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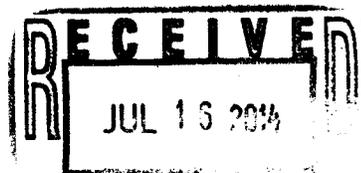
# Environmental Releases for Calendar Year 2012

Prepared for the U.S. Department of Energy  
Assistant Secretary for Environmental Management

Contractor for the U.S. Department of Energy  
under Contract DE-AC06-09RL14728



P.O. Box 650  
Richland, Washington 99352



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Mission Support Alliance

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**APPROVED**

*By Janis D. Aardal at 7:41 am, Aug 28, 2013*

Release Approval \_\_\_\_\_

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**CONTENTS**

1.0	INTRODUCTION	
1.1	TYPES AND LOCATIONS OF RELEASES.....	1-1
1.2	ENVIRONMENTAL RELEASE LIMITS AND GUIDELINES.....	1-1
1.2.1	Limits for Radioactive Releases .....	1-2
1.2.2	Limits for Nonradioactive Releases .....	1-2
2.0	AIR EMISSIONS	
2.1	RADIONUCLIDE AIR EMISSIONS.....	2-1
2.1.1	Radionuclide Air Emissions Data .....	2-1
2.1.2	Radionuclide Data Summary .....	2-1
2.2	CRITERIA AND TOXIC AIR POLLUTANTS .....	2-1
3.0	LIQUID EFFLUENTS.....	3-1
3.1	STATE PERMITTED DISCHARGES TO GROUND .....	3-1
3.1.1	200 Area Effluent Treatment Facility .....	3-1
3.1.2	200 Area Treated Effluent Disposal Facility.....	3-1
3.1.3	100-N Sewage Treatment Lagoon .....	3-1
3.1.4	200 West Area Evaporative Sewage Lagoon.....	3-1
3.1.5	Hydrotest, Maintenance, and Construction Discharges.....	3-2
3.1.6	Cooling Water and Steam Condensate Discharges .....	3-2
3.1.7	Stormwater Discharges .....	3-2
3.1.8	Waste Treatment and Immobilization Plant Pit 30 and Concrete Batch Plant Operations .....	3-2
3.1.9	Environmental Restoration Disposal Facility Pit 30 Discharges .....	3-2
4.0	HAZARDOUS SUBSTANCE RELEASES .....	4-1
4.1	NONROUTINE RELEASE .....	4-1
4.2	ROUTINE CONTINUOUS RELEASES .....	4-1
5.0	REFERENCES .....	5-1

**TABLES**

Table 2-1 Radionuclide Air Emissions from Facilities Managed by CH2M HILL Plateau Remediation Company, Mission Support Alliance, LLC, Washington Closure Hanford, LLC, and Washington River Protection Solutions, LLC, in 2012..... 2-2

Table 2-2 Hanford Site Radionuclide Air Emissions from Major Point Source in 2012 ..... 2-3

Table 2-3 Hanford Site Radionuclide Air Emissions from Minor Point Sources in 2012 ..... 2-7

Table 2-4 Criteria and Toxic Air Pollutants Reported by Hanford Site Facilities for 2012..... 2-9

Table 3-1 State Permitted Discharge Points during 2012..... 3-3

Table 3-2 Radionuclides in Liquid Effluents Discharged to the Environment in 2012..... 3-3

Table 3-3 200 Area Effluent Treatment Facility Discharge Monitoring Report (ST 4500, Outfall 001) for 2012..... 3-4

Table 3-4 200 Area Treated Effluent Disposal Facility Discharge Monitoring Report (ST 4502, Discharge No. 6653) for 2012 ..... 3-6

Table 3-5 100-N Sewage Treatment Lagoon Discharge Monitoring Report (ST 4507) for 2012..... 3-7

Table 3-6 200 West Area Evaporative Sewage Lagoon Discharge Monitoring Report (ST0045514) for 2012..... 3-7

Table 3-7 Waste Treatment and Immobilization Plant Concrete Batch Plant (WAG 50-5180) and Pit 30 (WAG 50-5181) Discharge Monitoring Report Effluents in 2012 ..... 3-8

Table 3-8 Environmental Restoration Disposal Facility Pit 30 Discharges in 2012..... 3-9

**ABBREVIATIONS AND ACRONYMS**

aka	also known as
BNI	Bechtel National, Inc.
Bq	becquerel
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
CFR	Code of Federal Regulations
CHPRC	CH2M HILL Plateau Remediation Company
Ci	curie
CY	calendar year
DCS	derived concentration standard
DL	detection limit
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EDE	effective dose equivalent
EDP	electronic data processing [code]
EPA	U.S. Environmental Protection Agency
ETF	Effluent Treatment Facility
FFTF	Fast Flux Test Facility
ft <sup>3</sup>	cubic foot
gal	gallons
gal/mo	gallons per month
gpm	gallons per minute
HTO	tritium, in the form of condensable water vapor
JCI	Johnson Controls, Inc.
L	liters
MASF	Maintenance and Storage Facility
MEI	maximally exposed individual
μCi	microcurie
μg/L	microgram per liter
μmhos/cm	micro-mho per centimeter
ml	milliliter
mrem	millirem (unit of dose)
MSA	Mission Support Alliance, LLC
MSIN	mailstop identifier
N	no
ND	no discharge or not detected (as defined within the context)
pCi	picocurie
PFP	Plutonium Finishing Plant
PNNL	Pacific Northwest National Laboratory
POTW	publicly owned treatment works
PUREX	Plutonium-Uranium Extraction (Plant)

**ABBREVIATIONS AND ACRONYMS (Cont.)**

REDOX	Reduction-Oxidation (S Plant)
RQ	reportable quantity
SALDS	State-Approved Land Disposal Site
TEDF	Treated Effluent Disposal Facility
WAC	Washington Administrative Code
WCH	Washington Closure Hanford, LLC
WESF	Waste Encapsulation and Storage Facility
WRAP	Waste Receiving and Processing Facility
WRPS	Washington River Protection Solutions, LLC
WSCF	Waste Sampling and Characterization Facility
WTP	Hanford Tank Waste Treatment and Immobilization Plant

## 1.0 INTRODUCTION

This report provides summaries of measured and/or estimated data on radioactive air emissions, criteria and/or toxic air pollutant emissions, and liquid effluents released to the environment during calendar year 2012. The summarized data are from documents submitted to environmental agencies and the U.S. Department of Energy (DOE) to satisfy various reporting requirements.

The reported releases are for facilities and activities managed by Bechtel National, Inc. (BNI); CH2M HILL Plateau Remediation Company (CHPRC); Johnson Controls, Inc. (JCI); Mission Support Alliance, LLC (MSA); Washington Closure Hanford, LLC (WCH); and Washington River Protection Solutions, LLC (WRPS). The releases were determined from direct sampling and resulting analysis data, calculations based upon approved release factors, and/or inventory records. Releases to the environment from facilities and non-facility activities managed by Pacific Northwest National Laboratory (PNNL) are not documented in this report.

### 1.1 TYPES AND LOCATIONS OF RELEASES

Radioactive air emissions were released during 2012 from facilities and activities in the 100, 200, 300, 400, and 600 Areas of the Hanford Site. Radioactive liquid effluents were discharged to the soil in the 600 Area. All air emissions and liquid discharges were beneath applicable limits.

