OFFICE OF RIVER PROTECTION
P.O. Box 450, MSIN H6-60
Richland, Washington 99352

16-ECD-0001

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Ms. Jane A. Hedges, Program Manager
Nuclear Waste Program
Washington State
Department of Ecology
3100 Port of Benton Blvd.
Richland, Washington 99354

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Ms. Hedges:

SUBMITTAL OF THE CRITERIA & TOXICS AIR EMISSIONS NOTICE OF CONSTRUCTION FOR THE OPERATION OF VENTIALTION SYSTEMS IN THE 241-AP, 241-SY, AND 241-AY/AZ TANK FARMS AND SUPPORT OF AY-102 RETRIEVAL

This letter transmits the Criteria & Toxics Air Emissions Notice of Construction (NOC) for the Operation of the Ventilation Systems in the 241-AP, 241-SY, and 241-AY/AZ Tank Farms and Support of AY-102 Retrieval, TOC-ENV-NOC-5251, attached, for your review and approval.

The NOC addresses:

- The installation of a new ventilation system in the 241-SY Farm
- The operation of the existing ventilation system in the 241-AP Tank Farm and the installation and operation of a new ventilation system in 241-AP Tank Farm
- The operation of the existing tank farm ventilation system in the 241-AY/AZ Tank Farm, including the operation of the annulus exhauster for tank AY-102, and the operation of a portable exhauster to ventilate tank AY-102 during waste retrieval operations.

In addition, the NOC includes new emission rate tables with comparisons to the regulatory levels.

If you have any questions, please contact Dennis W. Bowser, Environmental Compliance Division, (509) 373-2566.

Kevin W. Smith
Manager for

ECD:DWB

Attachment

cc: See page 2

JAN 07 2015

cc w/attach:
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Attachment 1
16-ECD-0001
(61 Pages)

Criteria & Toxics Air Emissions Notice of Construction for the Operation of the Ventilation Systems in the 241-AP, 241-SY, and 241-AY/AZ Tank Farms and Support of AY-102 Retrieval,

Dennis W. Bowser

TOC-ENV-NOC-5251, Rev. 00

Criteria and Toxics Air Emissions Notice of Construction for the Operation of Ventilation Systems in the 241-AP, 241-SY, and 241-AY/AZ Tank Farms and Support of AY-102 Retrieval

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U.S. Department of Energy Contract DE-AC27-08RV14800

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Key Words: NOC, Tank Farms, Air Emissions, Criteria and Toxics, 241-AP, 241-SY, 241-AY/AZ, POR 127

Abstract: The Notice of Construction addresses the installation of a new ventilation system in the 241-SY Farm; the operation of the existing ventilation system in the 241-AP Tank Farm and the installation and operation of a new ventilaiton system in 241-AP Tank Farm; and the operation of the existing tank farm ventilation system in the 241-AY/AZ Tank Farm, including the operation of the annulus exhauster for tank AY-102, and the operation of a portable exhauster to ventilate tank AY-102 during waste retrieval operations.

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APPROVED
By Anthony Scales at 10:19 am, Dec 29, 2015

Release Approval Date

DATE:
Dec 29, 2015
HANFORD RELEASE

Release Stamp

Approved For Public Release

Criteria and Toxics Air Emissions Notice of Construction for the Operation of Ventilation Systems in the 241-AP, 241-SY, and 241-AY/AZ Tank Farms and Support of AY-102 Retrieval

Prepared by:
Washington River Protection Solutions, LLC

Date Published
December 2015

Prepared for:

United States Department of Energy
Office of River Protection
P.O. Box 550
Richland, Washington

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EXECUTIVE SUMMARY

This document serves as a notice of construction pursuant to the requirements of *Washington Administrative Code* 173-400, "General Regulations for Air Pollution Sources," and *Washington Administrative Code* 173-460, "Controls for New Sources of Toxic Air Pollutants," for operation of ventilation systems in the 241-SY, 241-AP, and the 241-AY/AZ Tank Farms. Operation of the ventilation systems will be for the storage, treatment, retrieval, sampling, transfers, mixing, and disposal of the waste in the tanks. This document is a modification to the original application, TOC-ENV-NOC-5241, "Criteria & Toxics Air Emissions Notice of Construction for the Operation of Ventilation Systems in the 241-AP, 241-SY, and 241-AY/AZ Tank Farms," and supports the following ventilation system operations:

- Installation of a new ventilation system in the 241-SY Farm.
- Operation of the existing ventilation system in the 241-AP Tank Farm and installation and operation of a new ventilation system.
- Operation of the existing tank farm ventilation system in the 241-AY/AZ Tank Farm.
- Operation of the annulus exhauster for tank AY-102.
- Operation of a portable exhauster to ventilate tank AY-102 during waste retrieval operations.

As operations get closer to AY-102 tank waste retrieval, updated requirements for exhauster operation during waste retrieval were identified. To support safe and efficient waste retrieval, this new application increases the maximum flow rates of the AY-102 portable exhauster and the existing 241-AP Farm exhauster, increases the estimated dimethyl mercury per tank emission rate, and increases the tank mixing factor to reflect increased emissions from waste disturbing activities.

The combined emissions from the three farm's ventilation systems for criteria pollutants were estimated to be below the regulatory exemption levels, in accordance with *Washington Administrative Code* 173-400, with the exception of nitrogen oxides and total volatile organic compounds. Emissions of toxic air pollutants for all three exhausters were analyzed and 91 toxics were found to potentially be emitted. Of the 91 toxics identified, 49 were found to be above the *Washington Administrative Code* 173-460 de minimis screening levels and 31 were found to be above the small quantity emission rate. Two toxic air pollutants, dimethyl mercury and chromium, exceed their acceptable source impact levels. However, as described in Section 9.0, the filter train abatement credit decreased the dispersed concentration of chromium to below the acceptable source impact level. Therefore, only dimethyl mercury was found to be above the acceptable source impact level. It is proposed that RPP-ENV-59016, Rev. 01, *Second Tier Review Petition for Hanford Tank Farm and Waste Treatment Plant Dimethyl Mercury Emissions*, be used to satisfy WAC 173-460-090, "Second Tier Review," requirements for dimethyl mercury for this notice of construction application.

A best available control technology for toxics evaluation was previously performed for each new primary tank farm ventilation system in this notice of construction application. For the tank farm exhausters and the portable exhauster, the best available control technology for toxics was determined to be a de-entrainer, heater, pre-filter, and two banks of nuclear grade high efficiency particulate air filters in series. The best available control technology for toxics for the AY-102 annulus exhauster was determined to be two banks of nuclear grade high efficiency particulate air filters in series.

LIST OF TERMS

AERMOD	American Meteorological Society/U.S. Environmental Protection Agency Regulatory Model
AOP	air operating permit
ASIL	acceptable source impact level
BACT	Best Available Control Technology
CAS	Chemical Abstracts Service
DOE	U.S. Department of Energy
DST	double-shell tank
Ecology	State of Washington, Department of Ecology
EPA	United States Environmental Protection Agency
EIS	environmental impact statement
HEPA	high-efficiency particulate air
HIA	Health Impact Assessment
NOC	notice of construction
NOx	nitrogen oxides
RCW	*Revised Code of Washington*
SEPA	State Environmental Policy Act
SQER	small quantity emission rate
TAP	toxic air pollutant
tBACT	Best Available Control Technology for Toxics
TWINS	Tank Waste Information Network System
VOC	volatile organic compounds
WAC	*Washington Administrative Code*
WFD	waste feed delivery
WTP	Waste Treatment and Immobilization Plant

UNITS

g/s	grams per second
gal	gallons
lb/yr	pound(s) per year
m	meter
scfm	standard cubic feet per minute
$\mu g/m^3$	microgram per cubic meter

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
U.S. Customary Units	**Multiply by**	**To get**	**U.S. Customary Units**	**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	millimeters	millimeters	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
Energy			**Energy**		
kilowatt hour	3,412	British thermal unit	British thermal unit	0.000293	kilowatt hour
kilowatt	0.948	British thermal unit per second	British thermal unit per second	1.055	kilowatt
Force/Pressure			**Force/Pressure**		
pounds per square inch	6.895	kilopascals	kilopascals	0.14504	pounds per square inch

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

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TABLE OF CONTENTS

1.0 INTRODUCTION **1**
2.0 FACILITY IDENTIFICATION AND LOCATION **2**
2.1 241-SY Tank Farm 2
2.2 241-AP Tank Farm 3
2.3 241-AY and 241-AZ Tank Farms 3
3.0 RESPONSIBLE MANAGER **13**
4.0 PROPOSED ACTION **14**
4.1 241-SY Tank Farm 14
4.2 241-AP Tank Farm 15
4.3 241-AY/AZ Tank Farms 15
5.0 STATE ENVIRONMENTAL POLICY ACT **15**
6.0 CHEMICAL AND PHYSICAL PROCESS **16**
7.0 EMISSION ESTIMATES **17**
7.1 Estimated Emissions of Criteria Pollutants 17
7.2 Estimated Emissions of Toxic Air Pollutants 18
7.3 Air Dispersion Modeling 18
7.4 Estimated Ambient Concentrations Compared to WAC 173-460-150 20
7.5 Second Tier Review – Dimethyl Mercury 20
8.0 TANK VENTILATION PROCESS AND EMISSION CONTROL SYSTEMS **21**
8.1 Applicable Supporting Documents 21
8.2 System Descriptions 22
9.0 BEST AVAILABLE CONTROL TECHNOLOGY **22**
10.0 APPLICABLE CONTROL TECHNOLOGY DRAWINGS **23**
11.0 MONITORING DURING OPERATIONS **25**
12.0 REFERENCES **26**

LIST OF APPENDICES

Appendix A Criteria and Toxic Air Pollutant Emission Rates.....A-1

Appendix B Dimethyl Mercury Baseline Sampling Results.....B-1

LIST OF FIGURES

Figure 1. The Hanford Site 5
Figure 2. Location of the 241-SY Tank Farm..... 7
Figure 3. Aerial View of 241-SY Tank Farm 8
Figure 4. Location of 241-AP Tank Farm 9
Figure 5. Aerial View of 241-AP Tank Farm 10
Figure 6. Location of 241-AY and 241-AZ Tank Farms..... 11
Figure 7. Aerial View of 241-AY, 241-AZ, and 241-AX Tank Farms 12
Figure 8. General Exhauster Layout 24

LIST OF TABLES

Table 1. Tank Farm Locations 6
Table 2. Tank Exhauster Parameters 18
Table 3. Ecology Recommended Receptor Grid Spacing 19
Table 4. Exhauster Operating Configurations 19
Table 5. Air Dispersion Factors 20
Table 6. Comparison of Modeled Dimethyl Mercury Health Impact Assessment Emissions to Notice of Construction Application Estimated Emissions..... 21

1.0 INTRODUCTION

This Notice of Construction (NOC) application is being submitted for approval in accordance with *Washington Administrative Code* (WAC) 173-400, "General Regulations for Air Pollution Sources," and WAC 173-460, "Controls for New Sources of Toxic Air Pollutants." This NOC application describes the operation of the ventilation systems in the 241-SY, 241-AP, and 241-AY/AZ Tank Farms located in the 200 West and 200 East Areas of the Hanford Site. Operation of these ventilation systems will be for the storage, treatment, retrieval, sampling, and transfer of liquid/slurry wastes contained in the 200 West and 200 East Area tanks in support of AY-102 retrieval operations, future tank operation activities, and waste feed delivery (WFD) to the Hanford Waste Treatment and Immobilization Plant (WTP).

This document is a modification to the original application, TOC-ENV-NOC-5241, "Criteria & Toxics Air Emissions Notice of Construction for the Operation of Ventilation Systems in the 241-AP, 241-SY, and 241-AY/AZ Tank Farms," and supports the following ventilation system operations:

- Installation of a new ventilation system in the 241-SY Farm.
- Operation of the existing ventilation system in the 241-AP Tank Farm and installation and operation of a new ventilation system.
- Operation of the existing tank farm ventilation system in the 241-AY/AZ Tank Farm.
- Operation of the annulus exhauster for tank AY-102.
- Operation of a portable exhauster to ventilate tank AY-102 during waste retrieval operations.

As operations get closer to AY-102 tank waste retrieval, updated requirements for exhauster operation during waste retrieval was identified. To support safe and efficient waste retrieval, this new application increases the maximum flow rates of the AY-102 portable exhauster and the existing 241-AP Farm exhauster, increases the estimated dimethyl mercury per tank farm emission rate, and increases the tank mixing factor to reflect increased emissions from waste disturbing activities.

Emissions of all criteria air pollutants and toxic air pollutants (TAP), except dimethyl mercury, were estimated on a tank farm basis based upon tank concentration headspace data from the Tank Waste Information Network (TWINS) database. Dimethyl mercury tank emission rates were estimated based on baseline sampling data at the AY/AZ exhauster (Appendix B). Due to uncertainties in waste transfers between tanks over the life of these projects, a conservative approach was taken to estimate emissions. Emissions were estimated based upon the highest per tank emission rate of each pollutant for all the tanks in both the 200 West and 200 East Areas. All of the tanks in each tank farm were then assumed to have the highest per tank emission rate for each pollutant. Finally, it was assumed that two tanks would be mixed or retrieved at any given time in each tank farm and a factor of 25 will be applied to their emissions to simulate the increased emission from mixing or retrieving. The estimated emissions assume that only two tanks are being mixed or retrieved in each tank farm for the entire year.

The emissions for criteria pollutants were estimated to be below the regulatory exemption levels with the exception of nitrogen oxides (NOx) and total volatile organic compounds (VOCs) as shown in Appendix A. Estimated NOx emissions are 7,630 lbs/year and the estimated VOC emissions are 20,132 lbs/year. Both of these levels exceed the 4,000 lb/year exemption level in WAC 173-400-110(5)(b).

A total of 91 TAPs were identified in TWINs, as defined in WAC 173-460-150, but only 49 were above the de minimis emission screening level, and 31 were above the small quantity emission rate (SQER). Two toxic air pollutants, dimethyl mercury and chromium, exceed their acceptable source impact levels (ASIL). However, as described in Section 9.0, the filter train abatement credit decreased the dispersed concentration of chromium to below the ASIL. Therefore, dimethyl mercury was the only TAP found to be above the ASIL. It is proposed that RPP-ENV-59016, "Second Tier Review Petition for Hanford Tank Farm and Waste Treatment Plant Dimethyl Mercury Emissions," be used to satisfy WAC 173-460-090, "Second Tier Review," requirements for dimethyl mercury for this notice of construction application.

The technologies considered in RPP-ENV-46679, "Evaluation of Best Available Control Technology for Toxics (tBACT) Double Shell Tank Farms Primary Ventilation Systems Supporting Waste Transfer Operations," were eliminated due to technical infeasibilities or because the costs exceeded the amounts the Washington Department of Ecology (Ecology) and the U.S. Environmental Protection Agency (EPA) considers to be economically justifiable. Based on the results of the tBACT evaluation, the proposed tBACT control technology for the double-shell tank (DST) primary ventilation systems and the portable exhauster consists of a moisture de-entrainer, pre-heater, pre-filters, and two banks of nuclear grade high efficiency particulate air (HEPA) filters in series. For the AY-102 annulus exhauster, the proposed tBACT control technology consists of a heater and two banks of nuclear grade HEPA filters in series.

2.0 FACILITY IDENTIFICATION AND LOCATION

The DST farms are located at:

U.S. Department of Energy, Office of River Protection
Hanford Site
200 East and West Area Tank Farms
Richland, WA 99352

The DSTs are located in the 200 East and 200 West Areas of the Hanford Site (See Figure 1). A brief description of each tank farm follows. Table 1 lists the locations of the tank farms.

2.1 241-SY Tank Farm

The 241-SY Tank Farm consists of three buried DSTs in the 200 West Area. The tanks each have a capacity of 1.16 million gallons. The 241-SY Tank Farm is the only DST farm in the West Area and is the transfer point between the West Area and the East Area, where waste will be treated. The 241-SY Tank Farm was placed into service in 1977. Figure 2 shows a map of

the 241-SY Tank Farm and Figure 3 is an aerial photograph of the farm. The three tanks are numbered 241-SY-101, 241-SY-102, and 241-SY-103.

Current 241-SY exhausters are assigned stack numbers 296-S-25 ("A" Train) and 296-P-23 ("B" Train) and operate alternately. They are listed in the Hanford Site Air Operating Permit (AOP) Number 00-05-006 under emission points S-296S025-001 (296-S-25) and P-296SY-001 (296-P-23).

