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Attachment 1
08-ESQ-104

Radioactive Air Emissions Notice of Construction Application
for Operation of the 296-S-21 Exhauster

0077741

RADIOACTIVE AIR EMISSIONS NOTICE OF CONSTRUCTION APPLICATION FOR OPERATION OF THE 296-S-21 EXHAUSTER

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Richland, Washington

Contractor for the U. S. Department of Energy
Office of River Protection under Contract DE-AC27-99RL14047

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EXECUTIVE SUMMARY

This document serves as a revised notice of construction (NOC) application, in accordance with Title 40, *Code of Federal Regulations* (CFR) Section 61.07, "Application for approval of construction or modification" (10 CFR 61.07), and *Washington Administrative Code* (WAC) 246-247-060, "Applications, Registration and Licensing," for the operation of the 222-S Laboratory 296-S-21 exhauster.

The 222-S Laboratory was constructed in the 1950s, and the 11A hot cell and hot cell facility were added to the 222-S Laboratory in 1994. The initial application was submitted in the 1990s and addressed the construction and operation of the 11A hot cell and hot cell facility addition to the 222-S Laboratory. The potential unabated emissions, associated with the hot cell, resulted in a TEDE to the hypothetical onsite maximally exposed individual (MEI) of approximately 6.0E-02 mrem per year. Abated emissions estimates resulted in a TEDE to the MEI of 6.06E-03 mrem/yr.

This application expands the scope to encompass all radionuclide emissions exiting through the 222-S Laboratory 296-S-21 exhauster, which includes the 11A hot cell and hot cell facility addition. The revised potential unabated emissions estimates result in a TEDE to the hypothetical onsite maximally exposed individual (MEI) of approximately 3.0E+00 mrem per year. Abated emissions estimates result in a TEDE to the MEI of 1.02E-03 mrem/yr. This represents an unabated increase of 2.94E+00. Using a standard decontamination factor of 99.97% provided by one HEPA filter represents an abated emission decrease of 5.58E-03 mrem.

Activities that typically contribute to this dose include sample receipt, shipment, archiving, testing, analysis, maintenance and operations activities, and waste management activities including the management of small amounts of radioactive mixed waste not generated at the 222-S Laboratory (i.e., for short-term storage or transfer to the 219-S Tank System). This dose estimate is conservative for purposes of bounding all activities. The duration of project activities is expected to be continuous until closure of the Hanford Site.

The total effective dose equivalent (TEDE) from all calendar year 2006 Hanford Site air emissions (point sources as well as diffuse and fugitive sources) was 0.104 mrem (DOE/RL-2007-01, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2006*). The emissions resulting from the activities covered by this NOC application, in conjunction with other operations on the Hanford Site, will not exceed 10 mrem/yr (40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities").

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LIST OF TERMS

Abbreviations and Acronyms

ALARACT	as low as reasonably achievable control technology
ANSI	American National Standards Institute
APQ	annual possession quantity
ASME	American Society of Mechanical Engineers
BARCT	best available radionuclide control technology
BBI	best-basis inventory
CFR	*Code of Federal Regulations*
DSA	Documented Safety Analysis
DST	double-shell tank
HEPA	high-efficiency particulate air
ICRP	International Commission on Radiological Protection
MEI	maximally exposed individual
MPR	maximum public receptor
NOC	Notice of Construction
PFP	Plutonium Finishing Plant
PTE	potential-to-emit
SST	single-shell tank
TEDE	total effective dose equivalent
TWINS	Tank Waste Inventory Network System
WAC	*Washington Administrative Code*
WDOH	Washington State Department of Health

Units

Ci	curie
Ci/gal	curies per gallon
Ci/g	curies per gram
g	gram
gal	gallon
m	meter
mrem	millirem
mrem/Ci	millirem per curie
mrem/hr	millirem per hour
mrem/yr	millirem per year

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
Inches	25.40	Millimeters	Millimeters	0.0393	Inches
Inches	2.54	Centimeters	Centimeters	0.393	Inches
Feet	0.3048	Meters	Meters	3.2808	Feet
Yards	0.914	Meters	Meters	1.09	Yards
Miles	1.609	Kilometers	Kilometers	0.62	Miles
Area			**Area**		
Square inches	6.4516	Square centimeters	Square centimeters	0.155	Square inches
Square feet	0.092	Square meters	Square meters	10.7639	Square feet
Square yards	0.836	Square meters	Square meters	1.20	Square yards
Square miles	2.59	Square kilometers	Square kilometers	0.39	Square miles
Acres	0.404	Hectares	Hectares	2.471	Acres
Mass (weight)			**Mass (weight)**		
Ounces	28.35	Grams	Grams	0.0352	Ounces
Pounds	0.453	Kilograms	Kilograms	2.2046	Pounds
Short ton	0.907	Metric ton	Metric ton	1.10	Short ton
Volume			**Volume**		
Fluid ounces	29.57	Milliliters	Milliliters	0.03	Fluid ounces
Quarts	0.95	Liters	Liters	1.057	Quarts
Gallons	3.79	Liters	Liters	0.26	Gallons
Cubic feet	0.03	cubic meters	Cubic meters	35.3147	Cubic feet
Cubic yards	0.76456	Cubic meters	Cubic meters	1.308	Cubic yards
Temperature			**Temperature**		
Fahrenheit	Subtract 32 then multiply by 5/9ths	Celsius	Celsius	Multiply by 9/5ths, then add 32	Fahrenheit
Force/Pressure			**Force/Pressure**		
Pounds per square inch	6.895	Kilopascals	Kilopascals	1.4504×10^{-1}	Pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE, Second Ed., 1990, Professional Publications, Inc., Belmont, California.

1.0 LOCATION

Regulatory Citation: "Name and address of the facility, location (latitude and longitude) of the emission unit(s)."

U.S. Department of Energy, Office of River Protection
Hanford Site,
200 West Area
Richland, Washington 99352

The geodetic coordinates for the 222-S Laboratory are

Latitude: 46° 32' 5.5" N
Longitude: 119° 31' 14.4" W

The primary exhauster that ventilates this facility is assigned stack number 296-S-21 and is listed in 00-05-006, the *Hanford Site Air Operating Permit* under number 200E P-296S021-001.

2.0 RESPONSIBLE MANAGER

Regulatory Citation: "Name, title, address, and phone number of responsible manager."

Shirley J. Olinger, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 550
Richland, Washington 99352
(509) 372-3062

3.0 PROPOSED ACTIONS

Regulatory Citation: "Identify the type of proposed action for which this application is submitted:

a. Construction of new emission unit(s)
b. Modification of existing emission unit(s); identify whether this is a significant modification – significant means the potential-to-emit airborne radioactivity at a rate that could increase the TEDE to the MEI by at least 1.0 mrem/yr as a result of the proposed modification
c. Modification of existing unit(s), unregistered."

This application is submitted in accordance with *Washington Administrative Code* (WAC) 246-247-060(1)(a), "Applications, Registration and Licensing," for a significant modification to an existing registered emission unit.

No physical modifications, nor new activities, beyond established practices, are proposed with this Notice of Construction (NOC) revision. This revision is intended to address all the

222-S Laboratory radioactive emissions that exhaust through the 296-S-21 stack. This includes sample receipt, shipment, storage, analysis, and testing; maintenance and operations activities; and waste management activities. It also includes an increase in radioisotopic inventory to accommodate receipt of the number of samples originally planned for processing in the 11A hot cell and the associated increase in the annual possession quantity (APQ). These activities are further described in Section 5.0.