Primary sources of criteria and/or toxic air pollutant emissions of industrial origin released to the ambient air at the Hanford Site during 2012 were: (1) fossil-fuel combustion emissions from the operation of package boilers; (2) fossil-fuel combustion emissions from generators; and (3) emissions of nitrogen oxides, ammonia, and volatile organic compounds from the 200 Area Effluent Treatment Facility (ETF), and tanks containing radioactive liquid waste. Most of these sources are located in the 200 and 300 Areas.

Nonradioactive process wastewater in the 200 Area is sent to the 200 Area Treated Effluent Disposal Facility (TEDF) for discharge to ground by way of two percolation basins. Radioactive wastewater from many Hanford Site sources is treated at the 200 Area ETF and then discharged to ground at the State-Approved Land Disposal Site (SALDS). The 100-N Sewage Treatment Lagoon receives sanitary wastewater from 100-N facilities and from septic systems in the 100-K and 200 Areas. The new 200 West Area Evaporative Sewer Lagoon (actually a lagoon system, or plant, that began initial operation on September 14, 2012) treats sewage from the Hanford Site in accordance with State Waste Discharge Permit ST0045514 (ST0045514). It treats up to 55,000 gallons a day of domestic wastewater by separating solids from effluents, using physical, chemical, and biological treatment processes. Aerated lagoons and settling lagoons stabilize the wastes by aerobic biological processes. Effluent is stored in evaporative lagoons wherein evaporation is the means of disposal. Wastewater and septage from existing onsite sewage systems is transported by trucks to the plant.

### 1.2 ENVIRONMENTAL RELEASE LIMITS AND GUIDELINES

This section presents relevant environmental release standards for radiological and nonradiological constituents. These standards are applicable to the release and environmental transport of constituents and are important to: (1) demonstrate compliance with any issued federal, state, or local permits, and (2) demonstrate compliance with any federal, state, and local regulations and/or guidelines prescribed by DOE Richland Operations Office.

DOE/RL-2013-18, *Hanford Site Environmental Report for Calendar Year 2012*, contains an assessment of the Hanford Site radiological dose impact to the public. Effluent and emission data in DOE/RL-2013-18 and DOE/RL-2013-12, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2012*, were used by

PNNL to estimate a maximized radiological dose to the public. That radiological dose demonstrates the state of compliance with applicable standards and regulations. Related compliance determinations to federal and state dose standards are also published in DOE/RL-2013-18.

### **1.2.1 Limits for Radioactive Releases**

Quantities of radionuclides in air emissions and liquid effluents from the Hanford Site are governed by DOE Order 458.1, *Radiation Protection of the Public and the Environment*. Quantities of radionuclides in air emissions are also regulated by 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities;" Washington Administrative Code (WAC) 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides," and WAC 246-247, "Radiation Protection – Air Emissions." The effective dose equivalent (EDE) received by any member of the offsite public from all Hanford Site routine operational effluents and emissions is not to exceed 100 mrem/yr. For occasional exposure from noncontinuous releases, the EDE is not to exceed 500 mrem/yr. From the air pathway only, the EDE to any member of the public is not to exceed 10 mrem/yr. Derived concentration standard (DCS) values associated with DOE Order 458.1 apply to all radioactive effluents and emissions to which members of the public are exposed. However, DCS values are not emissions limits and are therefore used for comparison purposes only.

### **1.2.2 Limits for Nonradioactive Releases**

The following regulations, as applicable, govern nonradioactive constituents in air emissions and liquid effluents: *Clean Air Act of 1990*, as amended; *Clean Water Act of 1977*; *Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA)*; *Resource Conservation and Recovery Act of 1976*; *Safe Drinking Water Act of 1974*; *Toxic Substances Control Act of 1976*; State of Washington regulations WAC 173-216, "State Waste Discharge Permit Program"; WAC 173-218, "Underground Injection Control Program"; WAC 173-303, "Dangerous Waste Regulations"; WAC 173-400, "General Regulations for Air Pollution Sources"; WAC 173-401, "Operating Permit Regulation"; WAC 173-460, "Controls for New Sources of Toxic Air Pollutants"; and the Benton Clean Air Agency *Regulation 1*.

The Washington State Department of Ecology (Ecology) issues permits governing Hanford Site liquid effluent discharges to the ground per the requirements of WAC 173-216. Monitoring, sampling, analysis parameters, and release limits for specific constituents are defined in discharge permits issued by Ecology.

## 2.0 AIR EMISSIONS

Facilities and activities managed by CHPRC, JCI, MSA, WCH, and WRPS released radioactive emissions and criteria and toxic air pollutants to the atmosphere during 2012. Release data for each type of emission are discussed separately.

### 2.1 RADIONUCLIDE AIR EMISSIONS

Actively ventilated point sources having a potential to emit radioactive material to the atmosphere are routinely monitored. These point source emissions are measured and documented in this report when the following criteria were met during calendar year (CY) 2012: (1) the point source requires continuous monitoring or periodic confirmatory measurements in accordance with 40 CFR 61, Subpart H, or WAC 246-247, (2) the point source is listed in the *Hanford Site Title V Air Operating Permit 00-05-006*, and (3) the point source normally emits radioactive material or has the potential to emit radioactive material. Point sources not included in this section either did not meet those criteria or their air emissions were not actively ventilated. Examples of point sources without active ventilation include those that are deactivated, closed off from the ambient atmosphere, and passively ventilated.

Fugitive radionuclide air emissions emanating from Hanford Site facilities and waste sites are monitored by the Near-Field Monitoring Program. Ambient air data collected by this program are in DOE/RL-2013-12 and DOE/RL-2013-18.

#### 2.1.1 Radionuclide Air Emissions Data

Radionuclide air emission release data from facilities are in Table 2-1. Table 2-2 presents radionuclide air emission data for major point sources, while Table 2-3 presents radionuclide air emission data for minor point sources. Major point sources have a potential to discharge radionuclides into the air in quantities that could cause an EDE in excess of 0.1 mrem/yr to the maximally exposed individual (MEI) member of the public. Minor point sources have a potential to discharge radionuclides into the air in quantities that will not cause an EDE to exceed 0.1 mrem/yr to the MEI.

#### 2.1.2 Radionuclide Data Summary

Tables 2-2 and 2-3 list information associated with radioactive air emissions to the environment from point sources, via either stacks or vents.

## 2.2 CRITERIA AND TOXIC AIR POLLUTANTS

Criteria and toxic air pollutants reported for CY 2012 were from the following areas and facilities: package boilers in the 200 and 300 Areas; East Tank Farms; West Tank Farms, 200 Area ETF, and internal combustion engines. Emission data are in Table 2-4.

The Hanford Tank Waste Treatment and Immobilization Plant (WTP) also had emissions of criteria and/or toxic air pollutants in CY 2012, which are accounted for in Table 2-4. WTP emission sources include concrete batch plant point and fugitive emissions; diesel generators; fuel storage tanks; diesel and propane heaters; and dehumidifiers. Fugitive sources of emissions include aggregate processing, unpaved roads, and stockpiles. As are all of the emissions reflected in Table 2-4, the WTP emissions are estimated to the nearest ton and reported in DOE/RL-2013-17, *Calendar Year 2012 Criteria and Toxic Air Pollutants Air Emissions Inventory*.

Table 2-1. Radionuclide Air Emissions from Facilities Managed by CH2M HILL Plateau Remediation Company, Mission Support Alliance, LLC, Washington Closure Hanford, LLC, and Washington River Protection Solutions, LLC, in 2012.