The new assigned 241-SY exhauster stack numbers are 296-S-026 ("A" Train) and 296-S-027 ("B" Train) and will operate as one exhauster being primary and the other secondary. Only one exhauster will operate at a time. At the completion of testing, the old exhausters will be disconnected from the tank ventilation ducting, the power disconnected, and removed at a later date.

2.2 241-AP Tank Farm

The AP Tank Farm consists of eight buried DSTs in the 200 East Area. The tanks each have a capacity of 1.16 million gallons. The AP Tank Farm will be the transfer point for low activity waste from the 200 East Area to the WTP. The AP Tank Farm was placed into service in 1986. Figure 4 shows a map of the AP Tank Farm and Figure 5 is an aerial photograph of the AP Tank Farm. The tanks are numbered 241-AP-101 through 241-AP-108.

The current 241-AP exhauster is assigned stack number 296-A-40 and consists of two exhaust trains that operate alternately with a shared stack. The existing stack is listed in the AOP Number 00-05-006 under emission point P-296AP-001 (296-A-40).

The new assigned 241-AP exhauster stack numbers are 296-A-048 ("A" Train) and 296-A-049 ("B" Train) and will operate as one exhauster being primary and the other secondary. Only one exhauster will operate at a time. At the completion of testing, the old exhausters will be disconnected from the tank ventilation ducting, power disconnected, and removed at a later date.

2.3 241-AY and 241-AZ Tank Farms

The 241-AY Tank Farm and the 241-AZ Tank Farm each have two buried DSTs in the 200 East Area. The AY and AZ Tank Farms were placed into service in 1971 and 1977, respectively. A map of the AY and AZ Tank Farms is shown in Figure 6. Due to the proximity of the two tank farms, it is possible to use one exhauster system to ventilate both farms. Figure 7 shows an aerial photograph of the 241-AY, 241-AZ and nearby 241-AX Tank Farms. The tanks are numbered: 241-AY-101, 241-AY-102, 241-AZ-101, and 241-AZ-102.

The current 241-AY/AZ exhauster system consists of two exhaust trains. The stack is assigned number 296-A-42, and is listed in the AOP Number 00-05-006 under emission point P-296A042-001 (296-A-42).

The current 241-AY-102 annulus exhauster, which ventilates the space between the primary tank and the secondary containment liner, consists of one exhaust train with two banks of HEPA filters in series. Tank AY-102 has leaked from the primary tank into the secondary containment,

or tank annulus. The annulus exhauster is assigned number 296-A-19, and is listed in the AOP under emission point P-296A019-001.

Tank AY-102 is being emptied and it might be necessary to provide additional ventilation during retrieval operations. If necessary, a portable exhauster located either inside or outside of the tank farm area, will be connected to tank AY-102 to ventilate only that tank and will only be operated during retrieval activities. The portable exhauster 296-P-50 (POR 127) will be used on tank 241-AY-102 and it is listed in the AOP under emission point 296P050-001.

Figure 1. The Hanford Site

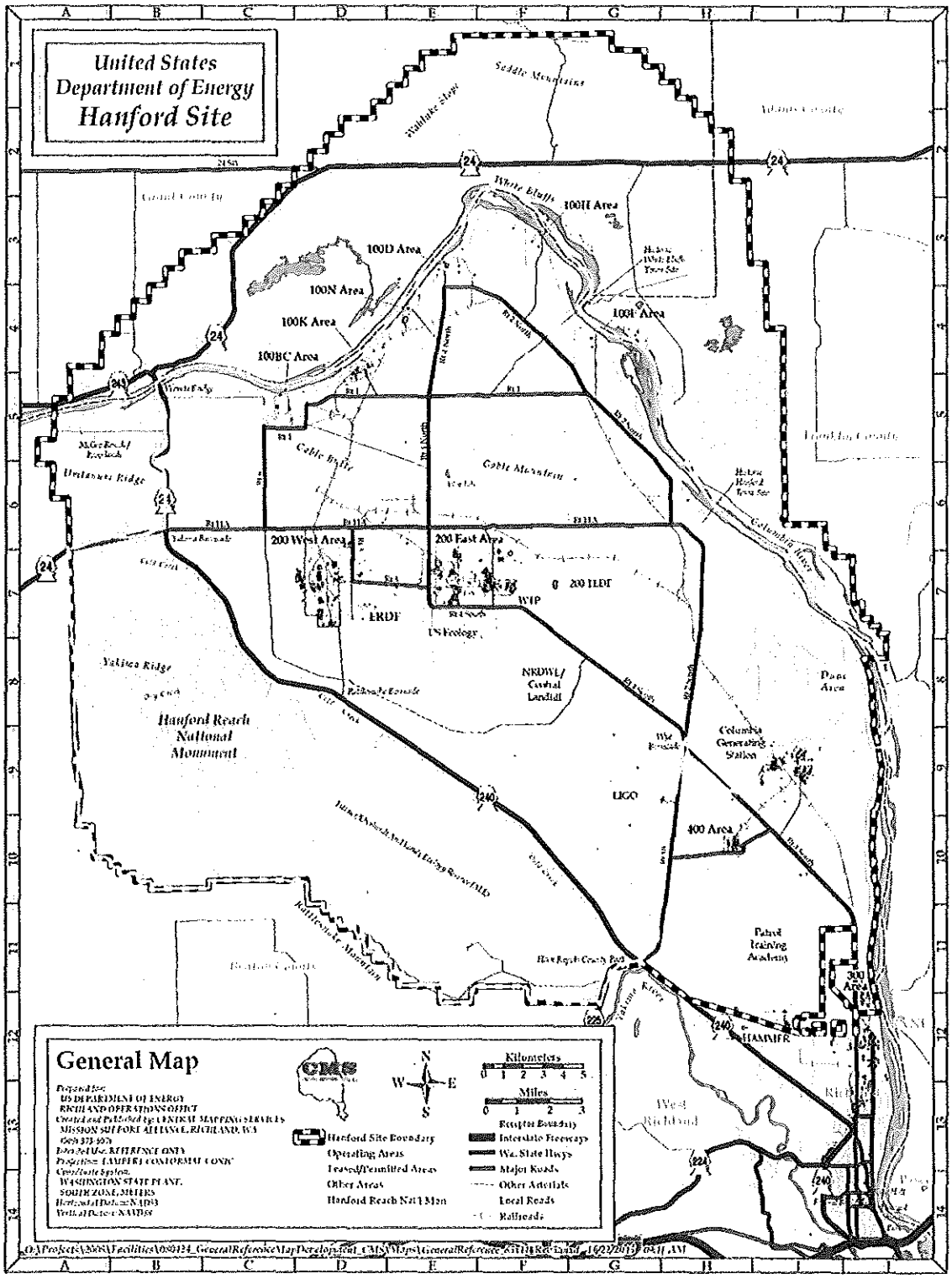


Table 1. Tank Farm Locations

Tank Farm	Latitude	Longitude
241-AP	46° 33' 07" N	119° 30' 57" W
241-SY	46° 32' 26" N	119° 37' 40" W
241-AY/AZ	46° 33' 18" N	119° 31' 03" W

Figure 2. Location of the 241-SY Tank Farm

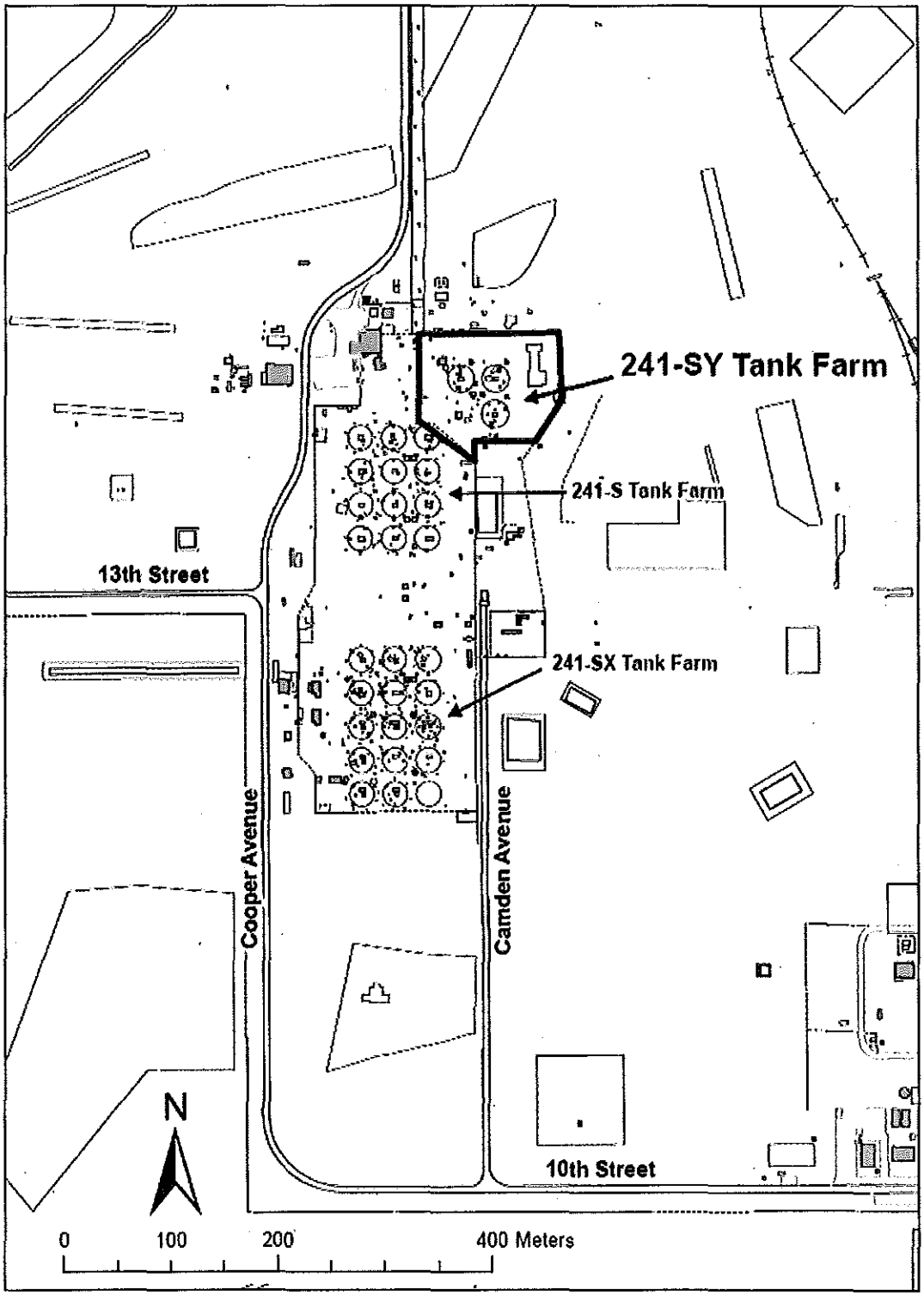


Figure 3. Aerial View of 241-SY Tank Farm

Figure 4. Location of 241-AP Tank Farm

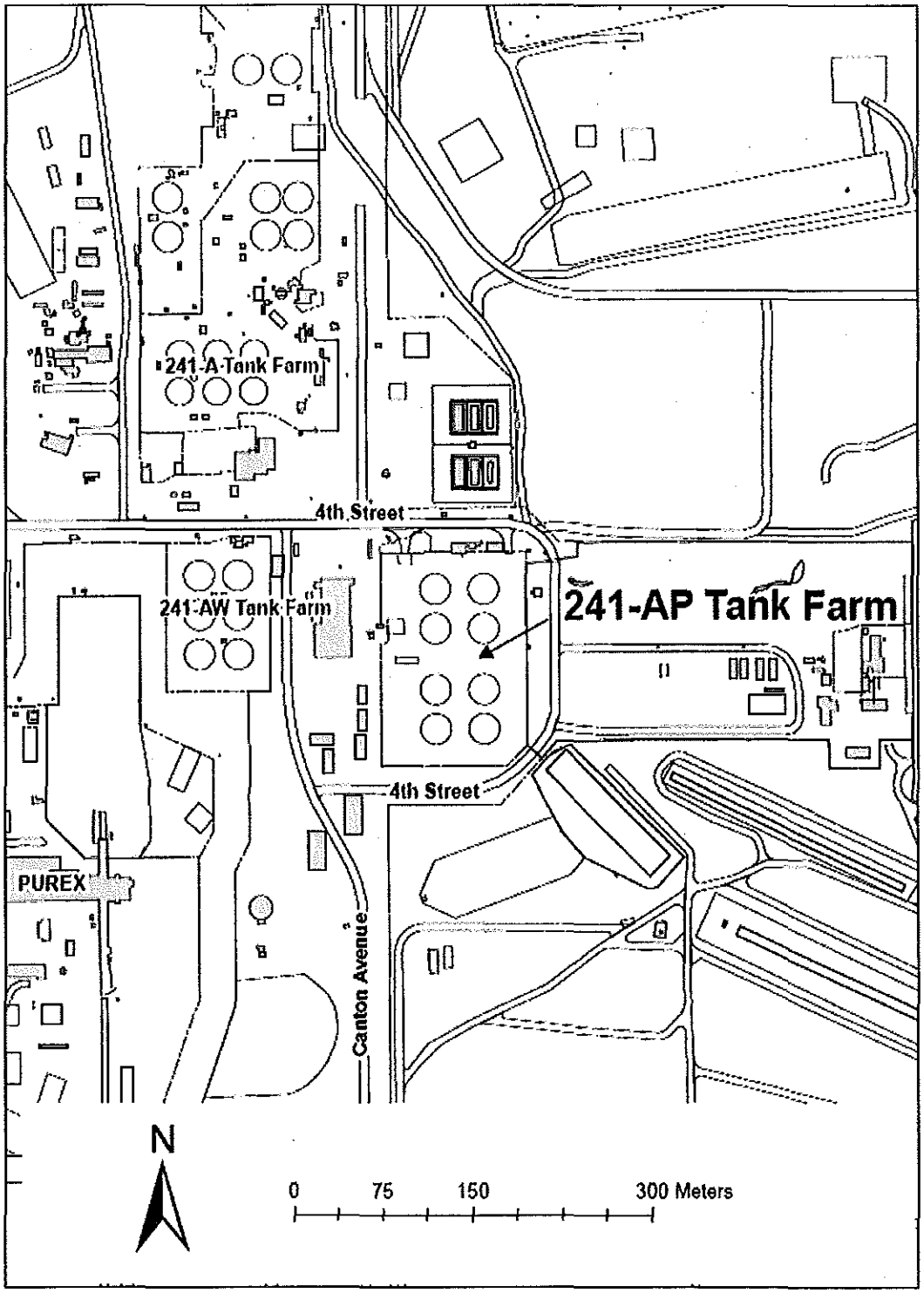


Figure 5. Aerial View of 241-AP Tank Farm

Figure 6. Location of 241-AY and 241-AZ Tank Farms

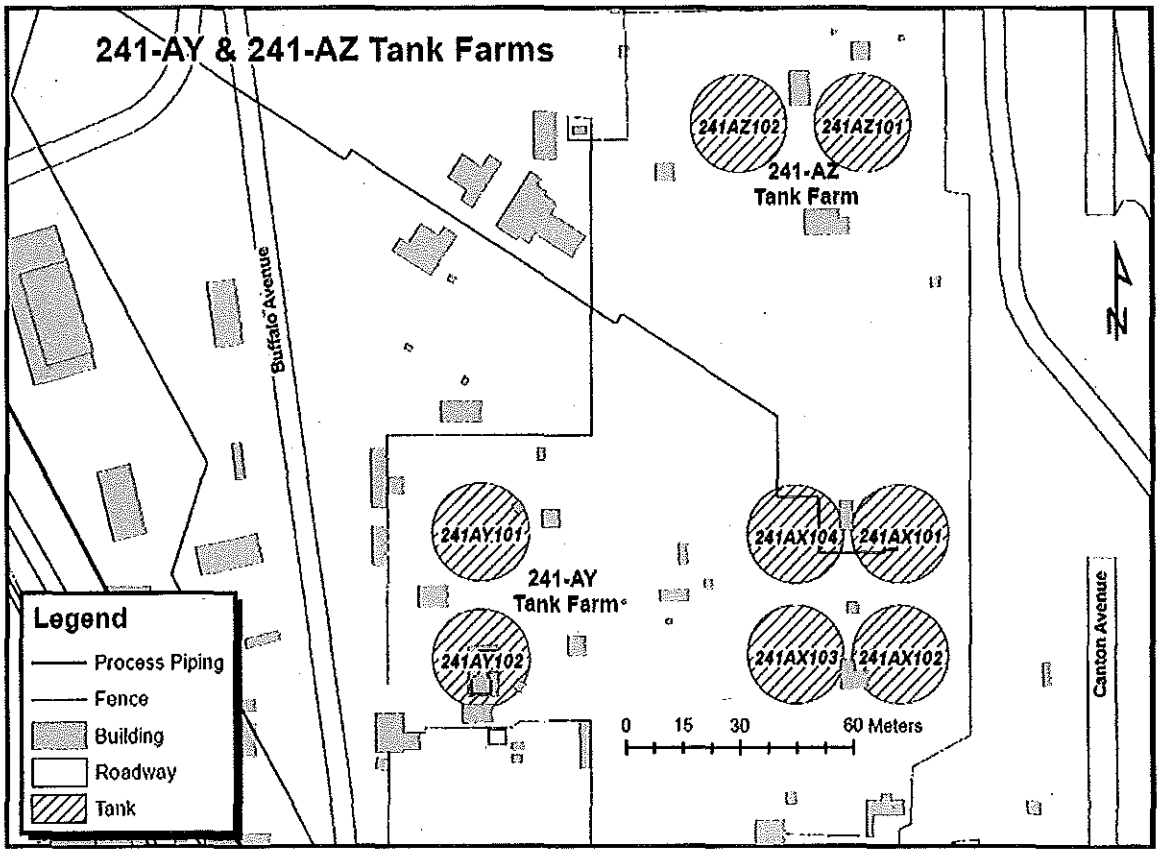


Figure 7. Aerial View of 241-AY, 241-AZ, and 241-AX Tank Farms

3.0 RESPONSIBLE MANAGER

The current responsible facility manager is:

Kevin W. Smith, Manager
U.S. Department of Energy, Office of River Protection
P.O. Box 550
Richland, Washington 99352
(509) 372-2315

4.0 PROPOSED ACTION

This NOC application is submitted for approval for:

- Installation of a new ventilation system in the 241-SY Farm (296-S-026 and 296-S-027).
- Operation of the existing ventilation system in the 241-AP Tank Farm (296-A-40) and installation and operation of a new ventilation system (296-A-48 and 296-A-49).
- Operation of the existing tank farm ventilation system in the 241-AY/AZ Tank Farm (296-A-42).
- Operation of the annulus exhauster for tank 241-AY-102 (296-A-19).
- Operation of a portable exhauster to ventilate tank 241-AY-102 during waste retrieval operations (296-P-50).