The increase in the potential-to-emit (PTE) total effective dose equivalent (TEDE) to the maximally exposed individual (MEI) as a result of increasing the APQ is approximately 3.0 mrem/yr which is greater than 1.0 mrem/yr. Therefore, this modification is considered significant as defined by WAC 246-247-030(25), "Definitions."

4.0 STATE ENVIRONMENTAL POLICY ACT

Regulatory Citation: "If the project is subject to the requirements of the State Environmental Policy Act (SEPA) contained in chapter 197-11 WAC, provide the name of the lead agency, lead agency contact person, and their phone number."

In accordance with WAC 197-11, "SEPA Rules," the Washington State Department of Health (WDOH) has identified and adopted the following *National Environmental Policy Act* documentation as being appropriate for this proposal after independent review. This document meets the agencies' review needs for the current proposal.

- DOE/EIS-0212, *Final Environmental Impact Statement, Safe Interim Storage; Hanford's Tank Waste.*
- 60 FR 61687, "Record of Decision; Safe Interim Storage of Hanford Tank Wastes, Hanford Site, Richland, WA."
- DOE/EIS-0189, *Tank Waste Remediation System, Hanford Site, Richland, Washington, Final Environmental Impact Statement.*
- 62 FR 8693, "Record of Decision for the Tank Waste Remediation System, Hanford Site, Richland, WA."

5.0 PROCESS DESCRIPTION

Regulatory Citation: "Describe the chemical and physical processes upstream of the emission unit(s)."

The 222-S Laboratory was built in the early 1950s to provide analytical services, first for the reduction and oxidation (REDOX) process, and later for several programs and plant operations. In 1994 Project W-041H, Environmental Hot Cell Expansion, provided the hot cell facility, an addition to the east end of the 222-S Laboratory that includes the 11A hot cells and associated

fume hoods. The increased hot cell capacity was required to support an increased demand for analytical services.

The 222-S Laboratory primarily receives, processes, and stores samples from various projects on the Hanford Site and packages samples for shipment to other onsite and offsite laboratories. The 222-S Laboratory is also used for sample analysis, testing, and process development. The majority of samples are from the single-shell tanks (SST) and double-shell tanks (DST) in the tank farm system with a few samples coming from other facilities such as the 242-A Evaporator, K Basins Project, Plutonium Finishing Plant (PFP), and the 219-S Waste Handling Facility. All SST and DST samples and most other samples are received through the 11A hot cell.

The 222-S Laboratory is also used for waste management activities, such as waste transfers to the 219-S Waste Handling Facility and other activities supporting laboratory and other Hanford Site operations. The 222-S Laboratory manages waste generated at 222-S Laboratory and small amounts of radioactive mixed waste not generated at the 222S Laboratory (i.e., for short-term storage or transfer to the 219-S Tank System).

The 222S Laboratory undergoes operation and maintenance activities that occur in the radioactive portion of the facility and contribute to emissions through the 296-S-21 stack. Nonanalytical portions of the facility that exhaust through the 296-S-21 stack are the basement, tunnels, and other miscellaneous sources (e.g., vented storage cabinets).

6.0 EXISTING AND PROPOSED CONTROLS

Regulatory Citation: "Describe the existing and proposed (as applicable) abatement technology. Describe the basis for the use of the proposed system. Include expected efficiency of each control device, and the annual average volumetric flow rate(s) in meters^3/sec for the emission unit(s)."

Emissions from the 222-S Laboratory are exhausted through stack number 296-S-21. The design flow for this stack is 100,000 cfm but operates nominally at 78,000 cfm. Prior to being emitted to the atmosphere, the 222S Laboratory hot cells exhaust passes through three stages of high-efficiency particulate air (HEPA) filters (two stages at 222-SC and a single stage at 222-SB/SE filter buildings). The 222-S Laboratory general room air, fume hood, glovebox, basement, tunnels, and miscellaneous source exhaust passes through a single stage of HEPA filtration at the 222-SB/SE filter buildings before exhausting to the 296-S-21 stack. In addition the 222-S hot cells, hoods, gloveboxes, and sample storage lockers exhaust air passes through single-stage HEPA filtration for which the purpose is to avoid contamination of ductwork and is not considered or maintained as a Pollution Control Device. Figure 1 in Section 7.0 shows the airflow path for the 222-S Laboratory.

Emissions through the 296-S-21 stack are continuously sampled. The HEPA filters used as Pollution Control Devices are tested in place to ensure that they remove at least 99.95% of particles ranging in size from 0.1 micron to 3.0 microns, with a mean particle size of 0.5 micron. A schematic of air flow at 222-S Laboratory and Pollution Control Devices are shown in Figure 1 of Section 7.0.

222-SB Filter Building—The 222-SB filter building, located south of the 222-S Laboratory building, houses a single stage of HEPA filtration comprised of 96 HEPA filters. This building provides filtering capabilities for the 222-S Laboratory when using any one of the three electrically powered exhaust fans. Exhaust air leaves the 222-SB filter building via ductwork to the 296-S-21 stack where it is discharged to the atmosphere. If exhaust plenum differential pressure becomes too low, supplementary exhaust ventilation will be provided through the 222-SE filter building via a direct-drive diesel-powered exhaust fan.

222-SE Filter Building—The 222-SE filter building, located south of the 222-S Laboratory building, is a facility that houses a single stage of HEPA filtration comprised of 56 HEPA filters. This building provides filtering capabilities for the 222-S Laboratory when using the diesel-powered exhaust fan. The diesel exhaust provides an alternative means of exhausting the 222-S Laboratory air, ensuring minimum radiological control during abnormal conditions. Exhaust air leaves the 222-SE filter building via ductwork to the 296-S-21 stack where it is discharged to the atmosphere.

The diesel powered exhaust fan provides approximately one-half of the exhaust ventilation flow rate provided by the electric fans and can be used during a loss of electricity, during electrically powered fan failure, during loss of sampling capabilities, and during maintenance activities on the 222-SB filter building or exhaust fans. The diesel exhaust fan can be used in conjunction with the electrically powered exhaust fans as required to maintain normal exhaust flows.

222-SC Filter Building—The 222-SC filter building, located north of the 222-S Laboratory building, contains two stages of HEPA filtration for the 10 hot cells (i.e., 1-A, 1-E-1, 1-E-2, 1-F, and 11-A-1 through 11-A-6). The 222-SC filter building houses five parallel pairs of HEPA filters, which provide filtration to hot cell exhaust air before it enters the main exhaust plenum and final filtering in the 222-SB or the 222-SE filter buildings.

Hot Cell Ventilation—222-S Laboratory hot cells are cubicles built of steel capable of reducing radiation dose rates from tens of rems per hour in the cubicle to <10 mrem/hr through the outer wall. The hot cells are used for operations that exceed operating limits for the hoods. There are 10 hot cells in the 222-S Laboratory Building: one each in Rooms 1-A and 1-F; two in Room 1-E; and six in Room 11-A.

