	R1-51 (6)	S. R. Pierce	S5-05
W. E. Davis	H6-20	L. D. Rakestraw	S5-05
L. P. Diediker	S3-95	Nasser Razfar	T4-07
J. E. Geary	S5-07	D. P. Reber	T4-08
C. J. Geier	R2-36	S. H. Rifaey	T4-07
R. D. Gustavson	R1-51	W. E. Ross	S5-07
G. N. Hanson	S5-05	L. W. Vance	T6-03
T. D. Kaiser	T4-07	J. H. Wicks	R2-50

RELEASE STAMP

DATE: HANFORD RELEASE ID:

STA: 4

JAN 19 1996

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A-7900-013-1

ENGINEERING CHANGE NOTICE

1. ECN (use no. from pg. 1)
627944

15. Design Verification Required	16. Cost Impact						17. Schedule Impact (days)	
	ENGINEERING			CONSTRUCTION				
[] Yes	Additional	[]	$	Additional	[]	$	Improvement	[]
[X] No	Savings	[]	$	Savings	[]	$	Delay	[]

18. Change Impact Review: Indicate the related documents (other than the engineering documents identified on Side 1)
that will be affected by the change described in Block 12. Enter the affected document number in Block 19.

SDD/DD	[]	Seismic/Stress Analysis	[]	Tank Calibration Manual	[]
Functional Design Criteria	[]	Stress/Design Report	[]	Health Physics Procedure	[]
Operating Specification	[]	Interface Control Drawing	[]	Spares Multiple Unit Listing	[]
Criticality Specification	[]	Calibration Procedure	[]	Test Procedures/Specification	[]
Conceptual Design Report	[]	Installation Procedure	[]	Component Index	[]
Equipment Spec.	[]	Maintenance Procedure	[]	ASME Coded Item	[]
Const. Spec.	[]	Engineering Procedure	[]	Human Factor Consideration	[]
Procurement Spec.	[]	Operating Instruction	[]	Computer Software	[]
Vendor Information	[]	Operating Procedure	[]	Electric Circuit Schedule	[]
OM Manual	[]	Operational Safety Requirement	[]	ICRS Procedure	[]
FSAR/SAR	[]	IEFD Drawing	[]	Process Control Manual/Plan	[]
Safety Equipment List	[]	Cell Arrangement Drawing	[]	Process Flow Chart	[]
Radiation Work Permit	[]	Essential Material Specification	[]	Purchase Requisition	[]
Environmental Impact Statement	[]	Fac. Proc. Samp. Schedule	[]	Tickler File	[]
Environmental Report	[]	Inspection Plan	[]		[]
Environmental Permit	[]	Inventory Adjustment Request	[]		[]

19. Other Affected Documents: (NOTE: Documents listed below will not be revised by this ECN.) Signatures below
indicate that the signing organization has been notified of other affected documents listed below.

Document Number/Revision	Document Number/Revision	Document Number Revision
NONE		

20. Approvals

Signature		Date	Signature	Date
OPERATIONS AND ENGINEERING			ARCHITECT-ENGINEER	
Cog. Eng. Gary M. Crummel	R1-51	1/16/96	PE	
Cog. Mgr. R.D. Gustavson	R1-51	1/16/96	QA	
QA L. W. Vance per telecon 1/16/96	T6-03		Safety	
Safety			Design	
Environ. L. P. Diediker	S3-95	1-18-96	Environ.	
Other C. J. Geier	S5-07	1/16/96	Other	
T. D. Kaiser 1/16/96	T4-07	1/16/96		
Johan Lohrasbi per telecon 1/16/96	S5-05			
			DEPARTMENT OF ENERGY	
			Signature or a Control Number that tracks the Approval Signature	
			ADDITIONAL	

TANK FARM STACK NESHAP DESIGNATION DETERMINATIONS

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WHC, Richland, WA 99352
U.S. Department of Energy Contract DE-AC06-87RL10930

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Abstract: This document provides a determination of the status of Tank Farm Exhausters as regulated by the "National Emission Standards for Hazardous Air Pollutants" (NESHAP) specified in the 40 Series Code of Federal Regulations (CFRs), Part 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities."

Release Approval 1/18/96 Date

DATE: STA: 4 HANFORD RELEASE ID: JAN 19 1996

Release Stamp

Approved for Public Release

RECORD OF REVISION

RECORD OF REVISION	(1) Document Number WHC-SD-WM-EM-031	Page 1
(2) Title Tank Farm Stack NESHAP Designation Determinations		

CHANGE CONTROL RECORD

(3) Revision	(4) Description of Change - Replace, Add, and Delete Pages	Authorized for Release (5) Cog. Engr.	(6) Cog. Mgr. Date
0	(7) EDT 603077, 11/30/93	NA	NA
1	Re-assessment of the potential emissions from various Tank Farms stacks, incorporation of ECN 161475, title change, and minor editing changes throughout (see ECN 623956).	GM CRUMMEL	RD GUSTAVSON
2 RS	Re-assessment of the potential emissions from various Tank Farm Stacks as well as incorporation of a couple of new stacks (see ECN 627944).	GM CRUMMEL 1/16/96	RD GUSTAVSON 1/16/96

EXECUTIVE SUMMARY

The National Emission Standards for Hazardous Air Pollutants (NESHAP), specified in 40 CFR Part 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities" require that radionuclide emissions from each stack on the Hanford Site be evaluated to determine compliance with the standard. If an emission point could potentially cause any member of the public to be exposed to greater than 0.1 mrem per year, then that emission point would be considered to be "designated" and must be monitored continuously as specified in the standard. If, on the other hand, an emission point is determined to potentially cause any member of the public to be exposed to less than 0.1 mrem per year then that emission point would be considered to be "non-designated" and only periodic confirmatory measurements are required to confirm these low emissions.

This document provides determination of the specific designations for the various Tank Farm stacks. A summary of the results of these determinations can be found on page 10, in Table 4.

In revision 0 and 0A, very conservative methods were employed to assess potential emissions from the included 31 Tank Farm stacks. Out of these, 16 were determined be designated. Less conservative methods, as well as new information, were found and used in revision 1 of this document. Therein, 5 of the originally designated stacks were reassessed to be non-designated. In addition, one of originally non-designated stacks was reassessed to be designated. The result was a net change in the total number of designated Tank Farm stacks to 12.

Revision 2 of this document includes three additional Tank Farm stacks that were not addressed in revision 1. These stacks include the 241-C-103 mixer stack 296-C-07, the new SY Tank Farm stack 296-S-25, and the 213-W waste compactor facility stack 296-W-03. These three stack were all determined to be non-designated. With this, the total number of stacks documented herein went up from 31 to 34. Also included in this revision were reassessments of 5 other stacks. Of these, two stacks were determined to be non-designated (the AY-AZ stacks 296-A-17 and 296-P-26), two remained designated (the SX Tank Farm stack 296-S-15 and the 244-S DCRT stack 296-S-22), and the fifth (the 244-A DCRT stack 296-A-25) was determined should have its pre-revision 1 status of designated again. The total number of designated Tank Farms stacks assessed in revision 2 of this document is 11.

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1.0 PURPOSE

The primary purpose of this document is to identify the appropriate Tank Farm exhauster stack designations as required by the "National Emission Standards for Hazardous Air Pollutants" (NESHAP), 40 Series Code of Federal Regulations (CFRs), Part 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other Than Radon From Department of Energy Facilities."

The NESHAP regulation sets the radionuclide emission limit for the entire Hanford Site to 10 mrem offsite to any member of the public. NESHAP requires that if any one emission point could potentially cause any member of the public to be exposed to greater than 0.1 mrem per year, then that emission point must measure the emissions continuously per those methods and standards specified in the regulations. EPA approval or equivalency can be obtained for measurements by other means if it is shown that the emissions are not significantly underestimated by those other means. If the emission point is shown to result in potentially less than or equal to 0.1 mrem per year, than only periodic confirmatory measurements are required.

2.0 SCOPE

This document determines the potential emissions from the following stacks:

296-A-12	244-AR Vessel Vent
296-A-13	244-AR Cell & Canyon Exhauster
296-A-17	241-AY/AZ Tank Farms Exhauster
296-P-26	241-AY/AZ Tank Farms Backup Exhauster (4000 CFM)
296-A-18	241-AY-101 Tank Annulus Exhauster
296-A-19	241-AY-102 Tank Annulus Exhauster
296-A-20	241-AZ Tank Farm Annulus Exhauster
296-A-21	242-A Evaporator Building Ventilation
296-A-22	242-A Evaporator Vessel Ventilation
296-A-25	244-A Double Contained Receiver Tank Exhauster
296-A-26	204-AR Rail Car Unloading Facility Exhauster
296-A-27	241-AW Tank Farm Exhauster
296-A-28	241-AW Tank Annulus Exhauster
296-A-29	241-AN Tank Farm Exhauster
296-A-30	241-AN Tank Annulus Exhauster
296-A-40	241-AP Tank Farm Exhauster
296-A-41	241-AP Tank Annulus Exhauster
296-B-28	244-BX Double Contained Receiver Tank Exhauster
296-C-05	244-CR Vault Exhauster
296-C-07	241-C-103 Vapor Mixing System
296-P-16	241-C-105/106 Tank Exhauster
296-P-17	241-A-105 Tank Exhauster (currently inactive)
296-P-22	241-SY Tank Annulus Exhauster
296-P-23	241-SY Tank Farm Exhauster
296-S-25	241-SY New Tank Farm Exhauster
296-P-28	241-SY Tank Farm Backup Exhauster
296-P-31	209-E Building Exhauster
296-S-15	241-SX Tank Farm Exhauster
296-S-18	242-S Evaporator Building Ventilation
296-S-22	244-S Double Contained Receiver Tank Exhauster
296-T-17	242-T Evaporator Building Ventilation
296-T-18	244-TX Double Contained Receiver Tank Exhauster
296-U-11	244-U Double Contained Receiver Tank Exhauster
296-W-03	213-W Waste Compactor

Each stack section below includes a brief description of the stack system, a discussion on the tank waste volumes (i.e., total, pumpable) if applicable, a discussion on the calculation of the source term if applicable, the calculation of the potential offsite doses for different scenarios, and identification of each tank system as "Designated" or "Non-designated."

Data sheets are included for each scenario for each stack system. These sheets show the activity for each radionuclide, the CAP-88 factors used, the appropriate release factors (e.g. 40 CFR 61, Appendix D factors), the calculated EDE for each radionuclide, and the percent of the total EDE for each radionuclide. Appendix A of this document includes NESHAP forms for the potential emission calculations and include WHC Quality Assurance (QA), Facility, and Environmental signature approval.

3.0 STACK DESIGNATION DETERMINATION METHODS

There are two primary methods used (except where noted otherwise) in this document to determine the potential emissions from each stack. These methods are discussed in the next subsections.

3.1 POTENTIAL EMISSIONS FROM SOURCE TERM DATA

A primary method employed in the determinations accomplished in this document are fashioned after that method given in Appendix D to Part 61 of 40 CFR. Unless noted otherwise, in the various stack section in this document, the Appendix D method was used. The Appendix D method provides a regulatory approved method for estimating radionuclide emissions. This method is used for dose calculations. Two parameters for each radionuclide must be known: the activity level and the physical state. The activity level is determined from the inventory of radionuclides in each tank. Appendix D provides release factors that depend on the physical state of the radionuclide. These factors are "1" for gases, "1E-3" for liquids or particulates, and "1E-6" for solids. The activity level is multiplied by the release factor to calculate the amount of activity for each radionuclide that would be available for emission to the atmosphere if no controls (e.g., HEPA filtration) were available. The releasable amount is multiplied by a dose conversion factor (i.e., the CAP-88 factor) for that radioisotope to estimate the potential offsite dose due to that specific radioisotope. The potential doses for all of the radioisotopes are added to calculate the total potential offsite dose due to entire source inventory in a tank or Tank Farm.

The stack systems are divided into five different types: tank primary exhausters, double-shell tank annuli exhausters, back-up systems, double contained receiver tanks (DCRTs), and containment facilities. The methods used for the calculations for each of these types of stack systems are described separately below.

The design and configuration of each stack system were reviewed to determine which tanks are ventilated through each exhauster. Radionuclide data for the waste in each tank is available from published WHC documents. Where available and applicable, the radiological source terms for each stack system were evaluated in terms of their constituents (e.g., supernatant versus slurry/sludge, pumpable liquid versus total waste). For the DCRTs, different scenarios have been proposed based on scheduled waste transfers. Only the volume of the waste that is "pumpable" (i.e., drainable liquid minus the solid heel) through the transfer system is used in the DCRT calculations. For each stack system, the source term for each radionuclide is multiplied by the appropriate CAP-88 dose conversion factor obtained from WHC-EP-0498, Unit Dose Calculation Methods and Summary of FEMP Determinations. This converts the activity (in Curies) to a potential offsite dose (in mrem). The sum of the contributions from the radionuclides in the specific waste tanks is calculated to determine the potential offsite dose for a specific stack system.

The activities for the source terms for the primary exhausters and the DCRTs were taken from two Westinghouse Hanford Company (WHC) documents:

- Van Vleet, R. J., August 10, 1993, Radionuclide and Chemical Inventories for the Single Shell Tanks, WHC-SD-WM-TI-565, Rev. 1, Westinghouse Hanford Company, Richland, WA.

- Van Vleet, R. J., August 10, 1993, Radionuclide and Chemical Inventories for the Double Shell Tanks, WHC-SD-WM-TI-543, Rev. 1, Westinghouse Hanford Company, Richland, WA.

The radionuclide activities listed in these documents were obtained from several different sources and summarized by tank for each Tank Farm. In some cases, the activities were listed for supernatant and for slurry/sludge. For others, only the total radionuclide activity level was available. When separate data for each are available, supernatant source terms are considered to be liquid and slurry/sludge are considered to be solids. For the sake of conservatism, when only the total activity in waste is available and the separate forms are not distinguished from each other, the physical form of the waste is considered to be liquid. Radioactivity levels used were based on sample analyses results or WHC Track Radioactive Components (TRAC) computer records. Descriptions of the activities based on sample analyses included the dates of the samples; the TRAC computer record activities were all dated January 1990. Decay corrections were made on all data and the activities were decay-corrected to September 1993.

The specific volumes of the wastes in each tank were obtained from the following reference:

- Hanlon, B. M., October 1993, Tank Farm Surveillance and Waste Status Summary Report for June 1993, WHC-EP-0182-63, Westinghouse Hanford Company, Richland, WA.

Ratios of pumpable liquid volume to total volume were required for the calculations for the DCRTs; the specific data for each tank are included in the appropriate section for each stack system.

No HEPA filter factor as designated in Appendix D (i.e., 0.01) was used in the calculations. For the NESHAP calculations, it is assumed that there is no filtration in place as specified in 40 CFR 61.93(b)(4)(ii) concerning engineered emission controls.

3.1.1 PRIMARY EXHAUSTERS

Ten stack systems are classified as primary exhausters for different Tank Farm facilities. Listed below are the systems and their identification numbers.

- 241-AY/AZ Tank Farm Primary Ventilation (296-A-17)
- 242-A Evaporator Vessel Ventilation (296-A-22)
- AW Tank Farm Primary Ventilation (296-A-27)
- AN Tank Farm Primary Ventilation (296-A-29)
- AP Tank Farm Primary Ventilation (296-A-40)
- 241-C-104/105/106 Portable Exhauster (296-P-16)
- 241-A-104/105/106 Ventilation (296-P-17)
- 241-SY Tank Farm Primary Ventilation (296-P-23)
- 241-SY New Tank Farm Primary Ventilation (296-S-25)
- 241-SX Tank Farm (296-S-15)

3.1.2 DOUBLE-SHELL TANK ANNULI EXHAUSTERS

Seven stack systems are classified as annuli exhausters for different Tank Farm facilities. Listed below are the systems and their identification numbers.

- 241-AY-101 Tank Annulus Ventilation (296-A-18)
- 241-AY-102 Tank Annulus Ventilation (296-A-19)
- 241-AZ Tank Farm Annulus Ventilation (296-A-20)
- AW Tank Farm Annulus Ventilation (296-A-28)
- AN Tank Farm Annulus Ventilation (296-A-30)
- AP Tank Farm Annulus Ventilation (296-A-41)
- SY Tank Farm Annulus Ventilation (296-P-22)

For the calculation of the potential annual offsite dose for each of these facilities, it is not expected that any of the primary containment vessels in any of the Double-Shell tanks will leak. The design life of each vessel is a minimum of 50 years and the tanks have undergone integrity assessments. If a leak is found, the affected annulus source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

3.1.3 BACK-UP EXHAUSTERS

Two stack systems are classified as back-up exhausters for different Tank Farm facilities. Listed below are brief descriptions of the systems and the identification numbers.

- 241-AY/AZ Tank Farm Primary Backup Exhauster (296-P-26)
- 241-SY Tank Farm Primary Backup Ventilation (296-P-28)

3.1.4 DOUBLE CONTAINED RECEIVER TANKS (DCRTS)

Seven stack systems are classified as exhausters for DCRTs for different Tank Farm facilities. Listed below are the systems and their identification numbers.

- 244-AR Vault Ventilation (296-A-12)
- 244-A DCRT & Annulus (296-A-25)
- 244-BX DCRT & Annulus (296-B-28)
- 244-CR Vault Ventilation (296-C-05)
- 244-S DCRT & Annulus (296-S-22)
- 244-TX DCRT & Annulus (296-T-18)
- 244-U DCRT & Annulus (296-U-11)

For the calculations of the potential offsite doses for these facilities, the radiological source term data were obtained from the Van Vleet references. These data were decay-corrected to September 1993.

The 244-AR Vault ventilation system has not been used to transfer waste for a number of years and is currently not in operation. Currently, the vault tanks contain some waste.

The calculations for the other 6 DCRTs were performed using the following method. The schedule for Tank Farm waste transfers for the next several years was obtained from the WHC Single-Shell Tank Stabilization Program. The DCRTs through which these transfers will be made is known. The fraction of the total activity to be transferred was calculated by dividing the pumpable liquid volume by the total volume of the waste for each tank involved in the transfer. This volume data was obtained by the June 1993 report on the Tank Farm Surveillance and Waste Status Summary (i.e., WHC-EP-0182-63) and the data for the specific tanks involved for a DCRT are listed in the report. The fraction for each radionuclide in each of the transfer tanks was calculated and the total "transfer" contributions were summed.

The amount of waste that is able to be in a DCRT at any time is limited to the maximum allowable volume of the DCRT itself; this is limited by physical and administrative limits. The administrative limit is normally 95% of the physical volume and is established to prevent overflow of the system. The administrative limit is the volume used in the calculations. The volumes for the specific DCRTs are used in the calculations. The fraction of the "total" Effective Dose Equivalent (EDE) is calculated based on the ratio of the volume of the DCRT to the total pumpable liquid volume of the waste from the tanks. The pumpable liquid volume is the drainable liquid volume remaining in a tank minus the volume of the undrainable heel.

Static and *dynamic* situations are evaluated for each scenario.

A *static* situation exists when a specific volume of waste is "stored" in the DCRT and no more waste is being transferred.

A *dynamic* situation exists when the waste is being transferred from one waste system to another and the waste is going through the DCRT.

With regard to the static situation, there is currently no restriction on the length of time that the waste can be stored in a DCRT. In this case, the calculated potential dose is based on the "administrative" volume of the DCRT, the average radioactivity concentration of the waste, and the length of time that the waste is stored.

For the dynamic situation, the operating range of the transfer system in terms of transfer velocity is 0.5 to 3 gal/min. This has been established to protect the system (e.g., screens, valves, etc.) from damage during the transfer. In the calculations, a transfer velocity of 0.5 gal/min is used as a conservative value. The limiting factors for the dynamic situation are the volume of the DCRT, the volume of waste being transferred, and the transfer velocity of the waste. If the volume of the waste to be transferred is greater than the volume that can be transferred in one year, then it will take more than one year to make the transfer, and the static calculation is the annual potential dose. If the volume of the waste is less than the volume that can be transferred in one year, then the dose will be less than the static level calculated - if the waste is indeed transferred in less than a year. The following examples are provided to help illustrate this.

1) Transfer of waste from tanks BY-102 and 109 through the 244-BX DCRT (Stack 296-B-28)

- BY-102: 22 Kgal pumpable liquid
- BY-109: 57 Kgal pumpable liquid
- Volume of 244-BX DCRT: 26.0 Kgal
- Total dose for the 79 Kgal: 4.89E-1 mrem/yr

Static and dynamic situations:

Static: [(4.89E-01 mrem/yr)(26.0 Kgal/79 Kgal)]
= 0.16 mrem/yr

Dynamic: [(4.89E-01 mrem/yr)(26.0 Kgal/79 Kgal)]
x (79 Kgal)/[(0.5E-03 Kgal/min)(60 min/hr)
x (24 min/d)(365 d/yr)]
= 4.8E-02 mrem over 108 days

2) Transfer of waste from tanks U-102 and 110 through the 244-U DCRT (Stack 296-U-11)

- U-102: 122 Kgal pumpable liquid
- U-110: 9 Kgal pumpable liquid
- Volume of 244-U DCRT: 13.03 Kgal
- Total dose for the 131 Kgal: 1.871 mrem/yr

Static and dynamic situations:

Static: [(1.871)(26 Kgal/131 Kgal)] = 0.371 mrem/yr

Dynamic: [(1.871)(26 Kgal/131 Kgal)]
x (131 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)
= 0.185 mrem over 182 days

Example 1 is a situation where if the static situation exists; that is, the waste resides in the DCRT over a full year, then the stack would be need to be identified as designated. If the dynamic situation exists where the waste is transferred through the system at an average rate of not less than 0.5 gal/min, then the stack would be classified as non-designated.

Example 2 shows that the DCRT could be classified as designated for either the static or dynamic situation if this specific waste is transferred or stored in this DCRT.

3.1.5 CONTAINMENT FACILITIES

Five stack systems are classified as exhausters for different Tank Farm containment facilities. Listed below are brief descriptions of the systems and the identification numbers.

- 244-AR Vault Canyon and Cell Exhauster (296-A-13)
- 242-A Evaporator Building Ventilation (296-A-21)
- 204-AR Unloading Facility (296-A-26)
- 242-S Evaporator Building Ventilation (296-S-18)
- 242-T Evaporator Facility (296-T-17)
- 209-E Bldg. Critical Mass Laboratory (296-P-31)

In these cases either room air sample data of surface area contamination smear data is used to derive potential radionuclide emissions. In the case of smear data, inventories are calculated from smear contamination data by assuming these levels to be uniformly spread over 100 percent of ventilated surface areas (floors, ceilings, walls, and large vessels) in the buildings. These inventories are then multiplied by the 40 CFR 61, Appendix D factors to arrive at potential emissions.

For the 209-E Building Critical Mass Laboratory, a building nuclear materials inventory and the contents of a worst-case radioactive solid waste package (CR Vault HEPA filter package assay and sample counting report) were used to determine the maximum inventory. Plans are established to use the critical assembly room and the mix room to assay, sample, and repackage low-level radioactive solid waste containers.

3.2 POTENTIAL EMISSIONS FROM HEPA FILTER ASSAY RESULTS

Another method for determining the potential emissions for a particular emission unit is to determine what the filters collected. This method is based directly on the requirement specified in 40 CFR 61.93 that directs potential emissions be determined without any emission controls in place. Emission controls for this Tank Farm exhauster consist primarily of two High Efficiency Particulate Air (HEPA) filter installed in series. Each HEPA filter bank is rated at 99.97% efficient for removal of 0.3 micron sized particles and are periodically tested to 99.95%. Since HEPA filters are tested to be 99.95% efficient in removal of particulates, it can be shown that the curie content collected on these filters represent 99.95% of the potential emission during the time the HEPAs were in use while the exhauster was in operation. In other words, potential emissions are 1.0005 times what the first filter stage catches. If the quantity on two HEPAs in series is know, the potential emissions can still be computed by multiplying the captured quantity by 1.00000025. Both these factors result in little to no change in emissions from that captured on HEPA.

HEPA filter storage and disposal assay results are used to determine this. Assays are accomplished when the HEPA filters are changed out. Assays are necessary to fully characterize the waste for storage and ultimate disposal. Standard methods are used for these assays.

It is expected that potential emission results from these assays provides a more realistic account than use of source term data using 40 CFR 61, Appendix D release factors. This is because Appendix D release factors is generally regarded as a very conservative method.

4.0 POTENTIAL EMISSION SUMMARY

Table 4 presents the various stacks assessed herein, specifies the specific section for each stack, the resulting potential emission result, and whether this result means the stack is designated or not. A stack system is considered to be designated if the calculation of the Effective Dose equivalent (EDE) is greater than 0.1 mrem. A designated stack means that emissions from it must be measured in accordance with the 40 CFR 61, Subpart H requirements.

TABLE 4: TANK FARM STACK DESIGNATION SUMMARY

STACK	SECTION	FACILITY	DESIGNATION	POTENTIAL (mrem/yr)
296-A-12	5.0	244-AR Vault	DESIGNATED	5.4
296-A-13	6.0	244-AR Vault Canyon and Cell	NON-DESIGNATED	4.5E-03
296-A-17	7.0	241-AY/AZ Tank Farm Primary	NON-DESIGNATED	1.5E-03
296-P-26	8.0	241-AY/AZ Tank Farm Primary Backup	NON-DESIGNATED	1.5E-03
296-A-18	9.0	241-AY-101 Tank Annulus	NON-DESIGNATED	0
296-A-19	10.0	241-AY-102 Tank Annulus	NON-DESIGNATED	0
296-A-20	11.0	241-AZ Tank Farm Annulus	NON-DESIGNATED	0
296-A-21	12.0	242-A Evaporator Building	NON-DESIGNATED	1.9E-06
296-A-22	13.0	242-A Evaporator Vessel	DESIGNATED	50.2
296-A-25	14.0	244-A DCRT & Annulus	DESIGNATED	0.106
296-A-26	15.0	204-AR Unloading Facility	NON-DESIGNATED	1.1E-08
296-A-27	16.0	AW Tank Farm Primary	NON-DESIGNATED	0.0418
296-A-28	17.0	AW Tank Farm Annulus	NON-DESIGNATED	0
296-A-29	18.0	AN Tank Farm Primary	NON-DESIGNATED	4.09E-04
296-A-30	19.0	AN Tank Farm Annulus	NON-DESIGNATED	0
296-A-40	20.0	AP Tank Farm Primary	DESIGNATED	47.5
296-A-41	21.0	AP Tank Farm Annulus	NON-DESIGNATED	0
296-B-28	22.0	244-BX DCRT & Annulus	DESIGNATED	0.84
296-C-05	23.0	244-CR Vault	DESIGNATED	19
296-C-07	24.0	241-C-103 Vapor Mixing System	NON-DESIGNATED	1.8E-03
296-P-16	25.0	241-C-104/105/106 Portable	DESIGNATED	1.68
296-P-17	26.0	241-A-104/105/106	NON-DESIGNATED(1)	202

TABLE 4: TANK FARM STACK DESIGNATION SUMMARY

STACK	SECTION	FACILITY	DESIGNATION	POTENTIAL (mrem/yr)
296-P-22	27.0	241-SY Tank Farm Annulus	NON-DESIGNATED	0
296-P-23	28.0	241-SY Tank Farm Primary	NON-DESIGNATED	1.5E-03
296-S-25	29.0	241-SY Tank Farm Primary	NON-DESIGNATED	1.5E-03
296-P-28	30.0	241-SY Tank Farm Primary Backup	NON-DESIGNATED	1.5E-03
296-P-31	31.0	209-E Critical Mass Laboratory	NON-DESIGNATED	1.77E-03
296-S-15	32.0	241-SX Tank Farm	DESIGNATED	1.57
296-S-18	33.0	242-S Evaporator Building	NON-DESIGNATED	0.074
296-S-22	34.0	244-S DCRT & Annulus	DESIGNATED	0.95
296-T-17	35.0	242-T Evaporator Facility	NON-DESIGNATED	0.072
296-T-18	36.0	244-TX DCRT & Annulus	DESIGNATED	0.38
296-U-11	37.0	244-U DCRT & Annulus	DESIGNATED	0.371
296-W-03	38.0	213-W Waste Compactor	NON-DESIGNATED	1.15E-09

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

5.0 STACK 296-A-12

5.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-12 stack system ventilates the 244-AR Vault vessels, providing negative pressure and removal of moisture from the vessels' offgas. The 244-AR Vault is located near the 241-A Tank Farm in the 200 East area.

The 244-AR Vault is considered to be a double-contained receiver tank (DCRT) in the Hanford Site Tank Farm Facilities Interim Safety Basis (WHC-SD-WM-ISB-001) based on its functional characteristics, although it is not listed as one of the five designated DCRTs in the 200 Area tank system. The 244-AR Vault was first used to transfer waste in 1966. Strontium sludge processing operations in the AR-Vault were complexed in April 1978, with the goal of removing the bulk of the A- and AX-Farm strontium accomplished. About 600 gallons of sludge from Tank 104-AX remain stored in AR-Vault Tank 004.

There are a total of four tanks in the 244-AR Vault which are ventilated by the 296-A-12 stack. Tanks 001 and 002 have a nominal volume of 50,000 gallons (limited respectively to 40,990 and 41,226 gallons by WHC operating specifications). Tanks 003 and 004 have a nominal volume of 5,000 gallons (limited respectively to 4,553 and 4,427 gallons by WHC operating specifications).

Tank 001 contains 2 to 3 thousand gallons of waste with an unknown source term. Tank 002 contains the waste that was originally in tank 004 (transfer occurred in the late 70s. Tank 003 currently holds stormwater runoff pumped from the 244-AR canyon and residual contamination from previous transfers. Tank 004 contains only the remains of the original AX-104 tank waste. Each of the vessels is held in its own cell and isolated from the 244-AR Vault canyon via a cell cover. Each of the vessels is ventilated via a common pipe which passes through ports in the cell walls, then through a heater followed by parallel pre-filters/HEPA filters, and a single blower system before venting in the 296-A-12 stack. The 296-A-12 stack system is used very infrequently due to the lack of a current mission for the facility. Currently, this facility is currently not in operation.

5.2 CALCULATION OF SOURCE TERM

The source term used herein is from tank 004, which contains the bulk of the curie content in this facility - about 200 Curies per gallon. Sample results taken from this tank in 1977 and decay corrected for 18 years are as follows:

ISOTOPE	Ci/gal
Sr-90	1.96E+02
Cs-137	3.22E+00

Since this waste is from tank 104-AX, other radionuclides sample concentrations can be obtained from WHC-SD-WM-TI-565, Rev 1.

5.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: Using the 40 CFR 61, Appendix D methodology, the potential EDE without HEPAs in place comes to the following:

Potential offsite dose = 5.4 mrem/yr

Since this exhauster operates in-frequently, a total operating time of 6.76 days would be required to cause the potential emissions for this stack to exceed 0.1 mrem/yr. This is computed as follows:

0.1 mrem/[5.4 mrem/yr * 1 yr/365 dys] = 6.76 dys

5.4 TANK FARM STACK STATUS: DESIGNATED

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244-AR VAULT VESSEL VENTILATION STACK 296-A-12 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
Sr-89/90	1.2E+05*	4.38E-02	1E-03	5.2E+00	95.9
Sb-125	1.2E-03	4.15E-03	1E-03	5.0E-09	
Cs-137	1.9E+03*	2.39E-02	1E-03	4.6E-02	0.8
Eu-154/155	1.5E-03	4.38E-02	1E-03	6.6E-05	
Np-237	1.8E-02	11.9	1E-03	2.2E-04	
U-238	3.2E-06	2.84	1E-03	9.1E-09	
Pu-239/240	2.1E+01	8.67	1E-03	1.8E-01	3.3
				TOTAL	5.4E+00

* DECAYED CORRECTED FOR 18 YRS

6.0 STACK 296-A-13

6.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-13 stack system ventilates the 244-AR Vault canyon and containment cells associated with the four 244-AR vessels. The 244-AR Vault is located near the 241-A Tank Farm in the 200 East area.

The 244-AR Vault is considered to be a double-contained receiver tank (DCRT) in the Hanford Site Tank Farm Facilities Interim Safety Basis (WHC-SD-WM-ISB-001) based on its functional characteristics, although it is not listed as one of the five DESIGNATED DCRTs in the 200 Area tank system. The 244-AR Vault was first used to transfer waste in 1966. As with the 296-A-12 stack (also part of this facility) this stack is currently not operating. Future uses of this Vault is undetermined at this time.

Contained spaces which are ventilated by the 296-A-13 consist of the 244-AR canyon with dimensions of 94 feet x 18 feet x 36 feet high, two cells with dimensions of 21 feet x 21 feet x 32.8 feet deep each containing one of the two large process tanks, and a cell with dimensions of 32 feet x 12 feet x 21 feet deep containing tanks 3 and 4.

Air is drawn in from the non-radiologically controlled 244-AR ventilation system and passes through a heater, pre-filter, and water scrubber system before entering the 244-AR canyon. The air then passes through the three containment cells and then through two HEPA filter banks before being exhausted at the 296-A-13 stack.

6.2 CALCULATION OF SOURCE TERM

Radionuclide inventory is based on beta/gamma levels found in survey data taken on 5/15/87 and reported on 11/01/94 in Internal Memo 33680-95-047 from Radiological Engineering and ALARA, subject "CCIP Database Update for Second Quarter 1995", dated June 5, 1995. This data shows loose surface beta/gamma contamination at 1 million disintegrations per minute per 100 square centimeters. Assuming worse case scenario, beta (Sr-90/Y-90) as the representative nuclides together with the contamination assumed to be uniformly distributed over all ventilated surface areas, the total curie content available for release from this stacks is shown in the following table.

NUCLIDE	TOTAL AREA (cm^2)	ACTIVITY (dpm /100 cm^2)	TOTAL ACTIVITY (Ci)
Sr-90	2.3×10^7	1,000,000	0.104
Y-90	2.3×10^7	1,000,000	0.104

6.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: Sr-90/Y-90 inventories are included in the calculation. No HEPA filter factors are included in the calculation.

Potential offsite dose = 4.5E-03 mrem/yr

6.4 TANK FARM STACK STATUS: NON-DESIGNATED

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244-AR CANYON AND VAULT STACK 296-A-13 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	0.104	4.380E-02	1.E-03	4.5E-03	99.1
90-Y	0.104	3.770E-04	1.E-03	3.9E-05	0.9
		TOTAL		4.5E-03	100

7.0 STACK 296-A-17

7.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-17 stack serves the 241-A-702 primary ventilation system for tanks in the 241-AY and 241-AZ Tank Farms and several diverter stations and catch tanks associated with these facilities. The 241-A-702 system provides negative pressure, removal of decay heat from radionuclides and removal of water vapor evaporating from the liquid waste. The 241-AY and 241 AZ Tank Farms are located in the 200 East area, northeast of the PUREX facility.

The 241-AY and 241-AZ Tank Farms contain double-shell tanks. The 241-AY Tank Farm received waste from 1968 to 1970 and the 241-AZ Tank received waste from 1971 to 1977. There are a total of four 1-M gallon tanks in the 241-AY/AZ Tank Farm. The 241-A-702 system serves as primary ventilation for these tanks. The ventilation system includes three condensers operating in parallel, two deentrainers, a steam air heater, six parallel trains of HEPA filter assemblies (each with two sets in series), and two exhaust fans feeding the 296-A-17 stack.

7.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL)	
	TANK TOTAL	PUMPABLE
241-AY-101	910	827
241-AY-102	835	803
241-AZ-101	972	937
241-AZ-102	962	871
TOTAL	3,679	3,438

7.3 CALCULATION OF POTENTIAL OFFSITE DOSE

REVISED ASSESSMENT: As mentioned in section 3.2, a method for determining the potential emissions for a particular emission unit is to determine what the filters collected. This method is based directly on the requirement specified in 40 CFR 61.93 that directs potential emissions be determined without any emission controls in place. Emission controls for this exhauster consist of a two High Efficiency Particulate Air (HEPA) filter installed in series - with six such parallel banks. Each HEPA filter bank is periodically tested to a particulate removal efficiency of 99.95%.

In August of 1995, all six parallel banks were changed out. The removed HEPA filters were placed in containers #ETFF-95-248-01. This container was fully characterized by standard methods used for processing this type of waste for storage and ultimate disposal. This characterization was used here to determine the potential emissions from this emission points. The following table summarizes the assay results as total curie content on these HEPA filters.

ISOTOPE	TOTAL (Ci)
Co-60	2.00E-06
Sr-90	5.68E-03
Y-90	5.68E-03
Cs-134	1.81E-05
Cs-137	1.33E-02
Ba-137m	1.26E-02
Eu-154	5.04E-06
Pu-238	1.64E-07
Pu-239	1.99E-06
Pu-240	4.46E-07
Pu-241	1.92E-05
Am-241	1.06E-08
Pu-242	2.61E-11

Since HEPA filters are tested to be 99.95% efficient in removal of particulates, it can be shown that the curie content collected on the first set of filters represent at least 99.95% (two in series represent 99.999975%) of the potential emission during the time the HEPAs were in use while the exhauster was in operation. This exhauster runs intermittently - while the 296-P-26 exhauster runs the rest of the time. Therefore, to determine the annual emissions from the curie content of these HEPAs it is necessary to know how long the exhauster ran while these HEPAs were in place. The following is used to derive this:

- The 296-A-17 HEPAs were installed on 5/26/94.
- These same filters were changed out on 8/13/95.
- During this time period that these HEPAs were installed the 296-P-26 operation time can be determined from the CASS exhauster log data to be 256 days.
- Also from the CASS exhauster log, it can be determined that during this same time period that these HEPAs were installed, the 296-A-17 operation time came to 444 - 256 = 188 days.
- 188/365 = 0.515 yr

The potential emissions from this facility for an entire operating year can now be computed as follows (see EDE computations for HEPA Assay results below):

Potential emissions = 0.00078 mrem/188 days * 365 days/yr
= 0.0015 mrem/yr

ORIGINAL ASSESSMENT: This assessment is left in for historical/informational purposes. This original method used the source term found in the tanks combined with the release fractions found in 40 CFR 61 Appendix D. The radioactivity in the supernatant of the waste and in the slurry/sludge in AY and AZ Tank Farms is included in the calculation. No HEPA filter factors are included in the calculation. The potential offsite dose result from this amounted to 226 mrem/yr.

7.4 TANK FARM STACK STATUS: **NON-DESIGNATED**

241-AY/AZ TANK FARM STACK 296-A-17 POTENTIAL EMISSIONS - FROM HEPA FILTER ASSAY DATA RESULTS

R-nuclide	Sum of Ci*	CAP-88 c-factor	EDE (mrem/yr)	% of Total EDE
H-3	2.99E+00	2.19E-05	6.55E-05*	8.4
60-Co	2.00E-06	2.90E-02	5.80E-08	
90-Sr	5.68E-03	4.38E-02	2.49E-04	32.1
90-Y	5.68E-03	3.77E-04	2.14E-06	0.3
129-I	4.00E-04**	2.91E-01	1.16E-04	14.9
134-Cs	1.81E-05	3.13E-02	5.67E-07	
137-Cs	1.33E-02	2.39E-02	3.18E-04	40.9
154-Eu	5.04E-06	4.38E-02	2.21E-07	
238-Pu	1.64E-07	8.02E+00	1.32E-06	0.2
239-Pu	1.99E-06	8.67E+00	1.73E-05	2.2
240-Pu	4.46E-07	8.67E+00	3.87E-06	0.5
241-Pu	1.92E-05	1.38E-01	2.65E-06	0.3
241-Am	1.06E-08	1.31E+01	1.39E-07	
242-Pu	2.61E-11	8.67E+00	2.26E-10	
		TOTAL	7.77E-04	

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

** From DOE/RL-95-49, "Radionuclide Air Emissions Report for the Hanford Site Calendar Year 1994."

Potential emissions = 0.00078 mrem/188 days * 365 days/yr
= 0.0015 mrem/yr

241-AY/AZ TANK FARM STACK 296-A-17 POTENTIAL EMISSIONS - Original Assessment

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.4970E+01	.2620E-02	1.E-03	1.302E-05	5.755E-06
60-Co	.1740E+04	.2900E-01	1.E-03	5.046E-02	2.230E-02
89/90-Sr	.3950E+05	.4380E-01	1.E-03	1.730E+00	7.646E-01
90-Y	.3950E+05	.3770E-03	1.E-03	1.489E-02	6.581E-03
99-Tc	.1290E+06	.1090E-02	1.E-03	1.406E-01	6.214E-02
129-I	.2480E+01	.2910E+00	1.E+00	7.217E-01	3.190E-01
134-Cs	.2890E+01	.3130E-01	1.E-03	9.046E-05	3.998E-05
137-Cs	.9240E+07	.2390E-01	1.E-03	2.208E+02	9.760E+01
154-Eu	.1880E+05	.4380E-01	1.E-03	8.234E-01	3.639E-01
Nat-U	.1880E+01	.2840E+01	1.E-03	5.339E-03	2.360E-03
237-Np	.2440E+00	.1190E+02	1.E-03	2.904E-03	1.283E-03
238-Pu	.2630E+00	.8020E+01	1.E-03	2.109E-03	9.322E-04
239/240-Pu	.2500E+01	.8670E+01	1.E-03	2.168E-02	9.580E-03
241-Pu	.1180E+02	.1380E+00	1.E-03	1.628E-03	7.197E-04
241-Am	.1460E+03	.1310E+02	1.E-03	1.913E+00	8.453E-01
		TOTAL		2.263E+02	1.000E+02

8.0 STACK 296-P-26

8.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-P-26 stack serves as the 241-A-702 backup ventilation system for tanks in the 241-AY and 241-AZ Tank Farms and several diverter stations and catch tanks associated with these facilities. The 241-A-702 system provides containment of radionuclides, removal of decay heat from radionuclides and removal of water vapor evaporating from the liquid waste. The 241-AY and 241 AZ Tank Farms are located in the 200 East area, northeast of the PUREX facility.

The 241-AY and 241 AZ Tank Farms contain double-shell tanks. The 241-AY Tank Farm received waste from 1968 to 1970 and the 241-AZ Tank received waste from 1971 to 1977. There are a total of four 1 M gallon tanks in the 241-AY/AZ Tank Farm. The 241-A-702 system serves as primary ventilation for these tanks. The 241-A-702 backup system serves as backup ventilation whenever the primary system is shut down for repair and servicing or in the event of system failure. Ducts from each of the tanks are joined through isolation valves. The 241-A-702 backup system uses the same ducting, deentrainer and condenser as the primary system, but uses its own backup heater and HEPA filtration system.

8.2 TANKS AND WASTE VOLUME

Tanks and Volumes are the same as for the 296-A-17 Stack. See section 7.2 above.

8.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Calculations are the same as for the 296-A-17 Stack. See section 7.3 above.

Potential offsite dose = 0.0015 mrem/yr

8.4 TANK FARM STACK STATUS: NON-DESIGNATED

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9.0 STACK 296-A-18

9.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-18 stack serves the annulus exhaust system for tank 241-AY-101 in the 241-AY Tank Farm. The 241-AY-101 annulus exhaust provides for air flow in the annulus to minimize corrosion of the outer surface of the primary tank, remove heat conducted through the tank wall, and provide emergency ventilation for the tank in the event of failure of primary and backup tank ventilation. The 241-AY Tank Farm is located in the 200 East area, northeast of the PUREX facility.

The 241-AY Tank Farm contains double-shell tanks. The 241-AY Tank Farm received waste from 1968 to 1970. There are a total of two 1 M gallon tanks in the 241-AY Tank Farm.

Makeup air is drawn in from the outside, heated and filtered through two HEPA filter banks and then sent through distribution ducts to the top and bottom surfaces of the primary tank. Air slots on the bottom of each tank uniformly distribute the circulating air. Air is removed from the annulus space through a 16-inch diameter duct and through two series HEPA filter trains each containing four filters (2 x 4), a single blower system and is vented through the 296-A-18 stack.

9.2 CALCULATION OF SOURCE TERM

It is not expected that the primary containment vessel in the 241-A-101 Tank will leak. The design life of this vessel is a minimum of 50 years and the tank has undergone an integrity assessment. If a leak is found, the annulus source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

9.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: No loss of primary containment of the tank is expected. No HEPA filter factors are included in the calculations.

Potential offsite dose = 0 mrem/yr

9.4 TANK FARM STACK STATUS: NON-DESIGNATED

10.0 STACK 296-A-19

10.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-19 stack serves the annulus exhaust system for tank 241-AY-102 in the 241-AY Tank Farm. The 241-AY-102 annulus exhaust provides for air flow in the annulus to minimize corrosion of the outer surface of the primary tank, to remove heat conducted through the tank wall, to provide for ventilation of the leak detection pits, and to provide emergency ventilation for the tank in the event of failure of primary and backup tank ventilation. The 241-AY Tank Farm is located in the 200 East area, northeast of the PUREX facility.

The 241-AY Tank Farm contains double-shell tanks. The 241-AY Tank Farm received waste from 1968 to 1970. There are a total of two 1 M gallon tanks in the 241-AY Tank Farm.

Makeup air is drawn in from the outside, heated and filtered through a pre-filter and a HEPA filter and then sent through distribution ducts to the top and bottom surfaces of the primary tank. Air slots on the bottom of each tank uniformly distribute the circulating air. Air is removed from the annulus space through a 16-inch diameter duct and through two series HEPA filter trains each containing four filters (2 x 4), a single blower system and is vented through the 296-A-19 stack.

10.2 CALCULATION OF SOURCE TERM

It is not expected that the primary containment vessel in the 241-A-102 Tank will leak. The design life of this vessel is a minimum of 50 years and the tank has undergone an integrity assessment. If a leak is found, the annulus source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

10.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: No loss of primary containment of the tank is expected. No HEPA filter factors are included in the calculations.

Potential offsite dose = <u>0 mrem/yr</u>

10.4 TANK FARM STACK STATUS: <u>NON-DESIGNATED</u>

11.0 STACK 296-A-20

11.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-20 stack serves the annulus exhaust system for tanks 241-AZ-101 and 241-AZ-102 in the 241-AZ Tank Farm. The annulus exhaust system provides for air flow in the annuli to minimize corrosion of the outer surface of the primary tanks, remove heat conducted through the tank walls, and provide emergency ventilation for the tanks in the event of failure of primary and backup tank ventilation. The 241-AZ Tank Farm is located in the 200 East area, northeast of the PUREX facility.

The 241-AZ Tank Farm contains double-shell tanks. The 241-AZ Tank Farm received waste from 1971 to 1977. There are a total of two 1 M gallon tanks in the 241-AZ Tank Farm.

Makeup air is drawn in from the outside, heated and filtered through two HEPA filter banks and then sent through four separate distribution ducts to the top and bottom surfaces of each of the primary tanks. Air is removed from the annulus space through a 16-inch diameter duct and through separate HEPA filter banks, one for each tank.

11.2 CALCULATION OF SOURCE TERM

It is not expected that the primary containment vessels in the 241-AZ Tank Farm will leak. The design life of these vessels is a minimum of 50 years and the tanks have undergone an integrity assessment. If a leak is found, the annuli source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

11.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: No loss of primary containment of a tank is expected. No HEPA filter factors are included in the calculations.

Potential offsite dose = 0 mrem/yr

11.4 TANK FARM STACK STATUS: NON-DESIGNATED

12.0 STACK 296-A-21

12.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-21 stack system ventilates the 242-A Evaporator building, providing a negative pressure with respect to external areas for the containment of radioactive materials which may escape the primary evaporator vessel containment. The 242-A Evaporator is located to the east of the PUREX facility in the 200 East area.

The 242-A Evaporator is used to remove water from the non-boiling, high-level liquid waste primarily from adjacent tank farms, principally the 241-AW Tank Farm. With the water evaporated, concentrated waste is returned to double-shell tanks in the 200 East area.

The ventilation system for the 242-A Evaporator building provides containment for certain radiologically controlled areas within the facility. The Inlet air passes through pre-heater, pre-filter, heater, water scrubber, and blower systems. The inlet air is then split into four air trains, passed through additional heaters and ventilates the evaporator room, pump room, condenser room, loadout/hot storage areas and loading dock areas. Exhaust air passes through two parallel systems consisting of pre-filter, two HEPA filters, and blower before being exhausted at the 296-A-21 stack.

12.2 CALCULATION OF SOURCE TERM

Radionuclide inventory is based on beta/gamma levels found in survey data taken on 9/25/89 through 11/29/89. This data can be found in Internal Memo 33680-95-047 from Radiological Engineering and ALARA, subject "CCIP Database Update for Second Quarter 1995", dated June 5, 1995. This data shows loose surface beta/gamma contamination (no alpha) at various levels as follows:

Pump Room:	1,000,000 dpm
Evaporator Room:	1,000,000 dpm
Condenser Room:	50,000 dpm
Loadout Room:	50,000 dpm

Assuming worse case scenario, beta (Sr-90/Y-90) as the representative nuclides together with the contamination assumed to be uniformly distributed over all ventilated surface areas, the total curie content available in each area are as follows:

Pump Room:	7.6E-03 Ci
Evaporator Room:	3.3E-02 Ci
Condenser Room:	1.8E-03 Ci
Loadout Room:	9.2E-04 Ci
Total:	4.3E-02 Ci

The source term thereby available for release was determined to be:

Sr-89/90	4.3E-02 Ci
Y-90	4.3E-02 Ci

12.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: Postulated Sr-90/Y-90 inventories are included in the calculation. No HEPA filter factors are included in the calculations.

Potential offsite dose = $\underline{1.9 \times 10^{-6}\ \text{mrem/yr}}$

12.4 TANK FARM STACK STATUS: NON-DESIGNATED

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242-A EVAPORATOR BUILDING STACK 296-A-21 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci	CAP-88 c-factor	APP D factor	EDE (mrem/yr)
89/90-Sr	4.3E-02	4.38E-02	1.E-03	1.9E-06
90-Y	4.3E-02	3.77E-04	1.E-03	1.6E-08
		TOTAL		1.9E-06

13.0 STACK 296-A-22

13.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-22 stack system ventilates the 242-A Evaporator vessel and associated equipment, providing containment and moisture removal for the system. The 242-A Evaporator is located to the east of the PUREX facility in the 200 East area.

The 242-A Evaporator is used to remove water from the non-boiling, high-level liquid waste primarily from adjacent tank farms, principally the 241-AW Tank Farm. With the water evaporated, concentrated waste is returned to double-shell tanks in the 200 East area.

Vessels which are evacuated via the 296-A-22 stack include the 242-A vacuum condenser, process condensate tank, after-condenser drain, and condensate collection vessel. Inlet air is bled from the Evaporator building air system and is passed through a HEPA filtration system. Vapor extracted from these systems passes through a deentrainer system, a pre-filter/demister system, heater, and two HEPA filters before being exhausted through the 296-A-22 stack.

13.2 SOURCE TERM

RADIOISOTOPE	ACTIVITY LEVEL (Ci)
C-14	3.500E+01
Co-60	1.272E+02
Se-79	1.050E+01
Sr-89/90	2.828E+04
Y-90	2.828E+04
Tc-99	2.700E+02
Ru/Rh-106	2.005E+03
Sb-125	0.000E+00
I-129	3.500E-01
Cs-134	1.104E+03
Cs-137	1.937E+05
Ce-144	0.000E+00
Pm-147	0.000E+00
Eu-154	1.090E+03
Nat-U	0.000E+00
Np-237	0.000E+00
Pu-238	1.800E-01
Pu-239/240	2.160E+01
Pu-241	1.833E+03
Am-241	1.343E+02
Cm-242/244	1.630E+00

13.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: Evaporator vessel inventory from WHC-EP-0466 are included in the calculations. No HEPA filter factors are included in the calculations.

Potential offsite dose = 50.2 mrem/yr

13.4 TANK FARM STACK STATUS: DESIGNATED

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242-A EVAPORATOR VESSEL VENT STACK 296-A-22 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.3500E+02	.2620E-02	1.E-03	9.170E-05	1.827E-04
60-Co	.1272E+03	.2900E-01	1.E-03	3.689E-03	7.349E-03
79-Se	.1050E+02	.4380E-01	1.E-03	4.599E-04	9.161E-04
89/90-Sr	.2828E+05	.4380E-01	1.E-03	1.239E+00	2.468E+00
90-Y	.2828E+05	.3770E-03	1.E-03	1.066E-02	2.124E-02
99-Tc	.2700E+03	.1090E-02	1.E-03	2.943E-04	5.836E-04
106-Ru/Rh	.2005E+04	.2090E-01	1.E+00	4.190E+01	8.347E+01
129-I	.3500E+00	.2910E+00	1.E+00	1.019E-01	2.012E-01
134-Cs	.1104E+04	.3130E-01	1.E-03	3.456E-02	6.884E-02
137-Cs	.1937E+06	.2390E-01	1.E-03	4.630E+00	9.223E+00
154-Eu	.1090E+04	.4380E-01	1.E-03	4.774E-02	9.510E-02
238-Pu	.1800E+00	.8020E+01	1.E-03	1.444E-03	2.876E-03
239/240-Pu	.2160E+02	.8670E+01	1.E-03	1.873E-01	3.731E-01
241-Pu	.1833E+04	.1380E+00	1.E-03	2.530E-01	5.040E-01
241-Am	.1343E+03	.1310E+02	1.E-03	1.759E+00	3.504E+00
242/244-Cm	.1630E+01	.6940E+01	1.E-03	1.131E-02	2.253E-02
		TOTAL		5.020E+01	1.000E+02

14.0 STACK 296-A-25

14.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-25 stack system ventilates the 244-A Double Shell Receiver Tank (DCRT), providing negative pressure. The 244-A DCRT is located west of the 241-AN tank farm in the 200 East area.

The 244-A DCRT is used to pump liquid waste from 200 East and 200 West to the 200 East double-shell tanks. The 244-A DCRT started operation in 1975. Potential waste streams which may pass through this DCRT include those from the 244-BX DCRT (BX, BY, B Tank Farms), from the 244-TX DCRT (PFP, T-Plant, TX, TY, and T Tank Farms), from the 244-S DCRT (222-S Lab, U-Plant, S and SX Tank Farms), from the 244-CR Vault (C Tank Farm), 241-AX and 241-A, and certain 242-A Evaporator feeds.

The DCRT catch tank is a steel vessel with nominal volume of 19,000 gallons and limited to a maximum operating volume of 13,030 gallons. The catch tank and the concrete pit containing the tank define the annulus space. The catch tank and annulus are ventilated by the 296-A-25 system. Air used to ventilate the tank and annulus is drawn in through a pre-filter, a HEPA filter, and a heater. The air train is split into two trains, with the annulus receiving 80 percent of the airflow and the tank receiving 20 percent. Air which is withdrawn from the tank and annulus passes through a heater and parallel sets of two HEPA filters (2 x 2) before being exhausted through the 296-A-25 stack. The exhauster is operated only when the temperature of the waste is above a specific temperature and/or during the transfer of waste through the facility.

14.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL)	
	TANK TOTAL	PUMPABLE
241-A-101	953	390
241-AX-101	748	298
241-BY-102	341	22
241-BY-109	423	57
241-C-102	423	19
241-C-107	275	20
241-C-110	187	5
TOTAL	3,350	811

14.3 CALCULATION OF POTENTIAL OFFSITE DOSE

The potential emissions for this stack were determined three times. The first, or original, time tank waste source term data was used along with the 40 CFR 61, Appendix D Method. This method is discussed in the "Original Assessment" below in section 14.3.2. The second assessment, discussed in section 14.3.1 "Revised Assessment" was next accomplished when HEPA filter disposal assay data became available. When accomplished, this second method was considered more representative of the true potential emissions. In an attempt to reassess the 244-S facility stack potential emissions, however, a problem was noted with this second 244-A assessment. What follows is brief synopsis of identification of this problem:

As with 244-A, a method to reassess 244-S using less conservative methods was desired. The original 244-S assessment (see section 34) used tank waste transfers source term with the method given in 40 CFR 61, Appendix D to determine the potential emissions. The 244-S facility has not been used in years, so real data was scarce. This created a particularly unique problem in coming up with a method for reassessment. A potential solution however, was thought to exit in the fact that the two facilities were of similar design and purpose. This meant that the results from the reassessment of 244-A may be found to be useful in reassessment of 244-S as well.

The technical approach proposed, then, for this task involved the collection of technical information to support the reassessment of the 244-S DCRT (i.e., existing HEPA filter operating data, recently changed out HEPA filter disposal assay data, past and future waste transfer data volumes and activity concentration and composition); the collection of additional information on the 244-A DCRT system (i.e., more precise HEPA filter operating data and past waste transfer data volumes and activity concentration and composition); and the addressing of the potential impact that specific conditions (i.e., presence of water vapor in the effluent, presence of ammonia in emissions) may have on this reassessment method (i.e., using HEPA filter assay results to estimate potential emissions). In addition, the technical approach included the correlation of past waste transfer volume and concentration data to the activity found on HEPA filters removed from the 244-A DCRT exhaust system in an attempt to derive a waste release factor which might be used to estimate potential emissions from the 244-S DCRT, and the derivation of a conservative, and technically sound, estimate of future potential emissions from the 244-S DCRT facility. This approach was implemented via WHC CONTRACT TTB-SVV-452401, TASK 065. The results of this effort were submitted in a Letter Report from Judson L. Kenoyer, SAIC to William E. Davis, WHC, Subject: "LETTER REPORT ON TANK FARM STACK 296-S-22 REASSESSMENT SUPPORT, WHC CONTRACT TTB-SVV-452401, TASK 065", dated November 30, 1995. A summary of this report can be found in section 34 under the discussion of potential emissions for the 244-S stack 296-S-22. The problem identified in this report with the 244-A reassessment using HEPA filter disposal assay results was explained in the Letter Report's conclusions as follows:

- "No waste transfers through the 244-A DCRT were identified by reviewing 190 work procedures that covered the period of May 1989 through March 1995." Waste transfers were apparently jumpered around this DCRT during this period.

- "The past assessment of the 244-A DCRT using HEPA filter data resulted in the calculation of a potential offsite dose of less than 0.1 mrem/yr. However, it was assumed that waste transfers had been made through the system, not jumped around it."

- "The potential offsite dose calculated for the waste that was stored in the 244-A DCRT for the last two years using the conservative 40 CFR 61, Appendix D airborne release fraction (ARF) was less than 0.1 mrem/yr as well." This value came to 0.0103 mrem/yr, which was actually less than that determined which had accumulated on the HEPAs (0.039 mrem/yr).

- "The empirical ARF calculated for the 244-A DCRT system using the HEPA filter and the waste characterization data resulted in an ARF of 3.0E-3. This is <u>more</u> conservative than the value in 40 CFR 61, Appendix D." The Appendix D factor for liquids and particulates is 1E-03. The value derived for 244-A is three times higher.

"Possible reasons for the larger-than-expected value include:"

- "resuspension of dried, deposited, contamination in the exhaust system due to the surging of the gas flow through the system during startup of the exhauster,"
- "formation and carryover of larger droplets formed during expansion of the liquid upon entry and the proximity of the waste inlet and exhaust outlet,"
- "release of gases in the liquid during entry into the tank,"
- "contamination of the exhaust system by other means, and"
- "transfers of waste volumes through the DCRT that were not included in the review of available work packages."

"The empirically derived ARF is not supported by the measured release fractions for any mechanism identified and it is recommended that this should be investigated. Each of the above possible reasons is dependent upon the physical configuration of the tank inlet and outlet nozzles, the exhaust system operating procedures, and the waste characteristics."

"It is recommended that use of this ARF is not warranted until the source of the high radionuclide content can be identified and translated into a mechanism found in all tanks."

- "The potential offsite dose for the 244-A DCRT using the HEPA filter data was calculated to be approximately 0.04 mrem/yr and during the corresponding period no waste transfers went through the DCRT. Therefore, it is recommended that the current classification for the 296-A-25 stack of "non-designated" be re-evaluated. Future waste transfers from tanks 241-A-101 and 241-AX-101 are scheduled to be sent through the 244-A DCRT during the period of April 1996 through December 1998. It would be conservative to reclassify the stack as "designated" until the waste transfers through the DCRT are completed."

CONCLUSION: Because of this new information, or the lack of an explanation for the yielded results, it has been agreed that the revised assessment value for the potential emissions for the 244-A facility stack 296-A-25 given in section 14.3.1 below may not be representative of the true potential emissions from this facility. Though, it has been suggested that since this facility was rarely used that the possibility expressed above that "resuspension of dried, deposited, contamination in the exhaust system due to the surging of the gas flow through the system during startup of the exhauster" may actually be the case and therefore the explanation. If so, the results from the HEPA filter disposal assay results would indeed be conservative. However, since, it is not good engineering to take this explanation as gospel and because some may believe we were reaching in doing so, it is recommended herein that the potential emission value discussed in section 14.3.2, the original assessment, be used for the time being as the appropriate value for the designation of this facility.

14.3.1 **REVISED ASSESSMENT**: As mentioned in section 3.2, a method for determining the potential emissions for a particular emission unit is to determine what the filters collected. This method is based directly on the requirement specified in 40 CFR 61.93 that directs potential emissions be determined without any emission controls in place. Emission controls for this DCRT exhauster consist of a prefilter rated at 40% particulate removal efficiency and two High Efficiency Particulate Air (HEPA) filter installed in series - with two such parallel banks. Each HEPA filter bank is periodically tested to a particulate removal efficiency of 99.95%.

In August of 1994, one of the parallel bank of HEPA filters was changed out. In March of 1995, the second set was changed out. The removed HEPA filters were placed in containers #ETFF-95-058-04 and #ETFF-95-082-01. These containers were fully characterized by standard methods used for processing this type of waste for storage and ultimate disposal. This characterization was used here to determine the potential emissions from this emission points. The following table summarizes the assay results as total curie content on these HEPA filters.

ISOTOPE	FIRST BANK (Ci)	SECOND BANK (Ci)	TOTAL (Ci)
Sr-90	7.03E-02	8.10E-02	1.51E-01
Y-90	7.03E-02	8.10E-02	1.51E-01
Cs-137	1.38E-02	3.26E-01	3.40E-01
Pu-238	4.70E-06	1.11E-04	1.16E-04
Pu-239	5.69E-05	1.34E-03	1.40E-03
Pu-240	1.28E-05	3.02E-04	3.15E-04
Pu-241	5.60E-04	1.30E-02	1.36E-02
Pu-242	7.65E-10	1.80E-08	1.88E-08
Am-241	3.03E-07	7.14E-06	7.44E-06

Since HEPA filters are tested to be 99.95% efficient in removal of particulates, it can be shown that the curie content collected on these filters represent 99.95% of the potential emission during the time the HEPAs were in use while the exhauster was in operation. This exhauster runs intermittently. Therefore, to determine the annual emissions from the curie content of these HEPAs it is also necessary to know or assume how long the exhauster ran while these HEPAs were in place. The following is used to derive this:

- It can be shown from exhauster log data that this exhauster ran for about 80 days in 1984.

- From operator knowledge, it is known that this exhauster ran intermittently in 1989, 1990, 1991, and the first part of 1992. Emission data confirms this for 1990 and 1991. Emission data for 1989 and 1992 are non detectable.

- The Automated Bar Coding of Air Samples at Hanford (ABCASH) Database Emission Data Processing (EDP) code E080 shows that this exhauster was sampled for 134 days in 1991 and 75 days in 1992. This data base does not have electronic files further back than February 6, 1991 for this emission point.

- Also from operator knowledge, it is known that one of the two HEPA filter banks was last changed in 1989. The other HEPA Filter Bank has been in place since before 1989.

- A conservative estimate of the operating time for these HEPAs can be derived by summing all the known operating days (134 days in 1991, 75 days in 1992, and 80 days in 1994). This total comes to 289 days.

The potential emissions from this facility for an entire operating year can now be computed as follows (see EDE computations for HEPA Assay results below):

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

14.3.2 ORIGINAL ASSESSMENT: This assessment is the original method which used the source term found in the tanks combined with the release fractions found in 40 CFR 61 Appendix D. Refer to Section 3.1.4, for the definitions and examples of *static* and *dynamic* situations. The results of this method gave a potential offsite dose equal to 0.106 mrem/yr.

SCENARIO: Transfer of waste from Tanks A-101 and AX-101 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(5.577 mrem/yr)(13.03 Kgal/688 Kgal)]
= 0.106 mrem/yr

Dynamic: [(5.577 mrem/yr)(13.03 Kgal/688 Kgal)]
x (688 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 0.277 mrem over 2.6 years

14.4 TANK FARM STACK STATUS: DESIGNATED

The original assessment value is considered more appropriate for use in this determination because the conclusion from the Letter Report Conclusions discussed in section 14.3 above. The potential emissions from this facility is therefore determined to be from above: 0.106 mrem/yr

244-A DCRT STACK 296-A-25 POTENTIAL EMISSIONS - REVISED ASSESSMENT (FILTER ASSAY RESULTS)

R-nuclide	Sum of Ci*	CAP-88 c-factor	EDE (mrem/yr)	% of Total EDE
90-Sr	1.51E-01	4.38E-02	6.63E-03	21.5
90-Y	1.51E-01	3.77E-04	5.70E-05	0.2
137-Cs	3.40E-01	2.39E-02	8.12E-03	26.3
238-Pu	1.16E-04	8.02E+00	9.28E-04	3.0
239-Pu	1.40E-03	8.67E+00	1.21E-02	39.2
240-Pu	3.15E-04	8.66E+00	2.73E-03	8.8
241-Pu	1.36E-02	1.38E-02	1.86E-04	0.6
242-Pu	1.88E-08	8.67E-00	1.62E-07	
241-Am	7.44E-06	1.31E+01	9.74E-05	0.3
		TOTAL	3.09E-02	99.9

244-A DCRT STACK 296-A-25 POTENTIAL EMISSIONS - ORIGINAL ASSESSMENT: SCENARIO (A-101/AX-101)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.3980E-01	.2620E-02	1.E-03	1.043E-07	1.870E-06
60-Co	.9840E+02	.2900E-01	1.E-03	2.854E-03	5.117E-02
79-Se	.7970E-10	.4380E-01	1.E-03	3.491E-15	6.260E-14
89/90-Sr	.1080E-05	.4380E-01	1.E-03	4.730E-11	8.483E-10
90-Y	.1080E-05	.3770E-03	1.E-03	4.072E-13	7.301E-12
99-Tc	.7970E-08	.1090E-02	1.E-03	8.687E-15	1.558E-13
106-Ru/Rh	.2580E+00	.2090E-01	1.E+00	5.392E-03	9.669E-02
125-Sb	.2210E+02	.4150E-02	1.E-03	9.172E-05	1.645E-03
129-I	.3980E-11	.2910E+00	1.E+00	1.158E-12	2.077E-11
134-Cs	.4870E+01	.3130E-01	1.E-03	1.524E-04	2.733E-03
137-Cs	.1660E+06	.2390E-01	1.E-03	3.967E+00	7.114E+01
154-Eu	.7740E+03	.4380E-01	1.E-03	3.390E-02	6.079E-01
Nat-U	.3980E+00	.2840E+01	1.E-03	1.130E-03	2.027E-02
237-Np	.2050E-04	.1190E+02	1.E-03	2.440E-07	4.375E-06
238-Pu	.7750E+01	.8020E+01	1.E-03	6.216E-02	1.115E+00
239/240-Pu	.1510E+03	.8670E+01	1.E-03	1.309E+00	2.348E+01
241-Pu	.3230E+03	.1380E+00	1.E-03	4.457E-02	7.993E-01
241-Am	.1180E+02	.1310E+02	1.E-03	1.546E-01	2.772E+00
242/244-Cm	.1720E-09	.6940E+01	1.E-03	1.194E-12	2.141E-11
			TOTAL	5.577E+00	1.000E+02

15.0 STACK 296-A-26

15.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-26 stack system ventilates the 204-AR Unloading Facility, providing negative pressure in the unloading area and soiled clothes area. The 204-AR Unloading Facility is located north of the PUREX Plant in the 200 East area.

The 204-AR Unloading Facility is designed to unload liquid radioactive materials from railroad tank cars and trucks in a radiologically controlled area. Railroad tracks enter the Facility from the west and extend to the length of the unloading area. The unloading area has dimensions of 25 feet high x 65 feet long x 40 feet wide. Radioactive liquid wastes are primarily non-complexed and phosphate wastes from T-Plant, 300 and 400 Area operations, from the 222-S lab, and from the N-Reactor.

The unloading area and adjacent soiled clothes area are vented through a single deentrainer, prefilter and two series HEPA filters, and a single blower system. Liquid waste is removed from railroad tank cars and trucks under negative pressure with a closed piping system, so isolation from areas ventilated by the 296-A-26 stack system is maintained.

15.2 CALCULATION OF SOURCE TERM

Radionuclide inventory is based on beta/gamma levels found in survey data taken on 11/30/89 and reported on 11/01/94. This data can be found in Internal Memo 33680-95-047 from Radiological Engineering and ALARA, subject "CCIP Database Update for Second Quarter 1995", dated June 5, 1995. This data shows loose surface beta/gamma contamination at 5,000 disintegrations per minute per 100 square centimeters. Assuming worse case scenario, beta (Sr-90/Y-90) as the representative nuclides together with the contamination assumed to be uniformly distributed over all ventilated surface areas, the total curie content available for release from this stacks is shown in the following table.

NUCLIDE	TOTAL AREA (cm^2)	POSTULATED UNIT ACTIVITY (dpm/100 cm^2)	TOTAL ACTIVITY (Ci)
Sr-90	1.1×10^7	5,000	2.5×10^{-4}
Y-90	1.1×10^7	5,000	2.5×10^{-4}

15.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: Postulated Am-241, Sr-90/Y-90 inventories are included in the calculation. No HEPA filter factors are included in the calculations.

Potential offsite dose = 1.1×10^{-8} mrem/yr

15.4 TANK FARM STACK STATUS: NON-DESIGNATED

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204-AR UNLOADING FACILITY STACK 296-A-26 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci	CAP-88 c-factor	APP D factor	EDE (mrem/yr)
89/90-Sr	2.5E-04	4.380E-02	1.E-03	1.09E-08
90-Y	2.5E-04	3.770E-04	1.E-03	9.34E-11
		TOTAL		1.1E-08

16.0 STACK 296-A-27

16.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-27 stack system ventilates the 241-AW Farm tanks, providing negative pressure and removal of heat and vapor from the primary containment vessels. The 241-AW Tank Farm is located northeast of the PUREX plant in the 200 East area.

Tanks in the 241-AW Tank Farm are double-shell tanks. The Tank Farm was first used to contain waste in 1978. There are a total of six tanks in the Tank Farm, each with a volume of 1.2 M gallons. The tanks received waste primarily from the PUREX waste stream.

The primary ventilation system consists of a deentrainer system for removal of moisture from vented air, an electric heater for lowering the relative humidity of the vented air, a pre-filter system for reducing the number of large particles which load the filter system, and a two-stage HEPA filter system. The primary exhaust system has an automatic switchover to a backup system in the event of failure of the primary system. Each 241-AW tank is exhausted through independent 12-inch diameter steel ducts which run to the central exhaust station.

16.2 TANKS AND WASTE VOLUME

	WASTE VOLUME (KGAL)	
TANK	TANK TOTAL	PUMPABLE
241-AW-101	1,151	1,067
241-AW-102	876	875
241-AW-103	645	297
241-AW-104	1,124	861
241-AW-105	998	708
241-AW-106	1,074	798
TOTAL	5,868	4,606

16.3 CALCULATION OF POTENTIAL OFFSITE DOSE

REVISED ASSESSMENT: As mentioned in section 3.2, a method for determining the potential emissions for a particular emission unit is to determine what the filters collected. This method is based directly on the requirement specified in 40 CFR 61.93 that directs potential emissions be determined without any emission controls in place. Emission controls for this exhauster consist of a prefilter rated at 80% particulate removal efficiency and two High Efficiency Particulate Air (HEPA) filter installed in series - with two such parallel banks. Each HEPA filter bank is periodically tested to a particulate removal efficiency of 99.95%.

All four HEPA filters and the prefilters were changed in May of 1995. These filters were placed in burial container #ETFF-95-102-01. This container was fully characterized by standard methods used for processing this type of waste for storage and ultimate disposal. This characterization was used here to determine the potential emissions from this emission point. The following list summarizes the assay results as total curie content on these HEPA filters.

Radionuclide	Total Quantity (Ci)
3-H	4.21E-01*
60-Co	7.86E-06
90-Sr	2.26E-01
90-Y	2.26E-01
134-Cs	1.49E-04
137-Cs	1.89E-01
238-Pu	1.77E-04
239-Pu	2.15E-03
240-Pu	4.83E-04
241-Pu	2.08E-02
241-Am	1.14E-05
242-Pu	2.89E-08

*Note: Tritium emissions are also included. This value comes from WHC-SD-WM-EMP-032, "Tritium Emissions From 200 East Area Double Shell Tanks." WHC-SD-WM-EMP-032 documents tritium sampling results accomplished in 1994. The samples were taken downstream of the HEPAs. However, it is assumed here, that tritium will not be captured by the HEPAs. Therefore, the tritium emissions results can be assumed to represent the potential tritium emissions from this facility as well.

Since HEPA filters are tested to be 99.95% efficient in removal of particulates, it can be shown that the curie content collected on these filters represent 99.95% (except for the tritium) of the potential emission during the time the HEPAs were in use while the exhauster was in operation. This exhauster runs continuously. Therefore, to determine the annual emissions from the curie content of these HEPAs it is also necessary to know only how long these HEPAs were in place. From operator knowledge, it is known that these HEPAs were in place for two years or more.

A conservative estimate, therefore, is to assume that curie content on these HEPAs represent the potential emissions from this facility for an entire operating year. See potential emissions computations below under "241-AW TANK FARM STACK 296-A-27 POTENTIAL EMISSIONS - HEPA FILTER ASSAY RESULTS." These results give the potential emissions as:

Potential emissions = 0.0418 = 0.0418 mrem/yr

Original Assessment: This assessment is left in for historical/informational purposes. This original method used the source term found in the tanks combined with the release fractions found in 40 CFR 61 Appendix D. The radioactivity in the supernatant of the waste and in the slurry/sludge in tanks 241-AW-101 through 241-AW-106 is included in the calculation. No HEPA filter factors are included in the calculations. The results of this method gave a potential offsite dose equal to 148 mrem/yr.

16.4 TANK FARM STACK STATUS: <u>NON-DESIGNATED</u>

The revised assessment is considered more representative than the original one because the revised assessment is based on real air stream data. The original assessment was based on liquid/vapor release factors (given in 40 CFR 61, Appendix D as 1E-03). These release factors are considered extremely conservative. The potential from this stack has, therefore, been determined to be 0.0418 mrem/yr.

241-AW TANK FARM STACK 296-A-27 POTENTIAL EMISSIONS - HEPA FILTER ASSAY RESULTS

R-nuclide	Sum of Ci*	CAP-88 c-factor	EDE (mrem/yr)	% of Total EDE
3-H	4.21E-01	2.19E-05	9.05E-06*	
60-Co	7.86E-06	2.90E-02	2.28E-07	
90-Sr	2.26E-01	4.38E-02	9.90E-03	23.7
90-Y	2.26E-01	3.77E-04	8.52E-05	0.2
134-Cs	1.49E-04	3.13E-02	4.66E-06	
137-Cs	1.89E-01	2.39E-02	4.52E-03	10.8
238-Pu	1.77E-04	8.02E+00	1.42E-03	3.4
239-Pu	2.15E-03	8.67E+00	1.86E-02	44.6
240-Pu	4.83E-04	8.67E+00	4.19E-03	10.0
241-Pu	2.08E-02	1.38E-01	2.87E-03	6.8
241-Am	1.14E-05	1.31E+01	1.51E-04	0.4
242-Pu	2.89E-08	8.67E+00	2.51E-07	
		TOTAL	4.18E-02	99.9

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

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241-AW TANK FARM STACK 296-A-27 POTENTIAL EMISSIONS - From Tank Source Term

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.1600E+01	.2620E-02	1.E-03	4.192E-06	2.833E-06
60-Co	.1600E+03	.2900E-01	1.E-03	4.640E-03	3.136E-03
89/90-Sr	.1610E+06	.4380E-01	1.E-03	7.052E+00	4.765E+00
90-Y	.1610E+06	.3770E-03	1.E-03	6.070E-02	4.102E-02
99-Tc	.6110E+03	.1090E-02	1.E-03	6.660E-04	4.501E-04
129-I	.1220E+01	.2910E+00	1.E+00	3.550E-01	2.399E-01
134-Cs	.3040E+04	.3130E-01	1.E-03	9.515E-02	6.430E-02
137-Cs	.5190E+07	.2390E-01	1.E-03	1.240E+02	8.382E+01
147-Pm	.2560E+03	.1140E-02	1.E-03	2.918E-04	1.972E-04
237-Np	.1550E+02	.1190E+02	1.E-03	1.845E-01	1.246E-01
238-Pu	.1180E-03	.8020E+01	1.E-03	9.464E-07	6.395E-07
239/240-Pu	.3880E+02	.8670E+01	1.E-03	3.364E-01	2.273E-01
241-Am	.1210E+04	.1310E+02	1.E-03	1.585E+01	1.071E+01
242/244-Cm	.1330E-01	.6940E+01	1.E-03	9.230E-05	6.237E-05
			TOTAL	1.480E+02	1.000E+02

17.0 STACK 296-A-28

17.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-28 stack system ventilates the annuli of the 241-AW Farm tanks, providing removal of heat from the outer surface of the primary tanks, and maintenance of a dry environment to minimize corrosion of the primary tank. The 241-AW Tank Farm is located northeast of the PUREX plant in the 200 East area.

Tanks in the 241-AW Tank Farm are double-shell tanks. The Tank Farm was first used to contain waste in 1978. There are a total of six tanks in the Tank Farm, each with a volume of 1.2 M gallons.

The 241-AW tank annuli ventilation system contains an intake stack with prefilter, HEPA filter and manually operated butterfly valve for adjusting inlet air distribution over primary tank surfaces; and exhaust system consisting of dual deentrainer, heater, HEPA filter and blower systems. The annulus exhaust system for each of the tanks consists of four 8-inch diameter risers which merge into one 12-inch diameter independent duct.

17.2 CALCULATION OF SOURCE TERM

It is not expected that the primary containment vessels in the 241-AW Tank Farm will leak. The design life of these vessels is a minimum of 50 years and the tanks have undergone an integrity assessment. If a leak is found, the annuli source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

17.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: No loss of primary containment of a tank is expected. No HEPA filter factors are included in the calculations.

Potential offsite dose = 0 mrem/yr

17.4 TANK FARM STACK STATUS: NON-DESIGNATED

18.0 STACK 296-A-29

18.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-29 stack system ventilates the 241-AN Farm tanks, providing negative pressure and removal of heat and vapor from the primary containment vessels. The 241-AN Tank Farm is located near the intersection of Canton Avenue and 7th Street in the 200 East area.

Tanks in the 241-AN Tank Farm are double-shell tanks with continuous monitoring and ventilation of primary tank and annuli. The Tank Farm was first used to contain waste in 1980. There are a total of seven tanks in the Tank Farm, each with a volume of 1.2 M gallons.

The primary ventilation system consists of a deentrainer system for removal of moisture from vented air, an electric heater for lowering the relative humidity of the vented air, a pre-filter system for reducing the number of large particles which load the filter system, and a two-stage HEPA filter system. The primary exhaust system has an automatic switchover to a backup system in the event of failure of the primary system. Each 241-AN tank is exhausted through independent 12-inch diameter steel ducts which travel underground to the central exhaust station.

18.2 TANKS AND WASTE VOLUME

	WASTE VOLUME (KGAL)	
TANK	TANK TOTAL	PUMPABLE
241-AN-101	639	639
241-AN-102	1,101	1,012
241-AN-103	952	15
241-AN-104	1,065	804
241-AN-105	1,129	1,129
214-AN-106	23	6
241-AN-107	1,066	932
TOTAL	5,975	4,537

18.3 CALCULATION OF POTENTIAL OFFSITE DOSE

REVISED ASSESSMENT: A method for determining the potential emissions for a particular emission unit is to determine what the filters collected. This method is based directly on the requirement specified in 40 CFR 61.93 that directs potential emissions be determined without any emission controls in place. Emission controls for this exhauster consist of a prefilter rated at 30-35% particulate removal efficiency and two High Efficiency Particulate Air (HEPA) filter installed in series - with two such parallel banks. Each HEPA filter bank is periodically tested to a particulate removal efficiency of 99.95%.

In July of 1994, the two parallel HEPA filters nearest the tank waste were changed out. These HEPA filters were placed in burial container #ETFF-94-195-03. In October of 1993, one of the downstream (nearest the fan) HEPA filters was changed out. This filter was put in burial container #ETFF-93-300-01. These container were fully characterized by standard methods used for processing this type of waste for storage and ultimate disposal. This characterization was used here to determine the potential emissions from this emission points. The following table summarizes the assay results as total curie content on these HEPA filters.

Radionuclide	94 Changeout Quantity (Ci)	93 Changeout Quantity (Ci)	Total (Ci)
3-H	8.14E-02*		8.14E-02
90-Sr	4.38E-03	8.96E-04	5.27E-03
90-Y	4.38E-03	8.96E-04	5.27E-03
137-Cs	3.20E-03	1.11E-04	3.31E-03
238-Pu	1.07E-07	5.13E-07	6.20E-07
239-Pu	1.35E-06	6.21E-06	7.56E-06
240-Pu	2.91E-07	1.40E-06	1.69E-06
241-Pu	1.21E-05	5.81E-05	7.02E-05
241-Am	6.89E-09	3.30E-08	3.99E-08
242-Pu	1.74E-11		1.74E-11

*Note: Tritium emissions are also included. This value comes from WHC-SD-WM-EMP-032, "Tritium Emissions From 200 East Area Double Shell Tanks." WHC-SD-WM-EMP-032 documents tritium sampling results accomplished in 1994. The samples were taken downstream of the HEPAs. However, it is assumed here, that tritium will not be captured by the HEPAs. Therefore, the tritium emissions results can be assumed to represent the potential tritium emissions from this facility as well.

Since HEPA filters are tested to be 99.95% efficient in removal of particulates, it can be shown that the curie content collected on these filters represent at least 99.95% (except for the tritium) of the potential emission during the time the HEPAs were in use while the exhauster was in operation. This exhauster runs continuously. Therefore, to determine the annual emissions from the curie content of these HEPAs it is also necessary to know only how long these HEPAs were in place while the exhauster was operating. This exhauster operates continuously. Also, from operator knowledge, it is known that these HEPAs were in place for at least one year or more.

Therefore, it can be assumed that the curie content on these HEPAs represent the potential emissions from this facility for an entire operating year. See potential emissions computations below under "241-AN TANK FARM STACK 296-A-29 POTENTIAL EMISSIONS - HEPA FILTER ASSAY RESULTS." These results give the potential emissions as:

Potential emissions = 4.09E-04 mrem/yr

Original Assessment: This assessment is left in for historical/informational purposes. This original method used the source term found in the tanks combined with the release fractions found in 40 CFR 61 Appendix D. The radioactivity in the supernatant of the waste and in the slurry/sludge in the AN Tank Farm is included in the calculation. No HEPA filter factors are included in the calculations. The results of this method gave a potential offsite dose equal to 846 mrem/yr.

18.4 TANK FARM STACK STATUS: NON-DESIGNATED

The revised assessment is considered more representative then the original one because the revised assessment is based on real air stream data. The original assessment was based on liquid/vapor release factors (given in 40 CFR 61, Appendix D as 1E-03). These release factors are considered extremely conservative. The potential from this stack has, therefore, been determined to be 0.000409 mrem/yr.

241-AN TANK FARM STACK 296-A-29 POTENTIAL EMISSIONS - HEPA FILTER ASSAY RESULTS

R-nuclide	Sum of Ci*	CAP-88 c-factor	EDE (mrem/yr)	% of Total EDE
3-H	8.14E-02*	2.19E-05	1.78E-06	0.4
90-Sr	5.27E-03	4.38E-02	2.31E-04	56.4
90-Y	5.27E-03	3.77E-04	1.99E-06	0.5
137-Cs	3.31E-03	2.39E-02	7.91E-05	19.3
238-Pu	6.20E-07	8.02E+00	4.97E-06	1.2
239-Pu	7.56E-06	8.67E+00	6.55E-05	16.0
240-Pu	1.69E-06	8.67E+00	1.47E-05	3.6
241-Pu	7.02E-05	1.38E-01	9.69E-06	2.3
241-Am	3.99E-08	1.31E+01	5.23E-07	0.1
242-Pu	1.74E-11	8.67E+00	1.51E-10	
		TOTAL:	4.09E-04	99.8

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

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241-AN TANK FARM STACK 296-A-29 POTENTIAL EMISSIONS - From Tank Source Term

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.1540E+02	.2620E-02	1.E-03	4.035E-05	4.768E-06
60-Co	.1280E+04	.2900E-01	1.E-03	3.712E-02	4.387E-03
89/90-Sr	.9810E+06	.4380E-01	1.E-03	4.297E+01	5.078E+00
90-Y	.9810E+06	.3770E-03	1.E-03	3.698E-01	4.370E-02
99-Tc	.2090E+04	.1090E-02	1.E-03	2.278E-03	2.692E-04
129-I	.2650E+01	.2910E+00	1.E+00	7.712E-01	9.113E-02
134-Cs	.5040E+03	.3130E-01	1.E-03	1.578E-02	1.864E-03
137-Cs	.9410E+07	.2390E-01	1.E-03	2.249E+02	2.658E+01
147-Pm	.4300E+04	.1140E-02	1.E-03	4.902E-03	5.793E-04
154-Eu	.1310E+05	.4380E-01	1.E-03	5.738E-01	6.781E-02
Nat-U	.2590E+00	.2840E+01	1.E-03	7.356E-04	8.692E-05
237-Np	.8860E+00	.1190E+02	1.E-03	1.054E-02	1.246E-03
238-Pu	.3410E-01	.8020E+01	1.E-03	2.735E-04	3.232E-05
239/240-Pu	.7420E+03	.8670E+01	1.E-03	6.433E+00	7.602E-01
241-Pu	.2050E+04	.1380E+00	1.E-03	2.829E-01	3.343E-02
241-Am	.4350E+05	.1310E+02	1.E-03	5.699E+02	6.734E+01
		TOTAL		8.462E+02	1.000E+02

19.0 STACK 296-A-30

19.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-30 stack system ventilates the annuli of the 241-AN Farm tanks, providing removal of heat from the outer surface of the primary tanks, and maintenance of a dry environment to minimize corrosion of the primary tank. The 241-AN Tank Farm is located near the intersection of Canton Avenue and 7th Street in the 200 East area.

Tanks in the 241-AN Tank Farm are double-shell tanks with continuous monitoring and ventilation of primary tank and annuli. The Tank Farm was first used to contain waste in 1980. There are a total of seven tanks in the Tank Farm, each with a volume of 1.2 M gallons. The tanks received waste primarily from single-shell tanks via Valve Pits 241-AN and from 242-A Evaporator via Valve Pits 241-AX.

The 241-AN tank annuli ventilation system contains an intake stack with prefilter, HEPA filter and manually operated butterfly valve for adjusting inlet air distribution over primary tank surfaces; and exhaust system consisting of parallel deentrainer, heater, HEPA filter and blower systems. The annulus exhaust system for each of the tanks consists of four 8-inch diameter risers. Tanks 241-AN-101, 241-AN-102, and 241-AN-103 exhaust risers are combined into one of the two parallel exhaust systems (DESIGNATED K2-1) while tanks 241-AN-104, 241-AN-105, 241-AN-106, and 241-AN-107 are combined into the second of the two parallel exhaust systems (DESIGNATED K2-2). These systems are each exhausted at the 296-A-30 stack.

19.2 CALCULATION OF SOURCE TERM

It is not expected that the primary containment vessels in the 241-AN Tank Farm will leak. The design life of these vessels is a minimum of 50 years and the tanks have undergone an integrity assessment. If a leak is found, the annuli source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

19.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: No loss of primary containment of a tank is expected. No HEPA filter factors are included in the calculations.

Potential offsite dose = <u>0 mrem/yr</u>

19.4 TANK FARM STACK STATUS: <u>NON-DESIGNATED</u>

20.0 STACK 296-A-40

20.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-40 stack system ventilates the 241-AP Farm tanks, providing negative pressure and removal of heat and vapor from the primary containment vessels. The 241-AP Tank Farm is located northeast of the PUREX Plant.

Tanks in the 241-AP Tank Farm are double-shell tanks. The Tank Farm was first used to contain waste in 1983. The tanks received waste from single-shell tanks, from the PUREX wastestream and the 242-A Evaporator via Valve Pits 241-A. There are a total of eight tanks in the Tank Farm, each with a volume of 1.2 M gallons.

The primary ventilation system consists of a deentrainer system for removal of moisture from vented air, an electric heater for lowering the relative humidity of the vented air, a pre-filter system for reducing the number of large particles which load the filter system, and a two-stage HEPA filter system. The primary exhaust system has an automatic switchover to a backup system in the event of failure of the primary system.

Each 241-AP tank is exhausted through independent 12-inch diameter steel ducts which combine into a common 12-inch diameter duct. This duct passes underground to the central exhaust station and feeds parallel blower systems with deentrainer, heater, prefilter, HEPA filter assemblies.

20.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL)	
	TANK TOTAL	PUMPABLE
241-AP-101	1,061	1,061
241-AP-102	1,107	1,107
241-AP-103	1,132	1,132
241-AP-104	19	19
241-AP-105	821	821
241-AP-106	1,129	1,129
241-AP-107	1,115	1,115
241-AP-108	901	901
TOTAL	7,285	7,285

20.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: The radioactivity in the waste in the AP Tank Farm is included in the calculations. No HEPA filter factors are included in the calculation.

Potential offsite dose = 47.5 mrem/yr

20.4 TANK FARM STACK STATUS: DESIGNATED

AP TANK FARM STACK 296-A-40 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
3-H	2.1E+02	2.190E-05	1.E+00	4.61E-03	1.1E-02
14-C	2.65E+01	2.620E-03	1.E-03	6.95E-05	1.6E-04
60-Co	3.20E+02	2.900E-02	1.E-03	9.27E-03	2.2E-02
79-Se	4.79E-02	4.380E-02	1.E-03	3.16E-09	7.6E-09
89/90-Sr	6.70E+03	4.380E-02	1.E-03	2.93E-01	7.1E-01
90-Y	6.70E+03	3.770E-04	1.E-03	2.53E-03	6.1E-03
99-Tc	5.85E+02	1.090E-03	1.E-03	6.38E-04	1.5E-03
129-I	4.73E-01	2.910E-01	1.E+00	1.38E-01	3.3E-01
134-Cs	1.67E+03	3.130E-02	1.E-03	5.24E-02	1.3E-01
137-Cs	1.71E+06	2.390E-02	1.E-03	4.08E+01	9.8E+01
144-Ce	4.31E+03	1.370E-02	1.E-03	5.90E-02	1.4E-01
147-Pm	1.74E+00	1.140E-03	1.E-03	1.98E-06	4.8E-06
234-U	2.81E-02	3.19E+00	1.E-03	8.96E-05	2.2E-04
235-U	1.45E-03	2.96E+00	1.E-03	4.29E-06	1.0E-05
238-U	5.39E-03	2.84E+00	1.E-03	1.53E-05	3.6E-05
237-Np	2.83E+00	1.19E+01	1.E-03	3.37E-02	8.1E-02
238-Pu	3.81E-02	8.02E+00	1.E-03	3.06E-04	7.4E-04
239/240-Pu	5.62E-01	8.67E+00	1.E-03	4.87E-03	1.2E-02
241-Am	9.13E+00	1.31E+01	1.E-03	1.20E-01	2.9E-01
244-Cm	1.49E-01	6.94E+00	1.E-03	1.03E-03	2.5E-03
		TOTAL		4.15E+01	

Radiological inventory data were available for only 7 of the 8 tanks that make up AP Tank Farm; therefore, the calculated potential offsite dose based on 7 tanks must be adjusted. Assuming potential offsite dose from tank AP-108 is 41.50 Ci./7 tanks.

POTENTIAL EMISSIONS

(8/7)(41.5 mrem/yr) = 47.5 mrem/yr

Data is from the following references (in addition to references provided in section 2.0 of this document):

WHC-SD-WM-ER-357, WHC-SD-WM-ER-358, WHC-SD-WM-ER-359, WHC-SD-WM-ER-360, WHC-SD-WM-ER-361, WHC-SD-WM-ER-362, & WHC-SD-WM-TI-543

21.0 STACK 296-A-41

21.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-A-41 stack system ventilates the annuli of the 241-AP Farm tanks, providing removal of heat from the outer surface of the primary tanks, and maintenance of a dry environment to minimize corrosion of the primary tank. The 241-AP Tank Farm is located northeast of the PUREX Plant.

Tanks in the 241-AP Tank Farm are double-shell tanks. The Tank Farm was first used to contain waste in 1983. The tanks received waste from single-shell tanks, from the PUREX wastestream and the 242-A Evaporator via Valve Pits 241-A. There are a total of eight tanks in the Tank Farm, each with a volume of 1.2 M gallons.

The 241-AP tank annuli ventilation system contains four independent air intake stations with heaters, pre-filters and HEPA filter systems. Each of the stations feeds two of the AP tanks. The exhaust portion of the ventilation system consists of one 8-inch diameter riser for each tank. Four of the risers are combined into a common 12-inch diameter duct in two valve pit systems. These two 12-inch diameter ducts are combined into a common 24-inch diameter duct which feeds parallel heater, HEPA filter assemblies in series, and blower systems.

21.2 CALCULATION OF SOURCE TERM

It is not expected that the primary containment vessels in the 241-AP Tank Farm will leak. The design life of these vessels is a minimum of 50 years and the tanks have undergone an integrity assessment. If a leak is found, the annuli source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

21.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: No loss of primary containment of a tank is expected. No HEPA filter factors are included in the calculations.

Potential offsite dose = 0 mrem/yr

21.4 TANK FARM STACK STATUS: NON-DESIGNATED

22.0 STACK 296-B-28

22.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-B-28 stack system ventilates the 244-BX Catch Station tank and annulus, providing negative pressure. The 244-BX Catch Station is located east of the 241-BX Tank Farm in the 200 East Area.

The 244-BX Catch Station is a double-contained receiver tank (DCRT) used to pump salt-well waste from single-shell tanks in the 241-B, 241-BX and 241-BY Tank Farms to double-shell tank farms in the 200 East area.

The catch tank is a steel vessel with maximum volume of 31,000 gallons which is limited to an operational capacity of 26,000 gallons. The pit containing the catch tank, with a gross volume of 85,000 gallons, constitutes secondary containment for the Station. The catch tank and the concrete pit containing the tank define the annulus space. The ventilation system draws in air through a heater, pre-filter and HEPA filter. This air train is split into two trains which ventilate the catch tank and annulus. Air withdrawn from these two volumes passes through one of three parallel systems, each containing a pre-filter and two HEPA filters. Air is exhausted through the 296-B-28 stack. The exhauster is operated only when the temperature of the waste is above a specific temperature and/or during any transfer of waste through the facility.

22.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL)	
	TANK TOTAL	PUMPABLE
241-B-104	371	40
241-B-107	165	7
241-B-110	246	17
241-B-111	237	16
241-BX-106	46	15
241-BX-110	199	10
241-BX-111	230	46
241-BY-102	341	22
241-BY-103	400	137
241-BY-105	503	169
241-BY-106	642	213
241-BY-109	423	57
TOTAL	3,803	749

22.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Refer to Section 3.1.4, for the definitions and examples of *static* and *dynamic* situations.

SCENARIO #1: Transfer of waste from tanks BY-102 and 109 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(4.89E-01 mrem/yr)(26.0 Kgal/79 Kgal)]
= 0.16 mrem/yr

Dynamic: [(4.89E-01 mrem/yr)(26.0 Kgal/79 Kgal)]
x (79 Kgal)/[(0.5E-03 Kgal/min)(60 min/hr)
x (24 min/d)(365 d/yr)]
= 4.8E-02 mrem over 108 days

SCENARIO #2: Transfer of waste from tanks BX-106 and BY-103, 105, 106 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(4.851 mrem/yr)(26.0 Kgal/534 Kgal)]
= 0.24 mrem/yr

Dynamic: [(4.851 mrem/yr)(26.0 Kgal/534 Kgal)]
x (534 Kgal)/[(0.5E-03 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 0.48 mrem over 2.03 years

SCENARIO #3: Transfer of waste from tanks B-104, 107, 110, and 111 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(2.59 mrem/yr)(26.0 Kgal/80 Kgal)]
= 0.84 mrem/yr

Dynamic: [(2.59 mrem/yr)(26.0 Kgal/80 Kgal)]
x (80 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 0.26 mrem over 111 days

SCENARIO #4: Transfer of waste from tanks BX-110 and 111 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(8.39E-02 mrem/yr)(26.0 Kgal/56 Kgal)]
= 3.90E-02 mrem/yr

Dynamic: [(8.39E-02 mrem/yr)(26.0 Kgal/56 Kgal)]
x (56 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 8.30E-03 mrem over 78 days

22.4 TANK FARM STACK STATUS: DESIGNATED

This transfer system was determined to be designated based on Scenario #1, #2, and #3.

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244-BX DCRT STACK 296-B-28 POTENTIAL EMISSIONS - Scenario #1 (BY-102, 109)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	.3090E+02	.4380E-01	1.E-03	1.353E-03	2.768E-01
90-Y	.3090E+02	.3770E-03	1.E-03	1.165E-05	2.382E-03
99-Tc	.2760E+02	.1090E-02	1.E-03	3.008E-05	6.153E-03
137-Cs	.2040E+05	.2390E-01	1.E-03	4.876E-01	9.971E+01
		TOTAL		4.890E-01	1.000E+02

Static: [(4.89E-01 mrem/yr)(26.0 Kgal/79 Kgal)] = 0.16 mrem/yr

Dynamic: [(4.89E-01 mrem/yr)(26.0 Kgal/79 Kgal)]
x (79 Kgal) / [(0.5E-03 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 4.8E-02 mrem over 108 days

244-BX DCRT STACK 296-B-28 POTENTIAL EMISSIONS - Scenario #2 (BX-106 / BY-103, 105, 106)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	.1130E+03	.4380E-01	1.E-03	4.949E-03	1.020E-01
90-Y	.1130E+03	.3770E-03	1.E-03	4.260E-05	8.783E-04
99-Tc	.5630E+02	.1090E-02	1.E-03	6.137E-05	1.265E-03
137-Cs	.1430E+06	.2390E-01	1.E-03	3.418E+00	7.046E+01
Nat-U	.9700E-04	.2840E+01	1.E-03	2.755E-07	5.679E-06
239/240-Pu	.1680E-04	.8670E+01	1.E-03	1.457E-07	3.003E-06
241-Am	.1090E+03	.1310E+02	1.E-03	1.428E+00	2.944E+01
		TOTAL		4.851E+00	1.000E+02

Static: [(4.851 mrem/yr)(26.0 Kgal/534 Kgal)] = 0.24 mrem/yr

Dynamic: [(4.851 mrem/yr)(26.0 Kgal/534 Kgal)]
x (534 Kgal)/(0.5E-03 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 0.48 mrem over 2.03 years

244-BX DCRT STACK 296-B-28 POTENTIAL EMISSIONS - Scenario #3 (B-104, 107, 110, 111)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.1490E+03	.2620E-02	1.E-03	3.904E-04	1.505E-02
79-Se	.6590E+01	.4380E-01	1.E-03	2.886E-04	1.113E-02
89/90-Sr	.5320E+04	.4380E-01	1.E-03	2.330E-01	8.983E+00
90-Y	.5320E+04	.3770E-03	1.E-03	2.006E-03	7.732E-02
99-Tc	.2220E+03	.1090E-02	1.E-03	2.420E-04	9.329E-03
106-Ru/Rh	.6060E-02	.2090E-01	1.E+00	1.267E-05	4.883E-04
125-Sb	.3110E+01	.4150E-02	1.E-03	1.291E-05	4.976E-04
129-I	.3810E+00	.2910E+00	1.E+00	1.109E-01	4.274E+00
137-Cs	.4080E+05	.2390E-01	1.E-03	9.751E-01	3.759E+01
144-Ce	.1490E-04	.1370E-01	1.E-03	2.041E-10	7.869E-09
154-Eu	.4140E+02	.4380E-01	1.E-03	1.813E-03	6.990E-02
Nat-U	.5810E+00	.2840E+01	1.E-03	1.650E-03	6.361E-02
237-Np	.6780E+00	.1190E+02	1.E-03	8.068E-03	3.110E-01
238-Pu	.7260E+00	.8020E+01	1.E-03	5.823E-03	2.245E-01
239/240-Pu	.3170E+02	.8670E+01	1.E-03	2.748E-01	1.060E+01
241-Pu	.4260E+02	.1380E+00	1.E-03	5.879E-03	2.266E-01
241-Am	.7400E+02	.1310E+02	1.E-03	9.694E-01	3.737E+01
242/244-Cm	.6560E+00	.6940E+01	1.E-03	4.553E-03	1.755E-01
		TOTAL		2.594E+00	1.000E+02

Static: [(2.59 mrem/yr)(26.0 Kgal/80 Kgal)] = 0.84 mrem/yr

Dynamic: [(2.59 mrem/yr)(26.0 Kgal/80 Kgal)]
x (80 Kgal)/[(0.5 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 0.26 mrem over 111 days

244-BX DCRT STACK 296-B-28 POTENTIAL EMISSIONS - Scenario #4 (BX-110, 111)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	.2650E+00	.4380E-01	1.E-03	1.161E-05	1.383E-02
90-Y	.2650E+00	.3770E-03	1.E-03	9.990E-08	1.190E-04
137-Cs	.3510E+04	.2390E-01	1.E-03	8.389E-02	9.994E+01
Nat-U	.8660E-03	.2840E+01	1.E-03	2.459E-06	2.930E-03
239/240-Pu	.1270E-02	.8670E+01	1.E-03	1.101E-05	1.312E-02
241-Am	.2100E-02	.1310E+02	1.E-03	2.751E-05	3.277E-02
		TOTAL		8.394E-02	1.000E+02

Static: [(8.39E-02 mrem/yr)(26.0 Kgal/56 Kgal)] = 3.90E-2 mrem/yr

Dynamic: [(8.39E-02 mrem/yr)(26.0 Kgal/56 Kgal)]
x (56 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 8.30E-03 mrem over 78 days

23.0 STACK 296-C-05

23.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-C-05 stack system ventilates the 244-CR Vault vessels, providing containment and moisture removal for the vessels' offgas. The 244-CR Vault is located north of the PUREX Plant in the 200 East area.

The 244-CR Vault is considered to be a double-contained receiver tank (DCRT) in the Hanford Site Tank Farm Facilities Interim Safety Basis (WHC-SD-WM-ISB-001) based on its functional characteristics, although it is not listed as one of the five DESIGNATED DCRTs in the 200 Area tank system. The 244-CR Vault is used to transfer waste from single-shell tanks in the 241-C Tank Farm to double-shell tanks in the 200 East area.

There are a total of four vessels in the 244-CR Vault which are ventilated by the 296-C-05 stack. Vessels CR-011 and CR-001 have a volume of 45,000 gallons and vessels CR-002 and CR-003 each have a volume of 14,655 gallons, however only tank CR-003 will be used during transfer waste from the C-Tank Farm. Tank CR-003 is limited to an operational volume of 13,500 gallons. Each of the vessels is held in its own cell and isolated from the 244-CR Vault canyon via a cell cover. It is ventilated via a common pipe which passes through ports in the cell walls through HEPA filters and then to the 296-C-05 stack. The exhauster is operated only when the temperature of the waste is above a specific temperature and/or during the transfer of waste through the facility.

23.2 POSTULATED WASTE VOLUME PASSING THROUGH DCRT

	WASTE VOLUME (KGAL)	
TANK	TANK TOTAL	PUMPABLE
241-C-102	423	19
241-C-103	195	133
241-C-107	275	20
241-C-110	187	5
TOTAL	1,080	177

23.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Refer to Section 3.1.4, for the definitions and examples of *static* and *dynamic* situations.

SCENARIO: Transfer of waste from tank C-103 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(1.87E+2 mrem/year)(13.5 Kgal/133 Kgal)]
= 19.0 mrem/yr

Dynamic: [(1.87E+2 mrem/year)(13.5 Kgal/133 Kgal)]
x [133 Kgal]/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)
= 9.62 mrem over 185 days

23.4 TANK FARM STACK STATUS: DESIGNATED

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244-CR VAULT STACK 296-C-5 POTENTIAL EMISSIONS - Scenario (C-103)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.4860E+00	.2620E-02	1.E-03	1.273E-06	6.817E-07
60-Co	.2970E+04	.2900E-01	1.E-03	8.613E-02	4.611E-02
89/90-Sr	.3510E+07	.4380E-01	1.E-03	1.537E+02	8.230E+01
90-Y	.3510E+07	.3770E-03	1.E-03	1.323E+00	7.084E-01
99-Tc	.4590E+03	.1090E-02	1.E-03	5.003E-04	2.678E-04
129-I	.5680E-01	.2910E+00	1.E+00	1.653E-02	8.849E-03
137-Cs	.1220E+06	.2390E-01	1.E-03	2.916E+00	1.561E+00
239/240-Pu	.1030E+04	.8670E+01	1.E-03	8.930E+00	4.781E+00
241-Am	.1510E+04	.1310E+02	1.E-03	1.978E+01	1.059E+01
			TOTAL	1.868E+02	1.000E+02

Note: CR Vault HEPA filter disposal assay results were performed for 209-E stack 296-P-31 potential emissions (see section 31). Not enough information exists to use this information for determination of CR Vault potential emissions. However, from the data given in section 31, the resulting potential from the HEPA results come to:

9.41E-04/1E-03 = 0.9 mrem

24.0 STACK 296-C-07

24.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-C-07 stack system is connected to what is called a mixing system. This mixing system utilizes a blower that forces approximately 22.6 cubic meters per minute (800 CFM) of fresh air up through a nominal 4.6 m (15-foot) stack. This relatively large flow rate of fresh air passes around a smaller beveled draw tube positioned perpendicular to the main flow. This configuration creates a low pressure in the smaller tube which is connected to the 103-C tank via a 2-inch diameter three-way valve installed on the existing tank breather filter. By adjusting the position of the beveled tube in the larger flow stream, the low pressure, and therefore the tank flow rate can be adjusted. The turbulence in the stack ensures full mixing of the two streams. The idea is to keep the tank flow rate low, near the normal breathing rate of the tank, yet high enough to capture emissions from other non-filtered pathways, while at the same time mixing and elevating these emissions out of the workers breathing zone. Reference WHC-SD-WM-ETP-115, Rev 0, Engineering Task Plan for a Vapor Treatment system on Tank 241-C-103, published under EDT No. 604999, March 7, 1995.

24.2 DETERMINATION OF POTENTIAL EMISSION

As seen above in section 23.4 the major radionuclide contributors to the potential offsite dose from tank 103-C can be determined to be Sr-90 and Am-241. The 40 CFR 61, Appendix D method used in the above cited section is based on liquid/vapor release factors (given as 1E-03). These release factors are considered extremely conservative. As such potential emission for 103-C are computed herein by other means - based on real air stream data. The latter method is considered more representative than the Appendix D method.

24.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Real air stream data is available from assay of the HEPA filters used to prevent radionuclide particulate matter from contaminating vapor space organic samples taken from this tank. An assay report from one of these filters (dated May 16, 1994) gave the activity per sample flow volume found in the vapor space of tank 103-C to be those values found in the "TOTAL (Ci/L)" column of the 103-C UNABATED EMISSIONS table below. The Sr-90 and Am-241 values were, of course, reported in the assay report in units of total beta and total alpha respectively.

The third column of the table below was computed based on a flow rate of 20 CFM which is equal to 2.98E+08 L/yr. The resultant off-site dose is shown to be 1.8E-03 mrem/yr.

103-C UNABATED EMISSIONS					
RADIONUCLIDE	TOTAL (Ci/L)	TOTAL (Ci/yr)	CAP-88 CONVERSION FACTOR (mrem/Ci)	OFF-SITE DOSE (mrem)	% OF Total
Sr-89/90	2.89E-12	8.61E-04	4.38E-02	3.77E-05	2
Am-241	4.64E-13	1.38E-04	13.1	1.81E-03	98
TOTAL				1.8E-03	

It should be noted that the samples used for this determination were not decayed to remove the short lived half-life radionuclides. As such the results are still conservative as the true activity may indeed be much lower.

24.4 TANK FARM STACK STATUS: <u>NON-DESIGNATED</u>

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25.0 STACK 296-P-16

25.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-P-16 portable exhauster and stack system directly ventilates tanks 241-C-105, 241-C-106, and indirectly ventilates through a cascade effect 241-C-104 in the 241-C Tank Farm, providing negative pressure and removal of heat and vapor from these tanks. The 241-C Tank Farm is located north of the PUREX plant in the 200 East Area.

The 241-C Tank Farm contains single-shell tanks which first received waste in 1943. Tanks 104, 105, and 106 each have a fill volume of 0.5 M gallons.

The ventilation system for the 104, 105, and 106 tanks consists of two exhaust heaters, a pre-filter, two HEPA filters and the 296-P-16 portable exhauster, all in series.

25.2 TANKS AND WASTE VOLUME

	WASTE VOLUME (KGAL)	
TANK	TANK TOTAL	PUMPABLE
241-C-104	295	5
241-C-105	150	4
241-C-106	229	42
TOTAL	674	51

25.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: The radioactivity in the supernatant of the waste and in the slurry/sludge in the C-104, 105, and 106 tanks of the 241-C Tank Farm is included in the calculation. No HEPA filter factors are included in the calculations.

Potential offsite dose = 1.21 mrem/yr (Supernatant)
+ 0.47 mrem/year (Slurry/Sludge)
= 1.68 mrem/year (Total)

25.4 TANK FARM STACK STATUS: DESIGNATED

TANKS C-104/105/106 STACK 296-P-16 POTENTIAL EMISSIONS (SUPERNATANT ONLY)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.2690E+00	.2620E-02	1.E-03	7.048E-07	5.848E-05
60-Co	.1920E+02	.2900E-01	1.E-03	5.568E-04	4.620E-02
79-Se	.0000E+00	.4380E-01	1.E-03	0.000E+00	0.000E+00
89/90-Sr	.3700E+03	.4380E-01	1.E-03	1.621E-02	1.345E+00
90-Y	.3700E+03	.3770E-03	1.E-03	1.395E-04	1.158E-02
99-Tc	.2200E+02	.1090E-02	1.E-03	2.398E-05	1.990E-03
129-I	.1210E-01	.2910E+00	1.E+00	3.521E-03	2.922E-01
137-Cs	.2710E+05	.2390E-01	1.E-03	6.477E-01	5.375E+01
Nat-U	.2840E-01	.2840E+01	1.E-03	8.066E-05	6.693E-03
239/240-Pu	.6020E+02	.8670E+01	1.E-03	5.219E-01	4.331E+01
241-Am	.1140E+01	.1310E+02	1.E-03	1.493E-02	1.239E+00
		TOTAL		1.205E+00	1.000E+02

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TANKS C-104/105/106 STACK 296-P-16 POTENTIAL EMISSIONS (SLURRY/SLUDGE)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem)	% of Total EDE
14-C	.2000E+01	.2620E-02	1.E-06	5.240E-09	1.105E-06
60-Co	.9570E+03	.2900E-01	1.E-06	2.775E-05	5.858E-03
89/90-Sr	.2810E+07	.4380E-01	1.E-06	1.231E-01	2.599E+01
90-Y	.2810E+07	.3770E-03	1.E-06	1.059E-03	2.236E-01
99-Tc	.4110E+04	.1090E-02	1.E-06	4.480E-06	9.457E-04
129-I	.1910E+00	.2910E+00	1.E+00	5.558E-02	1.173E+01
137-Cs	.4430E+06	.2390E-01	1.E-06	1.059E-02	2.236E+00
Nat-U	.2980E+04	.2840E+01	1.E-06	8.463E-03	1.786E+00
239/240-Pu	.2190E+05	.8670E+01	1.E-06	1.899E-01	4.009E+01
241-Am	.6490E+04	.1310E+02	1.E-06	8.502E-02	1.795E+01
		TOTAL		4.737E-01	1.000E+02

26.0 STACK 296-P-17

26.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-P-17 portable exhauster and stack system ventilates tanks 241-A-105, 104, and 106 in the 241-A Tank Farm, providing negative pressure and removal of heat and vapor from these tanks. The 241-A Tank Farm is located north of the PUREX plant in the 200 East Area.

The 241-A Tank Farm contains six single-shell tanks which first received waste in 1954. Tanks 101 through 106 each have a fill volume of 1.0 M gallons.

The ventilation system for the 241-A tanks consists of two exhaust heaters, a pre-filter system, and two parallel banks of nine HEPA filters each and the 296-P-17 portable exhauster.

26.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL) TANK TOTAL	PUMPABLE
241-A-101	953	390
241-A-102	41	0
241-A-103	370	0
241-A-104	28	0
241-A-105	19	0
241-A-106	125	0
TOTAL	1,536	390

26.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: The radioactivity in the waste in the A-104, 105, and 106 tanks of the 241-A Tank Farm is included in the calculation. No HEPA filter factors are included in the calculations.

Potential offsite dose = 202 mrem/yr[1]

26.4 TANK FARM STACK STATUS: NON-DESIGNATED[1]

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

A-104/105/106 TANK STACK 296-P-17 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.7080E+03	.2620E-02	1.E-03	1.855E-03	9.190E-04
79-Se	.2970E+00	.4380E-01	1.E-03	1.301E-05	6.445E-06
89/90-Sr	.3780E+07	.4380E-01	1.E-03	1.656E+02	8.203E+01
90-Y	.3780E+07	.3770E-03	1.E-03	1.425E+00	7.060E-01
99-Tc	.1000E+02	.1090E-02	1.E-03	1.090E-05	5.400E-06
106-Ru/Rh	.8160E-01	.2090E-01	1.E+00	1.705E-03	8.450E-04
129-I	.1000E-01	.2910E+00	1.E+00	2.910E-03	1.442E-03
137-Cs	.3780E+05	.2390E-01	1.E-03	9.034E-01	4.476E-01
Nat-U	.6050E+01	.2840E+01	1.E-03	1.718E-02	8.513E-03
237-Np	.4640E-01	.1190E+02	1.E-03	5.522E-04	2.736E-04
238-Pu	.6810E+02	.8020E+01	1.E-03	5.462E-01	2.706E-01
239/240-Pu	.2000E+04	.8670E+01	1.E-03	1.734E+01	8.591E+00
241-Pu	.3240E+04	.1380E+00	1.E-03	4.471E-01	2.215E-01
241-Am	.1190E+04	.1310E+02	1.E-03	1.559E+01	7.724E+00
242/244-Cm	.6570E-02	.6940E+01	1.E-03	4.560E-05	2.259E-05
		TOTAL		2.018E+02	1.000E+02

27.0 STACK 296-P-22

27.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-P-22 stack system ventilates the annuli of the 241-SY Farm tanks, providing removal of heat from the outer surface of the primary tanks, and maintenance of a dry environment to minimize corrosion of the primary tank. The 241-SY Tank Farm is located south of the Plutonium Finishing Plant in the 200 West area.

Tanks in the 241-SY Tank Farm are double-shell tanks, first used to contain waste in 1974. There are a total of three tanks in the Tank Farm, each with a volume of 1.2 M gallons.

The 241-SY tank annuli ventilation system contains an inlet system consisting of four inlet ducts per tank originating from parallel banks of pre-filter and HEPA filter systems and an outlet system consisting of deentrainer, heater, pre-filter and HEPA filter. The 296-P-22 annuli exhaust system does not have a backup system as do other double-shell tank farms. Portable exhauster units may be used for this purpose.

27.2 CALCULATION OF SOURCE TERM

It is not expected that the primary containment vessels in the 241-SY Tank Farm will leak. The design life of these vessels is a minimum of 50 years and the tanks have undergone an integrity assessment. If a leak is found, the annuli source term would be re-evaluated at that time. Therefore, there is no radionuclide source term associated with this stack system.

27.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: No loss of primary containment of a tank is expected. No HEPA filter factors are included in the calculations.

Potential offsite dose = <u>0 mrem/yr</u>

27.4 TANK FARM STACK STATUS: <u>NON-DESIGNATED</u>

28.0 STACK 296-P-23

28.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-P-23 stack system ventilates the 241-SY Farm tanks, providing negative pressure and removal of heat and vapor from the primary containment vessels. The 241-SY Tank Farm is located south of the Plutonium Finishing Plant in the 200 West area.

Tanks in the 241-SY Tank Farm are doubled shelled tanks, first used to contain waste in 1974. There are a total of three tanks in the Tank Farm, each with a volume of 1.2 M gallons.

The primary ventilation system connects to the tanks through 12-inch diameter risers which run independently to the exhaust system. Manually operated butterfly valves control airflow to each of the three tanks. The exhaust system consists of one deentrainer system, one heater system, a prefilter, two HEPA filters and one blower system. The 296-P-23 tank exhaust system relies on a portable exhauster system, 296-P-28, as a backup.

28.2 TANKS AND WASTE VOLUME

	WASTE VOLUME (KGAL)	
TANK	TANK TOTAL	PUMPABLE
241-SY-101	1,118	259
241-SY-102	726	655
241-SY-103	751	174
TOTAL	2,595	1,088

28.3 CALCULATION OF POTENTIAL OFFSITE DOSE

REVISED ASSESSMENT: As mentioned in section 3.2, a method for determining the potential emissions for a particular emission unit is to determine what the filters collected. This method is based directly on the requirement specified in 40 CFR 61.93 that directs potential emissions be determined without any emission controls in place. Emission controls for this SY exhauster consist of a prefilter rated at 8% particulate removal efficiency and two High Efficiency Particulate Air (HEPA) filter installed in series. Each HEPA filter is periodically tested to a particulate removal efficiency of 99.95%.

In December, 1994, the 241-SY first stage (closest in the exhaust train to the tank vapor space) High Efficiency Particulate (HEPA) Air filter and pre-filter on the primary tank exhauster were replaced. The replaced prefilter and HEPA filter was placed in containers #WTFF-94-349-02 and #WTFF-94-350-02 respectively. Both these containers were fully characterized by standard methods used for processing this type of waste for storage and ultimate disposal. This characterization was used here to determine the potential emissions from this emission points. The following table summarizes the assay results as total curie content on the prefilter and HEPA filter.

Isotope	Curies		
	Prefilter	HEPA	Total
Sr-90	2.30E-04	9.39E-03	9.62E-03
Y-90	2.30E-04	9.39E-03	9.62E-03
Eu-154	9.11E-07	7.47E-06	8.38E-06
Cs-137	7.81E-04	3.90E-02	3.98E-02
Pu-238	2.01E-06	5.61E-06	7.62E-06
Pu-239	2.43E-05	6.79E-05	9.22E-05
Pu-240	5.46E-06	1.53E-05	2.08E-05
Pu-241	2.39E-04	6.68E-04	9.07E-04
Pu-242	3.27E-10	9.12E-10	1.24E-09
Am-241	1.29E-07	3.61E-07	4.90E-07

Since HEPA filters are tested to be 99.95% efficient in removal of particulates, it can be shown that the curie content collected on these filters represent 99.95% of the potential emission during the time the HEPAs were in use while the exhauster was in operation. It is known that this exhauster runs continuously, except for intermittent operation of the backup exhauster for maintenance purposes. It is also known, from operator knowledge, that these filters were last changed in April or May of 1990. A very conservative assumption, therefore, is to assume that the curie content on these HEPAs represent the potential emissions for this facility for a one year period, as the regulations require. The potential emissions from this stack, therefore, is as follows (see computations for HEPA Filter Assay results below):

Potential offsite dose = 1.5E-03 = 1.5E-03 mrem/yr

ORIGINAL ASSESSMENT: This assessment is left in for historical/informational purposes. This original method used the source term found in the tanks combined with the release fractions found in 40 CFR 61 Appendix D. Radioactivity in the supernatant of the waste and the slurry/sludge in the SY Tank Farm was included in the calculation. No HEPA filter factors were included in the calculations. The results of this method gave a potential offsite dose equal to 10.5 mrem/yr.

28.4 TANK FARM STACK STATUS: **NON-DESIGNATED**

The revised assessment is considered more representative then the original one because the revised assessment is based on real air stream data. The original assessment was based on liquid/vapor release factors (given in 40 CFR 61, Appendix D as 1E-03). These release factors are considered extremely conservative. The potential from this stack has, therefore, been determined to be 0.0015 mrem/yr.

* * * * * * *

241-SY TANK FARM STACK 296-P-23 POTENTIAL EMISSIONS - HEPA FILTER ASSAY RESULTS

R-nuclide	Sum of Ci*	CAP-88 c-factor	EDE (mrem/yr)	% of Total EDE
90-Sr	9.62E-03	2.60E-02	2.5E-04	1.6E+01
90-Y	9.62E-03	2.22E-04	2.1E-06	1.4E-01
137-Cs	3.98E-02	1.42E-02	5.7E-04	3.8E+01
154-Eu	8.38E-06	2.60E-02	2.2E-07	1.5E-02
238-Pu	7.62E-06	4.76E+00	3.6E-05	2.3E+00
239-Pu	9.22E-05	5.15E+00	4.7E-04	3.1E+01
240-Pu	2.08E-05	5.14E+00	1.1E-04	7.3E+00
241-Pu	9.07E-04	8.17E-02	7.4E-05	4.9E+00
242-Pu	1.24E-09	5.15E-00	6.4E-09	4.2E-04
241-Am	4.90E-07	7.79E+00	3.8E-06	2.5E-01
		TOTAL	1.5E-03	

241-SY TANK FARM STACK 296-P-23 POTENTIAL EMISSIONS (SUPERNATANT ONLY) - ORIGINAL ASSESSMENT

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.0000E+00	.1650E-02	1.E-03	0.000E+00	0.000E+00
60-Co	.0000E+00	.1720E-01	1.E-03	0.000E+00	0.000E+00
79-Se	.0000E+00	.2600E-01	1.E-03	0.000E+00	0.000E+00
89/90-Sr	.5210E+04	.2600E-01	1.E-03	1.355E-01	1.289E+00
90-Y	.5210E+04	.2220E-03	1.E-03	1.157E-03	1.101E-02
99-Tc	.1040E+02	.6450E-03	1.E-03	6.708E-06	6.383E-05
106-Ru/Rh	.0000E+00	.1200E-01	1.E+00	0.000E+00	0.000E+00
125-Sb	.0000E+00	.2470E-02	1.E-03	0.000E+00	0.000E+00
129-I	.0000E+00	.1140E+00	1.E+00	0.000E+00	0.000E+00
134-Cs	.0000E+00	.1860E-01	1.E-03	0.000E+00	0.000E+00
137-Cs	.7290E+06	.1420E-01	1.E-03	1.035E+01	9.850E+01
144-Ce	.0000E+00	.8140E-02	1.E-03	0.000E+00	0.000E+00
147-Pm	.0000E+00	.6750E-03	1.E-03	0.000E+00	0.000E+00
154-Eu	.0000E+00	.2600E-01	1.E-03	0.000E+00	0.000E+00
Nat-U	.5810E-03	.1690E+01	1.E-03	9.819E-07	9.343E-06
237-Np	.0000E+00	.7050E+01	1.E-03	0.000E+00	0.000E+00
238-Pu	.0000E+00	.4760E+01	1.E-03	0.000E+00	0.000E+00
239/240-Pu	.6750E+00	.5150E+01	1.E-03	3.476E-03	3.308E-02
241-Pu	.0000E+00	.8170E-01	1.E-03	0.000E+00	0.000E+00
241-Am	.2270E+01	.7790E+01	1.E-03	1.768E-02	1.683E-01
242/244-Cm	.0000E+00	.4120E+01	1.E-03	0.000E+00	0.000E+00
		TOTAL		1.051E+01	1.000E+02

29.0 STACK 296-S-25

29.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-S-25 stack system is a new exhauster intended to take the place of the 296-P-23 stack exhauster. When this finally occurs, the 296-P-23 will become the primary backup system. The 241-SY Tank Farm is located south of the Plutonium Finishing Plant in the 200 West area. See section 28.0 for more descriptive information of SY Farm.

29.2 TANKS AND WASTE VOLUME

See section 28.0.

29.3 CALCULATION OF POTENTIAL OFFSITE DOSE

See section 28.0. Since the air stream data can be assumed for this exhauster to be equivalent to that of the 296-P-23 exhauster, potential emissions can also be assumed to be the same.

Potential offsite dose = 1.5E-03 = 1.5E-03 mrem/yr

29.4 TANK FARM STACK STATUS: NON-DESIGNATED

See section 28.0.

30.0 STACK 296-P-28

30.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-P-28 stack system is a backup, portable exhaust system which ventilates the 241-SY Farm tanks, providing negative pressure and removal of heat and vapor from the primary containment vessels. This system may be manually used in the event of failure of the primary system, 296-P-23. The 241-SY Tank Farm is located south of the Plutonium Finishing Plant in the 200 West area. See section 28.0 for more descriptive information of SY Farm.

The backup, portable exhauster may be connected to the primary system on the upstream side of 296-P-23 blower K1-4-1. The exhaust system then relies on the same configuration as the primary system to filter air exhausted from the 241-SY Farm Tanks. Exhaust air exits the tanks through 12-inch diameter risers which run independently to the exhaust system. Manually operated butterfly valves control airflow to each of the three tanks. The exhaust system consists of one deentrainer system, one heater system, two prefilters, two HEPA filters and one blower system.

30.2 TANKS AND WASTE VOLUME

See section 28.0.

30.3 CALCULATION OF POTENTIAL OFFSITE DOSE

See section 28.0. Since the air stream data can be assumed for this exhauster to be equivalent to that of the 296-P-23 exhauster, potential emissions can also be assumed to be the same.

Potential offsite dose = 1.5E-03 = 1.5E-03 mrem/yr

30.4 TANK FARM STACK STATUS: <u>NON-DESIGNATED</u>

See section 28.0.

31.0 STACK 296-P-31

31.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-P-31 Stack ventilates the 209-E building Critical Mass Lab. The 209-E building is located in the 200 East Area just east of B Plant. This building contains the old PNL Critical Mass Laboratory which is no longer operated. The building was transferred to WHC custodianship on January 20, 1992, and is currently used by Tank Farms Solid Waste Operations and Tank Farms Solid Waste Engineering. Plans are to use the critical assemble room and the mix room to assay, sample, and repackage low-level radioactive solid waste containers. Room air is discharged from this room through the hood assembly filters and through tank inlet filters. Plutonium and uranium residuals reside in these units. Discharged air passes through two HEPA filter assemblies, in series, and out the stack.

This determination was conducted using the inventory method of 40 CFR 61, Appendix D. A building nuclear materials inventory and the contents of a worst-case radioactive solid waste package (CR Vault HEPA filter package assay and sample counting report) were used to determine the maximum inventory. The nuclear materials inventory included 422 grams of residual plutonium and 15 grams of residual depleted uranium (U-238). Plutonium listed on the building nuclear materials inventory is assumed to be Pu-240. It is believed that the assumptions of this evaluation are very conservative. The results of the evaluation are presented on the attached sheet. The HEPA Filter filtration factor (0.01 given in Appendix D) was not used. The conclusion is that this stack is not DESIGNATED.

31.2 SOURCE TERM

RADIOISOTOPE	ACTIVITY LEVEL (Ci)
Co-60	8.37E-04
Sr-89/90	1.99E+01
Y-90	1.99E+01
Cs-137	4.59E-02
Eu-152	9.45E-06
Eu-154	8.37E-04
Eu-155	1.65E-02
U-238*	5.04E-06
Pu-238	2.35E-04
Pu-239	3.44E-03
Pu-240*	9.58E+01
Pu-240	8.01E-04
Pu-241	4.55E-02
Am-241	1.16E-03

* Assumes residual at 209-E is Pu-240 and associated daughter products.

31.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: 209-E Building nuclear materials inventory used as the source term. No HEPA filter factors are included in the calculations.

Potential offsite dose = 1.77E-03 mrem/yr

31.4 TANK FARM STACK STATUS: NON-DESIGNATED

BUILDING 209-E STACK 296-P-31 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
60-Co	8.37E-04	2.90E-02	1.E-03	2.43E-08	
89/90-Sr	1.99E+01	4.38E-02	1.E-03	8.72E-04	49.2
90-Y	1.99E+01	3.77E-04	1.E-03	7.50E-06	0.4
137-Cs	4.59E-02	2.39E-02	1.E-03	1.10E-06	0.1
152-Eu	9.45E-06	4.38E-02	1.E-03	4.14E-10	
154-Eu	8.37E-04	4.38E-02	1.E-03	3.67E-08	
155-Eu	1.65E-02	4.38E-02	1.E-03	7.23E-07	
Nat-U*	5.04E-06	2.84E+00	1.E-06	1.43E-11	
238-Pu	2.35E-04	8.02E+00	1.E-03	1.88E-06	0.1
239-Pu	3.44E-03	8.67E+00	1.E-03	2.98E-05	1.7
240-Pu*	9.58E+01	8.67E+00	1.E-06	8.31E-04	46.9
240-Pu	8.01E-04	8.67E+00	1.E-03	6.94E-06	0.4
241-Pu	4.55E-02	1.38E-01	1.E-03	6.27E-06	0.4
241-Am	1.16E-03	1.31E+01	1.E-03	1.52E-05	0.9
		TOTAL		1.77E-03	

* 209-E residual

Contribution to CR Vault HEPA filter would be:

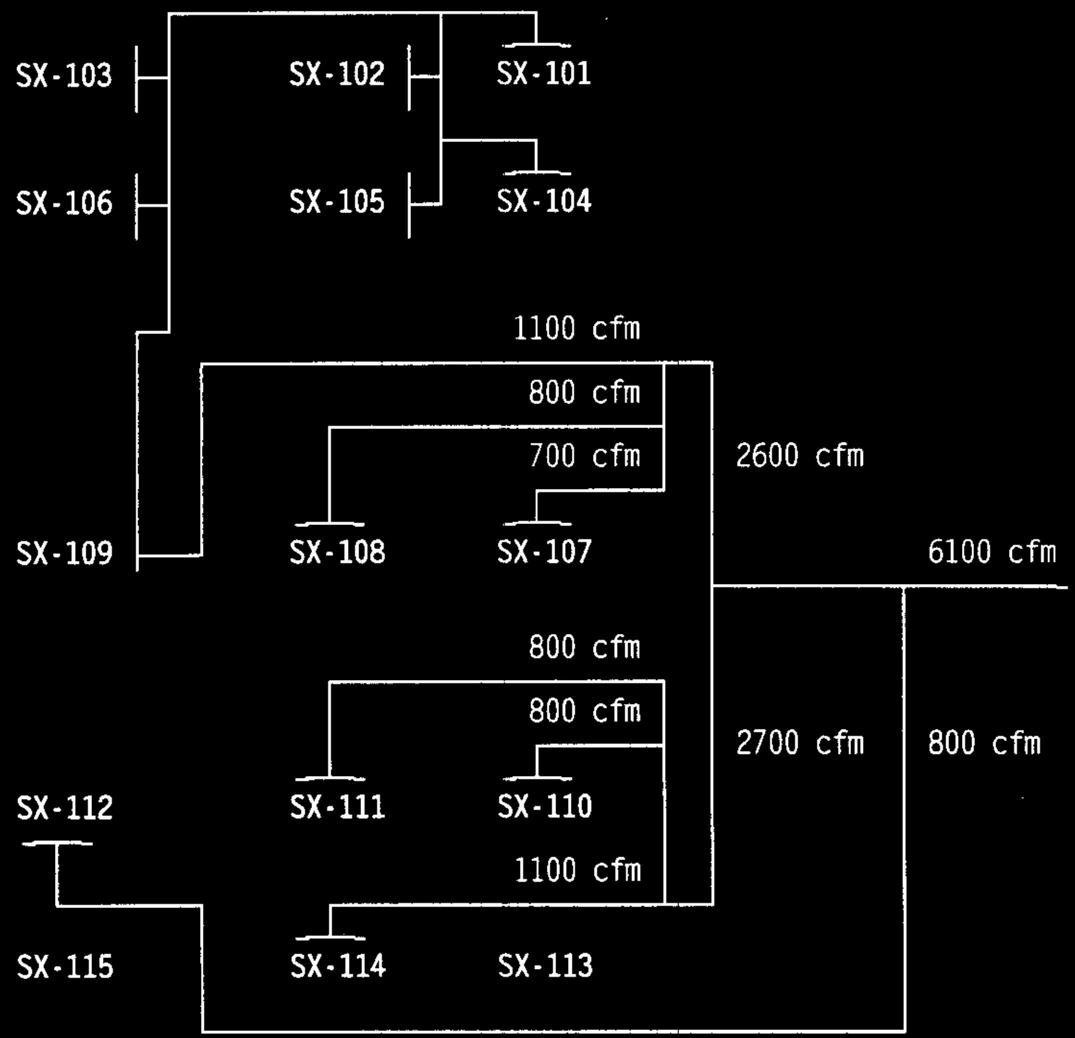
1.77E-03 - 1.43E-11 - 8.31E-04 = 9.41E-04

32.0 STACK 296-S-15

32.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-S-15 stack system ventilates 241-SX Tank Farm, tanks 101 through 112 and 114, providing negative pressure and removal of heat and vapor. The flow is designed as per the following flow diagram:

SX TANK FARM VENTILATION DIAGRAM



The 241-SX Tank Farm is located south of the Plutonium Finishing Plant in the 200 West area. The 241-SX tanks are single-shell tanks, first used to contain waste in 1953. The tanks ventilated by the 296-S-15 stack system are each 1 M gallons.

Inlet air enters the ventilation system through heater/pre-filter/HEPA filter units at tanks 107-112 and 114. This air is exhausted through vent lines in each of these tanks through deentrainer/heater/pre-filter/HEPA filters/blowers and stack 296-S-15. Tanks 101-106 have no air inlet system but are maintained at negative pressure through a connection to the ventilation system at tank 109.

32.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL)	
	TANK TOTAL	PUMPABLE
241-SX-101	456	124
241-SX-102	543	177
241-SX-103	652	211
241-SX-104	614	195
241-SX-105	683	238
241-SX-106	538	233
241-SX-107	104	0
241-SX-108	115	0
241-SX-109	250	0
241-SX-110	62	0
241-SX-111	125	0
241-SX-112	92	0
241-SX-114	181	0
TOTAL	4415	1178

32.3 CALCULATION OF POTENTIAL OFFSITE DOSE

The 40 CFR 61, Appendix D method used in the above cited section is based on liquid/vapor release factors (given as 1E-03). These release factors are considered extremely conservative. As such potential emission for 103-C are computed herein by other means - based on real air stream data. The latter method is considered more representative then the Appendix D method.

24.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Reassessment: In addition to the source term data presented above, real air stream data is available from assay of the HEPA filters used to prevent radionuclide particulate matter from contaminating vapor space organic samples taken from tank SX-109, SX-105, and SX-104. As can be seen from the diagram above, sample data from tank SX-109 is sufficient for this potential emission determination. Radionuclide analysis results are available from the following identified sample numbers:

Filter#: T-2266 (First filter in-line)
T-2267 (Second filter in-line)
T-2268 (Third filter in-line)
T-2269 (Fourth filter in-line)

Total Volume of Tank Gas through the vapor sample was given to be 305.95 liters.

It should be noted that the sample results were not decayed to remove the short lived half-life radionuclides. As such the results of this determination are still conservative as the true activity may indeed be much lower. The data yielded the results in the following table

SX-109 POTENTIAL EMISSION DATA						
Analyte	Alpha	Beta	Cs-137	TL-208	Bi-212	Pb-212
Units	Ci/L					
T2266	3.43E-12	4.38E-12	9.74E-14	6.60E-13	2.37E-12	2.07E-12
T2267	5.98E-15	6.57E-15				
T2268	3.79E-15	1.53E-14	8.89E-14			
T2269	2.49E-15	2.47E-14				
TOTAL	3.44E-12	4.43E-12	1.86E-13	6.60E-13	2.37E-12	2.07E-12
CAP-88	7.79	2.6E-02	1.42E-02	N/A	9.88E-05	1.85E-03
MREM/L	2.68E-11	1.15E-13	2.64E-15	---	2.34E-16	3.83E-15
RESULTS	2.69E-11 (mrem/L)					

According to drawing H-2-90866 the flow from SX109 is 1100 CFM
= 31,130 LPM
= 1.64E+10 L/yr

2.69E-11 (mrem/L) * 1.64E+10 L/yr = 0.44 mrem/yr

The drawing gives flows from SX109 to be 1100/6100 = 0.18 or 18% of the flow for the exhauster as a whole. If this percentage holds at the lower flows seen in the past several years (average flows from this exhauster computes to 3,913 cfm), the flow from SX109 would be:

0.18 * 3913 = 704 cfm = 19,933 lpm = 1.05E+10 L/yr

This gives the potential as:

2.69E-11 (mrem/L) * 1.05E+10 L/yr = 0.28 mrem/yr

Assuming this is representative, the total potential for this exhauster is:

0.28/0.18 = 1.57 mrem/yr

POTENTIAL USING TANK WASTE SOURCE TERM

Original Assessment: The radioactivity in the supernatant in the waste and in the slurry/sludge in the SX Tank Farm is included in the calculation table below. The 40 CFR 61, Appendix D Method was used. No HEPA filter factors are included in the calculations. This assessment yielded a potential offsite dose of 270 mrem/yr.

32.4 TANK FARM STACK STATUS: DESIGNATED

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SX TANK FARM STACK 296-S-15 POTENTIAL EMISSIONS (SUPERNATANT ONLY[1]) -
Original Assessment

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.8130E+03	.1650E-02	1.E-03	1.341E-03	4.975E-04
79-Se	.8950E+02	.2600E-01	1.E-03	2.327E-03	8.629E-04
89/90-Sr	.6660E+07	.2600E-01	1.E-03	1.732E+02	6.421E+01
90-Y	.6660E+07	.2220E-03	1.E-03	1.479E+00	5.483E-01
99-Tc	.3100E+04	.6450E-03	1.E-03	2.000E-03	7.415E-04
106-Ru/Rh	.5580E-01	.1200E-01	1.E+00	6.696E-04	2.483E-05
125-Sb	.8370E+02	.2470E-02	1.E-03	2.067E-04	7.667E-05
129-I	.4580E+01	.1140E+00	1.E+00	5.221E-01	1.936E-01
134-Cs	.2170E+01	.1860E-01	1.E-03	4.036E-05	1.497E-05
137-Cs	.1900E+07	.1420E-01	1.E-03	2.698E+01	1.001E+01
154-Eu	.9490E+03	.2600E-01	1.E-03	2.467E-02	9.150E-03
Nat-U	.1070E+02	.1690E+01	1.E-03	1.808E-02	6.706E-03
237-Np	.3450E+01	.7050E+01	1.E-03	2.432E-02	9.020E-03
238-Pu	.1190E+03	.4760E+01	1.E-03	5.664E-01	2.101E-01
239/240-Pu	.2330E+04	.5150E+01	1.E-03	1.200E+01	4.450E+00
241-Pu	.2720E+04	.8170E-01	1.E-03	2.222E-01	8.241E-02
241-Am	.7010E+04	.7790E+01	1.E-03	5.461E+01	2.025E+01
242/244-Cm	.1290E+02	.4120E+01	1.E-03	5.315E-02	1.971E-02
			TOTAL	2.697E+02	1.000E+02

[1] Total activity adjusted as data were available for specific tanks.

33.0 STACK 296-S-18

33.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-S-18 stack system ventilates the 242-S Evaporator building, providing a negative pressure with respect to external areas for the containment of radioactive material which may have escaped the primary evaporator vessel containment. The 242-S Evaporator building is located on the north side of the S-Tank Farm in the 200 West Area.

The 242-S Evaporator is designed to remove water from non-boiling, high level liquid waste in the nearby 241-SY Tank Farm. The 242-S Evaporator is now in shutdown-standby mode. The 296-S-18 stack system ventilates the 242-S pump room, evaporator room, and condenser room.

The ventilation system for the 242-S Evaporator building provides containment for certain radiologically controlled areas within the facility. Inlet air passes through pre-heater, pre-filter, heater, water scrubber, and blower systems. The inlet air is then split into four air trains, passed through additional heaters and ventilates the evaporator, pump, condenser and loading dock areas. Exhaust air passes through parallel systems consisting of pre-filter, two HEPA filters, and blower before being exhausted at the 296-S-18 stack.

HISTORICAL OVERVIEW

The 242-S Evaporator complex was started up in November of 1973. The 242-S Evaporator operated very successfully until shutdown in November 1980. The 242-S Evaporator was placed in Shutdown/Standby Condition II in 1981 which included flushing and removal of radioactive liquids from the facility. Because of future waste volume projections made at that time, in RHO-CD-80-615, "Tank Farm Waste Volume Projections", the facility was upgraded by addition of a pumpout system, by which the evaporator vessel could be pumped out to a double-shell tank in case of a shutdown during operation.

By 1985, no restart requirement had appeared, so the 242-S Evaporator was placed in Standby/Shutdown Condition III. This condition means that the building will be maintained in such a manner that it can be restarted, recognizing that the startup time would be greater than six months.

In 1985, a transfer was made through the 242-S ion exchange column to reduce the uranium content in the U-1/U-2 crib groundwater. The transfer was sent through the 302-C tank and then through the ion exchange column. The C-100 condensate catch tank was used during column regeneration. The project was shutdown for the winter and never resumed. Funding for this type of use for the 242-S Evaporator was never designated.

The 242-S Facility Shutdown/Standby Plan, SD-WM-SSP-002, dated 9/29/88 is available and explains what was done to place this facility in the current designated status of Standby/Shutdown Condition III. In addition Standard Operating Procedure TO-780-020, *242-S Shutdown/Standby Surveillance Routines* provides the surveillances accomplished to ensure the facility remains in a safe configuration.

33.2 CALCULATION OF POTENTIAL EMISSIONS

The potential to emit from this facility is based on recent air sample data and smear data documented in Radiation Survey Report Survey number 163308, dated 10-31-94. During this survey, both smear data and an air sample were taken. The activity levels on the air sample was 20,000 dpm beta/gamma, and less than 20 dpm alpha. The volume of air taken for this air sample was 40 cubic feet. The survey report concludes that the concentration of the air sample computed to be 1.0E-08 μCi/ml. Actually, a 20,000 dpm activity in 40 cubic feet of sample computes to 8.0E-09 μCi/ml. It is obvious, then, that report conclusion rounded the value of 1.0E-08 up. A less than 20 dpm alpha collected from 40 cubic feet of air computes to 8.0E-15 Ci/L or 8.0E-12 μCi/ml. The smear data taken in the survey report gave the highest values found to be 950,000 dpm per 100 square cm with a maximum dose rate of 500 mR/hr contact. The potential offsite dose consequence are determined from the air sample data in the following section.

33.2.1 USE OF AIR SAMPLE DATA

The regulations require that potential emissions be determined under normal operational conditions, but with no emission controls in place (i.e. the HEPA Filters are not present). To use the air sample data two assumptions were made. The first assumption was that the air sample concentration data represents the potential emissions. This means that the HEPA filter decontamination factors can not be used to reduce the concentrations emitted by the ventilation system. This assumption was assumed to be conservative because of the following two statements:

1. One of the technicians who entered the facility the day of the survey made the following comment over the phone when questioned about the details of the visit:

   "When we made entry into the pump room, the building exhauster caused great air turbulence which in turn resuspended some of the surface contamination."

2. A statement documented in the survey report makes the following claim:

   ". . .It was noted that the area was extremely filthy with particulates of dust on floor. . ."

These two statements can be interpreted to mean that the air sample taken at the time of entry represent disturbed conditions; not normal operations. Note that the regulations require that potential emissions only be determined under normal operations.

The second assumption was to use the air concentration data as representing normal conditions which would be assumed to exist for the entire year. This assumption, too was deemed to be conservative for the following reasons:

- At an average flow rate for this exhauster of 18,320 CFM (the average flow rate computed from vent & balance measurement data), the available volume of air in the ventilated area (computed to be 104618 cubic feet - see "Ventilated Area" table below) would be exchanged in approximately 6 minutes. At this rate of exchange, the dust that was disturbed during entry into the room during the reported survey would be expected to settle out or be filtered out in the ventilation system in a very short period of time. The concentrations, then, would be expected to drop significantly in a very short period of time.

- As with the first assumption, the air sample used represents disturbed conditions as evident by the dust accumulation noted in the survey report and by the statement of the technician who entered the facility.

- These rooms are rarely entered because of the operational status of the facility - classified as in Standby/Shutdown Condition III.

COMPUTATION: Available Vent & Balance measurement data give an average flow rate from this stack as 18,320 CFM. This represents 9.6E+09 cubic feet per year or 2.7E+11 liters per year which is exhausted to the environment. The air concentration collected, in the amount of 8.0E-09 µCi/ml is equivalent to 8.0E-12 curies (beta) per liter. The alpha concentration, though given in less than units, can be conservatively computed to represent 8.0E-15 curies per liter. From these values the total number of curies available for release was computed to 2.2 beta and less than 2.1E-03 alpha. The potential offsite exposure to this, using CAP-88 conversion factors for the 200 west area, computes to (using Sr-90 to represent the beta activity and Am-241 to represent the alpha activity):

$$2.2 * 2.6E-02 + 2.1E-03 * 7.79 = 0.074 \text{ mrem/yr}$$

Ventilated Area					
ROOM	LENGTH (ft)	WIDTH (ft)	HEIGHT (ft)	TOTAL VOLUME AREA (cubic feet)	TOTAL SURFACE AREA (sq cm)
PUMP	22.2	18	12.5	4,995	1.68E+06
EVAPORATOR	22.2	25.4	71.6	40,374	7.38E+06
CONDENSER	24	27	71.6	46,397	7.99E+06
LOADOUT/HOT STORAGE	22.2	12	36.4	9,697	2.81E+06
LOADING	23.9	12	11	3,155	1.27E+06
TOTAL				104,618	2.11E+07

33.3 CALCULATION OF POTENTIAL OFFSITE DOSE

SCENARIO: Use of air sample data is explained in section 33.2.1.

Potential Emissions: 0.074 mrem/yr

33.4 TANK FARM STACK STATUS: NON-DESIGNATED

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242-S EVAPORATOR BUILDING STACK 296-S-18 POTENTIAL EMISSIONS - SCENARIO #1 (Air Sample Data)

R-nuclide	Sum of Ci	CAP-88 c-factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	2.2E+00	2.600E-02	5.7E-02	7.7E+01
241-Am	2.1E-03	7.790E+00	1.6E-02	2.2E+01
		TOTAL	7.4E-02	

34.0 STACK 296-S-22

34.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-S-22 stack system ventilates the 244-S Catch Station tank and annulus, providing negative pressure. The 244-S Catch Station is located south of the 241-SY Tank Farms in the 200 West area.

The 244-S Catch Station is a double-contained receiver tank (DCRT) used to transfer liquid waste from 241-S and 241-SX salt wells to the 241-SY Tank Farm. The 244-S Catch Station started operation in 1975.

The catch tank is a steel vessel with maximum volume of 19,000 gallons and limited to an operational limit of 16,213 gallons. The catch tank and the concrete pit containing the tank define the annulus space. The volume of the pit minus the volume of the tank equals the volume of the annulus space. The pit containing the catch tank constitutes secondary containment for the Station. The catch tank and annulus are ventilated by the 296-S-22 system. Air used to ventilate the tank and annulus is drawn in through heater, pre-filter, HEPA filter. The air train is split into two trains, with the annulus receiving 80 percent of the airflow and the tank receiving 20 percent. Air which is withdrawn from the tank and annulus passes through a heater and parallel trains of two HEPA filters in series (2 x 2) before being exhausted through the 296-S-22 stack. The exhauster is operated only when the temperature of the waste is above a specific temperature and/or during the transfer of any waste through the facility.

34.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL)	
	TANK TOTAL	PUMPABLE
241-S-101	427	90
241-S-103	248	79
241-S-106	543	162
241-S-107	368	44
241-S-108	604	105
241-S-109	568	119
241-S-110	390	103
241-S-111	596	134
241-S-112	637	112
241-SX-101	456	124
241-SX-102	543	177
241-SX-103	652	211
241-SX-104	614	195
241-SX-105	683	238
TOTAL	7,329	1,893

34.3 CALCULATION OF POTENTIAL OFFSITE DOSE

34.3.1 **REASSESSMENT ATTEMPT**: This section documents a recently accomplished reassessment attempt which was attempted and failed to achieve any immediately useful results. The attempt was to try to reassess the 244-S DCRT stack using less conservative methods (e.g., vapor sampling, high-efficiency particulate air (HEPA) filter assays, etc.) then that used in the original assessment. The original assessment is discussed below in section 34.3.2.

A means for reassessment was difficult at first to develop because this stack had not operated in recent years, making useful data scarce if not non-existent or hard to find. It was thought, though, that reassessment of the potential emissions from the 244-S DCRT facility may be possible using results from the recently reassessed 244-A DCRT facility (see section 14.0 above) because these two facilities have similar configurations. The potential emissions from the 244-A DCRT facility were reassessed using HEPA filter disposal assay data. Because of the similar configurations, it was suspected that with additional data, the 244-A DCRT HEPA data could also be useful in estimating the potential emissions from the 244-S DCRT.

The technical approach proposed, then, for this task involved the collection of technical information to support the reassessment of the 244-S DCRT (i.e., existing HEPA filter operating data, recently changed out HEPA filter disposal assay data, past and future waste transfer data volumes and activity concentration and composition); the collection of additional information on the 244-A DCRT system (i.e., more precise HEPA filter operating data and past waste transfer data volumes and activity concentration and composition); and the addressing of the potential impact that specific conditions (i.e., presence of water vapor in the effluent, presence of ammonia in emissions) may have on this reassessment method (i.e., using HEPA filter assay results to estimate potential emissions). In addition, the technical approach included the correlation of past waste transfer volume and concentration data to the activity found on HEPA filters removed from the 244-A DCRT exhaust system in an attempt to derive a waste release factor which might be used to estimate potential emissions from the 244-S DCRT, and the derivation of a conservative, and technically sound, estimate of future potential emissions from the 244-S DCRT facility.

A WHC CONTRACT TTB-SVV-452401, TASK 065 was initiated to execute this task. The results of this effort were submitted in Letter Report from Judson L. Kenoyer, SAIC to William E. Davis, WHC, Subject: "LETTER REPORT ON TANK FARM STACK 296-S-22 REASSESSMENT SUPPORT, WHC CONTRACT TTB-SVV-452401, TASK 065", dated November 30, 1995. In short, the results of this effort proved rather fruitless in its original intent as discussed above in section 14.3. Nevertheless, the results which could be used from this effort are discussed further as follows:

Two scenarios were used to calculate potential emissions from the 244-S DCRT. The first used the source terms as provided in a draft internal memo from West Tank Farm Transition Projects Engineering (Mike Sutey) to S.H. Rifaey on the *Waste Compatibility Assessment of Tank 241-S-101, Tank 241-S-103, Tank 241-S-106, Tank 241-S-107, Tank 241-S-108, Tank 241-S-109, Tank 241-S-110 Waste with Tank 241-SY-102 Waste via DCRT 244-S* dated September 20, 1995. The second scenario used the source term as identified by 222-S Laboratory personnel as waste characteristics in terms of radionuclide concentrations and the assumption that 2.5 Kgal of waste will be sent through the 244-S DCRT system each month. This projected yearly waste transfer volume was taken from WHC-SD-WM-ER-029, Rev. 21, *Operational Waste Volume Projection*.

TANK WASTE SCENARIO #1: The draft waste compatibility assessment discussed above included radionuclide activity concentrations and volumes for waste transfers from specific tanks in the 241-S Tank Farm through the 244-S DCRT to tank 241-SY-102. These transfers were scheduled to start in January 1996 and be completed by the end of November 1999. Waste transfers from 241-S-102 and 241-SX-106 are also scheduled to be performed during this period.

The Letter Report lists source term data from the tanks, associated volumes for waste transfers, and radioactivity concentrations for ^{137}Cs, ^{90}Sr, ^{239}Pu, and ^{241}Am. These values are also listed in the table below. Using the conservative release fraction from 40 CFR 61, Appendix D, of 1.0E-3 for liquids, the cumulative result for all these tanks amounted to approximately 8.7 mrem/yr. This gives the potential offsite dose for 244-S as follows (refer to Section 3.1.4, for the definitions and examples of *static* and *dynamic* situations):

Potential offsite doses:

Static: [(8.7 mrem/yr)(16.2 Kgal/716 Kgal)]
= 0.197 mrem/yr

Dynamic: [(8.7 mrem/yr)(16.2 Kgal/716 Kgal)]
x (716 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)]
= 0.536 mrem over 2.7 years

This would identify the 296-S-22 stack as needing to stay "designated" through the period of waste transfers.

Source Term Data for the Calculation of Offsite Dose for Waste Transfers from the 241-S Tank Farm through the 244-S DCRT

Tank	Volume (Kgal)	Radioactivity Concentration (μCi/l)			
		^{137}Cs	^{90}Sr	^{239}Pu	^{241}Am
S-101	90	2.21E+5	2.51E+2	<MDL	1.37E-1
S-103	79	4.43E+5	6.31E+2	8.54E-2	1.15E+0
S-106	168	2.05E+5	1.09E+2	<MDL	3.30E-1
S-107	52	1.02E+5	1.24E+2	<MDL	8.99E-1
S-108	105	1.35E+5	6.46E+2	<MDL	<MDL
S-109	119	1.70E+5	4.24E+2	<MDL	2.37E-1
S-110	103	3.09E+5	7.58E+2	<MDL	<MDL

MDL = Minimum Detection Level

Calculation of the Potential Offsite Dose Due to Waste Transfers from the 241-S Tank Farm through the 244-S DCRT

Radionuclide	Activity (Ci)	CAP-88 Factor	Appendix D Release Fraction	EDE (mrem/yr)
^{137}Cs	6.08E+5	1.42E-2	1.0E-3	8.63
^{90}Sr	1.11E+3	2.60E-2	1.0E-3	2.89E-2
$^{239/240}Pu$	2.55E-2	5.15E+0	1.0E-3	1.31E-4
^{241}Am	8.85E-1	7.79E+0	1.0E-3	6.89E-3
			TOTAL:	8.67 mrem

LAB WASTE SCENARIO #2: After the tank stabilization efforts are completed for the 241-S and 241-SX Tank Farms, the only wastes scheduled to be sent through the 244-S DCRT are those from the 222-S Laboratory. Estimates of waste transfer volumes are stated in WHC-SD-WM-ER-029, Rev. 21, *Operational Waste Volume Projection* (WHC 1995). Nominal radionuclide concentrations in laboratory waste were obtained from 222-S Laboratory personnel. The next table shows the calculation for the potential offsite dose due to waste transfers from the 222-S Laboratory through the 244-S DCRT. The result using conservative factors (i.e., release fraction, activities, and volumes) is significantly below 0.1 mrem/yr and, therefore, the 296-S-22 stack could be classified as "non-designated" at the time only 222-S Laboratory wastes are transferred through the 244-S DCRT system.

Calculation of the Potential Offsite Dose Due to Waste Transfers
from the 222-S Laboratory through the 244-S DCRT
- Based on a transfer total of 30 kgals/yr -

Radionuclide	Activity (Ci)	CAP-88 Factor	Appendix D Release Fraction	EDE (mrem/yr)
^{137}Cs	11.40	1.42E-2	1.0E-3	1.62E-4
^{90}Sr	0.23	2.60E-2	1.0E-3	5.98E-6
$^{249/240}Pu$	9.08	5.15E+0	1.0E-3	4.68E-2
^{241}Am	2.27	7.79E+0	1.0E-3	1.77E-2
			TOTAL:	6.46E-2

34.3.2 **ORIGINAL ASSESSMENT**: The original method used the source term found in the several different tank pumping scenarios combined with the release fractions found in 40 CFR 61 Appendix D. The computations for tanks S-111, 112, and SX-101 through 105 amounted to the highest value of 0.95 mrem/yr. The following are a couple of those scenarios (refer to Section 3.1.4, for the definitions and examples of *static* and *dynamic* situations):

SCENARIO #1: Transfer waste from tanks S-101, 103, and 106 through 110 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(14.7 mrem/yr)(16.2 Kgal/702 Kgal)]
= 0.34 mrem/yr

Dynamic: [(14.7 mrem/yr)(16.2 Kgal/702 Kgal)]
x (702 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)]
= 0.906 mrem over 2.7 years

SCENARIO #2: Transfer of waste from tanks S-111 and 112 and from SX-101 through 105. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(6.94E+01 mrem/yr)(16.2 Kgal/1190 Kgal)]
= 0.95 mrem/yr

Dynamic: [(6.94E+01 mrem/yr)(16.2 Kgal/1190 Kgal)]
x (1190 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)]

= 4.28 mrem over 4.5 years

34.4 TANK FARM STACK STATUS: DESIGNATED

Potential Emissions: 0.95 mrem/yr

This transfer system was determined to be designated because of a waste transfer scenario computed, from the original assessment given in section 34.3.2 above. The scenario used tanks S-111, 112, and SX-101 through 105. With this, the 244-S DCRT 296-S-22 stack is to be kept classified as "designated" until the waste stabilization efforts are completed for the 241-S and 241-SX Tank Farms.

In addition, since stack calculations using the source terms for the 222-S Laboratory waste alone show that the potential emissions will be below 0.1 mrem/yr (0.0646 mrem/yr), it is suggested that when waste stabilization efforts are completed that this facility be reclassified as non-designated after another quick confirmatory reassessment.

244-S DCRT STACK 296-S-22 POTENTIAL EMISSIONS - SCENARIO #1 (S-101, 103, 106 through 110)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.6460E-06	.1650E-02	1.E-03	1.066E-12	7.254E-12
79-Se	.3190E-08	.2600E-01	1.E-03	8.294E-14	5.645E-13
89/90-Sr	.2730E+06	.2600E-01	1.E-03	7.098E+00	4.831E+01
90-Y	.2730E+06	.2220E-03	1.E-03	6.061E-02	4.125E-01
99-Tc	.1290E-06	.6450E-03	1.E-03	8.321E-14	5.663E-13
106-Ru/Rh	.1220E-01	.1200E-01	1.E+00	1.464E-04	9.963E-04
129-I	.2240E-09	.1140E+00	1.E+00	2.554E-11	1.738E-10
134-Cs	.1270E+01	.1860E-01	1.E-03	2.362E-05	1.608E-04
137-Cs	.2820E+06	.1420E-01	1.E-03	4.004E+00	2.725E+01
Nat-U	.9460E-02	.1690E+01	1.E-03	1.599E-05	1.088E-04
237-Np	.2240E-05	.7050E+01	1.E-03	1.579E-08	1.075E-07
238-Pu	.6190E-01	.4760E+01	1.E-03	2.946E-04	2.005E-03
239/240-Pu	.6850E+03	.5150E+01	1.E-03	3.528E+00	2.401E+01
241-Pu	.7760E+00	.8170E-01	1.E-03	6.340E-05	4.315E-04
241-Am	.3190E+00	.7790E+01	1.E-03	2.485E-03	1.691E-02
242/244-Cm	.1350E-04	.4120E+01	1.E-03	5.562E-08	3.785E-07
		TOTAL		1.469E+01	1.000E+02

Static: [(14.7 mrem/yr)(16.2 Kgal/702 Kgal)] = 0.34 mrem/yr

Dynamic: [(14.7 mrem/yr)(16.2 Kgal/702 Kgal)]
x (702 Kgal) /[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)]
= 0.906 mrem over 2.67 years

244-S DCRT STACK 296-S-22 POTENTIAL EMISSIONS - SCENARIO #2 (S-111, 112 / SX-101 through 105)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.4570E+03	.1650E-02	1.E-03	7.541E-04	1.087E-03
79-Se	.4080E+02	.2600E-01	1.E-03	1.061E-03	1.529E-03
89/90-Sr	.1230E+07	.2600E-01	1.E-03	3.198E+01	4.608E+01
90-Y	.1230E+07	.2220E-03	1.E-03	2.731E-01	3.935E-01
99-Tc	.1310E+04	.6450E-03	1.E-03	8.450E-04	1.218E-03
106-Ru/Rh	.3100E-04	.1200E-01	1.E+00	3.720E-07	5.360E-08
129-I	.2140E+01	.1140E+00	1.E+00	2.440E-01	3.515E-01
137-Cs	.1730E+07	.1420E-01	1.E-03	2.457E+01	3.540E+01
Nat-U	.3500E+00	.1690E+01	1.E-03	5.915E-04	8.523E-04
237-Np	.1570E+01	.7050E+01	1.E-03	1.107E-02	1.595E-02
238-Pu	.1290E+02	.4760E+01	1.E-03	6.140E-02	8.848E-02
239/240-Pu	.7680E+02	.5150E+01	1.E-03	3.955E-01	5.699E-01
241-Pu	.5340E+02	.8170E-01	1.E-03	4.363E-03	6.286E-03
241-Am	.1520E+04	.7790E+01	1.E-03	1.184E+01	1.706E+01
242/244-Cm	.4840E+01	.4120E+01	1.E-03	1.994E-02	2.873E-02
		TOTAL		6.940E+01	1.000E+02

Static: [(6.94E+01 mrem/yr)(16.2 Kgal/1190 Kgal)] = 0.95 mrem/yr

Dynamic: [(6.94E+01 mrem/yr)(16.2 Kgal/1190 Kgal)]
x (1190 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)]
= 4.28 mrem over 4.5 years

35.0 STACK 296-T-17

35.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-T-17 stack system ventilates the 242-T Evaporator building, providing a negative pressure with respect to external areas for the containment control of radioactive materials.

The 242-T Evaporator Facility is located in the 200 West Area of the Hanford Site between TY and TX Tank Farms. It was originally constructed in the early 1950s. The facility was operated as a batch evaporator unit until its shutdown in 1955. In 1965, modifications at the 242-T Evaporator Facility were made. The evaporator was restarted that same year and operated as a continuous evaporation process. During 1973, more modifications were made. The facility was now used to neutralize and concentrate high and low salt acid waste from the Plutonium Refinishing Plant (Z Plant). This configuration continued from 1973 until 1976, when it was once again shutdown. Following this shutdown, a new Receiver Tank (R-1) was built. This receiver tank was used for only neutralization of Z Plant acid waste. This new operation continued until November of 1980. Use of the 242-T Facility in this capacity was concluded with the anticipated startup of the 244-TX Double Contained Receiver Tank (DCRT) which was completed in the spring of 1981. The 244-TX DCRT was built to replace the R-1 Receiver Tank in the Receiver Vault. With the shutdown which occurred in 1980, operation of the process areas were no longer required and were placed in Shutdown/Standby Condition V (means that no further operational requirement exists). The control room area of the 242-T Evaporator Facility continued to be utilized in support of the salt well pumping program (the stabilization of the single shell tanks).

The 242-T Evaporator Facility is divided into a processing area and a control area. The process area includes the 242-T building, the 242-TA Vault, and 242-TB Ventilation building. The control area is contained in the metal building adjacent to the east wall of the 242-T building.

The 242-T Building is a steel reinforced concrete structure 48 feet in length, 42 feet wide, and 23 feet high. The building contains the Condensate Area, the Feed Cell, and the Evaporator Area. The Feed Cell houses the 4,000 gallon B-1 Blend Tank plus the interconnecting piping between this tank, the evaporator vessel, and the 241-TX Tank Farm. The Evaporator Area (called the hot cell) contains the evaporator vessel, a cyclone separator, the cyclone separator catch tank, two evaporator feed preheaters, a floor sump, and interconnecting piping between the feed and cold cells and the TX Tank Farm. The Condensate Area (called the cold cell) contains two 4,000 gallon condensate catch tanks, a scrubber, condenser, floor sump, and interconnecting piping between the feed and hot cells and the TX Tank Farm.

The 242-TA Vault is a concrete lined pit with a ground level steel cover. Inside this vault sits the 4,000 gallon R-1 Receiver Tank and the piping connecting this tank to the feed cell - acetic high level waste from Z Plant flowed into this tank for pumpage to the feed cell.

The 242-TB Ventilation Building contains the ventilation equipment and instruments for the TB ventilation system. This ventilation system services the R-1 Receiver Tank and the TA Vault.

The control area consists of an operating room, a radiation/contamination control room, a lunch room, and a lavatory. The operating room contains instrumentation for the 242-T building and much of the process control equipment for the 241-TX Tank Farm. The operating room will also house the instrumentation for the Salt Well Pumping Program. The radiation/contamination control room has storage for SWP Clothing, a shielded radiation survey area for people leaving the radiation zone and acts as a change room.

Three HEPA filtered ventilation exhaust systems are in place at the 242-T Evaporator Facility. The smallest system (the Vessel Ventilation System) was built to exhaust:

- the two catch tanks in the Condensate Area.
- the evaporator vessel and attached cyclone separator, catch tank, two feed preheater tanks, and interconnecting piping.

The exhauster is located at the east wall of the Condensate Area, just downstream of the filters. This system is no longer in service.

A second exhaust system is housed inside the 242-TB building. It was built to vent:

- the 242-TA Vault and the R-1 receiver tank.
- the Feed Cell B-1 tank.
- the Feed Cell.
- the Evaporator Area.

The 242-TB exhaust system is currently shut down as well.

The third and largest HEPA filtered ventilation exhaust system is powered by one of two electric fans, each rated at 2,000 ft^3/min. The stack is 1 foot in diameter and is 15 feet high. The system includes an inlet plenum, a preheater for the inlet air, and two HEPA filters upstream of the fan. A reserve bank of HEPA filters parallels the system. The heater is electric. It heats the air above saturation to prevent water damage to the HEPA filters. This system currently exhausts:

- the Evaporator Area (the hot area).
- the Feed Cell, through the Evaporator Area.
- the Condensate Area (the cold area), separately, but at a lower vacuum flow.

This is the only operating exhaust system for the process areas and is normally operated at a flow rate of 1,500 ft^3/min or less.

For purposes of this assessment, the following shutdown/standby activities were accomplished (reference RHO-CD-1410, Dated April 1981, *242-T Evaporator Facility Shutdown/Standby Plan*):

<u>242-TA Receiver Vault</u>

- The R-1 Receiver Tank was isolated.

<u>242-T Feed Cell</u>

- The B-1 Blend Tank in the Feed Cell was configured to receive liquid from the hot cell sump. A pump out system was installed to remove the liquid accumulated in this tank to the Tank Farms.

<u>242-T Hot Cell</u>

- The Evaporator was chemically flushed in 1976. Because of the extremely high radiation levels (9 RAD) within the Hot Cell, no effort was made to decontaminate it or the equipment within it. Line blanking and instrument disabling, etc, was, however, performed just after they left this room. The hot cell jet pump and associated gang valve system was left functioning to jet accumulated liquids to the B-1 Blend Tank.

<u>242-T Cold Cell</u>

- The cold cell was decontaminated to a level where entry could be made without a mask.
- A 50 cubic feet per minute (cfm) capacity HEPA filter was placed on the Vessel Ventilation system to serve as a breather filter for the condensate catch tanks.

- The Vessel Ventilation Stack Sampler and associated radiation alarm switches, alarms, and sensing elements were disabled. The Vessel Ventilation Exhauster was disconnected as well.

- The Condensate Catch Tanks were continued as collection vessels for liquids jetted from the 242-T Cold Cell Sump. The accumulated liquid is subsequently transferred to the double shelled tank farms (TK-102-SY).

The Building Ventilation System

- The building ventilation system is currently operated to reduce hazards associated with airborne radioactivity at the 242-T Evaporator facility. The building ventilation system has sufficient capacity to maintain the required negative pressure in the cold area, the hot area, and the feed cells.

- The steam to the Building Ventilation HEPA filter preheater was turned off. The condensate return line was rerouted to the Cold Cell Sump which is subsequently transferred to the Condensate Catch Tanks.

The TB Vessel Ventilation System

- The TB ventilation system was shut down. The system was replaced by breather filters on the R-1 Receiver Tank and the TA Vault area.

- The TB Ventilation fan was disconnected. The Stack Radiation Monitoring/Sampling System was disabled and disconnected.

35.2 CALCULATION OF SOURCE TERM

The assessment of potential emissions from this facility was based on air sample data. The following explains this data:

Air sample data from the condensate area was taken on 6/15/95 and documented in Radiological Survey Report 196474. This data gave the following results:

alpha air concentration levels were 1.60E-11 μCi/ml
beta air concentration levels were 2.08E-10 μCi/ml

Air sample data from the Evaporator area was taken on 6/29/95 and documented in the Daily Air Sample Counter Log W-06-291995-1. This data gave the following results:

alpha air concentration levels were 2.97E-10 μCi/ml
beta air concentration levels were 8.32E-08 μCi/ml

To use this data, the following additional information and assumptions were necessary:

The average stack 296-T-17 flow rate computed from vent and balance measurement data resulted in a flow rate of 1205 CFM. The annual volume from this stack, therefore, computes to 1.79E+10 liters.

Ventilation from this facility occurs through two separate ducts. The condensate area is ventilated through one of these ducts. The evaporator and feed area is vented through the other duct - the feed area is upstream of the evaporator area. These two ducts are joined outside the building just before the HEPA filter assemblies. Since this is the case, it was also important to know what percentage of the flows come from which duct. As mentioned above, the condensate area "is ventilated at a lower vacuum flow." From this, a conservative assumption was made to assume that only 10% of the stack flow comes from the condensate area. From this, the resulting annual volumetric flows from each of area was computed to be:

Evaporator area (includes the feed area): 1.61E+10 liters

Condensate area: 1.79E+09 liters

This information was next used with the air sample data given above to compute the potential curies available for released. This was accomplished as follows:

Evaporator area:

alpha (2.97E-10 μCi/ml): 2.97E-13 Ci/L * 1.61E+10 L
= 4.79E-03 Ci

beta (8.32E-08 μCi/ml): 8.32E-11 Ci/L * 1.61E+10 L
= 1.34E+00 Ci

Condensate area:

alpha (1.60E-11 μCi/ml): 1.60E-14 Ci/L * 1.79E+09 L
= 2.87E-05 Ci

beta (2.08E-10 μCi/ml): 2.08E-13 Ci/L * 1.79E+09 L
= 3.73E-04 Ci

The total curies available for release is therefore:

alpha: 4.79E-03 + 2.87E-05 = 4.82E-03 Ci

beta: 1.34E+00 + 3.73E-04 = 1.34E+00 Ci

35.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Assuming Am-241 represents the alpha and Sr-90 represents the beta, the following potential offsite dose results:

Potential offsite dose = <u>0.072 mrem/yr</u>

35.4 TANK FARM STACK STATUS: <u>NON-DESIGNATED</u>

* * * * * * * * *

242-T EVAPORATOR BUILDING STACK 296-T-17 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci	CAP-88 c-factor	EDE (mrem/yr)	% EDE
90-Sr	1.34E+00	2.600E-02	3.48E-02	48.1
241-Am	4.82E-03	7.790E+00	3.76E-02	51.9
		TOTAL	7.24E-02	

36.0 STACK 296-T-18

36.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-T-18 stack system ventilates the 244-TX Double Shell Receiver Tank (DCRT) and annulus, providing negative pressure. The 244-TX DCRT is located north of the 241-TX Tank Farm in the 200 West area.

The 244-TX DCRT is used to transfer liquid waste from the Plutonium Finishing Plant (PFP) and from single-shell tanks in the 241-T, 241-TX, and 241-TY Tank Farms to the 241-SY Tank Farm.

The DCRT is a steel vessel with maximum volume of 31,000 gallons and is limited to an operational volume of 26,000 gallons. The pit containing the tank, with a volume of 85,000 gallons, constitutes secondary containment for the Station. The tank and the concrete pit containing the tank define the annulus space. The ventilation system draws in air through a heater, pre-filter and HEPA filter. This air train is split into two trains which ventilate the catch tank and annulus. Air withdrawn from these two volumes passes through one or two of the three parallel systems, each containing a pre-filter and two HEPA filters in series. Air is exhausted through the 296-T-18 stack. The exhauster is operated only when the temperature of the waste is above a specific temperature and/or during any transfer of waste through the facility.

36.2 TANKS AND WASTE VOLUME

TANK	WASTE VOLUME (KGAL) TANK TOTAL	WASTE VOLUME (KGAL) PUMPABLE
241-T-102	32	13
241-T-104	445	44
241-T-107	180	16
241-T-110	379	36
241-T-111	458	45
241-T-112	67	7
TOTAL	1,561	161

36.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Refer to Section 3.1.4, for the definitions and examples of *static* and *dynamic* situations.

SCENARIO #1: Transfer of waste from tank T-107 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(1.76E-1 mrem/yr)(16 Kgal/16 Kgal)]
= 0.176 mrem/yr

Dynamic: [(1.75E-1 mrem/yr)(16 Kgal/16 Kgal)]
x (16 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 0.011 mrem over 22 days

SCENARIO #2: Transfer of waste from tanks T-104, 111, 102, and 112 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(3.41E-1 mrem/yr)(26 Kgal/109 Kgal)]
= 8.14E-2 mrem/yr

Dynamic: [(3.41E-1 mrem/yr)(26 Kgal/109 Kgal)]
x [109 Kgal)/(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 3.38E-2 mrem over 151 days

SCENARIO #3: Transfer of waste from tank T-110 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(1.23E-1 mrem/yr)(26 Kgal/36 Kgal)]
= 8.88E-2 mrem/yr

Dynamic: [(1.23E-1 mrem/yr)(26 Kgal/36 Kgal)]
x (36 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 1.22 E-2 mrem over 50 days

SCENARIO #4: PFP transfer waste Potential Emissions. It was shown in Internal Memo 7C420-094-016 from Tank Farm Environmental Engineering, Subject NESHAP DETERMINATION: Double Shell Receiver Tanks, dated March 16, 1994; that potential emission from PFP, based on 1994 transfers computed to 0.288 mrem. This potential was computed on 45,420 Liters (12,000 gallons) of waste. At 0.5 gallon/minute pumping rate (a slow rate), this quantity could be pumped in about 17 days.

In addition to the PFP transfer, a transfer was also made from T101. The referenced memo computed the potential for this combination to be 0.38 mrem/yr.

36.4 TANK FARM STACK STATUS: <u>DESIGNATED</u>

This transfer system was determined to be designated based on the waste transfers PFP, together with the transfer from tank T-101. This is explained in Scenario #4.

* * * * * * * * * *

244-TX DCRT STACK 296-T-18 POTENTIAL EMISSIONS - SCENARIO #1 (T-107)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	.4560E+04	.2600E-01	1.E-03	1.186E-01	6.745E+01
90-Y	.4560E+04	.2220E-03	1.E-03	1.012E-03	5.759E-01
125-Sb	.1510E+03	.2470E-02	1.E-03	3.730E-04	2.122E-01
137-Cs	.3840E+04	.1420E-01	1.E-03	5.453E-02	3.102E+01
144-Ce	.1030E+03	.8140E-02	1.E-03	8.384E-04	4.770E-01
239/240-Pu	.3600E-01	.5150E+01	1.E-03	1.854E-04	1.055E-01
241-Am	.3600E-01	.7790E+01	1.E-03	2.804E-04	1.595E-01
		TOTAL		1.758E-01	1.000E+02

Static: [(1.76E-1 mrem/yr)(16 Kgal/16 Kgal)] = 0.176 mrem/yr

Dynamic: [(1.75E-1 mrem/yr)(16 Kgal/16 Kgal)]
x (16 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 0.011 mrem over 22 days

244-TX DCRT STACK 296-T-18 POTENTIAL EMISSIONS - SCENARIO #2 (T-104, T-111, T-102, T-112)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.4060E+00	.1650E-02	1.E-03	6.699E-07	1.963E-04
79-Se	.1650E-01	.2600E-01	1.E-03	4.290E-07	1.257E-04
89/90-Sr	.8430E+03	.2600E-01	1.E-03	2.192E-02	6.424E+00
90-Y	.8430E+03	.2220E-03	1.E-03	1.871E-04	5.485E-02
99-Tc	.4060E+00	.6450E-03	1.E-03	2.619E-07	7.675E-05
106-Ru/Rh	.1150E-06	.1200E-01	1.E+00	1.380E-09	4.044E-08
129-I	.8120E-03	.1140E+00	1.E+00	9.257E-05	2.713E-02
137-Cs	.1720E+03	.1420E-01	1.E-03	2.442E-03	7.158E-01
154-Eu	.1760E+03	.2600E-01	1.E-03	4.576E-03	1.341E+00
Nat-U	.1440E-01	.1690E+01	1.E-03	2.434E-05	7.132E-03
237-Np	.4060E-03	.7050E+01	1.E-03	2.862E-06	8.389E-04
238-Pu	.1980E-03	.4760E+01	1.E-03	9.425E-07	2.762E-04
239/240-Pu	.5900E+02	.5150E+01	1.E-03	3.039E-01	8.905E+01
241-Pu	.7690E-06	.8170E-01	1.E-03	6.283E-11	1.841E-08
241-Am	.1040E+01	.7790E+01	1.E-03	8.102E-03	2.374E+00
242/244-Cm	.2860E-02	.4120E+01	1.E-03	1.178E-05	3.453E-03
		TOTAL		3.412E-01	1.000E+02

Static: [(3.41E-1 mrem/yr)(26 Kgal/109 Kgal)]
= 8.14E-2 mrem/yr

Dynamic: [(3.41E-1 mrem/yr)(26 Kgal/109 Kgal)]
x (109 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 3.38E-2 mrem over 151 days

244-TX DCRT STACK 296-T-18 POTENTIAL EMISSIONS - SCENARIO #3 (T-110)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.1900E-12	.1650E-02	1.E-03	3.135E-19	2.549E-16
79-Se	.2820E-12	.2600E-01	1.E-03	7.332E-18	5.961E-15
89/90-Sr	.3590E+03	.2600E-01	1.E-03	9.334E-03	7.589E+00
90-Y	.3590E+03	.2220E-03	1.E-03	7.970E-05	6.480E-02
99-Tc	.9500E-11	.6450E-03	1.E-03	6.128E-18	4.982E-15
106-Ru/Rh	.1490E-09	.1200E-01	1.E+00	1.788E-12	1.454E-10
129-I	.7700E-14	.1140E+00	1.E+00	8.778E-16	7.137E-13
137-Cs	.1750E-07	.1420E-01	1.E-03	2.485E-13	2.020E-10
Nat-U	.1900E-01	.1690E+01	1.E-03	3.211E-05	2.611E-02
237-Np	.6670E-05	.7050E+01	1.E-03	4.702E-08	3.823E-05
238-Pu	.3850E-01	.4760E+01	1.E-03	1.833E-04	1.490E-01
239/240-Pu	.2080E+02	.5150E+01	1.E-03	1.071E-01	8.709E+01
241-Pu	.3080E+01	.8170E-01	1.E-03	2.516E-04	2.046E-01
241-Am	.7700E+00	.7790E+01	1.E-03	5.998E-03	4.877E+00
242/244-Cm	.2260E-08	.4120E+01	1.E-03	9.311E-12	7.570E-09
		TOTAL		1.230E-01	1.000E+02

Static: [(1.23E-1 mrem/yr)(26 Kgal/36 Kgal)] = 8.88E-2 mrem/yr

Dynamic: [(1.23E-1 mrem/yr)(26 Kgal/36 Kgal)]
x (36 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)]
= 1.22 E-2 mrem over 50 days

244-TX DCRT STACK 296-T-18 POTENTIAL EMISSIONS - SCENARIO #4 (PFP WASTE TRANSFER combined with T101)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	3.43E+00	2.600E-02	1.E-03	8.9E-05	0
99-Tc	7.28E+00	6.450E-04	1.E-03	4.7E-06	0
137-Cs	6.36E+03	1.420E-02	1.E-03	9.0E-02	23.8
239/240-Pu*	4.09E+01	5.150E+00	1.E-03	2.1E-01	55.5
241-Am**	9.95E+00	7.790E+00	1.E-03	7.8E-02	20.6
		TOTAL		3.80E-01	

* Of which 4.09E+01 Ci came from the PFP transfer
** Of which 9.95 Ci came from the PFP transfer

37.0 STACK 296-U-11

37.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-U-11 stack system will be used to ventilate the 244-U Catch Station tank and annulus providing containment of airborne radioactive materials. The 244-U Catch Station is located adjacent to the U-Tank Farm in the 200 West area.

The 244-U Catch Station is a double-contained receiver tank (DCRT) which has never been used, but is scheduled to begin pre-startup activities in FY 1996. The Catch Station will be used to transfer waste from single-shell tanks in the 241-U Tank Farm to double-shell tanks in the 241-SY Tank Farm.

Design review of the system is currently being done. The DCRT is expected to retain a design similar to that of the 244-TX system. The exhauster will be operated only when the temperature of the waste is above a specific temperature and/or during the transfer of waste through the facility.

37.2 TANKS AND WASTE VOLUME

	WASTE VOLUME (KGAL)	
TANK	TANK TOTAL	PUMPABLE
241-U-102	374	122
241-U-103	468	166
241-U-105	418	157
241-U-106	226	61
241-U-107	406	156
241-U-108	468	174
241-U-109	463	160
241-U-110	186	9
241-U-111	329	99
TOTAL	3,338	1,104

37.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Refer to Section 3.1.4, for the definitions and examples of *static* and *dynamic* situations.

SCENARIO #1: Transfer of waste from tanks U-102 and 110 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(1.871 mrem/yr)(26 Kgal/131 Kgal)]
= 0.371 mrem/yr

Dynamic: [(1.871 mrem/yr)(26 Kgal/131 Kgal)]
x (131 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)
= 0.185 mrem over 182 days

SCENARIO #2: Transfer of waste from tanks U-103, 105, 108, and 109 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(5.831E-1 mrem/yr)(26 Kgal/ 657 Kgal)
= 2.31 E-2 mrem/yr

Dynamic: [(5.831E-1 mrem/yr)(26 Kgal/ 657 Kgal)]
x (657 Kgal)/(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)
= 5.77E-2 mrem over 2.5 years

SCENARIO #3: Transfer of waste from tanks U-106, 107, and 111 through this DCRT. No HEPA filter factors are included in the calculations.

Potential offsite doses:

Static: [(5.143E-1 mrem/yr)(26 Kgal)/(316 Kgal) = 4.23E-2 mrem/yr

Dynamic: [(5.143E-1 mrem/yr)(26 Kgal)/(316 Kgal)]
x (316 Kgal)/(0.5E-3 Kgal/min)(60 min/hr)
x (24 hrs/d)(365 d/yr)
= 5.09E-2 mrem over 1.2 years

37.4 TANK FARM STACK STATUS: DESIGNATED

This transfer system was determined to be designated based on transfers from tanks U-102 and 110.

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244-U DCRT STACK 296-U-11 POTENTIAL EMISSIONS - SCENARIO #1 (U-102, U110)

R-nuclide	Sum of Ci	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.1240E-01	.1650E-02	1.E-03	2.046E-08	1.093E-06
60-Co	.1150E+03	.1720E-01	1.E-03	1.978E-03	1.057E-01
79-Se	.4390E-03	.2600E-01	1.E-03	1.141E-08	6.099E-07
89/90-Sr	.3450E+05	.2600E-01	1.E-03	8.970E-01	4.793E+01
90-Y	.3450E+05	.2220E-03	1.E-03	7.659E-03	4.093E-01
99-Tc	.1460E-01	.6450E-03	1.E-03	9.417E-09	5.032E-07
106-Ru/Rh	.9700E-02	.1200E-01	1.E+00	1.164E-04	6.220E-03
129-I	.2530E-04	.1140E+00	1.E+00	2.884E-06	1.541E-04
137-Cs	.5470E+05	.1420E-01	1.E-03	7.767E-01	4.151E+01
144-Ce	.1150E-02	.8140E-02	1.E-03	9.361E-09	5.002E-07
154-Eu	.7490E+03	.2600E-01	1.E-03	1.947E-02	1.041E+00
Nat-U	.1460E+01	.1690E+01	1.E-03	2.467E-03	1.319E-01
237-Np	.9300E-04	.7050E+01	1.E-03	6.557E-07	3.504E-05
238-Pu	.1990E+01	.4760E+01	1.E-03	9.472E-03	5.062E-01
239/240-Pu	.3020E+02	.5150E+01	1.E-03	1.555E-01	8.311E+00
241-Pu	.1200E+02	.8170E-01	1.E-03	9.804E-04	5.239E-02
241-Am	.9840E-03	.7790E+01	1.E-03	7.665E-06	4.096E-04
242/244-Cm	.1370E-04	.4120E+01	1.E-03	5.644E-08	3.016E-06
		TOTAL		1.871E+00	1.000E+02

Static: [(1.871 mrem/yr)(26 Kgal/131 Kgal)] = 0.371 mrem/yr

Dynamic: [(1.871 mrem/yr)(26 Kgal/131 Kgal)]
x (131 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)
= 0.185 mrem over 182 days

244-U DCRT STACK 296-U-11 POTENTIAL EMISSIONS - SCENARIO #2 (U-103, 105, 108, 109)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
14-C	.1040E+01	.1650E-02	1.E-03	1.716E-06	2.943E-04
79-Se	.6950E-01	.2600E-01	1.E-03	1.807E-06	3.099E-04
89/90-Sr	.1740E+05	.2600E-01	1.E-03	4.524E-01	7.759E+01
90-Y	.1740E+05	.2220E-03	1.E-03	3.863E-03	6.625E-01
99-Tc	.2070E+01	.6450E-03	1.E-03	1.335E-06	2.290E-04
106-Ru/Rh	.2910E-04	.1200E-01	1.E+00	3.492E-07	5.989E-06
129-I	.3100E-02	.1140E+00	1.E+00	3.534E-04	6.061E-02
137-Cs	.6400E+04	.1420E-01	1.E-03	9.088E-02	1.559E+01
Nat-U	.3430E+00	.1690E+01	1.E-03	5.797E-04	9.942E-02
237-Np	.1870E-01	.7050E+01	1.E-03	1.318E-04	2.261E-02
238-Pu	.1720E+00	.4760E+01	1.E-03	8.187E-04	1.404E-01
239/240-Pu	.1120E+01	.5150E+01	1.E-03	5.768E-03	9.893E-01
241-Pu	.1210E+02	.8170E-01	1.E-03	9.886E-04	1.695E-01
241-Am	.3500E+01	.7790E+01	1.E-03	2.727E-02	4.676E+00
242/244-Cm	.6140E-03	.4120E+01	1.E-03	2.530E-06	4.339E-04
		TOTAL		5.831E-01	1.000E+02

Static: [(5.831E-1 mrem/yr)(26 Kgal/ 657 Kgal)] = 2.31 E-2 mrem/yr

Dynamic: [(5.831E-1 mrem/yr)(26 Kgal/ 657 Kgal)]
x (657 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)
= 5.77E-2 mrem over 2.5 years

244-U DCRT STACK 296-U-11 POTENTIAL EMISSIONS - Scenario 3 (U-106, 107, 111)

R-nuclide	Sum of Ci*	CAP-88 c-factor	APP D factor	EDE (mrem/yr)	% of Total EDE
60-Co	.8930E-03	.1720E-01	1.E-03	1.536E-08	2.986E-06
89/90-Sr	.1700E+05	.2600E-01	1.E-03	4.420E-01	8.594E+01
90-Y	.1700E+05	.2220E-03	1.E-03	3.774E-03	7.338E-01
134-Cs	.1550E+01	.1860E-01	1.E-03	2.883E-05	5.605E-03
137-Cs	.8730E+03	.1420E-01	1.E-03	1.240E-02	2.410E+00
239/240-Pu	.1090E+02	.5150E+01	1.E-03	5.614E-02	1.091E+01
		TOTAL		5.143E-01	1.000E+02

Static: [(5.143E-1 mrem/yr)(26 Kgal)/(316 Kgal)] = 4.23E-2 mrem/yr

Dynamic: [(5.143E-1 mrem/yr)(26 Kgal/ 316 Kgal)]
x (316 Kgal)/[(0.5E-3 Kgal/min)(60 min/hr)
x (24 hr/d)(365 d/yr)
= 5.09E-2 mrem over 1 2 years

38.0 STACK 296-W-03

38.1 SYSTEM DESCRIPTION/CONFIGURATION

The 296-W-03 stack system is used to ventilate the 213-W Waste Compactor Facility. This facility is currently used to decontaminate continuous air monitors (CAMs) and air samplers. The 213-W Facility is located next to the 272-WA building in the 200 West area.

38.2 CALCULATION OF POTENTIAL EMISSIONS

The potential to emit from this facility is based on the Radiological Work Permit (RWP) which governs the type of work which can be accomplished within this facility. This RWP (TF 001) gives a limit of 100,000 dpm/100 square centimeters beta-gamma and 20 dpm/100 square centimeters alpha. Using these limits and assuming a maximum contaminated area of 100 square feet (92,903 square centimeters) gives an available curie content as follows:

4.18E-05 Ci beta-gamma
8.37E-09 Ci alpha

38.3 CALCULATION OF POTENTIAL OFFSITE DOSE

Potential Emissions: 1.15E-09 mrem/yr

38.4 TANK FARM STACK STATUS: NON-DESIGNATED

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213-W WASTE COMPACTOR STACK 296-W-03 POTENTIAL EMISSIONS

R-nuclide	Sum of Ci	CAP-88 c-factor	App D Factor	EDE (mrem/yr)	% of Total EDE
89/90-Sr	4.18E-05	2.600E-02	1E-03	1.09E-09	94.3
241-Am	8.37E-09	7.790E+00	1E-03	6.52E-11	5.7
			TOTAL	1.15E-09	

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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: X DESIGNATED ___ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1-17/96

FACILITY MANAGER [signature] DATE 1-17-96

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 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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

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

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem)
H-3	Particulate	2.99E+00	6.55E-05*
60-Co	Particulate	2.00E-06	5.80E-08
90-Sr	Particulate	5.68E-03	2.49E-04
90-Y	Particulate	5.68E-03	2.14E-06
129-I	Particulate	4.00E-04**	1.16E-04
134-Cs	Particulate	1.81E-05	5.67E-07
137-Cs	Particulate	1.33E-02	3.18E-04
154-Eu	Particulate	5.04E-06	2.21E-07
238-Pu	Particulate	1.64E-07	1.32E-06
239-Pu	Particulate	1.99E-06	1.73E-05
240-Pu	Particulate	4.46E-07	3.87E-06
241-Pu	Particulate	1.92E-05	2.65E-06
241-Am	Particulate	1.06E-08	1.39E-07
242-Pu	Particulate	2.61E-11	2.26E-10
		TOTAL	7.77E-04

Potential emissions = 0.00078 mrem/188 days * 365 days/yr
= 0.0015 mrem/yr

Method Used to Project Dose: CAP88

COMMENTS

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

** From DOE/RL-95-49, "Radionuclide Air Emissions Report for the Hanford Site Calendar Year 1994."

STACK STATUS: ___ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/19/96

POTENTIAL EMISSIONS DETERMINED USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS

***

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

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem)
H-3	Particulate	2.99E+00	6.55E-05*
60-Co	Particulate	2.00E-06	5.80E-08
90-Sr	Particulate	5.68E-03	2.49E-04
90-Y	Particulate	5.68E-03	2.14E-06
129-I	Particulate	4.00E-04**	1.16E-04
134-Cs	Particulate	1.81E-05	5.67E-07
137-Cs	Particulate	1.33E-02	3.18E-04
154-Eu	Particulate	5.04E-06	2.21E-07
238-Pu	Particulate	1.64E-07	1.32E-06
239-Pu	Particulate	1.99E-06	1.73E-05
240-Pu	Particulate	4.46E-07	3.87E-06
241-Pu	Particulate	1.92E-05	2.65E-06
241-Am	Particulate	1.06E-08	1.39E-07
242-Pu	Particulate	2.61E-11	2.26E-10
		TOTAL	7.77E-04

Potential emissions = 0.00078 mrem/188 days * 365 days/yr
= 0.0015 mrem/yr

Method Used to Project Dose: CAP88

COMMENTS

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

** From DOE/RL-95-49, "Radionuclide Air Emissions Report for the Hanford Site Calendar Year 1994."

STACK STATUS: ___ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 X NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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: X DESIGNATED __ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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

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

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released	Projected Dose (mrem/yr)
14-C	Particulate	3.980E-02	1.E-03	3.980E-05	1.043E-07
60-Co	Particulate	9.840E+01	1.E-03	9.840E-02	2.854E-03
79-Se	Particulate	7.970E-11	1.E-03	7.970E-14	3.491E-15
89/90-Sr	Particulate	1.080E-06	1.E-03	1.080E-09	4.730E-11
90-Y	Particulate	1.080E-06	1.E-03	1.080E-09	4.072E-13
99-Tc	Particulate	7.970E-09	1.E-03	7.970E-12	8.687E-15
106-Ru/Rh	Particulate	2.580E-01	1.E+00	2.580E-01	5.392E-03
125-Sb	Particulate	2.210E+01	1.E-03	2.210E-02	9.172E-05
129-I	Particulate	3.980E-12	1.E+00	3.980E-12	1.158E-12
134-Cs	Particulate	4.870E+00	1.E-03	4.870E-03	1.524E-04
137-Cs	Particulate	1.660E+05	1.E-03	1.660E+02	3.967E+00
154-Eu	Particulate	7.740E+04	1.E-03	7.740E+01	3.390E-02
Nat-U	Particulate	3.980E-01	1.E-03	3.980E-04	1.130E-03
237-Np	Particulate	2.050E-05	1.E-03	2.050E-08	2.440E-07
238-Pu	Particulate	7.750E+00	1.E-03	7.750E-03	6.216E-02
239/240-Pu	Particulate	1.510E+01	1.E-03	1.510E-02	1.309E+00
241-Pu	Particulate	3.230E+02	1.E-03	3.230E-01	4.457E-02
241-Am	Particulate	1.180E+01	1.E-03	1.180E-02	1.546E-01
242/244-Cm	Particulate	1.720E-10	1.E-03	1.720E-13	1.194E-12
				TOTAL	5.577E+00

Potential Emission (see section 14.3.2):

[(5.577 mrem/yr)(13.03 Kgal/688 Kgal)] = 0.106 mrem/yr

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS: X DESIGNATED ___ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/22/96

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 X NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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)
NONE					
				Total Dose:	0.00

STACK STATUS: __ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 X NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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)
NONE					
				Total Dose:	0.00

STACK STATUS: __ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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-00	4.29E-06
U-238	Particulate	5.39E-03	1.00E-03	5.39E-00	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: X DESIGNATED __ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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)
NONE					
				Total Dose:	0.00

STACK STATUS: __ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 mrem/yr)(26.0 Kgal/80 Kgal)] = 0.84

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS: X DESIGNATED ___ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/12/96

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 mrem/year)(13.5 Kgal/133 Kgal)] = 19.0

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS: X DESIGNATED ___ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

POTENTIAL EMISSIONS DETERMINED USING
VAPOR SAMPLING HEPA FILTER
SAMPLE ASSAY DATA
***

FACILITY 241-C-103 DISCHARGE POINT Stack 296-C-07

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	8.61E-04	3.77E-05
Am-241	Particulate	1.38E-04	1.81E-03
		Total Dose:	1.8E-03

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS: ___ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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: X DESIGNATED __ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 _X_ NON-DESIGNATED(1)

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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)
NONE					
				Total Dose:	0.00

STACK STATUS: __ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 _X_ NONDESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

POTENTIAL EMISSIONS DETERMINED
USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS
FROM 296-P-23
***

FACILITY SY Tank Farm Primary DISCHARGE POINT Stack 296-S-25

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 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

POTENTIAL EMISSIONS DETERMINED
USING HEPA FILTER STORAGE/DISPOSAL ASSAY RESULTS
FROM 296-P-23
***

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 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

POTENTIAL EMISSIONS DETERMINED USING
VAPOR SAMPLING HEPA FILTER
SAMPLE ASSAY DATA
***

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

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	2.58E-01	6.71E-03
Am-241	Particulate	2.00E-01	1.56E+00
		Total Dose:	1.57E+00

Method Used to Project Dose: CAP88

COMMENTS

STACK STATUS: X DESIGNATED ___ NONSIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

POTENTIAL EMISSIONS DETERMINED USING AREA SURVEY AIR SAMPLE DATA

***

FACILITY 242-S Evaporator Building DISCHARGE POINT Stack 296-S-18

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
89/90-Sr	Particulate	2.2E+00	5.7E-02
241-Am	Particulate	2.1E-03	1.6E-02
		Total Dose:	0.074

Method Used to Project Dose: CAP88

STACK STATUS: ___ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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: X DESIGNATED ___ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 7/12/96

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 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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: X DESIGNATED ___ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

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 mrem/yr)(26 Kgal/131 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: X DESIGNATED ___ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96

POTENTIAL EMISSIONS DETERMINED USING
RELEASE FACTORS FROM APPENDIX D
WITH SOURCE TERM LIMIT SPECIFIED
IN RWP TF 001
***

FACILITY 213-W DISCHARGE POINT Stack 296-W-03

FACILITY RADIOLOGICAL POTENTIAL EMISSIONS

Radionuclide	Physical/ Chemical Form	Quantity (curies)	Release Factor	Potential Quantity Released (curies)	Projected Dose (mrem/yr)
Sr-89/90	Particulate	4.18E-05	1E-03	4.18E-08	1.09E-09
Am-241	Particulate	8.37E-09	1E-03	8.37E-12	6.52E-11

Method Used to Project Dose: CAP88 Total Dose: 1.15E-09

COMMENTS

STACK STATUS: ___ DESIGNATED _X_ NON-DESIGNATED

EVALUATOR [signature] DATE 1/16/96

MANAGER, ENVIRONMENTAL [signature] DATE 1/17/96

FACILITY MANAGER [signature] DATE 1/17/96