Approval of the installation and operation of the above ventilation systems will support the following:

- Operations for waste storage, treatment, retrieval, sampling, and transfers of the waste to the WTP.
- Increased air flow rates for AY-102 portable and 241-AP existing exhausters: the thermal hydraulic analysis of the WFD process determined that increased air flow rates were necessary to assure the tanks are maintained within operating temperature limits.
- The AY-102 tank is being pumped out due to loss of containment in the primary tank. The waste will be transferred from AY-102 to the 241-AP Tank Farm. A portable exhauster may be required for additional ventilation during retrieval of tank AY-102.

The activities proposed with this NOC revision will increase emissions during retrieval and WFD activities.

4.1 241-SY Tank Farm

The activities proposed in this NOC for the 241-SY Tank Farm include:

- Site preparation for the new exhauster skids.
- Isolation and removal of the existing exhausters.
- Installation of the new exhausters.
- Operation of one exhaust fan and train with a flow rate of 1,360 standard cubic feet per minute (scfm) for storage operations and most retrieval and sampling activities.
- Operation of one exhaust fan and train with a maximum flow rate of up to 2,500 scfm for WFD and retrieval operations.

The planned schedule for the installation of the 241-SY exhauster is 2017. The design life of the SY exhauster is 40 years.

4.2 241-AP Tank Farm

The activities proposed in this NOC for the 241-AP Tank Farm include:

- Operation of the existing ventilation system (296-A-40) with a flow rate of 1,170 scfm.
- Site preparation for the new exhauster skids.
- Isolation and removal of the existing exhausters.
- Installation of the new exhausters.
- Operation of the new exhausters with one exhaust fan and train with a flow rate of 1,500 scfm for storage, operations, and most retrieval and sampling activities. Exhausters will not operate concurrently.
- Operation of the new exhausters with one exhaust fan and train with a maximum flow rate of up to 3,000 scfm for retrieval and WFD.

The planned startup for the operation of the new 241-AP exhausters is scheduled for 2016. The design life of the new AP exhausters is 40 years.

4.3 241-AY/AZ Tank Farms

The activities proposed in this NOC for the 241-AY/AZ Tank Farm include:

- Operation of the 241-AY/AZ exhauster with a flow rate of 1,000 scfm.
- Operation of the AY-102 annulus exhauster with a flow rate of 3,800 scfm.
- Operation of a portable exhauster for waste retrieval operations with a flow rate of 3,000 scfm.

The start of operation of the portable exhauster for AY-102 retrieval is scheduled for 2016.

5.0 STATE ENVIRONMENTAL POLICY ACT

This project fulfills the requirements of WAC 197-11 and Revised Code of Washington (RCW) 43.21C.030(2)(C), "Guidelines for state agencies, local governments – Statements –Reports – Advice –Information," per RCW 43.21C.150, "RCW 43.21C.030(2)(c) inapplicable when statement previously prepared pursuant to national environmental policy act." which states, "*The requirements of RCW 43.21C.030(2)(c) pertaining to the preparation of a detailed statement by branches of government shall not apply when an adequate detailed statement has been previously prepared pursuant to the national environmental policy act of 1969, in which event said prepared statement may be utilized in lieu of a separately prepared statement under RCW 43.21C.030(2)(c).*" The document that meets the agencies review needs for the current proposal is:

DOE/EIS-0391, "Final Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington," Volume 2, Book 2, Appendix E.1.1.1, Operations and Maintenance.

The lead agency is the Office of River Protection, U.S. Department of Energy and the contact person is Mary Beth Burandt, Document Manager and her phone number is (509) 372-8828.

6.0 CHEMICAL AND PHYSICAL PROCESS

The 241-SY, 241-AP, and 241-AY/AZ Tank Farms all contain DSTs. The inner shell of each DST is constructed from heat-treated, stress-relieved steel, and the outer shell is constructed of non-stress-relieved steel. The inner tank where the waste is stored is 75 feet in diameter and is approximately 47 feet high at the crown. The two shells are separated by a 2.5-foot annulus, and both shells are contained within a concrete encasement.

Waste stored in the tanks consists of hazardous chemicals regulated under the Resource Conservation and Recovery Act of 1976 and radioactive isotopes regulated under the Atomic Energy Act of 1954. The DSTs are currently used to store waste. In the future, the DSTs will be used to treat and transfer waste to the WTP. The tanks contain mixed waste in the form of liquids and suspended or settled solids. Gases are generated by the reaction of radioactive and hazardous chemicals in the tanks. The contents of the tanks may be mixed periodically to entrain the solids. During storage activities, retrieval, and mixing, the ventilation system maintains the headspace in each tank below atmospheric pressure for containment of radioactive particulates.

The ventilation systems contain the radioactive particulates present in the tank headspace, and remove heat and the flammable gases and vapors that evolve from the liquid surface. The ventilation systems operate by drawing outside air into the headspace. The air is drawn out of the tanks via a riser into a common ventilation header. The header is then connected to the exhauster. See Section 7 for a discussion of the exhauster process and abatement systems.

During storage operations, the tank waste is quiescent. Retrieval of wastes from tanks will involve periodic transfers of waste between tanks. Supernatant from DSTs might be used to help mobilize sludge in the DSTs or SSTs, and the resulting waste will be transferred back to the DSTs. Waste will also be transferred between and among tanks for space management. In the 200 East Area, waste will also be transferred between tanks to reach the 242-A Evaporator for volume reduction. Periodic sampling will also occur. The 241-SY Tank Farm will receive waste transfers from the 222-S Laboratory.

For waste transfer operations, a maximum of two mixer pumps and a transfer pump will be installed in each of two tanks in a farm. Waste transfers and testing will occur prior to WTP operation. The mixer pumps will be run to ensure that the waste is a homogeneous mixture for sampling and delivery to the WTP. Mixer pumps are operated in a batch mode as needed to maintain waste uniformity during staging and to mix the waste for a period of time before and during transfer. As required by operational directives, mixer pumps will be operated until waste samples verify that adequate mixing has occurred. Waste samples will be collected periodically. If dilution or conditioning is needed, the pH and temperature of the diluents will be adjusted by means of a caustic supply system.

The contents in each tank could be mixed periodically to control gas entrapment in the settled solids, to control temperature, to perform chemical treatment, or for waste retrieval. Contained

solids are mobilized as part of the hydraulic action of the mixer pumps or by using air lift circulators in each of the tanks. Mobilization of solids normally occurs in a single tank at a time. During mixing and storage, the ventilation system will maintain the headspace below atmospheric pressure.

7.0 EMISSION ESTIMATES

SVF-1821, "Non-Radiological Air Source Term for 241-SY Farm and 241-AP Farm Primary Ventilation System," was used as a basis for estimating criteria and toxic air pollutants emissions and were estimated and reported on a per tank basis and a maximum tank farm basis. SVF-1821 calculates the maximum emissions for each TAP from all tanks, thus bounding the 241-AY/AZ exhauster emissions. For this analysis, with the exception of dimethyl mercury, the per tank emission rate from SVF-1821 was used to calculate the per tank farm emission rate for 241-SY, 241-AP, and 241-AY/AZ Tank Farms. Assumptions made for the evaluation were:

1. When the maximum value in the TWINS database is the measurement detection limit, that value is assumed to be the reported value.
2. Measurements were made over a quiescent waste and passively ventilated for all SSTs and actively ventilated DSTs. A constant emission rate was assumed as long as the tank waste remained quiescent.
3. SSTs were passively ventilated during measurements and each DST ventilation system was assumed to have a flow rate for each tank of 1,000 scfm divided by the number of tanks in the tank farm.
4. It was assumed that the headspace concentrations increased by a factor of 25 during waste disturbing activities.
5. No more than two tanks in a tank farm will have waste disturbing activities occurring simultaneously.
6. The emission rate from the highest tank for each TAP is contained in all tanks in the DST tank farm.
7. The dimethyl mercury per tank emission rate was assumed at the baseline dimethyl mercury emission rate (Appendix B).

The unabated emissions of criteria and toxic pollutants from the 241-SY, 241-AP and 241-AY/AZ exhausters were estimated based upon measured headspace concentrations in the TWINS database. This database was searched for regulated criteria pollutants by the Chemical Abstracts Service (CAS) number for all tanks. Because waste transfers will occur between tanks during the lifetimes of the exhausters, the highest emission rate per tank was calculated. The maximum per tank emission rate was used for each farm, assuming that two of the tanks will be simultaneously mixed in each farm.

7.1 Estimated Emissions of Criteria Pollutants

The annual emissions of criteria pollutants are shown in Table A-1 in Appendix A. Only NOx and VOCs were above the de minimis annual emission limit of 4,000 lbs/year. Nitrogen oxides had an annual emission rate of 7,630 lbs/year while volatile organic compound emissions were estimated to be 20,100 lbs/year.

7.2 Estimated Emissions of Toxic Air Pollutants

The emissions of TAPs are shown in Table A-2 in Appendix A. Ninety-one TAPs were identified in the tank headspace. Of these, only 49 had emissions above the de minimis emission threshold in WAC 173-460-150. Only 31 TAPs had emission rates above the SQER emission thresholds. Two toxic air pollutants, dimethyl mercury and chromium, exceed their acceptable source impact levels (ASIL). However, as described in Section 9.0, the filter train abatement credit decreased the dispersed concentration of chromium to below the ASIL. Therefore, dimethyl mercury was the only TAP found to be above the ASIL. RPP-ENV-59016 is proposed to satisfy second tier review requirements for dimethyl mercury per WAC 173-460-090 (see Section 7.5).

7.3 Air Dispersion Modeling

Ambient air concentrations at the Hanford Site boundary were estimated using the EPA American Meteorological Society/U.S. Environmental Protection Agency Regulatory Model (AERMOD) dispersion model, Version 15181. EPA-454/B-03-001, *User's Guide for the AMS/EPS Regulatory Model – AERMOD*, was used as modeling guidance.

The model inputs included the physical parameters of each stack (Table 2):

Table 2. Tank Exhauster Parameters

	241-SY (New)	241-AP (Existing)	241-AP (New)	241-AY/AZ (Existing)	AY-102 Annulus	AY-102 Portable
Stack Height (ft)	40	19.6	40	55	12.9	50
Maximum Flow Rate (scfm)	2,500	1,170	3,000	1,000	3,800	3,000

The public access points to the site were used as the site boundaries. The surface meteorological inputs were from the Hanford Meteorological Station and the upper air data was obtained from the Spokane, Washington, National Weather Service for the years 2009 through 2013. Digital elevation model data from the U.S. Geological Survey was used for model terrain input. The regulatory default mode was used. Based upon Ecology's 08-02-025, "Guidance Document: First, Second, and Third Tier Review of Toxic Pollution Source," Table 3 indicates the receptor grid spacing.

Table 3. Ecology Recommended Receptor Grid Spacing

Distance from Source (m)	Grid Spacing (m)
0 – 350	10
350 – 800	25
800 – 4,000	50
4,000 – 8,000	100
8,000-30,000	200

Due to this application covering multiple possible exhauster operating configurations, multiple runs of AERMOD were performed to estimate the most conservative modeling estimate, and thus produce an overly conservative dispersed concentration. Table 4 details the four operating configurations or "cases."

Table 4. Exhauster Operating Configurations

	Case 1	Case 2	Case 3	Case 4
241-AY/AZ	Operating	Operating	Operating	Operating
AY-102 Annulus	Operating	Operating	Operating	Operating
AY-102 Portable	Not Operating	Not Operating	Operating	Operating
241-AP (Existing)	Operating	Not Operating	Operating	Not Operating
241-AP (New)	Not Operating	Operating	Not Operating	Operating

The new exhausters were also assumed to be operating during mixing or retrieval operations for the entire year to ensure that the worst case situation was modeled.

A total unitary emission rate for all exhausters of 1 gram per second (g/s) was used based upon the ratio of the emission factors per tank farm to the total of the three exhausters' emissions. This method allowed for the actual exhaust rate for each TAP from all the exhausters to be multiplied by the conversion factor to achieve the dispersed concentration. The 241-SY Tank Farm had an emission factor of 51, two tanks being mixed or retrieved and one quiescent. The 241-AP Tank Farm had an emission factor of 56, two tanks mixed or retrieved and 6 tanks quiescent. The 241-AY/AZ Tank Farm had an emission factor of 52, two tanks mixed or retrieved and two tanks quiescent. The annulus had an emission rate of 0.00319 g/s based upon the tank waste being 1% of the total farm emissions. The emission factor for the 241-SY Tank Farm was 0.304 g/s (51/159). The 241-AP Tank Farm the emission factor was 0.377 g/s (56/159). The total 241-AY/AZ Tank Farm emission factor was 0.319 g/s (52/159).

Table 5 shows the most conservative dispersion factors for all four cases listed in Table 4 and the associated case and year.

Table 5. Air Dispersion Factors

Averaging Period / Case #	µg/m³ per g/s
1-hour (Case 4-2012)	18.68
24-hour (Case 1-2013)	1.46
Annual (Case 1-2013)	.075

The air dispersion factors, based upon the specific TAP averaging period, were multiplied by the total emission rate in g/s for the three tank farm exhausters to calculate the ambient air or "dispersed" concentrations shown in Table A-2.

7.4 Estimated Ambient Concentrations Compared to WAC 173-460-150

The results of the emissions and modeling are shown in Table A-2 in Appendix A. Two toxic air pollutants, dimethyl mercury and chromium, exceed their acceptable source impact levels (ASIL). However, as described in Section 9.0, the filter train abatement credit decreased the dispersed concentration of chromium to below the ASIL. Therefore, dimethyl mercury was the only TAP found to be above the WAC 173-460-150 ASIL limits. The dispersed dimethyl mercury concentration was modeled to be 2.47E-05 microgram per cubic meter (µg/m^3). The WAC 173-460-150 ASIL value for dimethyl mercury is 1E-99 µg/m^3. Therefore, the dimethyl mercury dispersed concentration exceeds the ASIL value. Section 7.5 proposes using RPP-ENV-59016 to satisfy second tier review requirements for dimethyl mercury.