The main building exhaust ventilation services the hot cells. The hot cell ventilation operates to provide a differential pressure between room and cubicle operating areas, and airflow through the hot cells is sufficient to maintain the hot cell at a negative air pressure relative to the room. Supply air to the hot cells is pulled from the room through a HEPA filter before entering the cell. These supply air filters are not considered or maintained as Pollution Control Devices; their purpose is to reduce contamination if reverse flow (i.e., airflow from the cell to the room) should occur and to reduce dust loading within the cell and ventilation system. The hot cell exhaust air passes through the 222-SC filter building, goes through two stages of HEPA filtration, and then is ducted to the 222-SB filter building passing through one final stage of HEPA filtration before being exhausted to atmosphere through the 296-S-21 stack. In the event that the diesel fan is in operation, the final HEPA filtration will be through the 222-SE filter building. In total, the hot cell exhaust is provided three stages of HEPA filtration for abatement of emissions.

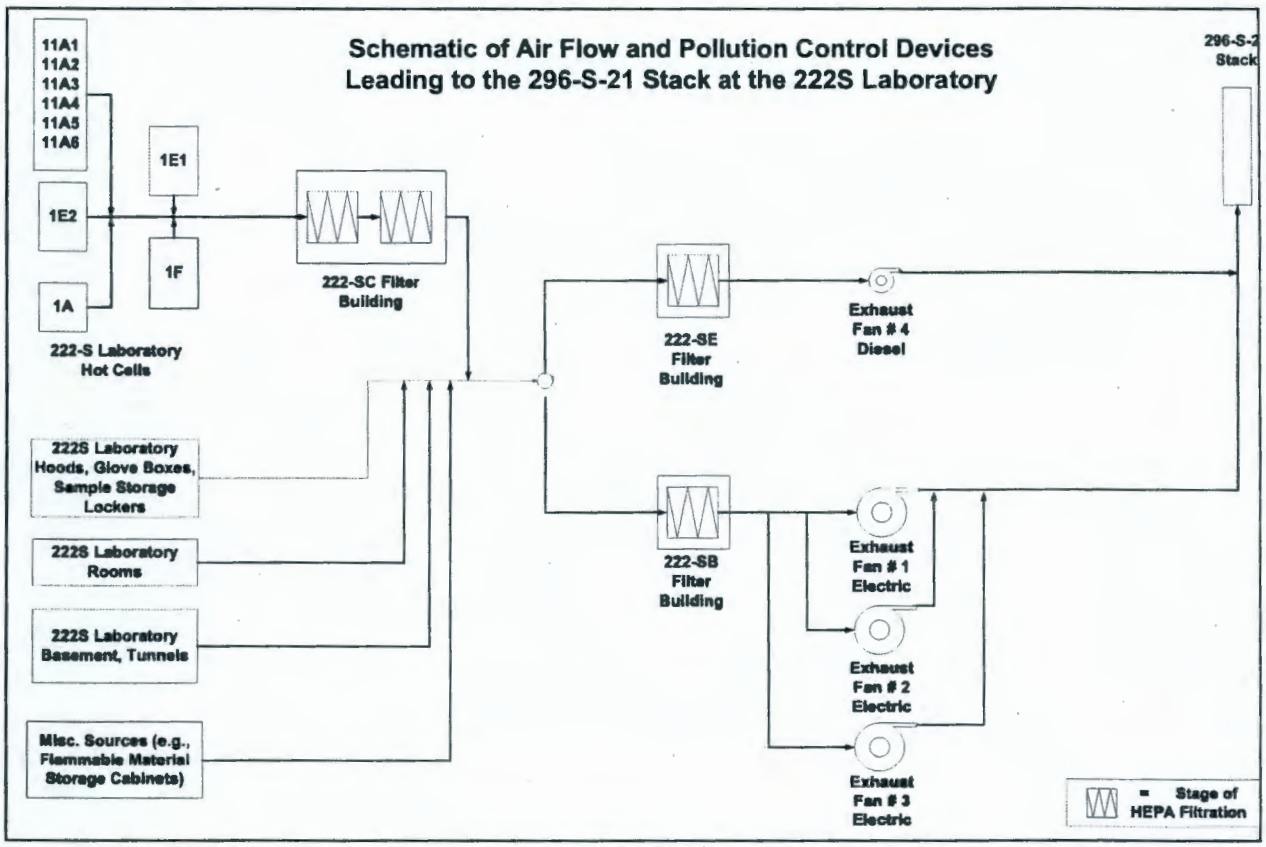
222S Laboratory Ventilation – The general 222-S Laboratory air space, hoods, gloveboxes, basement, tunnels, etc., undergo a single stage of HEPA filtration for the abatement of emissions before being exhausted to the environment through the 296-S-21 stack. When the diesel fan is in operation, filtration is through the 222-SE filter building; when the electric fans are in operation, filtration is through the 222-SB filter building.

7.0 DRAWINGS OF CONTROLS

Regulatory Citation: "Provide conceptual drawings showing all applicable control technology components from the point of entry of radionuclides into the vapor space to release to the environment."

Figure 1 is a schematic of the 296-S-21 stack tank ventilation system.

Figure 1. 222-S Laboratory Building Ventilation System.



8.0 RADIONUCLIDES OF CONCERN

Regulatory Citation: "Identify each radionuclide that could contribute greater than ten percent of the potential–to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential–to-emit TEDE to the MEI."

Radionuclides estimated to contribute greater than 10% of the PTE TEDE to the MEI from operation of the 296-S-21 exhauster are ^{137}Cs, ^{239}Pu, and ^{241}Am. Additionally, contributions of ^{90}Sr are nearly 0.1 mrem/yr PTE TEDE to the MEI. The ratios are presented in Appendix A.

The incremental contribution to dose consequences of all the other isotopes is considered negligible.

9.0 MONITORING

Regulatory Citation: "Describe the effluent monitoring system for the proposed control system. Describe each piece of monitoring equipment and its monitoring capability, including detection limits, for each radionuclide that could contribute greater than ten percent of the potential-to-emit TEDE to the MEI, or greater than 0.1 mrem/yr potential-to-emit TEDE to the MEI, or greater than twenty-five percent of the TEDE to the MEI, after controls. Describe the method with detail sufficient to demonstrate compliance with the applicable requirements."

The 296-S-21 effluent monitoring system samples the ventilation emissions continuously. The system collects its sample via a shrouded probe. The shrouded probe installation location and the transport lines adhere to the applicable requirements of ANSI/HPS N13.1-1999, *Sampling and Monitoring Releases of Airborne Radioactive Substances from the Stacks and Ducts of Nuclear Facilities.*

Testing was conducted in August 2006 according to the criteria of ANSI/HPS N13.1-1999 by Pacific Northwest National Laboratory to assess the suitability of the location of the air sampling probe on the 296-S-21 stack. The tests demonstrated that the location for the air sampling probe meets all performance criteria for air sampling systems at nuclear facilities. The results were documented in PNNL-16014, *Assessment of the 296-S-21 Stack Sampling Probe Location.*

A calculation was also performed to determine the particle penetration of the stack sampling system. ANSI/HPS N13.1-1999 requires that penetration of 10-micron AD aerosol particles from the free stream to the collector are not less than 50%. The results of the calculation demonstrated compliance with this section of the standard with a penetration value of 74.2%. This is documented in RPP-CALC-30326, *222-S Laboratory Stack 296-S-21 Sampling System Particle Penetration Deposition Determination.*

As noted in Section 8.0, ^{239}Pu, ^{137}Cs, and ^{241}Am contribute greater than 10% of the PTE TEDE to the MEI. Applying decontamination factors show that these radionuclides will also represent 25% of the TEDE to the MEI after controls. In addition to these, contribution of ^{90}Sr is nearly 0.1 mrem/yr PTE TEDE to the MEI. These radionuclides are collected in the record sample collection system and analyzed in the laboratory. Results are published in the annual Hanford Site emission reports, currently DOE/RL-2007-01, *Radionuclide Air Emissions Report for the Hanford Site, CalendarYear 2006.* The quality and detection limits of these analyses are controlled via the current revisions of the following documents:

- HNF-EP-0528, *NESHAP Quality Assurance Project Plan for Radioactive Air Emissions.*

- HNF-EP-0835-8, *Statement of Work for Services Provided by the Waste Sampling and Characterization Facility for the Environmental Compliance Program during Calendar Year 2007.*

- TFC-PLN-071, *Quality Assurance Program Plan for Tank Farm Contractor Radioactive Air Emissions.*

10.0 ANNUAL POSSESSION QUANTITY

Regulatory Citation: "Indicate the annual possession quantity for each radionuclide."