Radionuclide	Releases, Ci <sup>a</sup>					
	100 Areas	200 East Area	200 West Area	300 Area	400 Area	Total
<sup>3</sup> H (as HTO) <sup>b</sup>	NA	NA	NA	NA	1.8 E-03	1.8 E-03
<sup>22</sup> Na	NA	NA	NA	NA	1.4 E-09	1.4 E-09
<sup>90</sup> Sr	1.8 E-05 <sup>c</sup>	4.9 E-04 <sup>c</sup>	1.0 E-05 <sup>c</sup>	3.3 E-07 <sup>c</sup>	NA	5.2 E-04 <sup>c</sup>
<sup>129</sup> I	NA	9.8 E-04	NA	NA	NA	9.8 E-04
<sup>137</sup> Cs	4.0 E-06	3.6 E-05	2.7 E-07	ND	8.4 E-07 <sup>d</sup>	4.1 E-05
<sup>238</sup> Pu	7.9 E-07	ND	6.5 E-07	ND	NA	1.4 E-06
<sup>239/240</sup> Pu	1.3 E-05 <sup>e</sup>	7.5 E-07 <sup>e</sup>	9.5 E-05 <sup>e</sup>	1.6 E-08 <sup>e</sup>	9.9 E-08 <sup>e</sup>	1.1 E-04 <sup>e</sup>
<sup>241</sup> Am	3.9 E-06	6.7 E-08	6.7 E-06	ND	NA	1.1 E-05
<sup>241</sup> Pu	3.8 E-05	3.4 E-08	1.5 E-05	NA	NA	5.3 E-05

<sup>a</sup> 1 Ci = 1 curie = 3.7 E+10 becquerels (Bq), with becquerel defined as equal to one nuclear decay or other nuclear transformation per second; ND = not detected (i.e., either the radionuclide was not detected in any sample during the year or the average of all the measurements for that given radionuclide or type of radioactivity made during the year was below background levels).

<sup>b</sup> HTO = tritium in the form of condensable water vapor.

<sup>c</sup> This release value includes gross beta data, assumed to be <sup>90</sup>Sr in dose calculations. **Note:** For the 300 Area, the release value is entirely from gross beta because Sr-90 was not detected in emissions from the single WCH major stack, samples from which were analyzed for Sr-90.

<sup>d</sup> This release value derives entirely from data on gross beta emissions from 400 Area stacks.

<sup>e</sup> This release value includes data on gross alpha emissions from some stacks, except for those in the 400 Area, the value for which derives entirely from calculations based on estimates of residual radioactive material in the Fast Flux Test Facility (FFTF) reactor primary coolant system piping.

Table 2-2. Hanford Site Radionuclide Air Emissions from Major Point Sources in 2012.<sup>a</sup> (4 sheets)

Stack (facility; contractor; EDP code) <sup>b</sup>	Average operating flow rate, <sup>c</sup> ft <sup>3</sup> /min	Volume, ft <sup>3</sup>	Radionuclide or type of radioactivity	Average operating concentration, <sup>d</sup> μCi/mL	Emissions, Ci
<b>100 Area Major Point Source</b>					
<b>296-K-142</b> (CVDF;CHPRC; Y201)	16,100	8.5 E+09	<sup>90</sup> Sr	≤0	0
			<sup>137</sup> Cs	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	≤0	0
			<sup>241</sup> Pu	7.1 E-15	3.0 E-06
			<sup>241</sup> Am	3.0 E-19	1.3 E-10
			gross α	1.7 E-16	7.1 E-08
			gross β	2.7 E-16	1.2 E-07
<b>200 East Area Major Point Sources</b>					
<b>291-A-1</b> (PUREX Plant; CHPRC; A006)	27,215	1.45 E+10	<sup>90</sup> Sr	1.8 E-15	1.5 E-06
			<sup>129</sup> I	2.1 E-12	9.8 E-04
			<sup>137</sup> Cs	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	7.8 E-17	6.5 E-08
			<sup>241</sup> Am	7.6 E-17	6.3 E-08
			gross α	2.0 E-16	1.7 E-07
			gross β	9.3 E-16	7.7 E-07
<b>296-A-42</b> (TF; WRPS; E147)	807	4.3 E+08	<sup>90</sup> Sr	≤0	0
			<sup>137</sup> Cs	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	≤0	0
			<sup>241</sup> Am	≤0	0
			gross α	3.4 E-18	5.6 E-11
			gross β	2.5 E-16	4.2 E-09
<b>296-A-44</b> <b>and</b> <b>296-A-45</b> (TF; WRPS; E920 and E922, respectively [these two stacks exhaust the same source])	1,082 and 1,080	6.7 E+08	<sup>90</sup> Sr	≤0	0
			<sup>90</sup> Y	≤0	0
			<sup>137</sup> Cs	≤0	0
			<sup>231</sup> Pa	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	3.2 E-17	6.3 E-10
			<sup>241</sup> Pu	≤0	0
			<sup>241</sup> Am	≤0	0
			gross α	7.6 E-17	1.5 E-09
			gross β	9.8 E-16	2.0 E-08

Table 2-2. Hanford Site Radionuclide Air Emissions from Major Point Sources in 2012.<sup>a</sup> (4 sheets)

Stack (facility; contractor; EDP code) <sup>b</sup>	Average operating flow rate, <sup>c</sup> ft <sup>3</sup> /min	Volume, ft <sup>3</sup>	Radionuclide or type of radioactivity	Average operating concentration, <sup>d</sup> μCi/mL	Emissions, Ci
<b>296-A-46 and 296-A-47</b>  (TF; WRPS; E924 and E926, respectively [these two stacks exhaust the same source])	1,004 and 1,021	5.3 E+08	<sup>90</sup> Sr	≤0	0
			<sup>90</sup> Y	≤0	0
			<sup>137</sup> Cs	≤0	0
			<sup>231</sup> Pa	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	≤0	0
			<sup>241</sup> Pu	1.8 E-15	3.6 E-08
			<sup>241</sup> Am	≤0	0
			gross α	3.9 E-17	7.9 E-10
			gross β	1.8 E-15	3.8 E-08
<b>296-B-1</b>  (B Plant; CHPRC; B001)	16,105	8.5 E+09	<sup>90</sup> Sr	≤0	0
			<sup>137</sup> Cs	≤0	0
			gross α	2.4 E-17	7.1 E-09
			gross β	1.5 E-16	4.3 E-08
<b>296-B-10</b>  (WESF; CHPRC; B748)	24,390	1.3 E+10	<sup>90</sup> Sr	2.6 E-13	1.5 E-04
			<sup>137</sup> Cs	6.1 E-14	3.6 E-05
			gross α	3.7 E-16	2.2 E-07
			gross β	5.6 E-13	3.3 E-04
<b>296-H-212</b>  (CSB; CHPRC; C601)	8,694	4.6 E+09	<sup>90</sup> Sr	≤0	0
			<sup>137</sup> Cs	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	1.2 E-17	1.9 E-09
			<sup>241</sup> Pu	≤0	0
			<sup>241</sup> Am	2.4 E-17	3.8 E-09
			gross α	7.2 E-17	1.1 E-08
			gross β	6.4 E-16	1.0 E-07
<b>296-P-45</b> (TF; WRPS E047)			did not operate		
<b>296-P-47</b>  (TF; WRPS; E096)	853	2.5 E+08	<sup>90</sup> Sr	≤0	0
			<sup>137</sup> Cs	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	≤0	0
			<sup>241</sup> Am	≤0	0
			gross α	7.2 E-16	9.6 E-10
			gross β	2.5 E-14	3.4 E-08
<b>296-P-48</b>  (TF; WRPS; E098)	459	3.4 E+07	<sup>90</sup> Sr	1.9 E-15	1.9 E-08
			<sup>137</sup> Cs	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	3.2 E-17	3.1 E-10

Table 2-2. Hanford Site Radionuclide Air Emissions from Major Point Sources in 2012.<sup>a</sup> (4 sheets)

Stack (facility; contractor; EDP code) <sup>b</sup>	Average operating flow rate, <sup>c</sup> ft <sup>3</sup> /min	Volume, ft <sup>3</sup>	Radionuclide or type of radioactivity	Average operating concentration, <sup>d</sup> μCi/mL	Emissions, Ci			
296-P-107 (TF; WRPS; E104)	1,812	5.1 E+08	<sup>241</sup> Am	≤0	0			
			gross α	8.1 E-17	7.9 E-10			
			gross β	2.9 E-15	2.8 E-08			
			<sup>90</sup> Sr	≤0	0			
			<sup>137</sup> Cs	≤0	0			
			<sup>238</sup> Pu	≤0	0			
			<sup>239/240</sup> Pu	≤0	0			
			<sup>241</sup> Am	≤0	0			
			gross α	1.2 E-16	2.3 E-09			
			gross β	1.8 E-14	3.4 E-07			
<b>200 West Area Major Point Sources</b>								
291-T-1 (221-T; CHPRC; T785)	40,000	2.1 E+10	<sup>90</sup> Sr	4.8 E-16	3.6 E-07			
			<sup>137</sup> Cs	3.5 E-16	2.7 E-07			
			<sup>238</sup> Pu	≤0	0			
			<sup>239/240</sup> Pu	1.6 E-15	1.2 E-06			
			<sup>241</sup> Pu	≤0	0			
			<sup>241</sup> Am	1.1 E-16	8.3 E-08			
			gross α	1.6 E-15	1.2 E-06			
			gross β	2.7 E-15	2.1 E-06			
			291-Z-1 (PFP; CHPRC; Z810)	290,000	1.5 E+11	<sup>238</sup> Pu	1.3 E-16	6.5 E-07
						<sup>239/240</sup> Pu	6.3 E-15	3.2 E-05
<sup>241</sup> Pu	3.0 E-15	1.5 E-05						
<sup>241</sup> Am	1.3 E-15	6.7 E-06						
gross α	1.2 E-14	6.0 E-05						
gross β	1.1 E-15	5.6 E-06						
296-P-43 (TF; WRPS; E045)						did not operate		
296-P-44 (TF; WRPS; E046)			did not operate					
296-S-21 (222-S; WRPS; S289)	74,544	3.9 E+10	<sup>90</sup> Sr	≤0	0			
			<sup>137</sup> Cs	≤0	0			
			<sup>238</sup> Pu	≤0	0			
			<sup>239/240</sup> Pu	≤0	0			
			<sup>241</sup> Am	9.9 E-20	1.6 E-10			
			gross α	3.6 E-17	5.6 E-08			
			gross β	3.3 E-16	5.2 E-07			
			296-W-4 (WRAP; CHPRC; W123)	15,455	8.1 E+09	<sup>90</sup> Sr	1.0 E-16	3.3 E-08
<sup>137</sup> Cs	≤0	0						
<sup>238</sup> Pu	≤0	0						
<sup>239/240</sup> Pu	≤0	0						

Table 2-2. Hanford Site Radionuclide Air Emissions from Major Point Sources in 2012.<sup>a</sup> (4 sheets)

Stack (facility; contractor; EDP code) <sup>b</sup>	Average operating flow rate, <sup>c</sup> ft <sup>3</sup> /min	Volume, ft <sup>3</sup>	Radionuclide or type of radioactivity	Average operating concentration, <sup>d</sup> μCi/mL	Emissions, Ci
			<sup>241</sup> Pu	≤0	0
			<sup>241</sup> Am	≤0	0
			gross α	8.4 E-18	2.7 E-09
			gross β	2.1 E-16	6.5 E-08
<b>300 Area Major Point Sources</b>					
<b>EP-324-01-S</b>	42,262	2.2 E+10	<sup>90</sup> Sr	≤0	0
(324 Building; WCH; F025)			<sup>137</sup> Cs	≤0	0
			<sup>238</sup> Pu	≤0	0
			<sup>239/240</sup> Pu	2.2 E-17	1.6 E-08
			<sup>241</sup> Am	≤0	0
			gross α	1.1 E-17	8.1 E-09
			gross β	4.5 E-16	3.3 E-07

General definitions: ≤0 = analytical result equal to level of laboratory ambient background radioactivity or less than that level, which in practical terms means the radionuclide or type of radioactivity was not detected in the emission sampled; Ci = curie; 1 Ci = 3.7 E+10 becquerels (Bq), with becquerel defined as equal to one nuclear decay or other nuclear transformation per second; ft<sup>3</sup> = cubic feet; min = minute.

<sup>a</sup> A major point source has a radiological dose potential of >0.1 mrem/year EDE to the nearest public receptor.

<sup>b</sup> Abbreviations in this column are defined as: CHPRC = CH2M HILL Plateau Remediation Company; CSB = Canister Storage Building; CVDF = Cold Vacuum Drying Facility; EDP code = electronic data processing code, used in chain-of-custody activities to identify sampling locations; PFP = Plutonium Finishing Plant; PUREX = Plutonium-Uranium Extraction; TF = Tank Farms; WCH = Washington Closure Hanford, LLC; WESF = Waste Encapsulation and Storage Facility; WRAP = Waste Receiving and Processing Facility; WRPS = Washington River Protection Solutions, LLC.

<sup>c</sup> Reflects stack flow rate averaged over time of stack operation.

<sup>d</sup> Reflects concentration averaged over time of stack operation.

Table 2-3. Hanford Site Radionuclide Air Emissions from Minor Point Sources in 2012.<sup>a</sup>  
(3 sheets)

Stack (facility; contractor; EDP Code) <sup>b</sup>	Average operating flow rate, <sup>c</sup> ft <sup>3</sup> /min	Volume, ft <sup>3</sup>	Radionuclide or type of radioactivity	Average operating concentration, <sup>d</sup> μCi/mL	Emissions, Ci
<b>100 Area Minor Point Source</b>					
<b>105-KW Basin</b> (100-K Area; CHPRC; Y234, Y236 [Y235 did not operate])	8,700	4.6 E+09	<sup>90</sup> Sr	3.4 E-14	4.9 E-06
			<sup>137</sup> Cs	2.8 E-14	4.0 E-06
			<sup>238</sup> Pu	5.6 E-15	7.9 E-07
			<sup>239/240</sup> Pu	3.3 E-14	4.6 E-06
			<sup>241</sup> Pu	2.5 E-13	3.5 E-05
			<sup>241</sup> Am	2.8 E-14	3.9 E-06
			gross α	5.8 E-14	8.2 E-06
gross β	8.9 E-14	1.3 E-05			
<b>200 East Area Minor Point Sources</b>					
<b>296-A-18</b> (TF; WRPS; E060)	1,046	4.5 E+08	gross α	3.6 E-16	6.3 E-09
			gross β	1.6 E-15	2.8 E-08
<b>296-A-19</b> (TF; WRPS; E061)	795	4.3 E+08	<sup>90</sup> Sr	≤0	0
			<sup>137</sup> Cs	≤0	0
			<sup>241</sup> Am	≤0	0
			gross α	5.4 E-16	7.6 E-09
			gross β	1.7 E-15	2.5 E-08
<b>296-A-20</b> (TF; WRPS; E197)	1,942	9.5 E+08	gross α	3.0 E-17	9.5 E-10
			gross β	9.4 E-16	3.0 E-08
<b>296-A-21A</b> (242-A Evaporator; WRPS; E651)	19,218	6.2 E+09	gross α	2.3 E-17	5.5 E-09
			gross β	9.0 E-17	2.1 E-08
<b>296-A-22</b> (242-A Evaporator; WRPS; E643)	428	2.2 E+08	gross α	1.8 E-16	7.9 E-10
			gross β	2.6 E-15	1.2 E-08
<b>296-A-26</b> (TF; WRPS; E297)			did not operate		
<b>296-A-28</b> (TF; WRPS; E272)	6,712	3.5 E+09	gross α	4.8 E-16	1.0 E-07
			gross β	1.7 E-15	3.6 E-07
<b>296-A-30</b> (TF; WRPS; E903)	5,818	1.8 E+09	gross α	2.8 E-16	2.6 E-08
			gross β	2.6 E-15	2.4 E-07
<b>296-A-40</b> (TF; WRPS; E013)	796	3.5 E+09	gross α	9.8 E-17	1.4 E-09
			gross β	9.2 E-16	1.3 E-08
<b>296-A-41</b> (TF; WRPS; E015)	7,828	3.5 E+09	gross α	9.6 E-17	1.2 E-08
			gross β	1.8 E-16	2.2 E-08

Table 2-3. Hanford Site Radionuclide Air Emissions from Minor Point Sources in 2012.<sup>a</sup>  
(3 sheets)

Stack (facility; contractor; EDP Code) <sup>b</sup>	Average operating flow rate, <sup>c</sup> ft <sup>3</sup> /min	Volume, ft <sup>3</sup>	Radionuclide or type of radioactivity	Average operating concentration, <sup>d</sup> μCi/mL	Emissions, Ci
<b>296-A-43</b> (TF; WRPS; E148)	799	4.0 E+08	gross α	≤0	0
			gross β	1.1 E-16	1.7 E-09
<b>296-E-1</b> (ETF; CHPRC; E036)	50,978	2.7 E+10	gross α	1.1 E-16	1.1 E-07
			gross β	3.2 E-16	3.4 E-07
<b>200 West Area Minor Point Sources</b>					
<b>291-S-1</b> (REDOX Plant; CHPRC; S006)	18,449	9.7 E+09	gross α	1.2 E-15	4.5 E-07
			gross β	4.1 E-15	1.5 E-06
<b>296-P-22</b> (TF; WRPS; W191)	742	3.2 E+08	gross α	2.9 E-16	3.3 E-09
			gross β	1.6 E-15	1.8 E-08
<b>296-P-23 (W190) and 296-S-25 (W145)</b> (TF; WRPS; [stacks alternate exhausting a single source])	1,812 and 832	4.5 E+08 [combined total for both stacks]	gross α	4.6 E-16	7.5 E-09
			gross β	2.6 E-15	4.2 E-08
<b>296-S-16</b> (222-S; WRPS; S264)	24	1.3 E+07	gross α	7.7 E-16	3.7 E-10
			gross β	3.4 E-15	1.7 E-09
<b>296-T-7</b> (2706-T; CHPRC; T154)	160	8.4 E+07	<sup>137</sup> Cs	≤0	0
			gross α	≤0	0
			gross β	1.6 E-14	5.5 E-08
<b>296-Z-15</b> (PFP; CHPRC; Z915)	1,357	7.2 E+08	gross α	≤0	0
			gross β	≤0	0
<b>400 Area Minor Point Sources</b>					
<b>437-1-61</b> (MASF; CHPRC; F019)	12,600	4.6 E+09	gross α	≤0	0
			gross β	1.2 E-16	3.1 E-08
<b>437-MN&amp;ST</b> (MASF; CHPRC; F014)	4,643	4.6 E+09	gross α	7.0E-16	7.5 E-08
			gross β	7.6E-15	8.1 E-07
<b>FFTF-CB-EX</b> (FFTF; CHPRC; F011)	NA	NA	<sup>3</sup> H (HTO)	NA	1.8 E-03 <sup>e</sup>
			<sup>22</sup> Na	NA	1.4 E-09 <sup>e</sup>
			<sup>137</sup> Cs	NA	6.7 E-13 <sup>e</sup>
			<sup>239</sup> Pu	NA	9.1 E-15 <sup>e</sup>
			[Note: No measured flow from stack. Ci values derived from residual radioactive sodium in FFTF reactor primary coolant system piping, not actually measured from emission samples.]		
<b>600 Area Minor Point Sources</b>					
<b>696-W-1</b> (WSCF; MSA; W010)	49,748	2.6 E+10	gross α	≤0	0
			gross β	1.1 E-16	1.1 E-07
<b>696-W-2</b> (WSCF; MSA; W011)	1,178	6.2 E+08	gross α	≤0	0
			gross β	1.3 E-16	3.2 E-09

General definitions: ≤0 = analytical result equal to level of laboratory ambient background radioactivity or less than that level, which in practical terms means the radionuclide or type of radioactivity was not detected in the sample of the emission collected; Ci = curie; 1 Ci = 3.7 E+10 becquerels (Bq); ft<sup>3</sup> = cubic feet; HTO is tritiated water vapor, or tritium in the form of condensable water vapor; min = minute; mrem = millirem; NA = not applicable.

- <sup>a</sup> Determining the potential prospective dose impact of each point source necessitated using nearest public receptors, who may differ from the annually determined Hanford Site MEI.
- <sup>b</sup> Abbreviations and acronyms in this column are: CHPRC = CH2M HILL Plateau Remediation Company; EDP code = electronic data processing code, used in chain-of-custody activities to identify sampling locations; ETF = Effluent Treatment Facility; FFTF = Fast Flux Test Facility; MASF = Maintenance and Storage Facility; MSA = Mission Support Alliance, LLC; PFP = Plutonium Finishing Plant; REDOX = Reduction Oxidation (aka S Plant); TF = Tanks Farms; WCH = Washington Closure Hanford, LLC; WRPS = Washington River Protection Solutions, LLC; and WSCF = Waste Sampling and Characterization Facility.
- <sup>c</sup> Reflects stack flow rate averaged over time of stack operation.
- <sup>d</sup> Reflects concentration averaged over time of stack operation.
- <sup>e</sup> Value based on estimates of residual sodium in FFTF reactor primary coolant piping system.

Table 2-4. Criteria and Toxic Air Pollutants Reported by Hanford Site Facilities for 2012.

Constituent	Quantities, lb
Particulate matter total	0
Particulate matter ≤10 μm	0
Particulate matter ≤2.5 μm	0
Sulfur oxides	0
Nitrogen oxides	14,000
Carbon monoxide	18,000
Volatile organic compounds <sup>a, b</sup>	18,000
Ammonia <sup>c</sup>	32,000
Total criteria and toxic pollutants <sup>d</sup>	42,000

- <sup>a</sup> This estimated release of volatile organic compounds does not include emissions from certain laboratory operations nor from small non-road and/or mobile sources (e.g., vehicles, grass mowers, chain saws, etc.).
- <sup>b</sup> From combustion of petroleum to make steam and to power electrical generators; release value includes calculated estimates from tank farms in the 200 East and 200 West Areas; evaporation losses from fuel dispensing; and operation of the 200 Area ETF, Central Waste Complex, T Plant Complex, and Waste Receiving and Processing Facility.
- <sup>c</sup> Ammonia releases are calculated estimates from tank farms in the 200 East and 200 West Areas, from operation of the 200 Area ETF, and from petroleum burned to make steam and to power electrical generators.
- <sup>d</sup> Criteria pollutants include particulate matter—total, nitrogen oxides, sulfur oxides, carbon monoxide, lead, and volatile organic compounds.

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### 3.0 LIQUID EFFLUENTS

During CY 2012, nonradioactive and radioactive liquid effluents were discharged to the ground and radioactive liquid effluents to the Columbia River from facilities and activities managed by CHPRC, MSA, WCH, and WRPS. All discharges were in accordance with the requirements of state and federal discharge permits. Table 3-1 lists the permitted discharge points active in CY 2012.

Wastewater from various 200 Area facilities is piped to the 200 Area TEDF. The wastewater originates from the Plutonium Finishing Plant (PFP), T Plant, the Waste Encapsulation Storage Facility (WESF), 242-A-81 Building, 283-W Water Treatment Plant, 242-A Evaporator (when operating), 241-A Tank Farm, 222-S Laboratory, and several package boiler annexes in the 200 East and 200 West Areas.

ETF treats 242-A Evaporator process condensate, as well as other radioactive liquids generated at the Hanford Site, such as groundwater from the UP-1 Operable Unit and wastewater from cleanup of the 105-KW fuel storage basin. ETF treats liquid waste by filtration, ultraviolet oxidation, pH adjustment, reverse osmosis, and ion exchange. After treatment, the liquid waste is sampled and analyzed before approval is granted for discharge to SALDS, data for which are in Table 3-2.

#### 3.1 STATE PERMITTED DISCHARGES TO GROUND

State Waste Discharge Permits govern all Hanford Site liquid effluent streams discharged to the ground. The permitted streams are listed in Table 3-1 and described in succeeding sections.

##### 3.1.1 200 Area Effluent Treatment Facility

The 200 Area ETF discharges treated wastewater. The discharges are regulated in accordance with State Waste Discharge Permit ST 4500 (ST 4500). Permit-specified monitoring and analytical data parameters are in Table 3-3.

##### 3.1.2 200 Area Treated Effluent Disposal Facility

The 200 Area TEDF discharges treated wastewater to the ground. The facility consists of a piping network that conveys wastewater from numerous facilities on the Hanford Site to two 5-acre disposal basins located near the facility. Discharges from the 200 Area TEDF are regulated in accordance with State Waste Discharge Permit ST 4502 (ST 4502). Permit-specified monitoring and analytical data parameters are in Table 3-4. The discharges routinely meet state drinking water standards.

##### 3.1.3 100-N Sewage Treatment Lagoon

The 100-N Sewage Treatment Lagoon treats sewage from the 100-N, 100-K, and 200 Areas. Domestic wastewater from the 100-N Sewage Treatment Lagoon is discharged to ground in accordance with State Waste Discharge Permit Number ST 4507 (ST 4507). Leachate from residual solids and radioactive waste is not allowed by the permit. Permit-specified monitoring and analytical data parameters are in Table 3-5.

##### 3.1.4 200 West Area Evaporative Sewage Lagoon

The 200 West Evaporative Lagoon, which began initial operation on September 14, 2012, treats sewage from the 200 Areas and is operated in accordance with State Waste Discharge Permit ST0045514 (ST0045514). Reportable monitoring parameters are shown in Table 3-6.

### **3.1.5 Hydrotest, Maintenance, and Construction Discharges**

Hydrotest, maintenance, and construction activities occur at numerous locations throughout the Hanford Site producing wastewater discharges to soil. Such discharges are regulated in accordance with State Waste Discharge Permit ST 4511 (ST 4511), which also includes discharges of cooling water, steam condensate, and industrial stormwater. Sampling the discharges is not required as long as compliance is maintained with the Ecology-approved DOE/RL-97-67, *Pollution Prevention and Best Management Practices Plan for State Waste Discharge Permit ST 4511*.

WTP discharges hydrotest, maintenance, and construction water to ground in accordance with ST 4511. Discharge compliance is maintained through the Ecology-approved DOE/RL-97-67. Significant annual discharges as defined in permit condition S6 are documented. No significant discharges at WTP occurred in 2012.

### **3.1.6 Cooling Water and Steam Condensate Discharges**

Cooling water and steam condensate discharges occur at numerous locations throughout the Hanford Site. Such discharges are regulated in accordance with ST 4511, which also includes discharges of hydrotests, maintenance, construction, and stormwater. Discharge sampling is not required as long as compliance is maintained with DOE/RL-97-67.

### **3.1.7 Stormwater Discharges**

Industrial stormwater discharges collected in engineered structures and then discharged to engineered structures occur at numerous locations throughout the Hanford Site. Such discharges are regulated in accordance with ST 4511, which also addresses discharges from hydrotests, maintenance, construction, cooling water, and steam condensate. Discharge sampling is not required as long as compliance is maintained with DOE/RL-97-67.

### **3.1.8 Waste Treatment and Immobilization Plant Pit 30 and Concrete Batch Plant Operations**

WTP discharges process, dewatering, and stormwater to the ground at two locations in the 200 East Area of the Hanford Site: the Concrete Batch Plant (Discharge Permit WAG 50-5180) and Pit 30 (Discharge Permit WAG 50-5181). Permit-specified monitoring and analytical data parameters are in Table 3-6. Those data are from quarterly Sand and Gravel General Permit Discharge Monitoring Reports.

### **3.1.9 Environmental Restoration Disposal Facility Pit 30 Discharges**

Additional water discharges occurred in Pit 30 during operations to obtain gravel to be used in the construction of the Environmental Restoration Disposal Facility expansion cells. These activities were conducted under CERCLA, and the requirements of the State-wide Sand and Gravel Permit determined to be substantive were implemented. The monitoring data associated with sand and gravel activities in Pit 30 are reported in Table 3-7.

Table 3 -1. State Permitted Discharge Points during 2012.

Permit Number	Description
ST 4500	200 Area ETF, Discharge No. 001
ST 4502	200 Area TEDF, Discharge No. 6653
ST 4507	100-N Sewage Lagoon
ST 4511	<ul style="list-style-type: none"> <li>• Hydrotest, maintenance, and construction discharges</li> <li>• Cooling water and steam condensate discharges</li> <li>• Industrial stormwater discharges</li> <li>• WTP hydrostatic discharges</li> </ul>
ST0045514	200 West Area Evaporative Sewage Lagoon
WAG 50-5180	WTP Concrete Batch Plant Sand and Gravel General Permit
WAG 50-5181	WTF Pit 30 Sand and Gravel General Permit

Table 3-2. Radionuclides in Liquid Effluents Discharged to the Environment in 2012.

Liquid Effluent Stream (EDP code) <sup>a</sup>	Discharge Location	Total Flow, gal	Radionuclide or Type of Radioactivity	Average Concentration, $\mu\text{Ci}/\text{mL}$ <sup>b</sup>	Annual Release, Ci <sup>b</sup>
<i>Discharges to Ground in the 600 Area</i>					
200 Area Effluent Treatment Facility (H129)	616-A Crib (aka SALDS) <sup>c</sup>	9.5 E+07	$^3\text{H}$	9.8E-03	3.5

<sup>a</sup> EDP code = electronic data processing code, which identifies the sampler (aka "location code").

<sup>b</sup> Ci = curie; Ci = 3.7 E+10 becquerels/sec., with becquerel defined as equal to one nuclear decay or other nuclear transformation per second.

<sup>c</sup> The 616-A Crib is immediately north of the 200 West Area; SALDS = State-Approved Land Disposal Site.

Table 3-3. 200 Area Effluent Treatment Facility Discharge Monitoring Report (ST 4500, Outfall 001) for 2012. (2 sheets)

Sample Parameter <sup>a</sup> (monthly grab sample)	Monthly											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Conductivity (µmhos/cm)	ND	0.963	ND	3.12	3.13	1.98	1.66	ND	ND	ND	ND	ND
Total suspended solids (µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Nitrate (as N; µg/L)	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND
Total organic carbon (µg/L)	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND
Chloride (µg/L)	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND
Sulfate (µg/L)	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND
Arsenic (total; µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Arsenic (total; max., µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Beryllium (total; µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Cadmium (total; µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Chromium (total; µg/L)	ND	0.183	ND	0.153	<DL	<DL	0.206	ND	ND	ND	ND	ND
Copper (total; µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Lead (total; µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Gross beta radiation (pCi/L)	ND	4.5	ND	0	0	0	0	ND	ND	ND	ND	ND
Strontium-90 (pCi/L)	ND	<DL	ND	2.4	<DL	<DL	<DL	ND	ND	ND	ND	ND
Carbon tetrachloride (avg. µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Carbon tetrachloride (max. µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Chloroform (µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Benzene (µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Methylene chloride (µg/L)	ND	<DL	ND	<DL	<DL	<DL	2.7	ND	ND	ND	ND	ND
Tetrachloroethene (avg., µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Tetrachloroethene (max., µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Flow (max., gal/mo)	ND	1,988,000	ND	3,301,000	2,020,000	1,106,000	1,208,000	ND	ND	ND	ND	ND
Total dissolved solids (µg/L)	ND	<DL	ND	20,000	<DL	<DL	<DL	ND	ND	ND	ND	ND
Nitrite total (as N; µg/L)	ND	0	ND	0	0	0	0	ND	ND	ND	ND	ND
Mercury total (µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
N-nitrosodimethylamine (µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Acetophenone (µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND

Table 3-3. 200 Area Effluent Treatment Facility Discharge Monitoring Report (ST 4500, Outfall 001) for 2012. (2 sheets)

Sample Parameter <sup>a</sup> (monthly grab sample)	Monthly											
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Tetrahydrofuran (µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Gross alpha (pCi/L)	ND	0	ND	0.72	0.63	0	0	ND	ND	ND	ND	ND
Tritium (pCi/L)	ND	14,000	ND	16,000	18,000	20,000	450,000	ND	ND	ND	ND	ND
Ammonia (as N; µg/L)	ND	<DL	ND	<DL	3.90	<DL	2.20	ND	ND	ND	ND	ND
Uranium (total; µg/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND
Technetium-99 (pCi/L)	ND	<DL	ND	<DL	<DL	<DL	<DL	ND	ND	ND	ND	ND

<DL = less than detection limit; ND = no discharge; gal/mo = gallons per month; µmhos/cm = micro-mho per centimeter; µg/L = micrograms per liter; N = nitrogen; pCi/L = picocuries per liter.

<sup>a</sup> Measurements are monthly averages unless labeled otherwise.

Table 3-4. 200 Area Treated Effluent Disposal Facility Discharge Monitoring Report (ST 4502, Discharge No. 6653) for 2012.

Sample Parameter <sup>a</sup>	Month											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	4 <sup>th</sup> Quarter		
Conductivity (µmhos/cm)	231	191	173	158	164	171	147	154	178	170		
pH (min)	6.70	6.57	7.06	7.1	7.3	7.2	7.2	7.2	7.3	6.5		
pH (max)	8.22	8.07	8.04	7.8	8.0	8.1	8.9	8.4	8.1	8.5		
Nitrate (as N; avg, µg/L, Jan-Jun; mg/L, Jul-Dec)	383	179	190	296	153	207	0.122	0.241	0.122	5.21		
Nitrate (as N; max, µg/L, Jan-Jun; mg/L, Jul-Dec)	383	179	190	139	153	207	0.122	0.241	2.82	6.89		
Chloride (avg, µg/L, Jan-Jun; mg/L, Jul-Dec)	3,260	4,670	1,730	1,730	2,580	3,110	2.82	3.15	2.82	6.89		
Chloride (max, µg/L, Jan-Jun; mg/L, Jul-Dec)	3,260	4,670	1,730	1,730	2,900	3,110	2.82	3.15	2.82	16.6		
Sulfate (µg/L, Jan-Jun; mg/L, Jul-Dec)	19,400	23,700	12,200	13,500	18,600	19,100	21.3	20.6	21.1	37.6		
Arsenic (µg/L)	0.662	0.582	0.416	0.755	1.25	1.01	0.570	0.589	0.644	0.953		
Cadmium (µg/L)	<DL	<DL	<DL	0.058	0	<DL	<DL	<DL	<DL	<DL		
Chromium (µg/L)	0.423	0.335	0.131	0.365	0.150	0.189	0.157	0.132	0.250	0.557		
Iron (ug/L)	42.6	91.2	28.5	135	76.7	102	96.6	57.2	73.4	103		
Lead (ug/L, Jan-Jun; mg/L, Jul-Dec)	0.237	0.203	0.0550	1.81	0.249	0.271	0.373	0.224	0.254	0.301		
Manganese (ug/L, Jan-Jun; mg/L, Jul-Dec)	<DL	5.60	<DL	4.9	4.6	4.6	4.67	5.41	3.0	4.88		
Gross beta (pCi/L, Jan-Jun; mg/L, Jul-Dec)	15	<DL	<DL	0	2.9	<DL	<DL	<DL	0.0592	11		
Flow rate (gpm, Jan-Jun; mg/L, Jul-Dec)	25	15	22	39	51	56	0.0840	0.0710	0.0592	0.0661		
Total dissolved solids, avg. (µg/L, Jan-Jul; mg/L, Aug-Dec)	78,000	106,000	119,000	107,000	120,000	114,000	106	107	97	180		
Mercury (µg/L, Jan-Jun; mg/L, Jul-Dec)	<DL	<DL	<DL	<DL	0	<DL	<DL	<DL	<DL	<DL		
Gross alpha (pCi/L)	2.1	<DL	<DL	2.1	0	<DL	<DL	<DL	<DL	7.3		
Oil and grease (µg/L, Jan-Jun; mg/L, Jul-Dec)	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Carbon tetrachloride (µg/L, Jan-Jun; mg/L, Jul-Dec)	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Chloroform (µg/L, Jan-Jun; mg/L, Jul-Dec)	1.9	<DL	<DL	<DL	<DL	<DL	<DL	7.0	<DL	1.6		
Methylene chloride (µg/L, Jan-Jun; mg/L, Jul-Dec)	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Bis(2-ethylhexyl)phthalate (µg/L, Jan-Jun; mg/L, Jul-Dec)	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		
Total trihalomethanes (µg/L, Jan-Jun; mg/L, Jul-Dec)	1.9	<DL	<DL	<DL	<DL	<DL	<DL	7.0	<DL	1.6		
Tritium (pCi/L)	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL	<DL		

µmhos/cm = micro-mhos per centimeter; min = minimum; max = maximum; N= nitrogen; <DL = less than detection limit; ug/L = microgram per liter;  
 pCi/L = picocuries per liter; avg = average; gpm = gallons per minute.  
<sup>a</sup> Measurements are monthly averages unless labeled otherwise.

Table 3-5. 100-N Sewage Treatment Lagoon Discharge Monitoring Report (ST 4507) for 2012.

Sample Parameter	Month											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sep	Oct	Nov	Dec
Influent (gal/day)	12,924	9,924	16,844	14,345	16,614	15,241	13,300	14,597	5,453	2,124	877	0
Effluent (gal/day)	ND	42,506 <sup>a</sup>	ND	ND	38,806	ND	ND	ND	ND	54,218	44,135	ND
Total suspended solids (mg/L)	ND	23.0 <sup>a</sup>	ND	ND	37.0 <sup>a</sup>	ND	ND	ND	ND	9.5	20.0	ND
Total dissolved solids (mg/L)	ND	482.5 <sup>a</sup>	ND	ND	481.0	ND	ND	ND	ND	520.0	480.0	ND
Biochemical oxygen demand (mg/L)	ND	22.2 <sup>a</sup>	ND	ND	21.3	ND	ND	21.3	ND	6.1	25.4	ND
pH	ND	7.93 <sup>a</sup>	ND	ND	7.49	ND	ND	ND	ND	7.56	7.56	ND
Nitrate (i.e., NO <sub>3</sub> as N; mg/L)	ND	0.6 <sup>a</sup>	ND	ND	8.6	ND	ND	ND	ND	0.6	0.4	ND
Ammonia (i.e., NH <sub>3</sub> ; mg/L)	ND	39.1 <sup>a</sup>	ND	ND	23.4	ND	ND	ND	ND	8.6	12.6	ND
Fecal coliform (colony size per 100 ml)	ND	>2,400 <sup>a</sup>	ND	ND	>2,400	ND	ND	ND	ND	295	>2,400	ND

gal/day = gallons per day; ND = no discharge; N = nitrogen; mg/L = milligrams per liter; avg. = average.

Table 3-6. 200 West Area Evaporative Sewage Lagoon Discharge Monitoring Report (ST0045514) for 2012.

Sample Parameter	Quarterly			
	1st	2nd	3rd	4th
Influent (avg. gal/day)	NO	NO	17,163*	16,433

gal/day = gallons per day; NO = not operational; avg. = average.

\*Began initial operation September 14, 2012.

Table 3-7. Waste Treatment and Immobilization Plant Concrete Batch Plant (WAG 50-5180) and Pit 30 (WAG 50-5181) Discharge Monitoring Report Effluents in 2012. (2 sheets)

Sample Parameter	Month											
	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec
<b>WAG 50-5180: Process / Dewatering Water to Ground</b>												
pH (min)	-	-	-	-	-	-	-	-	-	-	-	-
pH (max)	-	-	-	-	-	-	-	-	-	-	-	-
Total dissolved solids	-	-	-	-	-	-	-	-	-	-	-	-
Visible oil sheen (daily)	-	-	-	-	-	-	-	-	-	-	-	-
No discharge	X	X	X	X	X	X	X	X	X	X	X	X
<b>Stormwater to Ground</b>												
pH minimum	-	-	8.30	8.14	-	8.21	-	-	-	8.31	7.76	-
pH maximum	-	-	8.41	8.25	-	8.33	-	-	-	8.44	8.46	-
Visible oil sheen (daily)	-	-	N	N	-	N	-	-	-	N	N	-
No discharge	X	X	-	-	X	-	X	X	X	-	-	X

Table 3-7. Waste Treatment and Immobilization Plant Concrete Batch Plant (WAG 50-5180) and Pit 30 (WAG 50-5181) Discharge Monitoring Report Effluents in 2012. (2 sheets)

Sample Parameter	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
<b>WAG 50-5181: Process/Dewatering Water to Ground</b>				
pH minimum	-	-	-	-
pH maximum	-	-	-	-
Visible oil sheen (daily)	N	N	N	N
No discharge	-	-	-	-
<b>Stormwater to Ground</b>				
pH minimum	-	-	-	-
pH maximum	-	-	-	-
Visible oil sheen (daily)	N	N	N	N
No discharge	-	-	-	-

"-" indicates a non-applicable field; "X" indicates no discharge occurred within the respective month or quarter; "N" indicates no visible oil sheen.

Table 3-8. Environmental Restoration Disposal Facility Pit 30 Discharges in 2012.

Sample Parameter	1 <sup>st</sup> Quarter	2 <sup>nd</sup> Quarter	3 <sup>rd</sup> Quarter	4 <sup>th</sup> Quarter
<b>WAG 50-5181: Process/Dewatering Water to Ground</b>				
pH minimum	-	-	-	-
pH maximum	-	-	-	-
Visible oil sheen (daily)	-	-	-	-
No discharge	X	X	X	X
<b>Stormwater to Ground</b>				
pH minimum	-	-	-	-
pH maximum	-	-	-	-
Visible oil sheen (daily)	-	-	-	-
No discharge	X	X	X	X

"-" indicates a non-applicable field; "X" indicates no discharge occurred within the respective month or quarter.

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#### **4.0 HAZARDOUS SUBSTANCE RELEASES**

Hazardous substances, whether radioactive or nonradioactive, released to the environment must be evaluated to determine if they are reportable to federal, state, or local regulatory agencies. Agency notification is required when a released amount exceeds reporting thresholds. Reportable releases of hazardous substances are classified as one of the following two types:

- Nonroutine releases
- Continuous, routine releases.

Each type of release is discussed in the following sections.

##### **4.1 NONROUTINE RELEASES**

No known notable elevated ambient conditions occurred nor were any constituents in excess of Reportable Quantity (RQ) thresholds released. Furthermore, the effect of any localized elevated emissions showed no discernible effect on cumulative annual routine emissions (i.e., from point sources and fugitive sources) at ambient air monitoring stations at or near the Hanford Site perimeter.

##### **4.2 ROUTINE CONTINUOUS RELEASES**

Releases of hazardous substances that exceed CERCLA RQs need not be reported immediately to the National Response Center when both of the following conditions are met:

- An initial notification has been completed
- The routine releases are continuous and stable in quantity and rate.

Historically at the Hanford Site, only the continuous, routine releases of ammonia, ammonium hydroxide, and carbon tetrachloride have posed operational difficulties for staying beneath RQs. During 2012, releases of ammonia, ammonium hydroxide, and carbon tetrachloride were below applicable RQs.

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## 5.0 REFERENCES

- 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Title 40, *Code of Federal Regulations*, Part 61, as amended.
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- Resource Conservation and Recovery Act of 1976*, 42 USC 6901 et seq.
- Safe Drinking Water Act of 1974*, 42 USC 300f et seq.
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- WAC 173-216, "State Waste Discharge Permit Program," *Washington Administrative Code*, Olympia, Washington.

WAC 173-218, "Underground Injection Control Program," *Washington Administrative Code*, Olympia, Washington.

WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Olympia, Washington.

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

WAC 173-401, "Operating Permit Regulation," *Washington Administrative Code*, Olympia, Washington.

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

WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides," *Washington Administrative Code*, Olympia, Washington.

WAC 246-247, "Radiation Protection – Air Emissions," *Washington Administrative Code*, Olympia, Washington.

WAG 50-5180, 2001, "Concrete Batch Plant Sand and Gravel General Permit," Washington State Department of Ecology, Olympia, Washington.

WAG 50-5181, 2001, "Pit 30 Sand and Gravel General Permit," Washington State Department of Ecology, Olympia, Washington.

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