7.5 Second Tier Review – Dimethyl Mercury

Pursuant to WAC 173-460-090, "Second Tier Review," if any expected toxic air pollutant is modeled to exceed the ASIL for a new or modified source, a second tier review, or health impact assessment (HIA), must be performed for that pollutant to demonstrate that the potential emissions do not present an unacceptable health risk to members of the public. Consistent with previous Hanford Site NOC applications, dimethyl mercury emissions are above the ASIL for the proposed modification described in this NOC (Appendix A, Table A-2).

RPP-ENV-59016 (currently being reviewed by Ecology) is a "bounding" dimethyl mercury second tier review document prepared in coordination with Ecology staff to satisfy WAC 173-460-090 requirements for future Hanford Site NOC applications. The emissions scenario described in the bounding HIA reflects a hypothetical situation where conservatively (over) estimated emissions are simultaneously emitted from numerous representative and key Hanford Site sources across the Tank Farms and WTP areas.

It is proposed that RPP-ENV-59016 be used to satisfy WAC 173-460-090 requirements for this NOC application. For this particular proposed activity, because the sources in question for

approval order DE11NWP-001 happen to correlate directly with representative sources modeled for RPP-ENV-59016, a direct comparison of the proposed estimated emissions with those modeled in the bounding HIA should be sufficient to accomplish this purpose (Table 6).

Table 6. Comparison of Modeled Dimethyl Mercury Health Impact Assessment Emissions to Notice of Construction Application Estimated Emissions

	RPP-ENV-59016, Dimethyl Mercury Health Impact Assessment	TOC-ENV-NOC-5251, Rev 00 (Current NOC Application)
SY Tank Farm (g/s)	6.09E-06	5.44E-06
AP Tank Farm (g/s)	6.39E-06	5.97E-06
AY/AZ Tank Farm (g/s)	6.15E-06	5.54E-06

1. The estimated dimethyl mercury emissions for this NOC application, as shown in Table 6, are derived as explained in Section 7.3. As shown in Table 6, the estimated dimethyl mercury emission rate for each impacted tank farm do not exceed the modeled emission rates used in RPP-ENV-59016.
2. The air dispersion screening model for this NOC application did not identify any other TAP as exceeding its ASIL. Calculated dispersed concentration values for each TAP are in Appendix A, Table A-2.
3. The tank farm emission factors used to estimate potential tank mixing emissions, as explained in Section 7.3, did not cause any additional neurotoxins similar to dimethyl mercury to exceed their respective SQER. Therefore, all neurotoxins of concern, as related to the health impacts of dimethyl mercury, are adequately addressed in RPP-ENV-59016.

8.0 TANK VENTILATION PROCESS AND EMISSION CONTROL SYSTEMS

8.1 Applicable Supporting Documents

The abatement technology for the new systems in 241-SY and 241-AP Tank Farms are described in RPP-SPEC-42594, "Procurement Specification SY/AP Primary Exhauster Skid For Waste Tank Ventilation." The abatement technology for the current system in the 241-AP Tank Farm is described in RPP-15124, "System Design Description for AP Tank Farm Ventilation Tank Primary System." The abatement technology for the current primary system in the AY/AZ Tank Farm is described in RPP-15127, "System Design Description for AY/AZ Tank Farm Ventilation Tank Primary System and Associated Cooling Water Systems." The abatement technology for the AY-102 annulus exhauster is described in RPP-15128, "System Design Description for AY/AZ Tank Farm Annulus Ventilation Systems (DSA Based)."

8.2 System Descriptions

The ventilation systems remove particulates and moisture, collect condensate, and reduce relative humidity in the exhaust stream. Inlet air for the tanks is primarily provided through inlet air filters, along with air infiltration through process pits and tank risers. Air flows from the tank to a common header. The major components of DST primary ventilation systems are:

- De-entrainer
- Heater
- Pre-filter
- Two HEPA filter banks in series
- Fans
- Exhaust stack
- Monitoring and control instruments and equipment.

The air from the common header passes through a de-entrainer to remove large water droplets. The air next passes through a heater to lower the relative humidity, and then through a pre-filter to remove large particles. The de-entrainers and heaters help protect the HEPA filter media from wetting, which could lead to wicking of contamination, plugging of a filter, or wetting of the exhaust system sample system filter and sample media. The air next passes through two nuclear grade HEPA filters that are rated to remove particles as small as 0.3 μm in diameter with a rated efficiency of no less than 99.97%. The monitoring and control instrumentation ensures that the pressure drop across the HEPA filters is within tolerances. The primary ventilation system will collect all condensate and return it to a designated DST.

Due to the low emissions, the AY-102 annulus exhauster only has two banks of HEPA filters in series, a fan, exhaust stack, and monitoring and control instrumentation.

9.0 BEST AVAILABLE CONTROL TECHNOLOGY

Pursuant to WAC 173-400-113(2), an analysis of Best Available Control Technology (BACT) for emissions of criteria pollutants was performed as well as a tBACT analysis pursuant to WAC 173-460-060(2) for toxics. RPP-ENV-46679 serves as the tBACT analysis for this NOC application. The tBACT was based upon emissions from the 241-AP Tank Farm and is bounding for the other tank farms.

The tBACT analysis was performed using the "top-down" approach established for BACT. The approach consists of the following steps:

1. Identify all control technologies.
2. Eliminate technically infeasible options.
3. Rank remaining control technologies by control effectiveness.
4. Evaluate most effective controls and document results.
5. Select BACT.

Toxics with similar chemical and physical properties were grouped together with the assumption that similar control technologies would be effective. The four groups identified were:

- Ammonia
- Toxic organic compounds
- Mercury and mercury related compounds
- Particulate metal compounds.

A detailed evaluation of the emission control technologies was performed. After an effectiveness analysis, a cost per ton of pollutant removed was calculated. Most of the costs per ton exceeded the cost ceiling estimates guidelines previously approved by Ecology and EPA as economically justifiable. Due to the low emission rates, the cost per ton to remove the pollutants becomes prohibitively expensive.

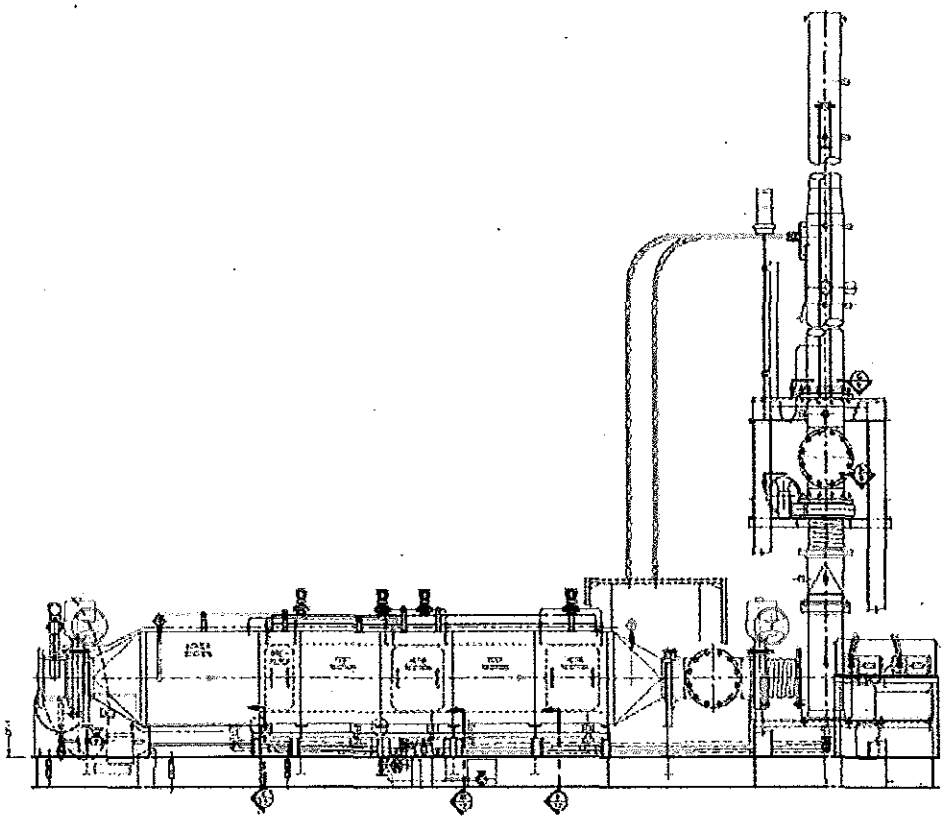
Based upon the results of this tBACT, the proposed tBACT control technology for the DST primary ventilation system consists of a moisture de-entrainer, heater, pre-filter, and two banks of nuclear grade HEPA filters in series. The proposed tBACT for the annulus is two banks of nuclear grade HEPA filters in series.

The unabated dispersed concentration of Chromium Hexavalent: Soluble, except Chromic Trioxide (CAS# 7440-47-3) is calculated at 1.75E-05 $\mu g/m^3$. The WAC 173-460-150 ASIL level for this compound is 0.00000667 $\mu g/m^3$. Therefore, the emission rate is projected to produce a dispersed concentration greater than the ASIL at the receptor. As described in Section 8.1, Best Available Control Technology, and RPP-ENV-46679, Rev. 1, emission control technology options for particulate metal compounds was evaluated. A control technology consisting of prefilters, mist eliminators, and dual HEPA filters provides a 99.99% mass based removal of metal aerosols. In order to decrease the expected dispersed concentration and provide a more accurate concentration, a 99.99% removal efficiency based on filter train control technology was applied. The abated dispersed concentration of Chromium Hexavalent: Soluble, except Chromic Trioxide (CAS# 7440-47-3) is calculated at 8.73E-09 $\mu g/m^3$. The abated dispersed concentration is below the ASIL, and therefore does not need further evaluation as required by WAC 173-460-150.

10.0 APPLICABLE CONTROL TECHNOLOGY DRAWINGS

Figure 8 shows a general tank farm exhauster design. The design includes a de-entrainer, heater, pre-filter, and two banks of nuclear grade HEPA filters in series and exhaust stack.

Figure 8. General Exhauster Layout



11.0 MONITORING DURING OPERATIONS

Annual sampling is proposed for:

1. NOx and VOCs emissions that are estimated to be above the SQERs.
2. The three TAPs closest to their respective ASIL values.
3. Dimethyl mercury because it is above the ASIL.

12.0 REFERENCES

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

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EPA-454/B-03-001, 2004, User's Guide for the AMS/EPS Regulatory Model – AERMOD, U.S. Environmental Protection Agency, Research Triangle Park, North Carolina.

DOE/EIS-0391, 2012, "Tank Closure and Waste Management Environmental Impact Statement for the Hanford Site, Richland, Washington," Volume 2, Book 2, Appendix E.1.1.1.2., Operations and Maintenance, U.S. Department of Energy, Office of River Protection, Richland, Washington.

42 USC 2011, *Atomic Energy Act of 1954*, et seq.

42 USC 4321, *National Environmental Policy Act of 1969*, et seq.

RCW 43.21C, "State Environmental Policy Act," *Revised Code of Washington*, as amended.

RPP-1-2735, "Tank Farm Source Term Document Corrections," Rev. 0A. CH2MHill Hanford Group, Inc., Richland, Washington.

RPP-15124, "System Design Description for AP Tank Farm Ventilation Tank Primary System," Rev. 3, Washington River Protection Solutions, Richland, Washington.

RPP-15127, "System Design Description for AY/AZ Tank Farm Ventilation Tank Primary System and Associated Cooling Water Systems," Rev. 4, Washington River Protection Solutions, Richland, Washington.

RPP-15128, "System Design Description for AY/AZ Tank Farm Annulus Ventilation Systems (DSA Based)," Rev. 2, Washington River Protection Solutions, Richland, Washington.

RPP-ENV-46679, "Evaluation of Best Available Control Technology for Toxics (tBACT) Double Shell Tank Farms Primary Ventilation Systems Supporting Waste Transfer Operations," Washington River Protection Solutions, LLC, Richland, Washington.

RPP-ENV-59016, 2015, "Second Tier Review Petition for Hanford Tank Farm and Waste Treatment Plant Dimethyl Mercury Emissions," Rev. 01, Washington River Protection Solutions, LLC., Richland, Washington.

RPP-SPEC-42594, 2010, "Procurement Specification SY/AP Primary Exhauster Skid For Waste Tank Ventilation," Rev. 4, Washington River Protection Solutions, LLC., Richland, Washington.

SVF-1821, "Non-Radiological Air Source Term for 241-SY Farm and 241-AP Farm Primary Ventilation System," Rev. 1, Washington River Protection Solutions, LLC., Richland, Washington.

WAC 173-400, "General Regulations for Air Pollution Sources," *Washington Administrative Code*, as amended.

WAC 173-460, "Controls for New Sources of Toxic Air Pollutants," *Washington Administrative Code*, as amended.

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

Appendix A

Criteria and Toxic Air Pollutant Emission Rates

Table A-1 Criteria Pollutants Emission Rates and Comparison to De Minimis Levels

Compound	CAS #	Averaging Period	Emission Rate (g/s)	Emission Rate (lbs/year)	De Minimis (lbs/year)	Above De Minimis?
Nitrogen oxides	10102-44-0	Year	1.59E-03	7,630	4,000	Yes
VOCs	Various	Year	4.20E-03	20,132	4,000	Yes
SOx (Sulfur oxides)	7446-09-05	Year	3.52E-06	17	4,000	No
Lead	7439-92-1	Year	9.50E-07	5	10	No
Carbon monoxide	630-08-0	Year	5.40E-04	2,592	10,000	No

Table A-2 Toxic Air Pollutant Emission Rates and Comparison to the WAC 173-460-150 de minimis, SQER, and ASIL Levels

Chemical ID	Compound	Averaging Period	ASIL (µg/m³)	SQER (lbs/ averaging period)	De Minimis (lbs/ averaging period)	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	AY/AZ Tank Farm (g/s)	SY Tank Farm (g/s)	Total – 3 Tank Farms (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (µg/m³)	Above ASIL?	Above SQER?	Above De Minimis?
71-55-6	1,1,1-Trichloroethane	24-hr	1000	131	6.57	9.77E-07	5.47E-05	5.08E-05	4.98E-05	1.55E-04	2.96E-02	2.27E-04	No	No	No
79-34-5	1,1,2,2-Tetrachloroethane	Year	0.0172	3.3	0.165	1.08E-05	6.04E-04	5.61E-04	5.50E-04	1.72E-03	1.19E+02	1.29E-04	No	Yes	Yes
79-00-5	1,1,2-Trichloroethane	Year	0.0625	12	0.6	8.57E-06	4.80E-04	4.46E-04	4.37E-04	1.36E-03	9.48E+01	1.03E-04	No	Yes	Yes
75-34-3	1,1-Dichloroethane	Year	0.625	120	6	3.94E-07	2.21E-05	2.05E-05	2.01E-05	6.27E-05	4.36E+00	4.73E-06	No	No	No
75-35-4	1,1-Dichloroethylene	24-hr	200	26.3	1.31	4.53E-05	2.54E-03	2.36E-03	2.31E-03	7.20E-03	1.37E+00	1.05E-02	No	No	Yes
57-14-7	1,1-Dimethylhydrazine	24-hr	0.5	0.0657	0.00329	2.52E-08	1.41E-06	1.31E-06	1.29E-06	4.01E-06	7.65E-04	5.86E-06	No	No	No
106-93-4	1,2-Dibromoethane	Year	0.0141	2.71	0.135	1.15E-06	6.47E-05	6.01E-05	5.89E-05	1.84E-04	1.28E+01	1.38E-05	No	Yes	Yes
107-06-2	1,2-Dichloroethane	Year	0.0385	7.39	0.369	2.36E-05	1.32E-03	1.23E-03	1.20E-03	3.75E-03	2.61E+02	2.83E-04	No	Yes	Yes
78-87-5	1,2-Dichloropropane	Year	0.1	19.2	0.959	6.93E-07	3.88E-05	3.60E-05	3.53E-05	1.10E-04	7.66E+00	8.31E-06	No	No	Yes
106-88-7	1,2-Epoxybutane	24-hr	20	2.63	0.131	5.85E-07	3.28E-05	3.04E-05	2.98E-05	9.30E-05	1.77E-02	1.36E-04	No	No	No
106-99-0	1,3-Butadiene	Year	0.00588	1.13	0.0564	2.89E-06	1.62E-04	1.50E-04	1.47E-04	4.59E-04	3.19E+01	3.46E-05	No	Yes	Yes
106-46-7	1,4-Dichlorobenzene	Year	0.0909	17.4	0.872	9.00E-07	5.04E-05	4.68E-05	4.59E-05	1.43E-04	9.95E+00	1.08E-05	No	No	Yes
123-91-1	1,4-Dioxane	Year	0.13	24.9	1.25	1.02E-05	5.70E-04	5.29E-04	5.19E-04	1.62E-03	1.13E+02	1.22E-04	No	Yes	Yes
75-68-3	1-Chloro-1,1-difluoroethane	24-hr	50000	6570	329	1.57E-05	8.79E-04	8.16E-04	8.00E-04	2.50E-03	4.75E-01	3.64E-03	No	No	No
95-48-7M	2-Methylphenol	24-hr	600	78.9	3.94	4.12E-07	2.31E-05	2.14E-05	2.10E-05	6.56E-05	1.25E-02	9.57E-05	No	No	No
79-46-9M	2-Nitropropane	24-hr	20	2.63	0.131	2.77E-06	1.55E-04	1.44E-04	1.42E-04	4.41E-04	8.40E-02	6.44E-04	No	No	No
108-39-4	3-Methylphenol	24-hr	600	78.9	3.94	6.87E-08	3.85E-06	3.57E-06	3.50E-06	1.09E-05	2.08E-03	1.59E-05	No	No	No
75-07-0	Acetaldehyde	Year	0.37	71	3.55	5.95E-05	3.33E-03	3.09E-03	3.03E-03	9.45E-03	6.57E+02	7.13E-04	No	Yes	Yes
60-35-5	Acetamide	Year	0.05	9.59	0.48	8.77E-08	4.91E-06	4.56E-06	4.47E-06	1.40E-05	9.70E-01	1.05E-06	No	No	Yes
75-05-8	Acetonitrile	Year	60	11500	576	5.55E-05	3.11E-03	2.88E-03	2.83E-03	8.82E-03	6.13E+02	6.65E-04	No	No	Yes
107-02-8	Acrolein	24-hr	0.06	0.00789	0.000394	4.32E-08	2.42E-06	2.25E-06	2.20E-06	6.87E-06	1.31E-03	1.00E-05	No	No	Yes
79-10-7	Acrylic Acid	24-hr	1	0.131	0.00657	9.44E-06	5.29E-04	4.91E-04	4.81E-04	1.50E-03	2.86E-01	2.19E-03	No	Yes	Yes
107-13-1M	Acrylonitrile	Year	0.00345	0.662	0.0331	1.78E-07	9.99E-06	9.28E-06	9.10E-06	2.84E-05	1.97E+00	2.14E-06	No	Yes	Yes