An investigation into the radiological inventory residing in the 222-S Laboratory was completed and results reported in HNF-10754, *222-S Laboratory Radiological Inventory Comparison with Accident Dose Consequences.*

The distribution of the primary radionuclides that could be released through the 296-S-21 exhauster was determined by deriving an average concentration of the radionuclides for the SST and DST systems from the best-basis inventory (BBI) contained in the Tank Waste Information Network System (TWINS) (see Appendix B). The anticipated source term was then based on limits established in HNF-12125, *222-S Laboratory Documented Safety Analysis* (DSA).

The DSA identifies the maximum radioactive material inventory that is allowed in the 222-S Laboratory at any given time. This quantity is administratively controlled and may be used as a measure of the APQ. The APQ is the sum of the radioactive material that is archived in, as well as processed through, the facility during any calendar year. Over the course of a year, the total inventory is expected to reach approximately five times the daily inventory limit specified in the DSA. Thus, the DSA inventory was multiplied by a factor of five.

Applying the factor of five to the DSA inventory, the initial APQ inventory would equate to 3165 Ci of ^{137}Cs. The ^{137}Cs conversion provides the most restrictive of the radionuclides based on the BBI to DSA ratio. An examination of the average concentration of ^{137}Cs in the tanks as reported by the BBI indicates that this represents 4186.5 gal of waste.

$$3165 \text{ Ci} / 0.756 \text{ Ci/gal} = 4186.5 \text{ gal} \quad (1)$$

To normalize the inventory to the ^{137}Cs limit of 3165 Ci, the average of SST and DST concentrations, reported in curies per gallon in Appendix B, was multiplied by 4186.5 gal.

Strontium-90, as a major contributor to the total inventory, was considered separately. The ^{90}Sr source term was increased to 9000 Ci to maintain the factor of five.

The other major contributors to the total inventory, ^{239}Pu and ^{241}Am, were also considered separately. As identified in HNF-SD-CP-MA-002, *222-S Laboratory Radiological Inventory Control Program*, all fissionable isotopes of plutonium, all ^{233}U, all nonexempt ^{237}Np, and all ^{235}U in excess of 1 wt% enrichment are tracked as equivalent concentrations of ^{239}Pu for

purposes of radioactive material inventory control. The specific activities for ^{239}Pu and ^{241}Am are 6.2 x 10^{-2} Ci/g and 3.43 Ci/g, respectively. The total curies of ^{239}Pu equivalence for 222-S Laboratory are 13.7 Ci (220.8 g x 6.2 x 10^{-2} Ci/g), and the total curies of ^{241}Am are 13.5 Ci (3.94 g x 3.43 Ci/g). These values represent the limits at any given time of fissionable material inventory. The annual curies of ^{239}Pu and ^{241}Am were increased to five times these fissionable material inventory limits to account for additional fissionable materials, which are received as samples from facilities other than tank farms such as PFP and K Basins. This resulted in 68.5 Ci of ^{239}Pu and 67.6 Ci of ^{241}Am.

This conversion process utilizing known constituents of the BBI may not identify all the fissionable materials that could be present but does provide a bounding limit for the total of all the fission product radionuclides. The APQ is presented in Table 1.

Table 1. Annual Possession Quantity.

Analyte	Ci		Analyte	Ci
^{3}H	3.12E-01		^{226}Ra	7.29E-07
^{14}C	4.58E-02		^{227}Ac	2.94E-04
^{59}Ni	1.19E-01		^{228}Ra	4.09E-04
^{60}Co	5.16E-01		^{229}Th	1.09E-04
^{63}Ni	1.09E+01		^{231}Pa	3.79E-04
^{79}Se	1.17E-02		^{232}Th	5.02E-04
^{90}Sr	9.00E+03		^{232}U	5.79E-04
^{90}Y	9.00E+03		^{233}U	4.96E-02
^{93}Zr	2.72E-01		^{234}U	1.73E-02
^{93m}Nb	2.19E-01		^{235}U	7.10E-04
^{99}Tc	1.97E+00		^{236}U	4.69E-04
^{106}Ru	1.27E-02		^{237}Np	8.98E-03
^{113m}Cd	3.46E-01		^{238}Pu	1.56E-01
^{125}Sb	8.28E-01		^{238}U	1.58E-02
^{126}Sn	3.07E-02		^{239}Pu	6.85E+01
^{129}I	2.24E-03		^{240}Pu	8.38E-01
^{134}Cs	2.00E-01		^{241}Am	1.17E+01
^{137}Cs	3.16E+03		^{241}Pu	6.76E+01
^{137m}Ba	2.97E+03		^{242}Cm	9.08E-03
^{151}Sm	3.00E+02		^{242}Pu	5.93E-05
^{152}Eu	1.17E-01		^{243}Am	5.32E-03
^{154}Eu	5.39E+00		^{243}Cm	8.90E-04
^{155}Eu	3.44E+00		^{244}Cm	2.05E-02

11.0 PHYSICAL FORM

Regulatory Citation: "Indicate the physical form of each radionuclide in inventory: Solid, particulate solids, liquid, or gas."

The physical form of each radionuclide of concern in the inventory is liquid, solid, or particulate.

12.0 RELEASE FORM

Regulatory Citation: "Indicate the release form of each radionuclide in inventory: Particulate solids, vapor, or gas. Give the chemical form and ICRP 30 solubility class, if known."

The radionuclides in the sample inventory listed in Table 1 are all assumed to be released as particulate with the exception of ^{3}H and ^{14}C, which are treated as gases.

13.0 RELEASE RATES

Regulatory Citation: "a. New emission unit(s): Give predicted release rates without any emission control equipment (the potential-to-emit) and with the proposed control equipment using the efficiencies described in subsection 6 of this section.
b. Modified emission unit(s): Give predicted release rates without any emissions control equipment (the potential-to-emit) and with the existing and proposed control equipment using the efficiencies described in subsection 6 of this section. Provide the latest year's emission data or emissions estimates.
In all cases, indicate whether the emission unit is operating in a batch or continuous mode."

The calculations for release rates are based on operating in a continuous mode.

The release rate is derived by applying 40 CFR 61 Appendix D, "Required Emission Inventory Information," factors to the APQ listed in Table 1. A release factor of 1.0E-03 was used for all liquid and particulate inventory with the exception of ^{3}H and ^{14}C, which can take a gaseous form and to which a release factor of 1.0E+00 has been applied.

The TEDE from all calendar year 2006 Hanford Site air emissions (point sources and diffuse and fugitive sources) was 0.104 mrem (DOE/RL-2007-01).

14.0 LOCATION OF MAXIMALLY EXPOSED INDIVIDUAL

Regulatory Citation: "Identify the MEI by distances and direction from the emission unit(s). The MEI is determined by considering distance, windrose data, presence of vegetable gardens, and meat or milk producing animals at unrestricted areas surrounding the emission unit."

The MEI was determined using CAP-88 dispersion factors, which are derived for use on the Hanford Site and published in DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses*. Dose-per-unit release factors used for the 296-S-21 ventilation system are

from DOE/RL-2006-29 Table 4-10 for 200 W Area with effective release height <40 m. Table 4-10 gives values in two separate columns for an offsite maximum public receptor (MPR) and an onsite MPR. Values from both columns were examined to determine the maximum dose. The results showed that the maximum dose occurred to the onsite MPR. The results of this MEI determination are presented in Appendix A. DOE/RL-2006-29, Table 4-2, indicates that the onsite MPR for the 200 West Area is 18,310 m in the ESE direction. This location is the Laser Interferometer Gravitational Wave Observatory (LIGO).

15.0 TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Regulatory Citation: "Calculate the TEDE to the MEI using an approved procedure (see WAC 246-247-085). For each radionuclide identified in subsection 8 of this section, determine the TEDE to the MEI for existing and proposed emission controls, and without any emission controls (the potential-to-emit) using release rates from subsection 13 of this section. Provide all input data used in the calculations."

The TEDE to the MEI resulted in emissions of approximately 3.0E+00 mrem/yr (unabated) and 1.02E-03 mrem/yr (abated), as shown in Appendix A. This was derived by applying the 40 CFR 61 Appendix D factors to the APQ established in Section 10.0. Although the system contains several HEPA filters in series, credit was taken for only one HEPA filter when calculating abated emissions. Derivations were performed in accordance with DOE/RL-2006-29, *Calculating Potential-to-Emit Radiological Releases and Doses.*

16.0 COST FACTOR IF NO ANALYSIS

Regulatory Citation: "Provide cost factors for construction, operating, and maintenance of the proposed control technology components and system, if a BARCT or ALARACT demonstration is not submitted with the NOC."

Pursuant to WAC 246-247-110(16), "Appendix A – Application Information Requirements," cost factors for construction, operation, and maintenance of proposed technology requirements are not required, as the WDOH has provided guidance that HEPA filters are generally considered best available radionuclide control technology (BARCT) for particulate emissions (letter AIR 92-710, "Notification for the Plutonium Finishing Plant Liquid Low Level Waste Treatment Facility, Project B-680"). Because the key radionuclides of concern are particulates, it is proposed that the HEPA filter controls described in Section 6.0 be accepted as BARCT. Compliance with the substantive BARCT technology standards is described in Section 18.0

17.0 DURATION OR LIFETIME

Regulatory Citation: "Provide an estimate of the lifetime for the facility process with the emission rates provided in this application."

The 222-S Laboratory was constructed in the 1950s and the 11A hot cell was constructed in 1994. The duration of project activities is expected to be continuous until closure of the Hanford Site.

18.0 STANDARDS

Regulatory Citation: "Indicate which of the following control technology standards have been considered and will be complied with in the design and operation of the emission unit(s) described in this application:....
ASME AG-1, ASME N509, ASME N510, ASME NQA-1, 40 CFR 60, Appendix A Methods 1, 1A, 2, 2A, 2C, 2D, 4, 5, and 17, and ANSI N13.1"

Some portions of the 222-S Laboratory, which existed prior to the addition of the 11A Hot cell and installation of the 296-S-21 ventilation system, were built to standards in effect at the time. For example the 222-SB was built to SMACNA requirements. The design and operation of the 296-S-21 ventilation system complies with the following standards:

Abatement Technology Standards:

- ASME AG-1, *Code on Nuclear Air and Gas Treatment* (where there are conflicts in standards with the other listed references, this standard shall take precedence).

- ASME N509, *Nuclear Power Plant Air-Cleaning Units and Components.*

- ASME N510, *Testing of Nuclear Air Treatment Systems.*

Quality Assurance:

ASME NQA-1, *Quality Assurance Program Requirements for Nuclear Facility Applications.*

Stack Volumetric Flow Rate Determination Methods: Stack effluent flow rates are necessary to compile emissions and complete the required annual reports. Requirements for flow rates can be broken into three areas:

- Measurements Location: The regulatory methods that specify the measurement location, distances from flow disturbances, number of measurements to take, etc., are provided in 40 CFR 60, Appendix A, Method 1 – "Sample and Velocity Traverses for Stationary Sources."

  Flow measurement locations and the number of measurements taken comply with this requirement.

- Measurement Method: The regulatory method that specify the measurement method and instrumentation to use are provided in 40 CFR 60 Appendix A, Method 2 – "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)."

Measurement methods and instrumentation comply with this requirement.

- Measurement Result: Flow rates are reported in dry standard units of temperature and pressure. The moisture content of the air stream is taken into account when finalizing the flow rate values. Method 2 and Method 2C (through reference to Method 2) suggest Method 4 – "Determination of Moisture Content in Stack Gases."

  This method is not used. Instead, a hygrometer is used to determine moisture content of the stream. The humidity value determined from this instrument is mathematically incorporated into the final flow rate measurement.

The methods discussed above are for manual measurements. In addition to these methods, 40 CFR 52 Appendix E – "Performance Specifications and, Specification Test Procedures for Monitoring Systems for Effluent Stream Gas Volumetric Flow Rate," may also be used.

The Appendix E method allows for the installation and operation of instrumentation to automatically and continuously measure flow rates. The Appendix E method requires use of Method 2 for use in comparison of the instrumentation readings and if, after a series of measurements are taken, the instrument accuracy is determined to be within that specified by the Appendix E method, the instrumentation is considered acceptable and can be used for flow rate determination and emission reporting purposes. The flow rate instrumentation on this system does not conform to Method 2 and is installed simply as an indicator. Measurements used for flow rate determination and reporting purposes are taken through ventilation flow testing.

Sampling System Design Methods and Standards:

No attempts have been made to design the sampling system to 40 CFR 60 Appendix A, Methods 5 and 17 – "Determination of Particulate Matter Emissions from Stationary Sources." Instead, the system has been designed to meet ANSI/HPS N13.1-1999.

19.0 REFERENCES

00-05-006, 2001, *Hanford Air Operating Permit*, Washington State Department of Ecology, Olympia, Washington.

40 CFR Part 52 Appendix E, "Performance Specifications and Specifications of Test Procedures for Monitoring System for Effluent Stream Gas Volumetric Flow Rate," *Code of Federal Regulations*, as amended.

40 CFR 60 Appendix A, "Guide to Sampling Airborne Radioactive Materials in Nuclear Facilities," *Code of Federal Regulations*, as amended.

40 CFR 61.07, "Application for approval of construction or modification," *Code of Federal Regulations*, as amended.

40 CFR 61, Appendix D, "Required Emission Inventory Information," *Code of Federal Regulations*, as amended.

40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides other than Radon from Department of Energy Facilities," *Code of Federal Regulations*, as amended.