Table A-2 Toxic Air Pollutant Emission Rates and Comparison to the WAC 173-460-150 de minimis, SQER, and ASIL Levels

Chemical ID	Compound	Averaging Period	ASIL (µg/m³)	SQER (lbs/ averaging period)	De Minimis (lbs/ averaging period)	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	AY/AZ Tank Farm (g/s)	SY Tank Farm (g/s)	Total – 3 Tank Farms (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (µg/m³)	Above ASIL?	Above SQER?	Above De Minimis?
107-05-1	Allyl Chloride	Year	0.167	32	1.6	1.48E-07	8.27E-06	7.68E-06	7.53E-06	2.35E-05	1.63E+00	1.77E-06	No	No	Yes
7664-41-7	Ammonia	24-hr	70.8	9.31	0.465	1.45E-02	8.13E-01	7.55E-01	7.41E-01	2.31E+00	4.40E+02	3.37E+00	No	Yes	Yes
7440-38-2	Arsenic & Inorganic Arsenic Compounds[3]	Year	0.000303	0.0581	0.00291	4.75E-10	2.66E-08	2.47E-08	2.42E-08	7.55E-08	5.25E-03	5.69E-09	No	No	Yes
71-43-2	Benzene	Year	0.0345	6.62	0.331	2.36E-05	1.32E-03	1.23E-03	1.20E-03	3.75E-03	2.61E+02	2.83E-04	No	Yes	Yes
100-44-7	Benzyl Chloride	Year	0.0204	3.91	0.196	1.94E-07	1.09E-05	1.01E-05	9.91E-06	3.09E-05	2.15E+00	2.33E-06	No	No	Yes
7440-41-7	Beryllium & Compounds (NOS)	Year	0.000417	0.08	0.004	4.76E-08	2.67E-06	2.48E-06	2.43E-06	7.57E-06	5.26E-01	5.71E-07	No	Yes	Yes
75-25-2	Bromoform	Year	0.909	174	8.72	1.27E-07	7.11E-06	6.60E-06	6.47E-06	2.02E-05	1.40E+00	1.52E-06	No	No	No
25013-16-5	Butylated hydroxyanisole	Year	17.5	3360	168	2.06E-08	1.15E-06	1.07E-06	1.05E-06	3.28E-06	2.28E-01	2.47E-07	No	No	No
7440-43-9	Cadmium & Compounds[3]	Year	0.000238	0.0457	0.00228	2.38E-10	1.33E-08	1.24E-08	1.21E-08	3.78E-08	2.63E-03	2.85E-09	No	No	Yes
75-15-0	Carbon disulfide	24-hr	800	105	5.26	5.80E-06	3.25E-04	3.02E-04	2.96E-04	9.23E-04	1.76E-01	1.35E-03	No	No	No
630-08-0	Carbon monoxide	1-hr	23000	50.4	1.14	5.40E-04	3.03E-02	2.81E-02	2.76E-02	8.59E-02	6.82E-01	1.60E+00	No	No	No
56-23-5	Carbon Tetrachloride	Year	0.0238	4.57	0.228	2.38E-05	1.33E-03	1.24E-03	1.21E-03	3.78E-03	2.63E+02	2.85E-04	No	Yes	Yes
108-90-7	Chlorobenzene	24-hr	1000	131	6.57	7.24E-06	4.05E-04	3.76E-04	3.69E-04	1.15E-03	2.19E-01	1.68E-03	No	No	No
75-45-6	Chlorodifluoromethane	24-hr	50000	6570	328	1.45E-05	8.10E-04	7.52E-04	7.38E-04	2.30E-03	4.38E-01	3.36E-03	No	No	No
67-66-3	Chloroform	Year	0.0435	8.35	0.417	2.38E-05	1.33E-03	1.24E-03	1.21E-03	3.78E-03	2.63E+02	2.85E-04	No	Yes	Yes
7440-47-3	Chromium Hexavalent: Soluble, except Chromic Trioxide[3]	Year	6.67E-06	0.00128	0.000064	7.28E-10	4.08E-08	3.79E-08	3.71E-08	1.16E-07	8.05E-03	8.73E-09	No	Yes	Yes
7440-48-4	Cobalt	24-hr	0.1	0.013	0.000657	9.50E-07	5.32E-05	4.94E-05	4.84E-05	1.51E-04	2.88E-02	2.20E-04	No	Yes	Yes
7440-50-8	Copper & Compounds	1-hr	100	0.219	0.011	4.76E-07	2.67E-05	2.48E-05	2.43E-05	7.57E-05	6.01E-04	1.41E-03	No	No	No
98-82-8	Cumene	24-hr	400	52.6	2.63	1.02E-06	5.71E-05	5.30E-05	5.20E-05	1.62E-04	3.09E-02	2.37E-04	No	No	No
110-82-7	Cyclohexane	24-hr	6000	789	39.4	2.29E-05	1.28E-03	1.19E-03	1.17E-03	3.64E-03	6.94E-01	5.32E-03	No	No	No
117-81-7	Di(2-ethylhexyl)phthalate	Year	0.0417	8	0.4	1.08E-08	6.05E-07	5.62E-07	5.51E-07	1.72E-06	1.19E-01	1.30E-07	No	No	No
75-09-2	Dichloromethane	Year	1	192	9.59	1.61E-04	9.03E-03	8.38E-03	8.22E-03	2.56E-02	1.78E+03	1.93E-03	No	Yes	Yes

Table A-2 Toxic Air Pollutant Emission Rates and Comparison to the WAC 173-460-150 de minimis, SQER, and ASIL Levels

Chemical ID	Compound	Averaging Period	ASIL (µg/m³)	SQER (lbs/ averaging period)	De Minimis (lbs/ averaging period)	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	AY/AZ Tank Farm (g/s)	SY Tank Farm (g/s)	Total – 3 Tank Farms (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (µg/m³)	Above ASIL?	Above SQER?	Above De Minimis?
593-74-8	Dimethyl Mercury[1]	24-hr	1E-99	1E-99	1E-99	1.07E-07	5.97E-06	5.54E-06	5.44E-06	1.69E-05	3.23E-03	2.47E-05	Yes[2]	Yes	Yes
75-00-3	Ethyl Chloride	24-hr	30000	3940	197	4.15E-06	2.33E-04	2.16E-04	2.12E-04	6.60E-04	1.26E-01	9.64E-04	No	No	No
100-41-4	Ethylbenzene	Year	0.4	76.8	3.84	2.05E-05	1.15E-03	1.06E-03	1.04E-03	3.25E-03	2.26E+02	2.45E-04	No	Yes	Yes
111-15-9	Ethylene glycol monoethyl ether acetate	24-hr	300	39.4	1.97	2.20E-06	1.23E-04	1.14E-04	1.12E-04	3.49E-04	6.65E-02	5.10E-04	No	No	No
75-21-8	Ethylene oxide	Year	0.0114	2.19	0.109	1.12E-07	6.28E-06	5.83E-06	5.72E-06	1.78E-05	1.24E+00	1.34E-06	No	No	Yes
50-00-0	Formaldehyde	Year	0.167	32	1.6	3.41E-07	1.91E-05	1.77E-05	1.74E-05	5.42E-05	3.77E+00	4.09E-06	No	No	Yes
87-68-3	Hexachlorobutadiene	Year	0.0455	8.73	0.437	1.68E-05	9.43E-04	8.75E-04	8.58E-04	2.68E-03	1.86E+02	2.02E-04	No	Yes	Yes
67-72-1	Hexachloroethane	Year	0.0909	17.4	0.872	2.44E-05	1.37E-03	1.27E-03	1.24E-03	3.88E-03	2.70E+02	2.92E-04	No	Yes	Yes
74-90-8	Hydrogen Cyanide	24-hr	9	1.18	0.0591	8.25E-08	4.62E-06	4.29E-06	4.21E-06	1.31E-05	2.50E-03	1.91E-05	No	No	No
67-63-0	Isopropyl Alcohol	1-hr	3200	7.01	0.35	4.89E-05	2.74E-03	2.54E-03	2.49E-03	7.77E-03	6.17E-02	1.45E-01	No	No	No
7439-92-1	Lead and compounds (NOS)[3]	Year	0.0833	16	10	4.75E-10	2.66E-08	2.47E-08	2.42E-08	7.55E-08	5.25E-03	5.69E-09	No	No	No
7439-96-5	Manganese & Compounds[3]	24-hr	0.04	0.00526	0.000263	4.75E-10	2.66E-08	2.47E-08	2.42E-08	7.55E-08	1.44E-05	1.10E-07	No	No	No
7439-97-6	Mercury, Elemental	24-hr	0.09	0.0118	0.000591	2.88E-07	1.61E-05	1.50E-05	1.47E-05	4.58E-05	8.72E-03	6.68E-05	No	No	Yes
67-56-1	Methyl Alcohol	24-hr	4000	526	26.3	1.03E-03	5.77E-02	5.36E-02	5.26E-02	1.64E-01	3.12E+01	2.39E-01	No	No	Yes
74-83-9	Methyl Bromide	24-hr	5	0.657	0.0329	9.30E-07	5.21E-05	4.84E-05	4.74E-05	1.48E-04	2.82E-02	2.16E-04	No	No	No
74-87-3	Methyl Chloride	24-hr	90	11.8	0.591	3.24E-06	1.81E-04	1.69E-04	1.65E-04	5.15E-04	9.81E-02	7.52E-04	No	No	No
78-93-3	Methyl Ethyl Ketone	24-hr	5000	657	32.9	1.39E-04	7.78E-03	7.23E-03	7.09E-03	2.21E-02	4.21E+00	3.23E-02	No	No	No
108-10-1	Methyl Isobutyl Ketone	24-hr	3000	394	19.7	4.01E-05	2.25E-03	2.09E-03	2.05E-03	6.38E-03	1.21E+00	9.31E-03	No	No	No
624-83-9	Methyl Isocyanate	24-hr	1	0.131	0.00657	2.56E-08	1.44E-06	1.33E-06	1.31E-06	4.08E-06	7.76E-04	5.95E-06	No	No	No
108-38-3M	m-Xylene	24-hr	221	29	1.45	1.37E-05	7.65E-04	7.10E-04	6.96E-04	2.17E-03	4.14E-01	3.17E-03	No	No	No
91-20-3M	Naphthalene	Year	0.0294	5.64	0.282	1.88E-07	1.05E-05	9.79E-06	9.60E-06	2.99E-05	2.08E+00	2.26E-06	No	No	Yes
110-54-3	n-Hexane	24-hr	700	92	4.6	7.48E-05	4.19E-03	3.89E-03	3.81E-03	1.19E-02	2.27E+00	1.74E-02	No	No	No
10102-44-0	Nitrogen dioxide	1-hr	470	1.03	0.457	7.99E-04	4.48E-02	4.16E-02	4.08E-02	1.27E-01	1.01E+00	2.37E+00	No	No	Yes

Table A-2 Toxic Air Pollutant Emission Rates and Comparison to the WAC 173-460-150 de minimis, SQER, and ASIL Levels

Chemical ID	Compound	Averaging Period	ASIL ($\mu g/m^3$)	SQER (lbs/ averaging period)	De Minimis (lbs/ averaging period)	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	AY/AZ Tank Farm (g/s)	SY Tank Farm (g/s)	Total – 3 Tank Farms (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration ($\mu g/m^3$)	Above ASIL?	Above SQER?	Above De Minimis?
55-18-5	n-Nitrosodiethylamine	Year	0.0001	0.0192	0.000959	2.81E-08	1.57E-06	1.46E-06	1.43E-06	4.46E-06	3.10E-01	3.37E-07	No	Yes	Yes
62-75-9	n-Nitrosodimethylamine	Year	0.000217	0.0416	0.00208	1.80E-05	1.01E-03	9.36E-04	9.18E-04	2.86E-03	1.99E+02	2.16E-04	No	Yes	Yes
924-16-3	n-Nitroso-di-n-butylamine	Year	0.000323	0.062	0.0031	2.81E-08	1.57E-06	1.46E-06	1.43E-06	4.46E-06	3.10E-01	3.37E-07	No	Yes	Yes
621-64-7	n-Nitrosodi-n-propylamine	Year	0.0005	0.0959	0.0048	2.81E-08	1.57E-06	1.46E-06	1.43E-06	4.46E-06	3.10E-01	3.37E-07	No	Yes	Yes
59-89-2	n-Nitrosomorpholine	Year	0.000526	0.101	0.00505	1.30E-07	7.27E-06	6.75E-06	6.62E-06	2.06E-05	1.43E+00	1.56E-06	No	Yes	Yes
10595-95-6	n-Nitroso-n-methylethylamine	Year	0.000159	0.0305	0.00153	2.81E-08	1.57E-06	1.46E-06	1.43E-06	4.46E-06	3.10E-01	3.37E-07	No	Yes	Yes
930-55-2	n-Nitrosopyrrolidine	Year	0.00167	0.32	0.016	2.81E-08	1.57E-06	1.46E-06	1.43E-06	4.46E-06	3.10E-01	3.37E-07	No	No	Yes
95-47-6	o-Xylene	24-hr	221	29	1.45	2.33E-05	1.30E-03	1.21E-03	1.19E-03	3.70E-03	7.05E-01	5.40E-03	No	No	No
127-18-4	Perchloroethylene	Year	0.169	32.4	1.62	2.34E-05	1.31E-03	1.22E-03	1.20E-03	3.73E-03	2.59E+02	2.81E-04	No	Yes	Yes
108-95-2	Phenol	24-hr	200	26.3	1.31	1.18E-04	6.61E-03	6.14E-03	6.02E-03	1.88E-02	3.57E+00	2.74E-02	No	No	Yes
1336-36-3	Polychlorinated Biphenyls (PCBs)	Year	0.00175	0.336	0.0168	2.95E-07	1.65E-05	1.53E-05	1.50E-05	4.69E-05	3.26E+00	3.54E-06	No	Yes	Yes
57-55-6	Propylene Glycol	24-hr	28.5	3.75	0.187	3.26E-06	1.83E-04	1.70E-04	1.66E-04	5.19E-04	9.88E-02	7.58E-04	No	No	No
115-07-1	Propylene	24-hr	3000	394	19.7	5.69E-05	3.19E-03	2.96E-03	2.90E-03	9.05E-03	1.72E+00	1.32E-02	No	No	No
106-42-3	p-Xylene	24-hr	221	29	1.45	2.36E-05	1.32E-03	1.23E-03	1.20E-03	3.75E-03	7.15E-01	5.48E-03	No	No	No
7782-49-2	Selenium & Selenium Compounds (other than Hydrogen Selenide)	24-hr	20	2.63	0.131	8.26E-08	4.63E-06	4.29E-06	4.21E-06	1.31E-05	2.50E-03	1.92E-05	No	No	No
100-42-5	Styrene	24-hr	900	118	5.91	6.70E-06	3.75E-04	3.48E-04	3.42E-04	1.07E-03	2.03E-01	1.56E-03	No	No	No
7446-09-05	Sulfur dioxide	1-hr	660	1.45	0.457	3.52E-06	1.97E-04	1.83E-04	1.79E-04	5.59E-04	4.44E-03	1.04E-02	No	No	No
108-88-3	Toluene	24-hr	5000	657	32.9	5.92E-04	3.32E-02	3.08E-02	3.02E-02	9.42E-02	1.79E+01	1.37E-01	No	No	No
156-60-5	Trans-1,2-dichloroethene	24-hr	807	106	5.3	1.73E-09	9.69E-08	8.99E-08	8.82E-08	2.75E-07	5.24E-05	4.02E-07	No	No	No
79-01-6	Trichloroethylene	Year	0.5	95.9	4.8	2.36E-05	1.32E-03	1.23E-03	1.20E-03	3.75E-03	2.61E+02	2.83E-04	No	Yes	Yes
1314-62-1	Vanadium Pentoxide	1-hr	30	0.0657	0.00329	1.70E-06	9.51E-05	8.83E-05	8.66E-05	2.70E-04	2.14E-03	5.05E-03	No	No	No
108-05-4	Vinyl acetate	24-hr	200	26.3	1.31	6.49E-09	3.63E-07	3.37E-07	3.31E-07	1.03E-06	1.97E-04	1.51E-06	No	No	No

Table A-2 Toxic Air Pollutant Emission Rates and Comparison to the WAC 173-460-150 de minimis, SQER, and ASIL Levels

Chemical ID	Compound	Averaging Period	ASIL (µg/m³)	SQER (lbs/ averaging period)	De Minimis (lbs/ averaging period)	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	AY/AZ Tank Farm (g/s)	SY Tank Farm (g/s)	Total – 3 Tank Farms (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (µg/m³)	Above ASIL?	Above SQER?	Above De Minimis?
75-01-4	Vinyl Chloride	Year	0.0128	2.46	0.123	2.38E-05	1.33E-03	1.24E-03	1.21E-03	3.78E-03	2.63E+02	2.85E-04	No	Yes	Yes

[1]See Appendix B for baseline sampling data used to determine assumed dimethyl mercury emission rate per tank.

[2]Dimethyl mercury requires a second tier review based on ASIL exceedance. See Section 7.5.

[3]HEPA filter abatement applied to arsenic, cadmium, chromium, lead, and manganese at 99.5% removal efficiency.

Table A-3 Toxic Air Pollutant Emission Rates from 241-SY Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	SY Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
71-55-6	1,1,1-Trichloroethane	24-hr	9.77E-07	4.98E-05	9.49E-03	7.28E-05
79-34-5	1,1,2,2-Tetrachloroethane	Year	1.08E-05	5.50E-04	3.83E+01	4.15E-05
79-00-5	1,1,2-Trichloroethane	Year	8.57E-06	4.37E-04	3.04E+01	3.30E-05
75-34-3	1,1-Dichloroethane	Year	3.94E-07	2.01E-05	1.40E+00	1.52E-06
75-35-4	1,1-Dichloroethylene	24-hr	4.53E-05	2.31E-03	4.40E-01	3.37E-03
57-14-7	1,1-Dimethylhydrazine	24-hr	2.52E-08	1.29E-06	2.45E-04	1.88E-06
106-93-4	1,2-Dibromoethane	Year	1.15E-06	5.89E-05	4.09E+00	4.44E-06
107-06-2	1,2-Dichloroethane	Year	2.36E-05	1.20E-03	8.37E+01	9.08E-05
78-87-5	1,2-Dichloropropane	Year	6.93E-07	3.53E-05	2.46E+00	2.66E-06
106-88-7	1,2-Epoxybutane	24-hr	5.85E-07	2.98E-05	5.69E-03	4.36E-05
106-99-0	1,3-Butadiene	Year	2.89E-06	1.47E-04	1.02E+01	1.11E-05
106-46-7	1,4-Dichlorobenzene	Year	9.00E-07	4.59E-05	3.19E+00	3.46E-06
123-91-1	1,4-Dioxane	Year	1.02E-05	5.19E-04	3.61E+01	3.92E-05
75-68-3	1-Chloro-1,1-difluoroethane	24-hr	1.57E-05	8.00E-04	1.52E-01	1.17E-03
95-48-7M	2-Methylphenol	24-hr	4.12E-07	2.10E-05	4.01E-03	3.07E-05
79-46-9M	2-Nitropropane	24-hr	2.77E-06	1.42E-04	2.70E-02	2.07E-04
108-39-4	3-Methylphenol	24-hr	6.87E-08	3.50E-06	6.67E-04	5.11E-06
75-07-0	Acetaldehyde	Year	5.95E-05	3.03E-03	2.11E+02	2.29E-04
60-35-5	Acetamide	Year	8.77E-08	4.47E-06	3.11E-01	3.37E-07
75-05-8	Acetonitrile	Year	5.55E-05	2.83E-03	1.97E+02	2.13E-04
107-02-8	Acrolein	24-hr	4.32E-08	2.20E-06	4.20E-04	3.22E-06
79-10-7	Acrylic Acid	24-hr	9.44E-06	4.81E-04	9.17E-02	7.03E-04
107-13-1M	Acrylonitrile	Year	1.78E-07	9.10E-06	6.33E-01	6.86E-07
107-05-1	Allyl Chloride	Year	1.48E-07	7.53E-06	5.24E-01	5.68E-07

Table A-3 Toxic Air Pollutant Emission Rates from 241-SY Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	SY Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
7664-41-7	Ammonia	24-hr	1.45E-02	7.41E-01	1.41E+02	1.08E+00
7440-38-2	Arsenic & Inorganic Arsenic Compounds	Year	4.75E-10	2.42E-08	1.68E-03	1.83E-09
71-43-2	Benzene	Year	2.36E-05	1.20E-03	8.37E+01	9.08E-05
100-44-7	Benzyl Chloride	Year	1.94E-07	9.91E-06	6.89E-01	7.47E-07
7440-41-7	Beryllium & Compounds (NOS)	Year	4.76E-08	2.43E-06	1.69E-01	1.83E-07
75-25-2	Bromoform	Year	1.27E-07	6.47E-06	4.50E-01	4.88E-07
25013-16-5	Butylated hydroxyanisole	Year	2.06E-08	1.05E-06	7.31E-02	7.93E-08
7440-43-9	Cadmium & Compounds	Year	2.38E-10	1.21E-08	8.44E-04	9.15E-10
75-15-0	Carbon disulfide	24-hr	5.80E-06	2.96E-04	5.64E-02	4.32E-04
630-08-0	Carbon monoxide	1-hr	5.40E-04	2.76E-02	2.19E-01	5.15E-01
56-23-5	Carbon Tetrachloride	Year	2.38E-05	1.21E-03	8.42E+01	9.14E-05
108-90-7	Chlorobenzene	24-hr	7.24E-06	3.69E-04	7.03E-02	5.39E-04
75-45-6	Chlorodifluoromethane	24-hr	1.45E-05	7.38E-04	1.41E-01	1.08E-03
67-66-3	Chloroform	Year	2.38E-05	1.21E-03	8.42E+01	9.14E-05
7440-47-3	Chromium Hexavalent: Soluble, except Chromic Trioxide	Year	7.28E-10	3.71E-08	2.58E-03	2.80E-09
7440-48-4	Cobalt	24-hr	9.50E-07	4.84E-05	9.23E-03	7.07E-05
7440-50-8	Copper & Compounds	1-hr	4.76E-07	2.43E-05	1.93E-04	4.54E-04
98-82-8	Cumene	24-hr	1.02E-06	5.20E-05	9.90E-03	7.59E-05
110-82-7	Cyclohexane	24-hr	2.29E-05	1.17E-03	2.23E-01	1.71E-03
117-81-7	Di(2-ethylhexyl)phthalate	Year	1.08E-08	5.51E-07	3.83E-02	4.16E-08
75-09-2	Dichloromethane	Year	1.61E-04	8.22E-03	5.72E+02	6.20E-04

Table A-3 Toxic Air Pollutant Emission Rates from 241-SY Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	SY Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
593-74-8	Dimethyl Mercury	24-hr	1.07E-07	5.44E-06	1.04E-03	7.94E-06
75-00-3	Ethyl Chloride	24-hr	4.15E-06	2.12E-04	4.03E-02	3.09E-04
100-41-4	Ethylbenzene	Year	2.05E-05	1.04E-03	7.25E+01	7.87E-05
111-15-9	Ethylene glycol monoethyl ether acetate	24-hr	2.20E-06	1.12E-04	2.13E-02	1.64E-04
75-21-8	Ethylene oxide	Year	1.12E-07	5.72E-06	3.97E-01	4.31E-07
50-00-0	Formaldehyde	Year	3.41E-07	1.74E-05	1.21E+00	1.31E-06
87-68-3	Hexachlorobutadiene	Year	1.68E-05	8.58E-04	5.97E+01	6.47E-05
67-72-1	Hexachloroethane	Year	2.44E-05	1.24E-03	8.65E+01	9.38E-05
74-90-8	Hydrogen Cyanide	24-hr	8.25E-08	4.21E-06	8.01E-04	6.14E-06
67-63-0	Isopropyl Alcohol	1-hr	4.89E-05	2.49E-03	1.98E-02	4.66E-02
7439-92-1	Lead and compounds (NOS)	Year	4.75E-10	2.42E-08	1.68E-03	1.83E-09
7439-96-5	Manganese & Compounds	24-hr	4.75E-10	2.42E-08	4.61E-06	3.54E-08
7439-97-6	Mercury, Elemental	24-hr	2.88E-07	1.47E-05	2.80E-03	2.14E-05
67-56-1	Methyl Alcohol	24-hr	1.03E-03	5.26E-02	1.00E+01	7.67E-02
74-83-9	Methyl Bromide	24-hr	9.30E-07	4.74E-05	9.03E-03	6.92E-05
74-87-3	Methyl Chloride	24-hr	3.24E-06	1.65E-04	3.15E-02	2.41E-04
78-93-3	Methyl Ethyl Ketone	24-hr	1.39E-04	7.09E-03	1.35E+00	1.03E-02
108-10-1	Methyl Isobutyl Ketone	24-hr	4.01E-05	2.05E-03	3.90E-01	2.99E-03
624-83-9	Methyl Isocyanate	24-hr	2.56E-08	1.31E-06	2.49E-04	1.91E-06
108-38-3M	m-Xylene	24-hr	1.37E-05	6.96E-04	1.33E-01	1.02E-03
91-20-3M	Naphthalene	Year	1.88E-07	9.60E-06	6.68E-01	7.24E-07
110-54-3	n-Hexane	24-hr	7.48E-05	3.81E-03	7.27E-01	5.57E-03
10102-44-0	Nitrogen dioxide	1-hr	7.99E-04	4.08E-02	3.23E-01	7.61E-01

Table A-3 Toxic Air Pollutant Emission Rates from 241-SY Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	SY Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
55-18-5	n-Nitrosodiethylamine	Year	2.81E-08	1.43E-06	9.96E-02	1.08E-07
62-75-9	n-Nitrosodimethylamine	Year	1.80E-05	9.18E-04	6.38E+01	6.92E-05
924-16-3	n-Nitroso-di-n-butylamine	Year	2.81E-08	1.43E-06	9.96E-02	1.08E-07
621-64-7	n-Nitrosodi-n-propylamine	Year	2.81E-08	1.43E-06	9.96E-02	1.08E-07
59-89-2	n-Nitrosomorpholine	Year	1.30E-07	6.62E-06	4.60E-01	4.99E-07
10595-95-6	n-Nitroso-n-methylethylamine	Year	2.81E-08	1.43E-06	9.96E-02	1.08E-07
930-55-2	n-Nitrosopyrrolidine	Year	2.81E-08	1.43E-06	9.96E-02	1.08E-07
95-47-6	o-Xylene	24-hr	2.33E-05	1.19E-03	2.26E-01	1.73E-03
127-18-4	Perchloroethylene	Year	2.34E-05	1.20E-03	8.31E+01	9.01E-05
108-95-2	Phenol	24-hr	1.18E-04	6.02E-03	1.15E+00	8.79E-03
1336-36-3	Polychlorinated Biphenyls (PCBs)	Year	2.95E-07	1.50E-05	1.05E+00	1.13E-06
57-55-6	Propylene Glycol	24-hr	3.26E-06	1.66E-04	3.17E-02	2.43E-04
115-07-1	Propylene	24-hr	5.69E-05	2.90E-03	5.53E-01	4.24E-03
106-42-3	p-Xylene	24-hr	2.36E-05	1.20E-03	2.29E-01	1.76E-03
7782-49-2	Selenium & Selenium Compounds (other than Hydrogen Selenide)	24-hr	8.26E-08	4.21E-06	8.02E-04	6.15E-06
100-42-5	Styrene	24-hr	6.70E-06	3.42E-04	6.51E-02	4.99E-04
7446-09-05	Sulfur dioxide	1-hr	3.52E-06	1.79E-04	1.42E-03	3.35E-03
108-88-3	Toluene	24-hr	5.92E-04	3.02E-02	5.75E+00	4.41E-02
156-60-5	Trans-1,2-dichloroethene	24-hr	1.73E-09	8.82E-08	1.68E-05	1.29E-07
79-01-6	Trichloroethylene	Year	2.36E-05	1.20E-03	8.37E+01	9.08E-05
1314-62-1	Vanadium Pentoxide	1-hr	1.70E-06	8.66E-05	6.88E-04	1.62E-03

Table A-3 Toxic Air Pollutant Emission Rates from 241-SY Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	SY Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
108-05-4	Vinyl acetate	24-hr	6.49E-09	3.31E-07	6.30E-05	4.83E-07
75-01-4	Vinyl Chloride	Year	2.38E-05	1.21E-03	8.42E+01	9.14E-05

Table A-4 Toxic Air Pollutant Emission Rates from 241-AP Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
71-55-6	1,1,1-Trichloroethane	24-hr	9.77E-07	5.47E-05	1.04E-02	7.99E-05
79-34-5	1,1,2,2-Tetrachloroethane	Year	1.08E-05	6.04E-04	4.20E+01	4.56E-05
79-00-5	1,1,2-Trichloroethane	Year	8.57E-06	4.80E-04	3.34E+01	3.62E-05
75-34-3	1,1-Dichloroethane	Year	3.94E-07	2.21E-05	1.54E+00	1.67E-06
75-35-4	1,1-Dichloroethylene	24-hr	4.53E-05	2.54E-03	4.83E-01	3.70E-03
57-14-7	1,1-Dimethylhydrazine	24-hr	2.52E-08	1.41E-06	2.69E-04	2.06E-06
106-93-4	1,2-Dibromoethane	Year	1.15E-06	6.47E-05	4.50E+00	4.88E-06
107-06-2	1,2-Dichloroethane	Year	2.36E-05	1.32E-03	9.19E+01	9.97E-05
78-87-5	1,2-Dichloropropane	Year	6.93E-07	3.88E-05	2.70E+00	2.93E-06
106-88-7	1,2-Epoxybutane	24-hr	5.85E-07	3.28E-05	6.24E-03	4.78E-05
106-99-0	1,3-Butadiene	Year	2.89E-06	1.62E-04	1.12E+01	1.22E-05
106-46-7	1,4-Dichlorobenzene	Year	9.00E-07	5.04E-05	3.50E+00	3.80E-06
123-91-1	1,4-Dioxane	Year	1.02E-05	5.70E-04	3.96E+01	4.30E-05
75-68-3	1-Chloro-1,1-difluoroethane	24-hr	1.57E-05	8.79E-04	1.67E-01	1.28E-03
95-48-7M	2-Methylphenol	24-hr	4.12E-07	2.31E-05	4.40E-03	3.37E-05
79-46-9M	2-Nitropropane	24-hr	2.77E-06	1.55E-04	2.96E-02	2.27E-04
108-39-4	3-Methylphenol	24-hr	6.87E-08	3.85E-06	7.33E-04	5.62E-06
75-07-0	Acetaldehyde	Year	5.95E-05	3.33E-03	2.32E+02	2.51E-04
60-35-5	Acetamide	Year	8.77E-08	4.91E-06	3.42E-01	3.71E-07
75-05-8	Acetonitrile	Year	5.55E-05	3.11E-03	2.16E+02	2.34E-04
107-02-8	Acrolein	24-hr	4.32E-08	2.42E-06	4.61E-04	3.53E-06
79-10-7	Acrylic Acid	24-hr	9.44E-06	5.29E-04	1.01E-01	7.72E-04
107-13-1M	Acrylonitrile	Year	1.78E-07	9.99E-06	6.95E-01	7.54E-07
107-05-1	Allyl Chloride	Year	1.48E-07	8.27E-06	5.75E-01	6.24E-07

Table A-4 Toxic Air Pollutant Emission Rates from 241-AP Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
7664-41-7	Ammonia	24-hr	1.45E-02	8.13E-01	1.55E+02	1.19E+00
7440-38-2	Arsenic & Inorganic Arsenic Compounds	Year	4.75E-10	2.66E-08	1.85E-03	2.01E-09
71-43-2	Benzene	Year	2.36E-05	1.32E-03	9.19E+01	9.97E-05
100-44-7	Benzyl Chloride	Year	1.94E-07	1.09E-05	7.56E-01	8.20E-07
7440-41-7	Beryllium & Compounds (NOS)	Year	4.76E-08	2.67E-06	1.85E-01	2.01E-07
75-25-2	Bromoform	Year	1.27E-07	7.11E-06	4.94E-01	5.36E-07
25013-16-5	Butylated hydroxyanisole	Year	2.06E-08	1.15E-06	8.03E-02	8.71E-08
7440-43-9	Cadmium & Compounds	Year	2.38E-10	1.33E-08	9.27E-04	1.01E-09
75-15-0	Carbon disulfide	24-hr	5.80E-06	3.25E-04	6.19E-02	4.75E-04
630-08-0	Carbon monoxide	1-hr	5.40E-04	3.03E-02	2.40E-01	5.65E-01
56-23-5	Carbon Tetrachloride	Year	2.38E-05	1.33E-03	9.25E+01	1.00E-04
108-90-7	Chlorobenzene	24-hr	7.24E-06	4.05E-04	7.72E-02	5.92E-04
75-45-6	Chlorodifluoromethane	24-hr	1.45E-05	8.10E-04	1.54E-01	1.18E-03
67-66-3	Chloroform	Year	2.38E-05	1.33E-03	9.25E+01	1.00E-04
7440-47-3	Chromium Hexavalent: Soluble, except Chromic Trioxide	Year	7.28E-10	4.08E-08	2.83E-03	3.07E-09
7440-48-4	Cobalt	24-hr	9.50E-07	5.32E-05	1.01E-02	7.77E-05
7440-50-8	Copper & Compounds	1-hr	4.76E-07	2.67E-05	2.12E-04	4.98E-04
98-82-8	Cumene	24-hr	1.02E-06	5.71E-05	1.09E-02	8.33E-05
110-82-7	Cyclohexane	24-hr	2.29E-05	1.28E-03	2.45E-01	1.87E-03
117-81-7	Di(2-ethylhexyl)phthalate	Year	1.08E-08	6.05E-07	4.21E-02	4.56E-08
75-09-2	Dichloromethane	Year	1.61E-04	9.03E-03	6.28E+02	6.81E-04

Table A-4 Toxic Air Pollutant Emission Rates from 241-AP Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
593-74-8	Dimethyl Mercury	24-hr	1.07E-07	5.97E-06	1.14E-03	8.72E-06
75-00-3	Ethyl Chloride	24-hr	4.15E-06	2.33E-04	4.43E-02	3.40E-04
100-41-4	Ethylbenzene	Year	2.05E-05	1.15E-03	7.96E+01	8.64E-05
111-15-9	Ethylene glycol monoethyl ether acetate	24-hr	2.20E-06	1.23E-04	2.34E-02	1.80E-04
75-21-8	Ethylene oxide	Year	1.12E-07	6.28E-06	4.36E-01	4.73E-07
50-00-0	Formaldehyde	Year	3.41E-07	1.91E-05	1.33E+00	1.44E-06
87-68-3	Hexachlorobutadiene	Year	1.68E-05	9.43E-04	6.55E+01	7.11E-05
67-72-1	Hexachloroethane	Year	2.44E-05	1.37E-03	9.49E+01	1.03E-04
74-90-8	Hydrogen Cyanide	24-hr	8.25E-08	4.62E-06	8.80E-04	6.74E-06
67-63-0	Isopropyl Alcohol	1-hr	4.89E-05	2.74E-03	2.17E-02	5.11E-02
7439-92-1	Lead and compounds (NOS)	Year	4.75E-10	2.66E-08	1.85E-03	2.01E-09
7439-96-5	Manganese & Compounds	24-hr	4.75E-10	2.66E-08	5.07E-06	3.88E-08
7439-97-6	Mercury, Elemental	24-hr	2.88E-07	1.61E-05	3.07E-03	2.35E-05
67-56-1	Methyl Alcohol	24-hr	1.03E-03	5.77E-02	1.10E+01	8.42E-02
74-83-9	Methyl Bromide	24-hr	9.30E-07	5.21E-05	9.92E-03	7.60E-05
74-87-3	Methyl Chloride	24-hr	3.24E-06	1.81E-04	3.46E-02	2.65E-04
78-93-3	Methyl Ethyl Ketone	24-hr	1.39E-04	7.78E-03	1.48E+00	1.14E-02
108-10-1	Methyl Isobutyl Ketone	24-hr	4.01E-05	2.25E-03	4.28E-01	3.28E-03
624-83-9	Methyl Isocyanate	24-hr	2.56E-08	1.44E-06	2.73E-04	2.10E-06
108-38-3M	m-Xylene	24-hr	1.37E-05	7.65E-04	1.46E-01	1.12E-03
91-20-3M	Naphthalene	Year	1.88E-07	1.05E-05	7.33E-01	7.95E-07
110-54-3	n-Hexane	24-hr	7.48E-05	4.19E-03	7.98E-01	6.12E-03
10102-44-0	Nitrogen dioxide	1-hr	7.99E-04	4.48E-02	3.55E-01	8.36E-01

Table A-4 Toxic Air Pollutant Emission Rates from 241-AP Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
55-18-5	n-Nitrosodiethylamine	Year	2.81E-08	1.57E-06	1.09E-01	1.19E-07
62-75-9	n-Nitrosodimethylamine	Year	1.80E-05	1.01E-03	7.01E+01	7.60E-05
924-16-3	n-Nitroso-di-n-butylamine	Year	2.81E-08	1.57E-06	1.09E-01	1.19E-07
621-64-7	n-Nitrosodi-n-propylamine	Year	2.81E-08	1.57E-06	1.09E-01	1.19E-07
59-89-2	n-Nitrosomorpholine	Year	1.30E-07	7.27E-06	5.05E-01	5.48E-07
10595-95-6	n-Nitroso-n-methylethylamine	Year	2.81E-08	1.57E-06	1.09E-01	1.19E-07
930-55-2	n-Nitrosopyrrolidine	Year	2.81E-08	1.57E-06	1.09E-01	1.19E-07
95-47-6	o-Xylene	24-hr	2.33E-05	1.30E-03	2.48E-01	1.90E-03
127-18-4	Perchloroethylene	Year	2.34E-05	1.31E-03	9.13E+01	9.90E-05
108-95-2	Phenol	24-hr	1.18E-04	6.61E-03	1.26E+00	9.65E-03
1336-36-3	Polychlorinated Biphenyls (PCBs)	Year	2.95E-07	1.65E-05	1.15E+00	1.25E-06
57-55-6	Propylene Glycol	24-hr	3.26E-06	1.83E-04	3.48E-02	2.67E-04
115-07-1	Propylene	24-hr	5.69E-05	3.19E-03	6.07E-01	4.65E-03
106-42-3	p-Xylene	24-hr	2.36E-05	1.32E-03	2.52E-01	1.93E-03
7782-49-2	Selenium & Selenium Compounds (other than Hydrogen Selenide)	24-hr	8.26E-08	4.63E-06	8.81E-04	6.75E-06
100-42-5	Styrene	24-hr	6.70E-06	3.75E-04	7.15E-02	5.48E-04
7446-09-05	Sulfur dioxide	1-hr	3.52E-06	1.97E-04	1.56E-03	3.68E-03
108-88-3	Toluene	24-hr	5.92E-04	3.32E-02	6.32E+00	4.84E-02
156-60-5	Trans-1,2-dichloroethene	24-hr	1.73E-09	9.69E-08	1.85E-05	1.41E-07
79-01-6	Trichloroethylene	Year	2.36E-05	1.32E-03	9.19E+01	9.97E-05
1314-62-1	Vanadium Pentoxide	1-hr	1.70E-06	9.51E-05	7.55E-04	1.78E-03

Table A-4 Toxic Air Pollutant Emission Rates from 241-AP Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AP Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
108-05-4	Vinyl acetate	24-hr	6.49E-09	3.63E-07	6.92E-05	5.31E-07
75-01-4	Vinyl Chloride	Year	2.38E-05	1.33E-03	9.25E+01	1.00E-04

Table A-5 Toxic Air Pollutant Emission Rates from 241-AY/AZ Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AY/AZ Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
71-55-6	1,1,1-Trichloroethane	24-hr	9.77E-07	5.08E-05	9.68E-03	7.42E-05
79-34-5	1,1,2,2-Tetrachloroethane	Year	1.08E-05	5.61E-04	3.90E+01	4.23E-05
79-00-5	1,1,2-Trichloroethane	Year	8.57E-06	4.46E-04	3.10E+01	3.36E-05
75-34-3	1,1-Dichloroethane	Year	3.94E-07	2.05E-05	1.43E+00	1.55E-06
75-35-4	1,1-Dichloroethylene	24-hr	4.53E-05	2.36E-03	4.49E-01	3.44E-03
57-14-7	1,1-Dimethylhydrazine	24-hr	2.52E-08	1.31E-06	2.50E-04	1.92E-06
106-93-4	1,2-Dibromoethane	Year	1.15E-06	6.01E-05	4.18E+00	4.53E-06
107-06-2	1,2-Dichloroethane	Year	2.36E-05	1.23E-03	8.53E+01	9.25E-05
78-87-5	1,2-Dichloropropane	Year	6.93E-07	3.60E-05	2.51E+00	2.72E-06
106-88-7	1,2-Epoxybutane	24-hr	5.85E-07	3.04E-05	5.80E-03	4.44E-05
106-99-0	1,3-Butadiene	Year	2.89E-06	1.50E-04	1.04E+01	1.13E-05
106-46-7	1,4-Dichlorobenzene	Year	9.00E-07	4.68E-05	3.25E+00	3.53E-06
123-91-1	1,4-Dioxane	Year	1.02E-05	5.29E-04	3.68E+01	3.99E-05
75-68-3	1-Chloro-1,1-difluoroethane	24-hr	1.57E-05	8.16E-04	1.55E-01	1.19E-03
95-48-7M	2-Methylphenol	24-hr	4.12E-07	2.14E-05	4.09E-03	3.13E-05
79-46-9M	2-Nitropropane	24-hr	2.77E-06	1.44E-04	2.75E-02	2.11E-04
108-39-4	3-Methylphenol	24-hr	6.87E-08	3.57E-06	6.80E-04	5.22E-06
75-07-0	Acetaldehyde	Year	5.95E-05	3.09E-03	2.15E+02	2.33E-04
60-35-5	Acetamide	Year	8.77E-08	4.56E-06	3.17E-01	3.44E-07
75-05-8	Acetonitrile	Year	5.55E-05	2.88E-03	2.00E+02	2.17E-04
107-02-8	Acrolein	24-hr	4.32E-08	2.25E-06	4.28E-04	3.28E-06
79-10-7	Acrylic Acid	24-hr	9.44E-06	4.91E-04	9.35E-02	7.17E-04
107-13-1M	Acrylonitrile	Year	1.78E-07	9.28E-06	6.45E-01	7.00E-07
107-05-1	Allyl Chloride	Year	1.48E-07	7.68E-06	5.34E-01	5.79E-07

Table A-5 Toxic Air Pollutant Emission Rates from 241-AY/AZ Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AY/AZ Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
7664-41-7	Ammonia	24-hr	1.45E-02	7.55E-01	1.44E+02	1.10E+00
7440-38-2	Arsenic & Inorganic Arsenic Compounds	Year	4.75E-10	2.47E-08	1.72E-03	1.86E-09
71-43-2	Benzene	Year	2.36E-05	1.23E-03	8.53E+01	9.25E-05
100-44-7	Benzyl Chloride	Year	1.94E-07	1.01E-05	7.02E-01	7.62E-07
7440-41-7	Beryllium & Compounds (NOS)	Year	4.76E-08	2.48E-06	1.72E-01	1.87E-07
75-25-2	Bromoform	Year	1.27E-07	6.60E-06	4.59E-01	4.98E-07
25013-16-5	Butylated hydroxyanisole	Year	2.06E-08	1.07E-06	7.46E-02	8.09E-08
7440-43-9	Cadmium & Compounds	Year	2.38E-10	1.24E-08	8.61E-04	9.33E-10
75-15-0	Carbon disulfide	24-hr	5.80E-06	3.02E-04	5.75E-02	4.41E-04
630-08-0	Carbon monoxide	1-hr	5.40E-04	2.81E-02	2.23E-01	5.25E-01
56-23-5	Carbon Tetrachloride	Year	2.38E-05	1.24E-03	8.59E+01	9.31E-05
108-90-7	Chlorobenzene	24-hr	7.24E-06	3.76E-04	7.17E-02	5.49E-04
75-45-6	Chlorodifluoromethane	24-hr	1.45E-05	7.52E-04	1.43E-01	1.10E-03
67-66-3	Chloroform	Year	2.38E-05	1.24E-03	8.59E+01	9.31E-05
7440-47-3	Chromium Hexavalent: Soluble, except Chromic Trioxide	Year	7.28E-10	3.79E-08	2.63E-03	2.85E-09
7440-48-4	Cobalt	24-hr	9.50E-07	4.94E-05	9.41E-03	7.21E-05
7440-50-8	Copper & Compounds	1-hr	4.76E-07	2.48E-05	1.96E-04	4.62E-04
98-82-8	Cumene	24-hr	1.02E-06	5.30E-05	1.01E-02	7.74E-05
110-82-7	Cyclohexane	24-hr	2.29E-05	1.19E-03	2.27E-01	1.74E-03
117-81-7	Di(2-ethylhexyl)phthalate	Year	1.08E-08	5.62E-07	3.91E-02	4.24E-08
75-09-2	Dichloromethane	Year	1.61E-04	8.38E-03	5.83E+02	6.32E-04

Table A-5 Toxic Air Pollutant Emission Rates from 241-AY/AZ Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AY/AZ Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
593-74-8	Dimethyl Mercury	24-hr	1.07E-07	5.54E-06	1.06E-03	8.09E-06
75-00-3	Ethyl Chloride	24-hr	4.15E-06	2.16E-04	4.11E-02	3.15E-04
100-41-4	Ethylbenzene	Year	2.05E-05	1.06E-03	7.39E+01	8.02E-05
111-15-9	Ethylene glycol monoethyl ether acetate	24-hr	2.20E-06	1.14E-04	2.18E-02	1.67E-04
75-21-8	Ethylene oxide	Year	1.12E-07	5.83E-06	4.05E-01	4.40E-07
50-00-0	Formaldehyde	Year	3.41E-07	1.77E-05	1.23E+00	1.34E-06
87-68-3	Hexachlorobutadiene	Year	1.68E-05	8.75E-04	6.09E+01	6.60E-05
67-72-1	Hexachloroethane	Year	2.44E-05	1.27E-03	8.82E+01	9.56E-05
74-90-8	Hydrogen Cyanide	24-hr	8.25E-08	4.29E-06	8.17E-04	6.26E-06
67-63-0	Isopropyl Alcohol	1-hr	4.89E-05	2.54E-03	2.02E-02	4.75E-02
7439-92-1	Lead and compounds (NOS)	Year	4.75E-10	2.47E-08	1.72E-03	1.86E-09
7439-96-5	Manganese & Compounds	24-hr	4.75E-10	2.47E-08	4.70E-06	3.61E-08
7439-97-6	Mercury, Elemental	24-hr	2.88E-07	1.50E-05	2.85E-03	2.19E-05
67-56-1	Methyl Alcohol	24-hr	1.03E-03	5.36E-02	1.02E+01	7.82E-02
74-83-9	Methyl Bromide	24-hr	9.30E-07	4.84E-05	9.21E-03	7.06E-05
74-87-3	Methyl Chloride	24-hr	3.24E-06	1.69E-04	3.21E-02	2.46E-04
78-93-3	Methyl Ethyl Ketone	24-hr	1.39E-04	7.23E-03	1.38E+00	1.06E-02
108-10-1	Methyl Isobutyl Ketone	24-hr	4.01E-05	2.09E-03	3.97E-01	3.05E-03
624-83-9	Methyl Isocyanate	24-hr	2.56E-08	1.33E-06	2.54E-04	1.95E-06
108-38-3M	m-Xylene	24-hr	1.37E-05	7.10E-04	1.35E-01	1.04E-03
91-20-3M	Naphthalene	Year	1.88E-07	9.79E-06	6.81E-01	7.38E-07
110-54-3	n-Hexane	24-hr	7.48E-05	3.89E-03	7.41E-01	5.68E-03
10102-44-0	Nitrogen dioxide	1-hr	7.99E-04	4.16E-02	3.30E-01	7.76E-01

Table A-5 Toxic Air Pollutant Emission Rates from 241-AY/AZ Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AY/AZ Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
55-18-5	n-Nitrosodiethylamine	Year	2.81E-08	1.46E-06	1.02E-01	1.10E-07
62-75-9	n-Nitrosodimethylamine	Year	1.80E-05	9.36E-04	6.51E+01	7.06E-05
924-16-3	n-Nitroso-di-n-butylamine	Year	2.81E-08	1.46E-06	1.02E-01	1.10E-07
621-64-7	n-Nitrosodi-n-propylamine	Year	2.81E-08	1.46E-06	1.02E-01	1.10E-07
59-89-2	n-Nitrosomorpholine	Year	1.30E-07	6.75E-06	4.69E-01	5.09E-07
10595-95-6	n-Nitroso-n-methylethylamine	Year	2.81E-08	1.46E-06	1.02E-01	1.10E-07
930-55-2	n-Nitrosopyrrolidine	Year	2.81E-08	1.46E-06	1.02E-01	1.10E-07
95-47-6	o-Xylene	24-hr	2.33E-05	1.21E-03	2.31E-01	1.77E-03
127-18-4	Perchloroethylene	Year	2.34E-05	1.22E-03	8.47E+01	9.19E-05
108-95-2	Phenol	24-hr	1.18E-04	6.14E-03	1.17E+00	8.96E-03
1336-36-3	Polychlorinated Biphenyls (PCBs)	Year	2.95E-07	1.53E-05	1.07E+00	1.16E-06
57-55-6	Propylene Glycol	24-hr	3.26E-06	1.70E-04	3.23E-02	2.48E-04
115-07-1	Propylene	24-hr	5.69E-05	2.96E-03	5.64E-01	4.32E-03
106-42-3	p-Xylene	24-hr	2.36E-05	1.23E-03	2.34E-01	1.79E-03
7782-49-2	Selenium & Selenium Compounds (other than Hydrogen Selenide)	24-hr	8.26E-08	4.29E-06	8.18E-04	6.27E-06
100-42-5	Styrene	24-hr	6.70E-06	3.48E-04	6.64E-02	5.09E-04
7446-09-05	Sulfur dioxide	1-hr	3.52E-06	1.83E-04	1.45E-03	3.42E-03
108-88-3	Toluene	24-hr	5.92E-04	3.08E-02	5.87E+00	4.50E-02
156-60-5	Trans-1,2-dichloroethene	24-hr	1.73E-09	8.99E-08	1.71E-05	1.31E-07
79-01-6	Trichloroethylene	Year	2.36E-05	1.23E-03	8.53E+01	9.25E-05
1314-62-1	Vanadium Pentoxide	1-hr	1.70E-06	8.83E-05	7.01E-04	1.65E-03

Table A-5 Toxic Air Pollutant Emission Rates from 241-AY/AZ Tank Farm

Chemical ID	Compound	Averaging Period	Emission Rate per Tank (g/s)	AY/AZ Tank Farm (g/s)	Emissions Total (lbs/averaging period)	Dispersed Concentration (ug/m3)
108-05-4	Vinyl acetate	24-hr	6.49E-09	3.37E-07	6.43E-05	4.93E-07
75-01-4	Vinyl Chloride	Year	2.38E-05	1.24E-03	8.59E+01	9.31E-05

Appendix B

Dimethyl Mercury Baseline Sampling Results

Table B-1 Dimethyl Mercury Baseline Sampling Results

Agent	Air Concentration[a] (mg/m^3)	Sample Date	Sample ID	Specific Location	Stack Flow Rate[b] (ft^3/min)	Emissions (lb/24hr)	Average AY/AZ Emissions (lb/24hr)
Dimethyl Mercury	3.0E-04	11/11/2015	15-08730-1-002a	702-AZ: Train 2: 702-AZ Exhauster/Sample Port AE-AZK 1-3	753	2.0E-05	2.1E-05
	3.0E-04	11/10/2015	15-08700-1-001a	702-AZ: Train 1: 702-AZ Exhauster/Sample Port AE-AZK 1-3	753	2.0E-05	
	3.0E-04	11/10/2015	15-08700-1-002a	702-AZ: Train 2: 702-AZ Exhauster/Sample Port AE-AZK 1-3	753	2.0E-05	
	6.0E-06	11/11/2015	15-08746-1-001A	AY FARM: AY102	980	5.3E-07	
	6.0E-06	11/10/2015	15-08701-1-001	AY FARM: AY102	980	5.3E-07	
	5.0E-06	11/11/2015	15-08746-1-002A	AY FARM: AY102	980	4.4E-07	
	5.0E-06	11/10/2015	15-08701-1-002A	AY FARM: AY102	980	4.4E-07	

[a]Site Wide Industrial Hygiene Database (SWIHD) reported generated 12/7/2015.

[b]702AZ: Median flow rate from Surveillance Data Display System (SDDS) for dates 11/10/2015 - 11/11/2015; report generated 12/2/2015.
AY102: Work Package #159051 dated 9/8/15.

Attachment 2
16-ECD-0001
(7 Pages)

Notice of Construction

DEPARTMENT OF ECOLOGY State of Washington

Notice of Construction Application

This application applies statewide for facilities under the Department of Ecology's jurisdiction. Submit this form for review of your project to construct a new or modified source of air emissions. Please refer to Ecology Forms ECY 070-410a-g, "Instructions for NOC Application," for general information about completing the application.

Ecology offers up to two hours of free pre-application assistance. We encourage you to schedule a pre-application meeting with the contact person specified for the location of your proposal, below. If you use up your two hours of free pre-application assistance, we will continue to assist you after you submit Part 1 of the application and the application fee. You may schedule a meeting with us at any point in the process.

Upon completion of the application, please enclose a check for the initial fee and mail to:

Department of Ecology
Cashiering Unit
P.O. Box 47611
Olympia, WA 98504-7611

For Fiscal Office Use Only:
001-NSR-216-0299-000404

Check the box for the location of your proposal. For assistance, call the contact listed below:		
	Ecology Permitting Office	**Contact**
☐ **CRO**	**Chelan, Douglas, Kittitas, Klickitat, or Okanogan County** Ecology Central Regional Office – Air Quality Program	Lynnette Haller (509) 457-7126 lynnette.haller@ecy.wa.gov
☐ **ERO**	**Adams, Asotin, Columbia, Ferry, Franklin, Garfield, Grant, Lincoln, Pend Oreille, Stevens, Walla Walla or Whitman County** Ecology Eastern Regional Office – Air Quality Program	Greg Flibbert (509) 329-3452 gregory.flibbert@ecy.wa.gov
☐ **NWRO**	**San Juan County** Ecology Northwest Regional Office – Air Quality Program	David Adler (425) 649-7082 david.adler@ecy.wa.gov
☐ **IND**	**For actions taken at** **Kraft and Sulfite Paper Mills and Aluminum Smelters** Ecology Industrial Section – Waste 2 Resources Program Permit manager: _____	Garin Schrieve (360) 407-6916 garin.schrieve@ecy.wa.gov
☒ **NWP**	**For actions taken on the** **US Department of Energy Hanford Reservation** Ecology Nuclear Waste Program	Philip Gent (509) 372-7983 philip.gent@ecy.wa.gov

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

DEPARTMENT OF ECOLOGY State of Washington

Notice of Construction Application

Check the box below for the fee that applies to your application.

New project or equipment:

☐	**$1,500: Basic project** initial fee covers up to 16 hours of review.
☐	**$10,000: Complex project** initial fee covers up to 106 hours of review.

Change to an existing permit or equipment:

☐	**$200: Administrative or simple change** initial fee covers up to 3 hours of review Ecology may determine your change is complex during completeness review of your application. If your project is complex, you must pay the additional $675 before we will continue working on your application.
☒	**$875: Complex change** initial fee covers up to 10 hours of review
☐	**$350** flat fee: **Replace or alter control technology equipment under WAC 173-400-114** Ecology will contact you if we determine your change belongs in another fee category. You must pay the fee associated with that category before we will continue working on your application.

Read each statement, then check the box next to it to acknowledge that you agree.	
☒	The initial fee you submitted may not cover the cost of processing your application. Ecology will track the number of hours spent on your project. If the number of hours Ecology spends exceeds the hours included in your initial fee, Ecology will bill you $95 per hour for the extra time.
☒	You must include all information requested by this application. Ecology may not process your application if it does not include all the information requested.
☒	Submittal of this application allows Ecology staff to visit and inspect your facility.

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WRPS-1505785 – Enclosure 2

DEPARTMENT OF ECOLOGY State of Washington

Notice of Construction Application

Part 1: General Information

I. Project, Facility, and Company Information

1. Project Name Revision 4 of Ecology Order DE11NWP-001
2. Facility Name United States Department of Energy, Office of River Protection
3. Facility Street Address 2440 Stevens Drive, Richland, WA 99352
4. Facility Legal Description Hanford Site, 200 West and 200 East Areas
5. Company Legal Name (if different from Facility Name)
6. Company Mailing Address (street, city, state, zip) P.O. Box 550, MSIN H6-60, Richland, WA 99352

II. Contact Information and Certification

1. Facility Contact Name (who will be onsite) Dennis Bowser	
2. Facility Contact Mailing Address (if different than Company Mailing Address)	
3. Facility Contact Phone Number (509) 373-2566	4. Facility Contact E-mail Dennis_W_Bowser@orp.doe.gov
5. Billing Contact Name (who should receive billing information) Dennis Bowser	
6. Billing Contact Mailing Address (if different than Company Mailing Address)	
7. Billing Contact Phone Number (509) 373-2566	8. Billing Contact E-mail Dennis_W_Bowser@orp.doe.gov
9. Consultant Name (optional – if 3rd party hired to complete application elements)	
10. Consultant Organization/Company	
11. Consultant Mailing Address (street, city, state, zip)	
12. Consultant Phone Number	13.Consultant E-mail
14. Responsible Official Name and Title (who is responsible for project policy or decision-making) Kevin W. Smith, Manager	
16. Responsible Official Phone (509) 372-2315	17. Responsible Official E-mail Kevin_W_Smith@orp.doe.gov
18. Responsible Official Certification and Signature I certify, based on information and belief formed after reasonable inquiry, the statements and information in this application are true, accurate and complete.	

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

DEPARTMENT OF ECOLOGY State of Washington

Notice of Construction Application

1. Facility Contact Name (who will be onsite) Dennis Bowser	
2. Facility Contact Mailing Address (if different than Company Mailing Address)	
3. Facility Contact Phone Number (509) 373-2566	4. Facility Contact E-mail Dennis_W_Bowser@orp.doe.gov
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9. Consultant Name (optional – if 3rd party hired to complete application elements)	
10. Consultant Organization/Company	
11. Consultant Mailing Address (street, city, state, zip)	
12. Consultant Phone Number	13.Consultant E-mail
Signature _____ Date_____	

Part 2: Technical Information

The Technical Information may be sent with this application form to the Cashiering Unit, or may be sent directly to the Ecology regional office with jurisdiction along with a copy of this application form.

For all sections, check the box next to each item as you complete it.

III. Project Description

Please attach the following to your application.

☒ Written narrative describing your proposed project.
☒ Projected construction start and completion dates.
☒ Operating schedule and production rates.
☒ List of all major process equipment with manufacturer and maximum rated capacity.
☒ Process flow diagram with all emission points identified.
☒ Plan view site map.

☐ Manufacturer specification sheets for major process equipment components.
☒ Manufacturer specification sheets for pollution control equipment.
☒ Fuel specifications, including type, consumption (per hour & per year) and percent sulfur.

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

DEPARTMENT OF ECOLOGY State of Washington

Notice of Construction Application

IV. State Environmental Policy Act (SEPA) Compliance

Check the appropriate box below.

☒ SEPA review is complete:
Include a copy of the final SEPA checklist and SEPA determination (e.g., DNS, MDNS, EIS) with your application.

☐ SEPA review has not been conducted:

☐ If review will be conducted by another agency, list the agency. You must provide a copy of the final SEPA checklist and SEPA determination before Ecology will issue your permit.
Agency Reviewing SEPA:

_____

☐ If the review will be conducted by Ecology, fill out a SEPA checklist and submit it with your application. You can find a SEPA checklist online at www.ecy.wa.gov/programs/sea/sepa/docs/echecklist.doc

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

DEPARTMENT OF ECOLOGY State of Washington

Notice of Construction Application

V. Emissions Estimations of Criteria Pollutants

Does your project generate criteria air pollutant emissions? ☒ Yes ☐ No

If yes, please provide the following information regarding your criteria emissions in your application.

☒ The names of the criteria air pollutants emitted (i.e., NO_x, SO_2, CO, $PM_{2.5}$, PM_{10}, TSP, VOC, and Pb)

☒ Potential emissions of criteria air pollutants in tons per hour, tons per day, and tons per year (include calculations)

☐ If there will be any fugitive criteria pollutant emissions, clearly identify the pollutant and quantity

VI. Emissions Estimations of Toxic Air Pollutants

Does your project generate toxic air pollutant emissions? ☒ Yes ☐ No

If yes, please provide the following information regarding your toxic air pollutant emissions in your application.

☒ The names of the toxic air pollutants emitted (specified in WAC 173-460-150[1])

☒ Potential emissions of toxic air pollutants in pounds per hour, pounds per day, and pounds per year (include calculations)

☐ If there will be any fugitive toxic air pollutant emissions, clearly identify the pollutant and quantity

VII. Emission Standard Compliance

☐ Provide a list of all applicable new source performance standards, national emission standards for hazardous air pollutants, national emission standards for hazardous air pollutants for source categories, and emission standards adopted under Chapter 70.94 RCW.
Does your project comply with all applicable standards identified? ☒ Yes ☐ No

VIII. Best Available Control Technology

☒ Provide a complete evaluation of Best Available Control Technology (BACT) for your proposal.

IX. Ambient Air Impacts Analyses

Please provide the following:

☒ Ambient air impacts analyses for Criteria Air Pollutants (including fugitive emissions)

[1] http://apps.leg.wa.gov/WAC/default.aspx?cite=173-460-150

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.

DEPARTMENT OF ECOLOGY State of Washington

Notice of Construction Application

☒ Ambient air impacts analyses for Toxic Air Pollutants (including fugitive emissions)

☒ Discharge point data for each point included in air impacts analyses (include only if modeling is required)

- ☒ Exhaust height
- ☒ Exhaust inside dimensions (ex. diameter or length and width)
- ☒ Exhaust gas velocity or volumetric flow rate
- ☒ Exhaust gas exit temperature
- ☒ The volumetric flow rate
- ☒ Description of the discharges (i.e., vertically or horizontally) and whether there are any obstructions (ex., raincap)
- ☒ Identification of the emission unit(s) discharging from the point
- ☒ The distance from the stack to the nearest property line
- ☒ Emission unit building height, width, and length
- ☒ Height of tallest building on-site or in the vicinity and the nearest distance of that building to the exhaust
- ☒ Whether the facility is in an urban or rural location

Does your project cause or contribute to a violation of any ambient air quality standard or acceptable source impact level? ☐ Yes ☒ No

If you need this document in a format for the visually impaired, call the Air Quality Program at 360-407-6800. Persons with hearing loss can call 711 for Washington Relay Service. Persons with a speech disability can call 877-833-6341.