60 FR 61687, 1995, "Record of Decision; Safe Interim Storage of Hanford Tank Waste, Hanford Site, Richland, WA," *Federal Register*, Vol. 60, pp. 61687-61692 (December 1).

62 FR 8693, 1997, "Record of Decision for the Tank Waste Remediation System, Hanford Site, Richland, WA," *Federal Register*, Vol. 62, pp. 8693-8704 (February 26).

AIR 92-710, 1992, "Acknowledges Notification for the Plutonium Finishing Plant Liquid Low Level Waste Treatment Facility Project B-680" (letter from A. W. Conklin to R. D. Izatt, DOE-RL, July 30), Washington State Department of Health, Olympia, Washington.

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ASME AG-1, *Code on Nuclear Air and Gas Treatment*, American Society of Mechanical Engineers, New York, New York.

ASME N509, *Nuclear Power Plant Air-Cleaning Units and Components*, American National Standards Institute, New York, New York.

ASME N510, *Testing of Nuclear Air Treatment Systems*, American National Standards Institute, New York, New York.

ASME NQA-1, 2000, *Quality Assurance Requirements for Nuclear Facility Applications*, American Society of Mechanical Engineers, New York, New York.

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DOE/RL-2006-29, 2006, *Calculating Potential-to-Emit Radiological Releases and Doses*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington..

DOE/RL-2007-01, 2007, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2006*), Rev. 0, DOE/RL-2007-01, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2006*).

HNF-EP-0528, *NESHAP Quality Assurance Plan for Radioactive Airborne Emissions,* latest revision, Fluor Hanford, Inc., Richland, Washington.

HNF-10754, 2002, *222-S Laboratory Radiological Inventory Comparison with Accident Dose Consequences*, Rev. 0, Fluor Hanford, Inc., Richland, Washington,

HNF-12125, 2007, *222-S Laboratory Documented Safety Analysis*, Rev. 4, CH2M HILL Hanford Group, Inc., Richland, Washington.

HNF-EP-0835-8, 2007, *Statement of Work for Services Provided by the Waste Sampling and Characterization Facility for the Environmental Compliance Program during Calendar Year 2007*, Fluor Hanford, Inc., Richland, Washington.

HNF-SD-CP-MA-002, 2006, *222-S Laboratory Radiological Inventory Control Program*, Rev. 7, CH2M HILL Hanford Group, Inc., Richland, Washington.

NQA-1, 2000, *Quality Assurance Requirements for Nuclear Facility Applications*, American Society of Mechanical Engineers, New York, New York.

PNNL-16014, 2006, *Assessment of the 296-S-21 Stack Sampling Probe Location*, Pacific Northwest National Laboratory, Richland, Washington.

RPP-CALC-30326, 2006, *222-S Laboratory Stack 296-S-21 Sampling System Particle Penetration Deposition Determination*, Rev. 0, CH2M HILL Hanford Group, Inc., Richland, Washington.

TFC-PLN-071, *Quality Assurance Program Plan for Tank Farm Contractor Radioactive Air Emissions*, Rev. A, CH2M HILL Hanford Group, Inc., Richland, Washington.

WAC 197-11, "SEPA Rules," *Washington Administrative Code*, as amended.

WAC 246-247-030(25), "Definitions," *Washington Administrative Code*, as amended.

WAC 246-247-060, "Applications, Registration and Licensing," *Washington Administrative Code*, as amended.

WAC 246-247-110(16), "Appendix A—Application Information Requirements," *Washington Administrative Code*, as amended.

APPENDIX A. TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Nuclide	Concen. (Ci/gal)	Volume (gal)	APQ (Ci)	Release Fraction	Curies Released	CAP 88 (Offsite) (mrem/Ci)	Offsite Dose (mrem/yr)	CAP 88 (Onsite) (mrem/Ci)	Onsite Dose (mrem/yr)	Abated Dose (Onsite) (mrem/yr)	% of Total PTE	% of Total Abated
^{3}H	7.48E-05	4186.5	3.13E-01	1.00E+00	3.13E-01	2.50E-05	7.83E-06	1.10E-05	3.44E-06	3.44E-06	0.00%	0.34%
^{14}C	1.10E-05	4186.5	4.60E-02	1.00E+00	4.60E-02	2.00E-03	9.21E-05	3.00E-04	1.38E-05	1.38E-05	0.00%	1.36%
^{59}Ni	2.85E-05	4186.5	1.19E-01	1.00E-03	1.19E-04	2.40E-04	2.86E-08	3.30E-04	3.94E-08	1.31E-11	0.00%	0.00%
^{60}Co	1.24E-04	4186.5	5.18E-01	1.00E-03	5.18E-04	1.90E-01	9.85E-05	3.40E-01	1.76E-04	5.87E-08	0.01%	0.01%
^{63}Ni	2.61E-03	4186.5	1.09E+01	1.00E-03	1.09E-02	2.00E-04	2.19E-06	7.80E-05	8.52E-07	2.84E-10	0.00%	0.00%
^{79}Se	2.81E-06	4186.5	1.17E-02	1.00E-03	1.17E-05	0	0.00E+00	0	0.00E+00	0.00E+00	0.00%	0.00%
^{90}Sr	9.28E-01	*	9.00E+03	1.00E-03	9.00E+00	8.80E-02	7.92E-01	1.10E-02	9.90E-02	3.30E-05	3.30%	3.24%
^{90}Y	9.28E-01	*	9.00E+03	1.00E-03	9.00E+00	2.60E-04	2.34E-03	2.90E-04	2.61E-03	8.70E-07	0.09%	0.09%
^{93}Zr	6.52E-05	4186.5	2.73E-01	1.00E-03	2.73E-04	9.90E-04	2.70E-07	1.50E-03	4.10E-07	1.37E-10	0.00%	0.00%
^{93m}Nb	5.25E-05	4186.5	2.20E-01	1.00E-03	2.20E-04	1.60E-03	3.51E-07	1.30E-03	2.86E-07	9.52E-11	0.00%	0.00%
^{99}Tc	4.73E-04	4186.5	1.98E+00	1.00E-03	1.98E-03	1.80E-02	3.57E-05	1.80E-03	3.57E-06	1.19E-09	0.00%	0.00%
^{106}Ru	3.04E-06	4186.5	1.27E-02	1.00E+00	1.27E-02	1.60E-02	2.03E-04	2.20E-02	2.80E-04	9.32E-08	0.01%	0.01%
^{113m}Cd	8.30E-05	4186.5	3.48E-01	1.00E-03	3.48E-04	0	0.00E+00	0	0.00E+00	0.00E+00	0.00%	0.00%
^{125}Sb	1.99E-04	4186.5	8.31E-01	1.00E-03	8.31E-04	2.10E-02	1.75E-05	3.70E-02	3.08E-05	1.03E-08	0.00%	0.00%
^{126}Sn	7.36E-06	4186.5	3.08E-02	1.00E-03	3.08E-05	3.70E-02	1.14E-06	4.60E-02	1.42E-06	4.73E-10	0.00%	0.00%
^{129}I	5.38E-07	4186.5	2.25E-03	1.00E+00	2.25E-03	7.60E-02	1.71E-04	8.10E-03	1.82E-05	6.08E-09	0.00%	0.00%
^{134}Cs	4.81E-05	4186.5	2.01E-01	1.00E-03	2.01E-04	7.80E-02	1.57E-05	1.00E-01	2.01E-05	6.71E-09	0.00%	0.00%
^{137}Cs	7.56E-01	4186.5	3.16E+03	1.00E-03	3.16E+00	1.90E-01	6.01E-01	3.10E-01	9.81E-01	3.27E-04	32.68%	32.13%
^{137m}Ba	7.13E-01	4186.5	2.98E+03	1.00E-03	2.98E+00	0	0.00E+00	0	0.00E+00	0.00E+00	0.00%	0.00%

APPENDIX A. TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Nuclide	Concen. (Ci/gal)	Volume (gal)	APQ (Ci)	Release Fraction	Curies Released	CAP 88 (Offsite) (mrem/Ci)	Offsite Dose (mrem/yr)	CAP 88 (Onsite) (mrem/Ci)	Onsite Dose (mrem/yr)	Abated Dose (Onsite) (mrem/yr)	% of Total PTE	% of Total Abated
^{151}Sm	7.19E-02	4186.5	3.01E+02	1.00E-03	3.01E-01	5.80E-04	1.75E-04	9.50E-04	2.86E-04	9.54E-08	0.01%	0.01%
^{152}Eu	2.80E-05	4186.5	1.17E-01	1.00E-03	1.17E-04	1.90E-01	2.23E-05	3.40E-01	3.99E-05	1.33E-08	0.00%	0.00%
^{154}Eu	1.29E-03	4186.5	5.41E+00	1.00E-03	5.41E-03	1.50E-01	8.12E-04	2.80E-01	1.52E-03	5.05E-07	0.05%	0.05%
^{155}Eu	8.26E-04	4186.5	3.46E+00	1.00E-03	3.46E-03	6.30E-03	2.18E-05	1.10E-02	3.80E-05	1.27E-08	0.00%	0.00%
^{226}Ra	1.75E-10	4186.5	7.33E-07	1.00E-03	7.33E-10	3.60E-01	2.64E-10	2.90E-01	2.12E-10	7.08E-14	0.00%	0.00%
^{227}Ac	7.06E-08	4186.5	2.96E-04	1.00E-03	2.96E-07	1.10E+01	3.25E-06	2.00E+01	5.91E-06	1.97E-09	0.00%	0.00%
^{228}Ra	9.80E-08	4186.5	4.10E-04	1.00E-03	4.10E-07	1.50E-01	6.15E-08	2.79E-01	1.14E-07	3.82E-11	0.00%	0.00%
^{229}Th	2.60E-08	4186.5	1.09E-04	1.00E-03	1.09E-07	1.20E+01	1.31E-06	2.20E+01	2.40E-06	7.99E-10	0.00%	0.00%
^{231}Pa	9.10E-08	4186.5	3.81E-04	1.00E-03	3.81E-07	8.90E+00	3.39E-06	1.50E+01	5.71E-06	1.90E-09	0.00%	0.00%
^{232}Th	1.20E-07	4186.5	5.04E-04	1.00E-03	5.04E-07	7.20E+00	3.63E-06	1.30E+01	6.55E-06	2.18E-09	0.00%	0.00%
^{232}U	1.39E-07	4186.5	5.82E-04	1.00E-03	5.82E-07	8.60E+00	5.00E-06	1.50E+01	8.73E-06	2.91E-09	0.00%	0.00%
^{233}U	1.19E-05	4186.5	4.98E-02	1.00E-03	4.98E-05	2.40E+00	1.19E-04	4.20E+00	2.09E-04	6.97E-08	0.01%	0.01%
^{234}U	4.15E-06	4186.5	1.74E-02	1.00E-03	1.74E-05	2.40E+00	4.17E-05	4.20E+00	7.30E-05	2.43E-08	0.00%	0.00%
^{235}U	1.70E-07	4186.5	7.13E-04	1.00E-03	7.13E-07	2.30E+00	1.64E-06	4.00E+00	2.85E-06	9.50E-10	0.00%	0.00%
^{236}U	1.13E-07	4186.5	4.71E-04	1.00E-03	4.71E-07	2.30E+00	1.08E-06	3.90E+00	1.84E-06	6.13E-10	0.00%	0.00%
^{237}Np	2.15E-06	4186.5	9.02E-03	1.00E-03	9.02E-06	8.90E+00	8.02E-05	1.60E+01	1.44E-04	4.81E-08	0.00%	0.00%
^{238}Pu	3.74E-05	4186.5	1.56E-01	1.00E-03	1.56E-04	5.90E+00	9.23E-04	1.00E+01	1.56E-03	5.21E-07	0.05%	0.05%
^{238}U	3.78E-06	4186.5	1.58E-02	1.00E-03	1.58E-05	2.10E+00	3.32E-05	3.70E+00	5.85E-05	1.95E-08	0.00%	0.00%
^{239}Pu	9.17E-04	*	6.85E+01	1.00E-03	6.85E-02	6.40E+00	4.38E-01	1.10E+01	7.54E-01	2.51E-04	25.12%	24.69%

APPENDIX A. TOTAL EFFECTIVE DOSE EQUIVALENT TO THE MAXIMALLY EXPOSED INDIVIDUAL

Nuclide	Concen. (Ci/gal)	Volume (gal)	APQ (Ci)	Release Fraction	Curies Released	CAP 88 (Offsite) (mrem/Ci)	Offsite Dose (mrem/yr)	CAP 88 (Onsite) (mrem/Ci)	Onsite Dose (mrem/yr)	Abated Dose (Onsite) (mrem/yr)	% of Total PTE	% of Total Abated
^{240}Pu	2.01E-04	4186.5	8.41E-01	1.00E-03	8.41E-04	6.40E+00	5.39E-03	1.10E+01	9.26E-03	3.09E-06	0.31%	0.30%
^{241}Am	2.81E-03	*	6.76E+01	1.00E-03	6.76E-02	9.80E+00	6.62E-01	1.70E+01	1.15E+00	3.83E-04	38.31%	37.66%
^{241}Pu	1.78E-03	4186.5	7.46E+00	1.00E-03	7.46E-03	1.00E-01	7.46E-04	1.60E-01	1.19E-03	3.98E-07	0.04%	0.04%
^{242}Cm	2.18E-06	4186.5	9.12E-03	1.00E-03	9.12E-06	3.20E-01	2.92E-06	5.70E-01	5.20E-06	1.73E-09	0.00%	0.00%
^{242}Pu	1.42E-08	4186.5	5.96E-05	1.00E-03	5.96E-08	6.10E+00	3.63E-07	1.00E+01	5.96E-07	1.99E-10	0.00%	0.00%
^{243}Am	1.28E-06	4186.5	5.35E-03	1.00E-03	5.35E-06	9.80E+00	5.24E-05	1.70E+01	9.09E-05	3.03E-08	0.00%	0.00%
^{243}Cm	2.14E-07	4186.5	8.94E-04	1.00E-03	8.94E-07	6.60E+00	5.90E-06	1.20E+01	1.07E-05	3.58E-09	0.00%	0.00%
^{244}Cm	4.92E-06	4186.5	2.06E-02	1.00E-03	2.06E-05	5.20E+00	1.07E-04	9.00E+00	1.85E-04	6.17E-08	0.01%	0.01%
TOTAL							2.51E+00		**3.00E+00**	**1.02E-03**		

* Radionuclides normalized to ^{137}Cs (4186.5 gallons), except ^{241}Am, ^{90}Sr, and Pu isotopes as ^{239}Pu were increased to reflect additional non-tank farm inventory.

APPENDIX B. 2007 BEST BASIS INFORMATION FOR TANK FARM WASTE TANK CONCENTRATIONS

Analyte	SST and DST Combined	Double-Shell Tank		Single-Shell Tank	
	Avg Conc. (Ci/gal)	Avg Conc. (Ci/gal)	Max Conc. (Ci/gal)	Avg Conc. (Ci/gal)	Max Conc. (Ci/gal)
^{3}H	7.48E-05	6.12E-05	5.49E-04	8.69E-05	7.88E-04
^{14}C	1.10E-05	9.83E-06	2.76E-05	1.20E-05	7.97E-04
^{59}Ni	2.85E-05	1.12E-05	1.18E-04	4.39E-05	3.79E-03
^{60}Co	1.24E-04	1.25E-04	1.64E-03	1.23E-04	2.11E-02
^{63}Ni	2.61E-03	9.62E-04	1.10E-02	4.08E-03	3.74E-02
^{79}Se	2.81E-06	3.13E-06	1.03E-05	2.52E-06	2.02E-05
^{90}Sr	9.28E-01	7.47E-01	2.14E+01	1.09E+00	2.93E+02
^{90}Y	9.28E-01	7.47E-01	2.14E+01	1.09E+00	2.93E+02
^{93}Zr	6.52E-05	6.62E-05	8.09E-04	6.44E-05	3.75E-03
^{93m}Nb	5.25E-05	5.10E-05	4.51E-04	5.38E-05	3.54E-03
^{99}Tc	4.73E-04	5.74E-04	1.37E-03	3.83E-04	2.94E-03
^{106}Ru	3.04E-06	6.45E-06	9.64E-05	2.97E-10	3.31E-08
^{113m}Cd	8.30E-05	1.05E-04	6.19E-04	6.34E-05	2.46E-03
^{125}Sb	1.99E-04	3.75E-04	5.72E-03	4.17E-05	1.24E-02
^{126}Sn	7.36E-06	9.40E-06	7.50E-05	5.55E-06	6.35E-04
^{129}I	5.38E-07	6.33E-07	2.25E-06	4.53E-07	9.74E-06
^{134}Cs	4.81E-05	1.02E-04	1.77E-03	2.14E-07	1.05E-05
^{137}Cs	7.56E-01	1.12E+00	6.31E+00	4.33E-01	7.10E+00
^{137m}Ba	7.13E-01	1.05E+00	5.95E+00	4.09E-01	6.70E+00
^{151}Sm	7.19E-02	4.59E-02	9.11E-01	9.51E-02	4.41E+00
^{152}Eu	2.80E-05	3.14E-05	1.31E-03	2.50E-05	3.86E-03
^{154}Eu	1.29E-03	1.59E-03	3.01E-02	1.03E-03	1.25E-01
^{155}Eu	8.26E-04	1.31E-03	1.45E-02	3.95E-04	6.31E-02
^{226}Ra	1.75E-10	2.06E-10	8.19E-10	1.47E-10	1.86E-07
^{227}Ac	7.06E-08	7.12E-09	4.24E-08	1.27E-07	7.80E-06
^{228}Ra	9.80E-08	8.62E-08	3.79E-07	1.09E-07	5.71E-06
^{229}Th	2.60E-08	3.39E-09	2.30E-08	4.62E-08	2.14E-06
^{231}Pa	9.10E-08	5.99E-08	4.42E-07	1.19E-07	9.13E-07
^{232}Th	1.20E-07	1.48E-08	2.44E-07	2.14E-07	1.53E-05
^{232}U	1.39E-07	1.73E-08	1.72E-07	2.47E-07	8.73E-06
^{233}U	1.19E-05	5.08E-07	2.61E-06	2.20E-05	1.30E-03
^{234}U	4.15E-06	1.35E-06	2.31E-05	6.65E-06	8.13E-04
^{235}U	1.70E-07	5.32E-08	8.85E-07	2.74E-07	3.45E-05
^{236}U	1.13E-07	9.87E-08	2.23E-06	1.25E-07	5.99E-06
^{237}Np	2.15E-06	2.30E-06	2.03E-05	2.02E-06	1.82E-04
^{238}Pu	3.74E-05	3.46E-05	2.84E-04	3.98E-05	7.60E-03
^{238}U	3.78E-06	1.05E-06	1.59E-05	6.21E-06	7.84E-04
^{239}Pu	9.17E-04	5.07E-04	7.41E-03	1.28E-03	1.14E-01
^{240}Pu	2.01E-04	1.25E-04	1.71E-03	2.68E-04	2.68E-02
^{241}Am	2.81E-03	3.90E-03	4.74E-02	1.83E-03	1.52E-01
^{241}Pu	1.78E-03	1.84E-03	1.26E-02	1.73E-03	1.75E-01
^{242}Cm	2.18E-06	3.08E-06	7.07E-05	1.37E-06	6.23E-04
^{242}Pu	1.42E-08	1.20E-08	1.14E-07	1.62E-08	1.54E-06
^{243}Am	1.28E-06	1.73E-06	4.28E-05	8.72E-07	8.58E-05
^{243}Cm	2.14E-07	3.56E-07	9.81E-06	8.73E-08	3.15E-05
^{244}Cm	4.92E-06	8.24E-06	2.32E-04	1.96E-06	7.08E-04

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Attachment 2
08-ESQ-104

Hanford Site Air Operating Permit Notification of Off-Permit Change
Permit Number: 00-05-006, Renewal 1

HANFORD SITE AIR OPERATING PERMIT

NOTIFICATION OF OFF-PERMIT CHANGE
Permit Number: 00-05-006 Renewal 1

This notification is provided to Washington State Department of Ecology, Washington State Department of Health, and the U.S. Environmental Protection Agency as a notice of an off-permit change described as follows.

This change is allowed pursuant to WAC 173-401-724(1), WAC 173-401-724(2), and WAC 173-401-724(6):
1. Change is not specifically addressed or prohibited by the permit terms and conditions,
2. Change does not weaken the enforceability of the existing permit conditions,
3. Change is not a Title I modification or a change subject to the acid rain requirements under Title IV of the FCAA,
4. Change meets all applicable requirements and does not violate an existing permit term or condition,
5. Change has complied with applicable preconstruction review requirements established pursuant to RCW 70.94.152.

Provide the following information pursuant to WAC-173-401-724(3):

Description of the change:	
This consolidates, revises, and supersedes the *222-S-Labs 11-A Hot Cell Expansion.* It increases the potential Annual Possession Quantity (APQ) and associated Potential to Emit (PTE) to accommodate the originally planned sampling work scope. No new physical changes will be made with this revision. The title has been changed to *Radioactive Notice of Construction Application for Operation of the 296-S-21 Exhauster* to more accurately designate the content of the document.	
Date of Change: (To be provided in the agency approval order.)	
Describe the emissions resulting from the change:	
The estimated increase in the potential unabated dose to the MEI resulting from this revision is 2.94E+00 mrem per year. The abated dose estimate is expected to decrease by 5.58E-03 mrem/yr.	
Describe the new applicable requirements that will apply as a result of the change: (To be provided in the agency approval order.)	
For Hanford Use Only:	
AOP Change Control Number:	Date Submitted: