
2019 Highlight

Air Quality and Protection

The Hanford Site continued to comply with the Hanford Site Air Operating Permit that contains requirements for emission sources on the Hanford Site.

Radiation Protection of the Public and the Environment

The dose to a maximally exposed member of the public during 2019 was estimated to be 0.16 mrem, well below the U.S. Department of Energy public dose limit of 100 mrem/yr. This continues the trend of very low radiation exposure to members of the public.

Pollution Prevention and Waste Minimization

The Hanford Site continued diversion efforts for 1,020 metric tons of nonhazardous solid waste by maintaining a diverse recycling program. The Hanford Site received a five-star 2020 Electronic Product Environmental Assessment Tool purchaser award for the procurement of sustainable electronics.

2.0 Compliance Summary

JR Draper

For the protection of human health and the environment through safe operations, the Hanford Site has compliance programs designed to meet applicable federal, state, and local environmental laws, regulations, and requirements and comply with the U.S. Department of Energy (DOE) orders, notices, directives, policies, and guidance (Section 2.9). These measures include specific requirements, actions, plans, and schedules identified in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement [TPA]) (Ecology et al. 1989) and other compliance or consent agreements. The U.S. Department of Energy, Richland Operations Office (DOE-RL) and Office of River Protection (DOE-ORP) recognize the importance of maintaining a proactive program of self-assessment and regulatory reporting to ensure that environmental compliance is achieved and maintained at the Hanford Site. This report fulfills reporting requirements for the annual compliance status under the environmental standards specified in DOE O 231.1B, Chg 1, *Environmental, Safety and Health Reporting*. The Order is intended to ensure that the DOE, including the National Nuclear Security Administration, receives timely, accurate information about events that have affected or could adversely affect the health, safety, and security of the public or workers, the environment, the operations of DOE facilities, or the credibility of DOE.

Section 2.0 summarizes the laws and regulations that govern Hanford Site activities with regard to federal environmental protection statutes and associated state and local environmental regulations. This section discusses both permits required under specific environmental protection regulations and U.S. Environmental Protection Agency (EPA) or Washington State Department of Ecology (Ecology)-issued notices of violation or non-compliance. Notices of violation are the regulatory means of informing organizations that their work activities are not meeting requirements; notices of non-compliance are informal notifications of regulatory violations.

2.1 Hazardous Materials and Waste Management

This section provides compliance information regarding federal environmental statutes and regulations related to hazardous materials and waste management at the Hanford Site.

2.1.1 Federal Facility Compliance Act of 1992

ME Mills

Enacted by Congress on October 6, 1992, the *Federal Facility Compliance Act of 1992* amends Section 6001 of the *Resource Conservation and Recovery Act of 1976* (RCRA) to specify that the U.S. waives sovereign immunity from civil and administrative fines and penalties for RCRA violations. In addition, RCRA requires EPA to conduct annual inspections of all federal facilities. Authorized states are given authority to conduct inspections of federal facilities to enforce compliance with state hazardous waste programs. A portion of RCRA also requires DOE to provide mixed waste information to EPA and the states. DOE provides this information annually as part of the Hanford Site Mixed Waste Land Disposal Restrictions Reports pursuant to TPA Milestone M-026-01.

2.1.2 Resource Conservation and Recovery Act of 1976

DI Weyns

Congress enacted RCRA in 1976 to protect human health and the environment. In 1984, the *Hazardous and Solid Waste Amendments* amended RCRA, imposing new requirements on hazardous waste management. RCRA's central principle is to establish cradle-to-grave management to track hazardous waste from its generation to treatment, storage, and disposal (TSD). The state of Washington is authorized under RCRA and EPA's implementing regulations to implement state law and regulations in lieu of the federal regulations. The Hanford Site hazardous waste activities are subject to applicable provisions of WAC 173-303, "Dangerous Waste Regulations."

2.1.2.1 Hanford Facility RCRA Permit

JK Perry

EPA assigned the Hanford Site a single EPA identification number for permitting purposes (WA7890008967); as such, the Hanford Site is a single RCRA facility, though there are numerous TSD units spread over large geographic areas. The permit is issued to the following seven permittees:

- DOE-RL and DOE-ORP as the owners/operators
- Four of DOE's contractors as permittees and co-operators
 - Bechtel National, Inc.
 - CH2M Plateau Remediation Company (CHPRC)
 - Pacific Northwest National Laboratory
 - Washington River Protection Solutions, LLC (WRPS).
- A fifth contractor, Mission Support Alliance, LLC (MSA), is also a permittee. However, MSA is not a co-operator.

The Washington State dangerous waste regulations (WAC 173-303) require Ecology to issue a new permit after a term of up to 10 years. The initial Hanford Facility RCRA permit was issued on September 27, 1994, for a 10-year term. DOE submitted an application for a new permit on March 30, 2004. The permit expired on September 27, 2004; since that time, Ecology has been endeavoring to prepare and issue a new permit. Because the DOE submitted a timely application for a new permit, and Ecology subsequently determined the application was complete, the DOE is allowed to operate under the expired permit per WAC 173-303-806(7). The DOE continues to operate under the expired permit *Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit, Dangerous Waste Portion for the Treatment, Storage, and Disposal of Dangerous Waste* (Hanford Facility Dangerous Waste Permit) (Ecology 1994).

In May 2012, Ecology issued a draft permit for public comment (Ecology 2012). Ecology received approximately 1,800 comments from the public and 3,000 comments from the DOE on the draft permit during the comment period held from May 1 to October 22, 2012. Issues raised during the comment period identified substantial new questions; as a result, Ecology plans to make revisions and reopen the public comment period for the draft renewal permit. The new permit is expected to be issued in the 2023 time frame. The process will include the following activities:

- Review and evaluate the comments received from the first comment period and develop responses to all comments
- Revise the permit based on significant information and issues raised in the first comment period and other changes that have occurred in the intervening years
- Issue a revised draft permit and responses to the original comments
- Reopen the comment period
- Prepare responses to the next round of public comments
- Issue the final permit.

Ecology is working with the DOE to perform the actions in first and second bullets above.

While operating under the expired permit, DOE is required to submit permit modifications reflecting changing operations in order to keep the permit consistent with current operations. During 2019, modifications were made to the expired permit. The changes affected requirements for the following TSD units pursuant to WAC 173-303-830, "Permit Changes":

- Liquid Effluent Retention Facility and 200 Areas Effluent Treatment Facility (Operating Unit Group 3)
- 242-A Evaporator (Operating Unit Group 4)
- 325 Hazardous Waste Treatment Unit (Operating Unit Group 5)
- Hanford Tank Waste Treatment and Immobilization Plant (WTP) (Operating Unit 10)
- 400 Area Waste Management Unit (Operating Unit 16)
- 276-BA Organic Storage Area (Closure Unit Group 32).

2.1.2.2 Regulatory Agency Inspections

SA Szendre

During fiscal year (FY) 2019, 90 regulatory agency inspections and visits were conducted at DOE facilities on the Hanford Site. Some of the agency inspections were conducted jointly between multiple agencies.

Ecology inspections were conducted by the Nuclear Waste Program Office located in Richland, Washington. EPA Region 10 inspections focused on TSD facilities and conducting oversight of Ecology and Washington State Department of Health (WDOH) inspections under EPA-delegated authority. WDOH inspections were performed by the Office of Radiation Protection, Richland, Washington. WDOH focused on Major and Minor Emission Units, the progress of work involved with the Plutonium Uranium Extraction Facility (PUREX) Tunnel 1 and 2, and the Plutonium Finishing Plant Demolition Project. The City of Richland inspection focused on the 300 Area of the Hanford Site to evaluate compliance with Industrial Wastewater Discharge Permit (CR-IU010) requirements, including the monitoring of wastewater discharges to the publicly-owned treatment works. The DOE-RL, DOE-ORP, and Pacific Northwest Site Office facility inspections are performed in accordance with the terms and conditions of the Air Operating Permit, Radioactive Air Emissions License, Wastewater Discharge Permits, and RCRA Permit. Inspections are supported by the Hanford Site contractors responsible for the facilities being inspected.

Regulatory agency inspections can result in alleged violations of regulations and other concerns. If deemed appropriate, regulatory agencies may initiate a variety of enforcement and compliance actions, which are discussed further in Section 2.10.

DOE utilizes two internal tracking databases to track regulatory agency inspection activity and agency enforcement actions. The Regulatory Agency Inspection Database includes documentation for regulatory agency inspections of DOE facilities on the Hanford Site managed by the DOE-RL, DOE-ORP, and Pacific Northwest Site Office. Regulatory agency inspections can result in notices of noncompliance or enforcement actions for alleged violations of permit conditions/requirements and applicable federal, state, and local laws and regulations. As such, the Regulatory Agency Inspection Database links to the Environmental Action Tracking System. The Environmental Action Tracking System documents alleged regulatory noncompliance and enforcement actions and their status for the Hanford Site (Section 2.9).

RCRA Inspections. The Ecology inspections focused on TSD unit compliance with the Hanford Facility Dangerous Waste Permit (Ecology 1994) and WAC 173-303, "Washington State Dangerous Waste Regulations." The TSD units and other facilities inspected during 2019 included the following:

- 200 Areas Effluent Treatment Facility/ Liquid Effluent Retention Facility
- Waste Encapsulation and Storage Facility
- 222-S Laboratory
- 400 Area Waste Management Unit
- 242-A Evaporator
- 325 Building
- 324 Building
- B-Plant
- Hexone Storage and Treatment Facility
- Central Waste Complex
- Low-level Burial Grounds Trenches 31 and 34

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- Plutonium Finishing Plant
 - PUREX/PUREX Storage Tunnel
 - Double-shell tank and single-shell-tank tank farms
 - T-Plant
 - Waste Receiving and Processing Facility
 - Central Accumulation Area
 - Satellite Accumulation Areas
 - Universal Waste management operations.
 - Nonradioactive Dangerous Waste Landfill
 - Groundwater Monitoring Network Wells
 - Waste Treatment Facility
 - Low-level Burial Grounds.

Section II.O of the RCRA permit addresses general inspection requirements required in accordance with WAC 173-303-320. General Inspections are required to be done by the permittees in addition to the TSD unit inspections specified in Parts III, V, and VI of the RCRA permit. The RCRA permit requires General Inspection of the 100, 200-East, 200-West, 300, and 400 Areas, as well as the Columbia River shoreline. General Inspections are performed annually in these areas by Hanford Site contractors, with oversight from DOE, to identify and correct potential malfunctions, deterioration, operator errors, and discharges that may cause or lead to the release of dangerous waste constituents to the environment or that threaten human health. In accordance with RCRA permit requirements, Ecology is notified of the general inspections at least 7 days in advance to allow their participation. RCRA permit general inspection summary reports are maintained in the Hanford Facility Operating Record and Regulatory Agency Inspection Database.

Clean Air Act Inspections

SA Szendre and CJ Perkins

In 2019 the WDOH inspections focused on compliance of point and non-point emission units with the Radioactive Air Emissions License (FF-01). Ecology inspections included inspections of discharge points (e.g., emergency engines/generators and passive vents and stacks) and packaged boiler systems regulated under the Hanford Site Air Operating Permit.

2.1.2.3 RCRA Groundwater Monitoring

MJ Hartman

The Soil and Groundwater Remediation Project monitors groundwater at 23 RCRA units on the Hanford Site. Section 8.0 includes a summary of groundwater monitoring activities for the RCRA units during 2019. DOE/RL-2019-65, *Hanford Site RCRA Groundwater Monitoring Report for 2019*, includes detailed groundwater monitoring information.

2.1.3 Comprehensive Environmental Response, Compensation, and Liability Act

GT Berlin

In 1980, Congress passed the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA) to address response, compensation, and liability for past releases or potential releases of hazardous substances (including radionuclides), pollutants, and contaminants to the environment. Because the operation of nuclear production and disposal facilities at the Hanford Site has resulted in past releases of hazardous substances, pollutants, or contaminants, the facility is subject to CERCLA provisions.

The *Superfund Amendments and Reauthorization Act of 1986* (SARA) amended CERCLA on October 17, 1986. SARA reflected EPA's experience in administering the complex Superfund program during its first 6 years and made several important changes and additions to the program:

- Stressed the importance of permanent remedies and innovative treatment technologies in cleaning up hazardous waste sites
- Required Superfund actions to consider the standards and requirements found in other state and federal environmental laws and regulations
- Provided new enforcement authorities and settlement tools
- Increased state involvement in every phase of the Superfund program
- Increased the focus on human health problems posed by hazardous waste sites
- Encouraged greater citizen participation in making decisions on how sites should be cleaned up
- Increased the size of the trust fund to \$8.5 billion.

SARA also required EPA to revise the Hazard Ranking System to ensure that it accurately assessed the relative degree of risk to human health and the environment posed by uncontrolled hazardous waste sites that may be placed on the National Priorities List.

2.1.3.1 CERCLA Five-Year Reviews

For waste sites where hazardous substances, pollutants, or contaminants remain at the Hanford Site above levels that allow for unlimited use and unrestricted exposure, CERCLA requires a review every 5 years to evaluate the implementation and performance of a remedy to determine if the remedy is or will be protective of human health and the environment. The 5-year review requirement applies to all remedial actions selected under CERCLA Section 121. The CERCLA Five-Year Review Report documents the review methods, technical assessments, and protectiveness statements. Recommendations to address identified issues are also provided. The results of the four 5-year reviews conducted since 2000 are documented in the *USDOE Hanford Site First Five-Year Review Report* (EPA 2001); DOE/RL-2006-20, *Second CERCLA Five-Year Review Report for the Hanford Site*; DOE/RL-2011-56, *Hanford Site Third CERCLA Five-Year Review Report*; and DOE/RL-2016-01, *Hanford Site Fourth CERCLA Five-Year Review Report*.

The Hanford Site Fourth CERCLA Five-Year Review Report (DOE/RL-2016-01), addressing 2011 through 2015, was completed by DOE-RL in 2017 and received EPA concurrence (EPA 2017). This report aligned with EPA's latest guidance on 5-year review reports, as well as recent training provided to multi-federal agencies as they strove for more consistent reports and the use of substantive tables and figures to more concisely present information that supports the protectiveness statements.

This latest CERCLA 5-year review report (DOE/RL-2016-01) evaluates the protectiveness of 30 operable units with remedies that have been documented in interim or final Records of Decision (RODs). Approximately 16 of the Hanford Site's operable units do not have remedies documented in interim or

final RODs at this time; however, they will be addressed in future 5-year review reports as additional RODs are issued. A breakdown of the source and groundwater operable units that are were in scope and out of scope for Hanford's fourth CERCLA 5-year review report is provided below.

- In scope (operable units with interim or final RODs):
 - Source operable units: 100-BC-1, 100-BC-2, 100-FR-1, 100-FR-2, 100-IU-2, 100-IU-6, 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2, 100-NR-1, 300-FF-1, 300-FF-2, 200-CU-1, 200-CU-3, 200-DF-1, 200-CW-5, 200-PW-1, 200-PW-3, 200-PW-6, 1100-EM-1.
 - Groundwater operable units: 100-FR-3, 100-HR-3, 100-KR-4, 100-NR-2, 300-FF-5, 200-UP-1, 200-ZP-1.
- Out of scope (operable units without RODs):
 - Source operable units: 100-OL-1, 200-BC-1, 200-CB-1, 200-CP-1, 200-CR-1, 200-CW-1, 200-DV-1, 200-EA-1, 200-IS-1, 200-OA-1, 200-SW-1, 200-SW-2, and 200-WA-1.
 - Groundwater: 100-BC-5, 200-BP-5, and 200-PO-1.

Of the 23 source operable units assessed in Hanford's fourth CERCLA 5-year review, 5 operable units (100-FR-1, 100-FR-2, 100-IU-2, 100-IU-6, and 1100-EM-1) were determined to be in the EPA protectiveness category of "Protective"; 18 operable units (100-BC-1, 100-BC-2, 100-DR-1, 100-DR-2, 100-HR-1, 100-HR-2, 100-KR-1, 100-KR-2*, 100-NR-1, 300-FF-1, 300-FF-2, 200-CU-1, 200-CU-3, 200-DF-1, 200-CW-5, 200-PW-1, 200-PW-3, and 200-PW-6) were determined to be in the category of "Will Be Protective". Of the seven groundwater operable units assessed in Hanford's fourth CERCLA 5-year review, one operable unit (200-ZP-1) was determined to be in the EPA protectiveness category of "Protective"; five operable units (100-FR-3, 100-HR-3*, 100-KR-4*, 300-FF-5, and 200-UP-1) were determined to be in the category of "Will Be Protective"; and one operable unit (100-NR-2*) was determined to be in the category of "Not Protective." For the operable units in this paragraph that include an asterisk (*), recommendations for issues identified during the 5-year review are described within DOE/RL-2016-01.

Hanford's next CERCLA 5-year review report is due by May 4, 2022.

2.1.3.2 Institutional Controls

GT Berlin

The MSA Long-Term Stewardship (LTS) program is responsible for managing institutional controls (IC) along the River Corridor with the exception of a portion of the 100-K Area. CHPRC is responsible for the ICs associated with groundwater. The DOE/RL 2001-41, *Sitewide Institutional Controls Plan for Hanford CERCLA Response Actions and RCRA Corrective Actions*, describes the ICs for the Hanford Site in accordance with CERCLA and/or RCRA decision documents. The CERCLA decision documents present the selected remedial actions chosen in accordance with CERCLA, as amended by the SARA and implemented under 40 CFR 300. CERCLA decision documents are developed as part of the cleanup mission at the Hanford Site. The selected remedies chosen may include ICs through implementation of the remedy and then afterwards. The CERCLA decision documents identify the specific requirements for these ICs.

The ICs are primarily administrative in nature and typically are used to augment the engineered components of a selected remedy to minimize the potential for human exposure to residual contaminants. Active ICs, such as controlling access to the Hanford Site or activities that may affect remedial action, are generally employed during remediation. After remediation is completed, passive ICs are employed such as permanent markers, retaining public records and archives, or sustaining regulations regarding land or resource use. ICs such as drilling and excavation restrictions for waste sites with contamination below 15 ft (4.6 m), monitoring and controlling access to the area, and warning signs also may be employed after remediation is completed.

As described in DOE/RL-2001-41, ICs are assessed annually as required by the respective CERCLA and/or RCRA decision documents. Hanford Site contractors provide an annual update on the effectiveness of the ICs to EPA and Ecology at the area unit managers meetings each September. Minutes from the unit managers' meeting are available on the TPA Administrative Record Public Information Repository website (<http://pdw.hanford.gov/arpir/>). The Hanford Site CERCLA 5-year review also includes a rollup of the issues/actions noted during the annual assessments.

The MSA LTS organization is responsible for managing ICs related to Hanford Site access control and the wastes sites in the River Corridor area. The results of LTS's 2019 annual assessment can be summarized as follows:

- Entry Restrictions
 - Active badging program and barricades are in place to control unauthorized entries.
 - Damaged fences were observed in 11 locations and repairs have been completed.
- Warning Notices
 - Hazardous Area Warning signs required by decision documents are in place; two were repaired/replaced in 2019.
 - “No Trespassing” signs along road perimeters were found to be damaged or illegible due to general weathering or fire; replacement signs were fabricated and installed in 2019.
- Land Use Management
 - LTS reviewed 28 Site Evaluations in 2019 to ensure adherence to existing land-use ICs
 - LTS approval is mandatory on Site Excavation Permits.
 - 146 Site Excavation Permit applications were evaluated in FY 2019 for IC compliance.
 - No change in land-use designations occurred in FY 2019 (e.g., industrial use).
 - No significant disturbances or natural subsidence/erosion was found on the waste sites with ICs.

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- Thirty-six waste sites in the 300 Area Industrial Complex with enhanced recharge controls were reviewed in 2019:
 - LTS improved and maintained drainage systems and in-place asphalt barriers to support the prevention of enhanced recharge IC. LTS continued facilitation of regular 300 Area Hanford Contractor Interface meetings.
 - Collaboration continues among the 300 Area contractors to minimize impact of discharges from fire hydrant flushing and to improve/maintain drainage systems to support enhanced-recharge control ICs.
 - Groundwater-Use Management
 - Wells drilled in the LTS-managed areas are approved through the site excavation permit process.
 - Barriers– Engineered Controls
 - Controls are in place to maintain integrity of the cap at the Horn Rapids Landfill.
 - Miscellaneous Provisions
 - Ten reportable trespassing incidents occurred on the Hanford Site in FY 2019. Operable units in the Central Plateau of the Hanford Site also have a number of ICs in both interim and final ROD documents. In FY 2019, an assessment of ICs at 200-UP-1 Operable Unit, 221-U Facility, and 200-ZP-1 Operable Unit identified no deficiencies.

2.1.4 Emergency Planning and Community Right-to-Know Act of 1986

GM Fritz

Title III of SARA, also known as the *Emergency Planning and Community Right-to-Know Act of 1986* (EPCRA), requires owners and operators of facilities that handle certain hazardous chemicals onsite to provide information on the release, storage, and use of these chemicals to organizations responsible for emergency response planning. EPCRA has four major provisions: emergency planning, emergency release notification, hazardous chemical inventory reporting, and toxic chemical release inventory reporting. Table 2-1 summarizes sections of EPCRA and its requirements, including two annual reports:

- Tier Two Emergency and Hazardous Chemical Inventory, which provides information about hazardous chemicals stored at each facility in amounts exceeding minimum threshold levels
- Toxic Chemical Release Inventory, which describes total annual releases of certain toxic chemicals and associated waste management activities.

Table 2-2 provides an overview of reporting under the EPCRA during 2019.

Table 2-1. Emergency Planning and Community Right-to-Know Act Requirements Summary.

Section	CFR Section	Reporting Criteria	Due Date	Agencies Receiving Report
302	40 CFR 355, "Emergency Planning and Notification"	Presence of an extremely hazardous substance in quantity equal to or greater than threshold planning quantity at any one time.	Within 60 days of threshold planning quantity exceedance	Local Emergency Planning Committee; State Emergency Response Commission
		Change occurring at a facility that is relevant to emergency planning.	Within 30 days after change has occurred	Local Emergency Planning Committee
304		Release of an extremely hazardous substance or a CERCLA hazardous substance in quantity equal to or greater than reportable quantity.	Initial notification: immediate (within 15 min of knowledge of reportable release). Written follow-up within 14 days of release.	Local Emergency Planning Committee; State Emergency Response Commission
311	40 CFR 370, "Hazardous Chemical Reporting"	The presence at any one time at a facility an OSHA hazardous chemical in quantity greater than or equal to 10,000 lbs (4,500 kg) or an extremely hazardous substance in quantity equal to or greater than threshold planning quantity or 500 lbs (230 kg), whichever is less.	Revised list of chemicals due within 3 months of a chemical exceeding a threshold	Local Emergency Planning Committee; State Emergency Response Commission; Local Fire Departments
312		The presence at any one time at a facility an OSHA hazardous chemical in quantity equal to or greater than 10,000 lbs (4,500 kg), or an extremely hazardous substance in quantity equal to or greater than threshold planning quantity or 500 lbs (230 kg), whichever is less.	Annually by March 1	Local Emergency Planning Committee; State Emergency Response Commission; Local Fire Departments
313	40 CFR 372, "Toxic Chemical Release Reporting"	Manufacture, process, or use at a facility, any listed Toxic Release Inventory chemical in excess of threshold amount during a CY. Thresholds are 25,000 lbs (11,300 kg) for manufactured or processed or 10,000 lbs (4,500 kg) for otherwise used except for persistent, bio-accumulative, toxic chemicals with thresholds under 100 lbs (45 kg).	Annually by July 1	EPA; State Emergency Response Commission
CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act CFR = Code of Federal Regulation CY = calendar year EPA = U.S. Environmental Protection Agency OSHA = Occupational Safety and Health Administration				

Table 2-2. Emergency Planning and Community Right-to-Know Compliance Reporting.

Section	Description of Reporting	Status	Notes
302	Emergency planning notifications	Yes	
304	Extremely hazardous substance release notification	Not required	No releases occurred
311	Material safety data sheet	Yes	
312	Chemical inventory	Yes	
313	Toxic release inventory	Yes	

DOE/RL-2020-06, *2019 Hanford Site Tier Two Emergency and Hazardous Chemical Inventory*, was submitted to Ecology's Community Right-To-Know Unit; local emergency planning committees for Benton, Franklin, and Grant Counties; and the City of Richland and Hanford Site Fire Department before the annual March 1 deadline. The Hanford Site had 58 hazardous chemicals that exceeded the reporting thresholds. One chemical category (lead acid batteries, which contain sulfuric acid - an extremely hazardous substance) exceeded the reporting threshold for offsite locations (700 Area, 1100 Area, and the Federal Building). Table 2-3 lists the average quantities of the 10 hazardous chemicals stored in greatest quantity on the Hanford Site in 2019.

Table 2-3. Average Quantity of the 10 Hazardous Chemicals Stored in Greatest Quantities.

CAS#	Chemical	TPQ	Average Amount (lb/kg)
8052-42-4	Asphalt	10,000	7,113,949/3,226,832
7647-14-5	Sodium Chloride	10,000	2,027,934/919,855
9003-55-8	Styrene Polymer with 1,3-Butadiene	10,000	1,778,293/806,620
	Cement Mixture	10,000	2,085,983/946,185
68476-34-6	Diesel Fuel	10,000	2,625,492/1,190,903
8012-95-1	Mineral Oil	10,000	1,597,430/724,582
8006-61-9	Gasoline	10,000	759,256/344,392
74-98-6	Propane	10,000	716,556/325,024
7727-37-9	Nitrogen	10,000	842,246/382,036
7440-23-5	Sodium	10,000	2,351,028/1,066,408

The DOE/RL-20120-30, *2019 Hanford Site Toxic Chemical Release Inventory*, report was submitted to EPA and Ecology before the annual July 1 deadline. During calendar year (CY) 2019, the Hanford Site exceeded activity thresholds for lead, naphthalene, propylene, xylene, toluene, and sodium nitrite. Information concerning these chemicals is described in Table 2-4.

Table 2-4. Toxic Chemicals Exceeding Reporting Thresholds.

CAS No.	Chemical	Non-Exempt Use Description
7439-92-1	Lead	Ammunition fired during range practice by Hanford Safeguards and Security
91-20-3	Naphthalene	Diesel used for stationary equipment
115-07-1	Propylene	Propane gas used sitewide
108-88-3	Toluene	Gasoline used for stationary equipment
1330-20-07	Xylene	Gasoline used for stationary equipment
7632-00-0	Sodium Nitrite	Control pH in waste at Tank Farms

2.1.5 Environmental Release Reporting

CJ Nelson

Federal regulations establish reporting requirements for certain environmental releases that must be reported to the National Response Center. The National Response Center is the central point of contact for reporting hazardous substance and oil spills. Reportable releases include spills or discharges of hazardous substances to the environment other than releases permitted under state or federal law. CERCLA Section 103 requires reporting for releases of hazardous substances that equal or exceed specified reportable quantities, including releases that are continuous and stable in quantity and rate but exceed specified limits. Washington State regulations (WAC 173-303-145, "Spills and Discharges into the Environment") also require that spills or non-permitted discharges of dangerous waste or hazardous substances to the environment be reported. The requirement applies to spills or discharges onto the ground, into groundwater or surface water (Columbia River), or in the air such that human health or the environment are threatened, regardless of the quantity of dangerous waste or hazardous substance.

During the reporting period, hazardous substance releases were conservatively assessed under WAC 173-303-145, and none of these events required notification to Ecology. These relatively minor spill events primarily involved petroleum products from leaking equipment and vehicles (e.g., hydraulic fluid, diesel fuel, and motor oil). These spills have all been logged per CRD 436.1. All of these spilled products were cleaned up and all resulting materials (e.g., absorbents and impacted soils) were processed for disposal in accordance with applicable requirements.

2.1.6 Toxic Substances Control Act

DI Weyns

The Hanford Site has a well-structured program that complies with the regulations promulgated under the authority granted to EPA by the *Toxic Substances Control Act* (TSCA). At the Hanford Site, TSCA primarily involves regulation of polychlorinated biphenyls (PCBs). TSCA also regulates other constituents (e.g., asbestos and lead-based paint). The applicability of TSCA to the management of these constituents at the Hanford Site is discussed in the following:

- Lead-based Paint
 - TSCA regulations for lead-based paint are applicable to residential and child-occupied facilities and do not apply to Hanford Site activities.

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- Asbestos
 - Asbestos at the Hanford Site is primarily regulated by the *Clean Air Act* and Occupational Safety and Health Administration.
 - The TSCA accreditation and training requirements found at 40 CFR 763, Appendix C, are applicable at the Hanford Site. These requirements specify the minimum training standards for personnel engaged in asbestos abatement activities.
 - PCBs – federal regulations for use, storage, and disposal of PCBs are contained in 40 CFR 761, “Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, and Use Prohibitions.” Background information regarding Hanford Site PCB management activities are as follows:
 - PCB wastes on the Hanford Site are stored and/or disposed of in accordance with the requirements of 40 CFR 761.
 - Some radioactive PCB waste remains in extended storage onsite pending the development of adequate treatment and disposal technologies and capacities.
 - In service electrical equipment that might contain PCBs is maintained in accordance with 40 CFR 761.
 - Signed on August 31, 2000, *The Hanford PCB Framework Agreement 8/31/00: Framework Agreement for Management of Polychlorinated Biphenyls (PCBs) in Hanford Tank Waste* (EPA et al. 2000) resulted in the TPA agencies and DOE contractors working together to resolve the regulatory issues associated with managing PCB waste at the WTP, tank farms, and affected waste management units adjacent to the tank farms.
 - DOE-RL submitted the DOE/RL-2019-18, *2018 Polychlorinated Biphenyl Annual Report*, and DOE/RL-2019-17, *2018 Polychlorinated Biphenyl Annual Document Log*, to EPA on June 28, 2019, as required by 40 CFR 761.180, “Records and Monitoring.” These documents describe the PCB waste management and disposal activities occurring on the Hanford Site.
 - Work was performed at the 242-A Evaporator under the risk-based disposal approval (RBDA) for the 200 Areas Liquid Waste Processing Facilities.
 - The EPA’s 2005 RBDA letter (EPA 2005) allowed for the solidification of the K-Basins North Load-Out Pit (NLOP) sludge, which was a multi-phasic (mixture of liquid and non-liquid phases) radioactive (transuranic) PCB remediation waste. The waste was solidified at the Hanford Site T-Plant Complex to meet radiological treatment standards in preparation for disposal at the Waste Isolation Plant.
 - Condition 5 of the NLOP RBDA requires DOE to submit to EPA plans and schedules for final decontamination and/or disposal of the NLOP treatment system. As of 2019, DOE is developing plans to place additional K-Basin sludge containers in T-Plant, which will require removal of the NLOP treatment equipment. When the K-Basins Sludge Project is finalized, EPA will be notified of plans to decontaminate or dispose of the NLOP treatment equipment.
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2.1.7 Federal Insecticide, Fungicide, and Rodenticide Act

JM Rodriguez

EPA administers the *Federal Insecticide, Fungicide, and Rodenticide Act*. The Washington State Department of Agriculture administers standards to regulate implementation of the Act in the state, including RCW 15.58, “Washington Pesticide Control Act”; RCW 17.21, “Washington Pesticide Application Act”; and rules relating to general pesticide use codified in WAC 16-228, “General Pesticide Rules.” Commercial pesticides are applied on the Hanford Site by commercial pesticide operators that are listed on one of two commercial pesticide applicator licenses and by a licensed private commercial applicator.

2.2 National Environmental Policy Act of 1969

JW Cammann

The *National Environmental Policy Act of 1969* (NEPA) requires federal agencies to assess the environmental consequences of proposed actions prior to making decisions that may have environmental effects. The Council on Environmental Quality regulations that implement NEPA (40 CFR 1500-1508) and DOE’s NEPA implementing procedures (10 CFR 1021) ensure compliance with the letter and spirit of NEPA.

NEPA and its implementing regulations and procedures require federal agencies to integrate NEPA reviews early in project planning to ensure decisions reflect environmental considerations, avoid delays later in the process, and anticipate and resolve conflicts; rather than be an after-the-fact process that justifies decisions already made. The evaluation of many natural, cultural, ecological, and other resource areas fall within the jurisdiction of other environmental laws and regulations, which may require a specific standard to be met (substantive requirements) or may require a permit, license, or other approval by the agency responsible for administering the law.

Proposed actions are evaluated in accordance with the Council on Environmental Quality regulations and DOE NEPA implementing procedures to determine whether an Environmental Impact Statement (EIS) or Environmental Assessment (EA) is required; or the proposed action is categorically excluded from preparation of an EIS or EA.

This section provides the status of NEPA documentation (EISs, EAs, and CXs) completed or underway at the Hanford Site during CY 2019. Hanford Site NEPA documentation is available online at <https://www.hanford.gov/page.cfm/Documents>.

2.2.1 Hanford Site Environmental Impact Statements.

There were no EISs completed or underway at the Hanford Site during CY 2019.

2.2.2 Hanford Site Environmental Assessments.

Hanford Site EAs that were completed or underway in CY 2019 are described in this section.

2.2.2.1 Environmental Assessment for Rebuild of 12.6 Miles of the Benton-Othello Switching Station 115-kV Electrical Transmission Line on the Hanford Site, Washington (DOE/EA-2038).

An EA was prepared to assess environmental effects of Avista Utilities' (Avista) proposal to rebuild 12.6 mi (20.27 km) of the Benton-Othello Switching Station electrical transmission line on the Hanford Site. The upgrade on the Hanford Site would begin approximately 0.5 mi (0.8 km) south of State Route 24.

DOE made a determination to prepare an EA for the rebuild of the transmission line on April 6, 2016. A Public Scoping Notice to prepare an EA was issued on January 3, 2017. The U.S. Department of the Interior, Fish and Wildlife Service, issued a Biological Opinion for the project on February 12, 2018.

DOE completed the final EA in July 2019 and determined that the Proposed Action would not constitute a major federal action significantly affecting the quality of the human environment within the meaning of NEPA. Therefore, preparation of an EIS is not required, and DOE issued its Finding of No Significant Impact on July 28, 2019.

2.2.2.2 Test Bed Initiative Environmental Assessment (DRAFT).

An EA is underway to analyze the potential environmental impacts of a proposed Test Bed Initiative (TBI). The TBI would involve a treatment demonstration using 2,000 gallons of tank waste staged in a double-shell tank. Cesium would be removed from the waste by inserting a pump in the double-shell tank with an in-tank filtration system and ion exchange column containing Crystalline Silicotitanate to capture the cesium. Work continued on the TBI-EA during FY 2019.

2.2.3 Hanford Site Categorical Exclusions.

Categorical exclusions (CXs) encompass classes of actions that DOE has analyzed and determined do not individually or cumulatively have a significant effect on the environment and for which neither an EA nor an EIS is required (10 CFR 1021).

The DOE-RL NEPA Compliance Officer (NCO) approved a total of 49 CXs during CY 2019. Of these, 36 were annual CXs to cover routine and recurring work activities planned to be performed during CY 2019 at the Hanford Site (MSA – 36 annual CXs used to cover corrective, preventive, and predictive maintenance of existing water and sewer pumps and piping, electrical power poles and conductors, and telecommunication network cabling and antenna, no other Hanford contractors prepared annual CXs for approval by the NCO during CY 2019). A total of 13 activity-specific CXs (ASCXs) were approved by the NCO (MSA – 13 ASCXs to cover the siting, acquisition, construction or modification, operation, and removal of raw and sanitary water and sewer systems, electrical distribution systems, telecommunication systems, support buildings, and parking lots, no other Hanford contractors prepared ASCXs for approval by the NCO during CY 2019). Annual and ASCX approved by the DOE-RL NCO may be viewed at <http://www.hanford.gov/page.cfm/CategoricalExclusions>.

2.3 Radiation Protection Statutes, Regulations, and Directives

TA Ikenberry

The Hanford Site is subject to radiation protection statutes and regulations designed to protect the health and safety of the public, workforce, and the environment. Relevant laws and regulations are described in the following sections.

2.3.1 Atomic Energy Act of 1954

To ensure proper management of radioactive materials, the *Atomic Energy Act of 1954* (AEA) and its amendments include provisions to delegate roles and responsibilities to control radioactive materials and nuclear energy primarily to DOE, the U.S. Nuclear Regulatory Commission (NRC), and EPA. Through the AEA, DOE regulates the control of radioactive materials under its authority, including the TSD of low-level radioactive waste from its operations. Sections of the AEA authorize DOE to establish radiation protection standards for itself and its contractors. Accordingly, DOE promulgated a series of regulations (e.g., 10 CFR 820, “Procedural Rules for DOE Nuclear Activities”; 10 CFR 830, “Nuclear Safety Management”; and 10 CFR 835, “Occupational Radiation Protection”). Additional DOE directives to protect public health and the environment from potential risks associated with radioactive materials include DOE O 458.1, *Radiation Protection of the Public and Environment*, and DOE O 435.1, Chg. 1, *Radioactive Waste Management*. Hanford Site operations are subject to these regulations and directives.

DOE directives may be accessed via the Departmental Directives Program website at <https://www.directives.doe.gov/>. DOE technical standards may be accessed via the DOE Office of Environment, Health, Safety & Security website at <https://www.standards.doe.gov/>.

2.3.2 DOE O 458.1, Radiation Protection of the Public and the Environment

The purpose of DOE O 458.1 is to establish standards and requirements for conduct of DOE and DOE contractor operations to provide radiological protection of the public and the environment. DOE O 458.1 was developed and issued consistent with DOE’s policy to implement legally applicable radiation protection requirements; consider and adopt, as appropriate, recommendations by authoritative organizations (e.g., the National Council on Radiation Protection and Measurements and the International Commission on Radiological Protection); and adopt and implement standards generally consistent with those of the NRC for DOE facilities and activities not subject to NRC authority. Specifically, relative to guidance, standards, and regulatory requirements existing at the time of its issuance, DOE O 458.1 adopted applicable standards issued by the National Council on Radiation Protection and Measurements and International Commission on Radiological Protection, incorporated regulatory requirements applicable to DOE operations, and consolidated and upgraded DOE guidance for property with residual radioactive material.

DOE O 458.1 applies to all DOE elements and contractors performing work for DOE, as provided by law and/or contract, and as implemented by the appropriate contracting officer. DOE O 458.1 was developed and issued under the authority of the AEA as amended, which authorizes DOE to provide for the radiological health and safety of the public for operations conducted under DOE direction.

Relative to the radiological health and safety of the public, the goals of DOE O 458.1 are to ensure that DOE operations achieve the following:

- Maintain radiation exposures to the public within established limits
- Manage real and personal property to control residual radioactivity
- Ensure potential exposures to the public are as far below established limits as low as reasonably achievable (ALARA)

- Ensure DOE facilities have the capabilities consistent with the types of operations conducted to monitor routine and non-routine releases and to assess doses to the public.

In addition to providing radiological protection to the public, the objective of DOE O 458.1 is to provide radiological protection of the environment to the extent practical.

Table 2-5 provides the standards (dose limits) for radiation protection of the public and the environment from routine DOE operations. While the public dose limit of 100 mrem/yr (1 millisievert [mSv]/yr) is the primary dose standard, other regulations impose additional constraints on the dose that may be received through specific exposure pathways. The air and water pathways are also regulated by the EPA and Washington State; they are discussed in more detail in Sections 2.4 and 2.5. DOE O 458.1 provides dose limits for protection of aquatic and terrestrial plants and animals in the vicinity of radiological activities on the Hanford Site. In addition, dose constraints are provided for the dose that could be received by a member of the public from certain other activities, including radioactive waste management, storage, and disposal as well as unrestricted release to the public or clearance of real and personal property.

These radiation standards are dose limits but not DOE's expectation for dose to the public and the environment. DOE O 458.1 requires the application of the ALARA process to all routine radiological activities to further reduce (optimize) radionuclide releases and resulting doses to the extent possible.

Table 2-5. Radiation Protection Standards for the Public and the Environment from All Routine DOE Operations.^a (2 Pages)

All Pathways (DOE O 458.1)		
Exposure of members of the public will not cause a total effective dose exceeding 100 mrem (1 mSv) in a year	Total Effective Dose^c	
	mrem/year	mSv/year
Routine public dose	100	1
Temporary public dose ^b , under special circumstances with specific authorization and justification	>100, <500	>1, <5
Air Pathway Dose Constraints (40 CFR 61 Subpart H, WAC 173-480, WAC 246-247)		
See Section 2.3		
Emissions of radionuclides shall not cause any member of the public to receive an effective dose equivalent of 10 mrem/yr	Effective Dose Equivalent	
	mrem/year	mSv/year
	10	0.1
Water Pathway Dose Constraints (40 CFR 141, WAC 246-290)		
See Section 2.4		
The annual dose equivalent to the total body or to any organ shall not exceed 4 mrem/yr, based on average annual concentrations	Dose Equivalent	
	mrem/year	mSv/year
	4	0.04
Protection of Biota. (DOE O 458.1, DOE-STD-1153-2019)		
Radiological activities must be conducted to protect populations of aquatic animals, terrestrial plants, and terrestrial animals	Absorbed Dose	
	rad/day	mGy/day
Aquatic animal	1	10
Riparian animal	0.1	1
Terrestrial plant	1	10
Terrestrial animal	0.1	1

Table 2-5. Radiation Protection Standards for the Public and the Environment from All Routine DOE Operations.^a (2 Pages)

Radioactive Waste Dose Constraint (DOE O 458.1)		
Exposure from radioactive waste management, storage, and disposal activities shall be ALARA and meet the dose constraint.	Total Effective Dose	
	mrem/year	mSv/year
Public dose constraint	25	0.25
Release and Clearance of Property (DOE O 458.1)		
Exposure from release of real (land and buildings) and personal property shall be controlled to be ALARA and meet dose constraints.	Total Effective Dose	
	mrem/year	mSv/year
Public dose constraint from real property	25	0.25
Public dose constraint from personal property	1	0.01
<p>NOTE: Radiation doses received from natural background, residual weapons testing and nuclear accident fallout, medical exposure, and consumer products are excluded from the implementation of these dose limits.</p> <p>NOTE: International dose units shown in italics are not provided in the order or rules but are provided for information.</p> <p>^a Routine DOE operations imply normal, planned activities and do not include actual or potential accidental or unplanned releases.</p> <p>^b DOE-RL may request specific authorization from DOE-HQ for a temporary public dose limit greater than 100 mrem/yr (1 mSv/yr). The request must document the justification, alternative considered, and the application of the ALARA process.</p> <p>^c Dose units are those in the cited regulation, order or standard. DOE uses the most up-to-date dosimetry system of any United States agency.</p> <p>ALARA = as low as reasonably achievable CFR = Code of Federal Regulations DOE-HQ = U.S. Department of Energy, Headquarters mrem = millirem mSv = millisievert mGy = milligray WAC = Washington Administrative Code</p>		

2.3.3 DOE O 435.1, Radioactive Waste Management

I. Siddoway, G Pyles

The purpose of DOE O 435.1 is to establish requirements to manage high-level waste, transuranic waste, and low-level waste, including the radioactive component of mixed waste (high-level waste, transuranic waste, and low-level waste containing chemically hazardous constituents) in a safe manner that is protective of the worker, public health, and the environment. DOE O 435.1 takes a cradle-to-grave approach to managing waste and includes requirements for waste generation, storage, treatment, disposal, and post-closure monitoring of facilities.

Radioactive waste shall be managed such that the requirements of other DOE orders, standards, and regulations are met, including 10 CFR 835, "Occupational Radiation Protection"; DOE O 440.1B, *Worker Protection Program for DOE (Including the National Nuclear Security Administration) Federal Employees*; and DOE O 458.1, *Radiation Protection of the Public and the Environment*. For facilities undergoing CERCLA removal actions or CERCLA remedial actions, DOE O 435.1 may not be an Applicable or Relevant and Appropriate Requirement as defined in Section 121(d) of the CERCLA.

2.4 Air Quality Statutes and Regulations

RA Kaldor

Below is information on federal, state, and local statutes applicable to the Hanford Site air quality program.

2.4.1 Clean Air Act

The federal *Clean Air Act* was enacted to protect and enhance air quality and is the legal basis for federal, state, and local air quality regulations. Originally passed in 1963, the law has been revised extensively on numerous occasions. The most recent revision, the *Clean Air Act Amendments of 1990* provides the framework for a significant portion of current federal air quality regulations. The Washington *Clean Air Act*, which parallels and supplements federal law, has been revised periodically to keep pace with federal changes. The EPA has delegated authority to Ecology and WDOH to implement state laws and regulations in lieu of EPA regulations implementing the *Clean Air Act*.

WDOH regulates radioactive air emissions on the Hanford Site by enforcing the requirements in WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides," and WAC 246-247, "Radiation Protection – Air Emissions." Applicable federal requirements in 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants," Subpart A, and 40 CFR 61, Subpart H, "National Emission Standards for Emissions of Radionuclides Other than Radon from Department of Energy Facilities," are adopted by reference in WAC 246-247.

Ecology regulates criteria and toxic air pollutant emissions at the Hanford Site by enforcing applicable federal requirements in 40 CFR 52, "Approval and Promulgation of Implementation Plans"; 40 CFR 60, "Standards of Performance for New Stationary Sources"; 40 CFR 61, "National Emission Standards for Hazardous Air Pollutants"; 40 CFR 63, "NESHAPs for Source Categories"; 40 CFR 68, "Chemical Accident Prevention Provisions"; and 40 CFR 82, "Protection of Stratospheric Ozone"; as well as the state requirements in WAC 173-400, "General Regulations for Air Pollution Sources"; WAC 173-460, "Controls for New Sources of Toxic Air Pollutants"; WAC 173-480, "Ambient Air Quality Standards and Emission Limits for Radionuclides"; and WAC 173-491, "Emission Standards and Controls for Sources Emitting Gasoline Vapors." Criteria and toxic air pollutant emissions are often referred to as nonradioactive air emissions at the Hanford Site. Criteria pollutants are particulate matter, nitrogen oxides, sulfur oxides, carbon monoxide, lead, and volatile organic compounds. Toxic air pollutants are other chemical contaminants as regulated by Washington State. Ecology also regulates demolition and asbestos renovation activities at the Hanford Site in accordance with federal requirements in 40 CFR 61, Subpart M, "National Emission Standard for Asbestos."

The Benton Clean Air Agency regulates outdoor burning activities at the Hanford Site in accordance with state requirements in WAC 173-425, "Outdoor Burning."

2.4.2 Air Permits Required by Regulations

RA Kaldor, SA Szendre

Hanford Site contractors evaluate each proposed new or modified emission unit using the new source review requirements of radioactive air emissions (WAC 246-247) and criteria and toxic air pollutants (WAC 173-400-110, "New Source Review (NSR) for Sources and Portable Sources," and WAC 173-460-040, "New Source Review") to determine whether a notice of construction application

must be submitted to the WDOH and/or Ecology (as applicable) for approval before construction or operation of the proposed source.

Hanford Site radioactive air emission sources are operated in accordance with the Radioactive Air Emissions License for the DOE-RL Hanford Site, License FF-01 issued by the WDOH. The FF-01 license is a compilation of all applicable radioactive air emission requirements and is renewed every 5 years. For each emission unit, the FF-01 license includes either an approval to modify/construct or an operating license. Overall, Hanford Site radioactive air emissions are controlled to sufficiently low levels to ensure the resultant exposure to any offsite individual remains well below the 10 mrem (100 microsievert [μSv])/yr specified in 40 CFR 61.92, "Standard." Hanford Site radioactive air emissions data are published annually in the radionuclide air emissions report for the Hanford Site (DOE/RL-2020-08, *Radionuclide Air Emissions Report for the Hanford Site, Calendar Year 2019*).

As a major source of air pollutants, the Hanford Site is subject to the air operating permit requirements in 40 CFR 70, "State Operating Permit Programs," and WAC 173-401, "Operating Permit Regulation." In coordination with WDOH and the Benton Clean Air Agency, Ecology issued Renewal 2 of the Air Operating Permit for a period of 5 years, effective April 1, 2013. An application for renewal of the Air Operating Permit was submitted to Ecology in September 2017 and determined by Ecology to be complete in November 2017. A draft renewal 3 Air Operating Permit was issued for public comment in December 2017 and then again in July 2018. Renewal 2 continued to be in effect until a renewed permit was issued. Ecology issued Renewal 3 of the Air Operating Permit for a period of 5 years, effective August 1, 2019. Renewal 3 was issued to incorporate new WDOH and Ecology air emission licenses, approval orders, and updated regulatory requirements.

The Air Operating Permit is a compilation of applicable *Clean Air Act* requirements for both radioactive and criteria/toxic air pollutant emissions, including the radioactive air emissions license FF-01 issued by WDOH and Notice of Construction Approval Orders issued by Ecology. The Air Operating Permit requires the submittal of semiannual reports to the regulatory agencies documenting the status of required monitoring and permit deviations. In addition, an annual report documenting the compliance status of Hanford Site emission sources against applicable *Clean Air Act* requirements and an annual report that documents total emissions of criteria and toxic pollutants is also required.

The WDOH, Ecology, and the Benton Clean Air Agency conduct inspections of Hanford Site emission sources to verify compliance with applicable *Clean Air Act* requirements. Hanford Site contractors and DOE actively work to resolve any potential compliance issues identified during these inspections. During 2019, regulatory agencies conducted 44 *Clean Air Act* inspections on the Hanford Site.

2.5 Water Quality Permits, Statutes, and Regulations

M Kamberg

This section provides information on federal, state, and local requirements and permits for water quality protection.

2.5.1 Federal Permit – Discharges to Columbia River

The *Clean Water Act*, as amended, applies to discharges to surface waters in the United States. At the Hanford Site, applicable regulations are found at 40 CFR Part 122, "EPA Administered Permit Programs:

The National Pollutant Discharge Elimination System.” DOE does not currently have any discharges to the Columbia River requiring permits.

2.5.2 State Waste Discharge Permit – Discharges to the Soil Column/Groundwater

Ecology’s Wastewater Discharge Permit program regulates discharges to state waters, including groundwater. Four Ecology state waste discharge permits, all held by DOE, were in effect during 2019: ST0004500, ST0004502, ST0004511, and ST0045514. Ecology’s wastewater discharge permits page is located at <https://fortress.wa.gov/ecy/nwp/permitting/WWD/index.html>. WDOH issues annual permits to DOE to operate Hanford Site onsite sewage systems, which include some holding-tank sewage systems. Most onsite sewage systems (septic systems) operate under permits issued by the WDOH.

Two Ecology general permits for sand and gravel operations were in effect (and issued to Bechtel National Inc.) during 2019: WAG-50-5180 and WAG-50-5181.

2.5.3 Local Discharge Permit – Discharges to the City of Richland Sewer

The City of Richland regulates industrial wastewater discharges to its sewer collection system in accordance with City of Richland Code Chapter 17.30, *Richland Pretreatment Act*. DOE holds Permit No. CR-IU010, which allows discharges from the 300 Area facilities. The current permit will expire March 6, 2023.

2.5.4 Safe Drinking Water Act of 1974

BR Stenson

The *Safe Drinking Water Act of 1974* (SDWA) established a cooperative program among local, state, and federal agencies to institute drinking water regulations applicable to all public water systems in the United States. States were granted primary responsibility (known as primacy) for administering and enforcing the SDWA. To obtain primacy, states were required to meet certain criteria, including adoption of regulations equal to or more stringent than EPA regulations.

Washington State was awarded primacy in 1978; the State Board of Health and WDOH became partners in developing and enforcing state drinking water regulations. Hanford Site water systems were designated as public in 1986 and became formally registered as public under WDOH jurisdiction in 1987.

The SDWA was amended in 1986 and 1996. Although 1986 amendments included provisions that emphasized treatment to ensure safe drinking water, 1996 amendments focused on source water protection, water system improvements funding, operator training, public information, and strengthening EPA’s scientific work including a risk and cost benefit analysis in establishing drinking water standards. Between 1975 and 2006, these amendments resulted in the development of 18 new drinking water regulations. Post-1996 regulations have included more complex compliance determinations and more advanced treatment technologies. Based on site-specific conditions, many public water systems are either using or investigating new treatment technologies to comply with the increasingly complex requirements.

The EPA’s microbial and disinfection byproduct rules include nine drinking water regulations, address acute threats from microbial contamination, and address chronic threats from disinfectant residuals and disinfection byproducts. Disinfection byproducts are sometimes formed when an oxidizing agent like chlorine is added to water during the water treatment process to kill or inactivate harmful organisms that may cause various diseases. Chlorine is a very active substance and reacts with naturally occurring

substances, like organic material and bacteria, to form compounds known as disinfection byproducts. These rules limit disinfectant residuals and disinfection byproducts in the distribution systems while improving particle removal in the drinking water treatment plants. In 2018, all but one of the affected Hanford Site water systems demonstrated compliance with the filtration and disinfection treatment technique requirements and limits for disinfectant residuals and disinfection byproducts.

To protect worker health using public water supplies on the Hanford Site, water systems were monitored during 2019 for microbiological, chemical, physical, and radiological constituents. There were no microbiological violations during the 2019 monitoring cycle and all eight water systems had chemical concentrations in drinking water that were well below the maximum contaminant levels established by EPA. The 200-West system had one detection for total coliform bacteria, but all repeat samples were satisfactory and no violation occurred. Table 2-6 provides selected drinking water standards. System-specific information and analytical results for 2019 radiological monitoring are summarized in Section 7.1.3.

Table 2-6. Selected Drinking Water Standards. (2 Pages)

Constituent	Drinking Water Standard ^a		Agency ^b
Antimony	6 µg/L	0.006 ppm	EPA, WDOH
Arsenic	10 µg/L	0.01 ppm	EPA, WDOH
Asbestos	7 million fibers/L	7 million fibers/L	WDOH
Barium	2,000 µg/L	2 ppm	EPA, WDOH
Beryllium	0.4 mg/L	0.004 ppm	WDOH
Bromate	10 µg/L	0.010 ppm	EPA, WDOH
Cadmium	5 µg/L	0.005 ppm	EPA
Carbon tetrachloride	5 µg/L	0.005 ppm	EPA, WDOH
Trihalomethanes ^c	80 µg/L	0.08 ppm	EPA
Chromium	100 µg/L	0.1 ppm	EPA, WDOH
Chlorite	1000 µg/L	1.0 ppm	EPA, WDOH
cis-1,2-Dichloroethene	70 µg/L	0.07 ppm	EPA, WDOH
Copper	1,300 µg/L	1.3 ppm	EPA
Cyanide	200 µg/L	0.2 ppm	EPA, WDOH
Fluoride	4 mg/L	4 ppm	EPA, WDOH
Haloacetic Acids	60 µg/L	0.060 ppm	EPA, WDOH
Lead	15 µg/L	0.015 ppm	EPA
Mercury (inorganic)	2 µg/L	0.002 ppm	EPA, WDOH
Methylene chloride	5 µg/L	0.005 ppm	EPA, WDOH
Nickel	0.1 mg/L	0.1 ppm	
Nitrate, as NO ₃ ⁻	10 mg/L	10 ppm	EPA, WDOH
Nitrite, as NO ₂ ⁻	1.0	1.0 ppm	EPA, WDOH
Selenium	50 µg/L	0.05 ppm	EPA, WDOH
Tetrachloroethene	5 µg/L	0.005 ppm	EPA, WDOH
Thallium	2 µg/L	0.002 ppm	EPA, WDOH
Trichloroethene	5 µg/L	0.005 ppm	EPA, WDOH
Antimony-125	300 pCi/L ^d	11.1 Bq/L	EPA
Beta particle and photon activity	4 mrem/yr ^e	40 µSv/yr	EPA, WDOH
Carbon-14	2,000 pCi/L ^d	74.1 Bq/L	EPA
Cesium-137	200 pCi/L ^d	7.4 Bq/L	EPA
Cobalt-60	100 pCi/L ^d	3.7 Bq/L	EPA
Iodine-129	1 pCi/L ^d	0.037 Bq/L	EPA
Ruthenium-106	30 pCi/L ^d	1.11 Bq/L	EPA
Strontium-90	8 pCi/L ^d	0.296 Bq/L	EPA, WDOH

Table 2-6. Selected Drinking Water Standards. (2 Pages)

Constituent	Drinking Water Standard ^a		Agency ^b
Technetium-99	900 pCi/L ^d	33.3 Bq/L	EPA
Total alpha (excluding uranium)	15 pCi/L ^d	0.56 Bq/L	EPA, WDOH
Tritium	20,000 pCi/L ^d	740 Bq/L	EPA, WDOH
Uranium	30 µg/L	0.03 ppm	EPA, WDOH

^a Maximum contaminant level for drinking water supplies.

^b WDOH at WAC 246-290; EPA at 40 CFR 141, "National Primary Drinking Water Regulations;" 40 CFR 143, "National Secondary Drinking Water Regulations;" and *Drinking Water Regulations and Health Advisories* (EPA 1996).

^c Standard is for total trihalomethanes.

^d EPA DWSs for radionuclides were derived based on a 4-mrem/yr dose standard using maximum permissible concentrations in water specified in *National Bureau of Standards Handbook 69* (U.S. Department of Commerce 1963, as amended).

^e Beta and gamma radioactivity from anthropogenic radionuclides. Annual average concentration shall not produce an annual dose from anthropogenic radionuclides equivalent to the total body or any internal organ dose greater than 4 mrem/yr. If two or more radionuclides are present, the sum of their annual dose equivalents shall not exceed 4 mrem/yr. Compliance may be assumed if annual average concentrations of total beta, tritium, and strontium-90 are less than 50, 20,000, and 8 pCi/L, respectively.

Bq = Becquerel
 CFR = Code of Federal Regulations
 DWS = drinking water standards
 EPA = U.S. Environmental Protection Agency
 L = liter
 Mg = milligrams
 MSv = millisievert
 pCi = picocuries
 ppm = parts per million
 µg = micrograms
 WAC = Washington Administrative Code
 WDOH = Washington State Department of Health
 yr = year

2.5.5 Surface Water Standards

Washington State has established surface water quality standards to protect public health and public enjoyment of the waters and for the propagation and protection of fish, shellfish, and wildlife. The standards apply to all surface water and water courses within the jurisdiction of Washington State. For the Hanford Site, this primarily encompasses the Columbia River. The standards are contained within WAC 173-201A.

2.6 Natural and Cultural Resources

This section provides information on federal statutes and assessments related to ecological and cultural resource compliance at the Hanford Site.

2.6.1 Ecological Compliance

KJ Cranna

The DOE/RL-96-32, *Hanford Site Biological Resources Management Plan*, (BRMP) requires that all Hanford Site projects with the potential to adversely affect biological resources conduct an ecological

compliance review before the project starts. DOE uses the review to determine if the project will comply with the *Endangered Species Act of 1973*, the *Migratory Bird Treaty Act of 1918* (MBTA), and the *Bald and Golden Eagle Protection Act*, as well as Executive Order 11988, “Floodplain Management” and Executive Order 11990, “Protection of Wetlands.” The review also addresses whether other significant resources (e.g., Washington State-listed species of concern, wetlands, and native shrub-steppe habitats) are adequately considered during the project planning process. When adverse effects are identified, mitigation actions are prescribed. Mitigation actions may include avoidance of significant resources, minimization of effects, and rectification or compensation if resources are affected.

There were 100 ecological compliance reviews requested during FY 2019 from 17 functional departments on the Hanford Site. Of the 17 functional departments, those with a significant number of requests include Soil and Groundwater (16), Reliability Services (12), Remediation (10), Water and Sewer Utilities (10), and Electrical Utilities (6).

2.6.1.1 Endangered Species Act of 1973.

Several protected species of plants and animals exist on the Hanford Site and along the Hanford Reach of the Columbia River. Upper Columbia River Steelhead trout (*Oncorhynchus mykiss*) and spring-run Chinook salmon (*Oncorhynchus tshawytscha*) are listed under the *Endangered Species Act of 1973* as either threatened or endangered (50 CFR 17, “Endangered and Threatened Wildlife and Plants,” Subpart B) and occur onsite. Critical habitat for these species has been designated within the Hanford Reach. The bull trout (*Salvelinus confluentus*) is also listed under the *Endangered Species Act of 1973* and may occasionally occur in the Hanford Reach; critical habitat for bull trout was designated in the Hanford Reach in 2010 (USFWS 2010). The DOE/RL-2000-27, *Threatened and Endangered Species Management Plan: Salmon, Steelhead, and Bull Trout*, is in place for all three fish species. Two plant species, the Umtanum desert buckwheat (*Eriogonum codium*) and White Bluffs bladderpod (*Physaria douglasii* ssp. *tuplashensis*) are listed under the *Endangered Species Act of 1973*. Other species on the Hanford Site are listed by the Washington State Natural Heritage Program and/or the Washington State Department of Fish and Wildlife as endangered, threatened, or sensitive (see Section 11.2).

2.6.1.2 Migratory Bird Treaty Act.

The MBTA prohibits taking or disturbing listed migratory birds or their feathers, eggs, or nests. Over 200 species of birds that regularly occur on the Hanford Site are protected under the MBTA. All Hanford Site projects with a potential to affect federal or state-listed species of concern complied with the requirements of the MBTA by using the ecological compliance review process as described in the BRMP (DOE/RL-96-32). When applicable, ecological reviews produce recommendations to minimize adverse impacts to migratory birds, such as performing work outside of the nesting season and minimizing the loss of habitat. Hanford Site biologists maintain migratory bird permits issued by the U.S. Fish and Wildlife Service (USFWS) that allow for certain MBTA-related actions. An Annual Permit Activity Form summarizing all activities conducted under this permit is provided to the USFWS each year.

2.6.1.3 Bald and Golden Eagle Protection Act.

The *Bald and Golden Eagle Protection Act* provides for the protection of the bald eagle and golden eagle by prohibiting, except under certain specified conditions, the taking, possession, or commerce of such birds. DOE/RL-94-150, *Bald Eagle Management Plan for the Hanford Site, South Central Washington*, directs Hanford Site activities in accordance with current federal and state regulations and guidelines. This management plan outlines seasonal access restrictions around documented nesting and communal roosting sites at the Hanford Site and establishes guidelines for the protection of perches, roosts, and

nest sites. When applicable, ecological reviews have produced recommendations to minimize adverse impacts to bald eagles, including performing work outside of the winter season; staying out of established buffer areas; entering buffer areas at mid-day; and minimizing impacts by avoiding eagle roosting periods.

2.6.1.4 Executive Orders 11988 and 11990.

Executive Order 11988 and Executive Order 11990 require federal agencies to minimize the loss or degradation of wetlands on federal lands and account for floodplain management when developing water- and land-use plans, respectively. DOE implements the requirements of these two executive orders through 10 CFR 1022, "Compliance with Floodplain and Wetlands Environmental Review Requirements." It is DOE policy to 1) restore and preserve natural and beneficial values served by floodplains; 2) minimize the destruction, loss, or degradation of wetlands; and 3) preserve and enhance the natural and beneficial value of wetlands. Compliance with these executive orders, as well as the wetland provisions of the *Clean Water Act*, are implemented at the Hanford Site through the ecological compliance review process in conjunction with the appropriate site environmental compliance officers. The compliance process includes the identification, protection, and, when necessary, mitigation of wetlands and floodplains on the Hanford Site.

2.6.2 Cultural Resource Compliance

CD Currie

The *Department of Energy Management of Cultural Resources* (DOE P 141.1) requires compliance with cultural resource-related laws and regulations to include the *Antiquities Act of 1906*, *Historic Sites Act of 1935*, *National Historic Preservation Act of 1966* (NHPA), NEPA, *Archaeological and Historic Preservation Act of 1974*, *American Indian Religious Freedom Act of 1978*, *Archaeological Resources Protection Act of 1979*, and *Native American Graves Protection and Repatriation Act*.

Regulations applicable to cultural resources include 36 CFR 60, "National Register of Historic Places"; 36 CFR 63, "Determinations of Eligibility for Inclusion in the National Register of Historic Places"; 36 CFR 65, "National Historic Landmarks Program"; 36 CFR 79, "Curation of Federally-Owned and Administered Archaeological Collections"; 36 CFR 800, "Protection of Historic Properties"; 43 CFR 7, "Protection of Archaeological Resources"; and 43 CFR 10, "Native American Graves Protection and Repatriation and Regulations."

Executive orders applicable to cultural resources include Executive Order 11593, "Protection and Enhancement of the Cultural Environment"; Executive Order 13007, "Indian Sacred Sites"; Executive Order 13175, "Consultation and Coordination with Indian Tribal Governments"; Executive Order 13287, "Preserve America"; and Presidential Proclamation 7319, "Establishment of the Hanford Reach National Monument" (65 FR 37253). Refer to Section 11.3 for details regarding the Hanford Site Cultural and Historic Resources Programs.

There were 71 NHPA Section 106 compliance reviews completed on the Hanford Site in 2019. There were 18 archaeological sites monitored under the NHPA Section 110 Site Conditions Monitoring Program. See Section 11.3.1 for additional information.

2.7 Sustainability

The federal government is committed to avoiding the depletion of natural resources. Federal requirements and guidance have been initiated for agencies to follow. The following are additional statutes implemented at the Hanford Site.

2.7.1 Chemical Management Systems

ML Hermanson

Each Hanford Site contractor maintains a formal program to manage chemicals used by their respective contracts. These chemical management programs apply to the acquisition, use, storage, transportation, and final disposition of all chemicals used at the Hanford Site. A central sitewide information system (The Safety Data Sheets-Material Safety Data Sheets [SDS-MSDS] Database), used by all Hanford Site contractors, maintains an inventory of chemical product SDS and MSDS. The SDS-MSDS Database is available to all Hanford Site employees with access to the Hanford Local Area Network. An information only copy of the SDS-MSDS Database has been made available outside the Hanford Local Area Network in a public domain (<https://ehs.hanford.gov/msds/>). This public domain copy makes the manufacturers SDS and MSDS documents available to public emergency responders, should the need arise, when any chemicals managed by a Hanford Site contractor are shipped offsite. The SDS-MSDS Database is also the information point of entry for the Hanford Site's Chemical Inventory Tracking System (CITS).

Each chemical product is entered into the CITS Database and is profiled identifying information such as the percentage of pure chemical constituents; Specific Gravity; flash point; physical state; National Fire Protection Association (NFPA) 704 classification; Occupational Safety and Health Administration 29 CFR 1910.1200, "Hazard Communication"; hazard class; and category. Codes are applied to each chemical constituent that identify reporting requirement categories.

Hanford Site contractors assign personnel to enter information into CITS to track the inventory of their company's chemicals from acquisition, use, storage, and transportation through final disposition. Using the CITS inventory quantity and location data, combined with the chemical product profile information, data sets are generated to support company hazard communication and required reporting such as EPCRA Toxic Release Inventory and Tier II, NFPA 1 Maximum Allowable Quantity limitations, and DOE Sustainable Environmental Stewardship goals.

2.7.2 Pollution Prevention Program

MM Oates

The *Pollution Prevention Act of 1990* requires that pollution be prevented or reduced at the source whenever possible, and pollution that cannot be prevented be recycled or treated in an environmentally safe manner. The *Hanford Site Sustainability Plan* (HNF-54800) promotes sustainability, ecological and cultural resource preservation, and the integration of sustainable practices into management functions and mission activities. DOE-RL is responsible for the Hanford Site Sustainability Plan and provides the Site Sustainability Guidance to Hanford Site contractors to build a comprehensive approach to site sustainability. This plan provides goals and expectations for the implementation of energy conservation opportunities, water conservation initiatives, greenhouse gas emission reductions, waste minimization, and pollution prevention.

DOE O 436.1, *Departmental Sustainability*, establishes pollution prevention and environmental stewardship requirements. In accordance with these requirements, pollution prevention and waste

minimization activities are documented, tracked, and reported. Table 2-7 summarizes Hanford Site pollution prevention and waste minimization quantities recycled in FY 2019.

Table 2-7. Recycle Quantities.

Material	FY 2019 Total (metric tons)
<i>Non-hazardous Solid Wastes</i>	
Activated Carbon	44.50
Aluminum Cans	3.46
Cardboard	90.45
CI Shredded Paper	408.33
Electronics	23.23
Ferrous Metal	145.56
Furniture	101.04
Miscellaneous	50.66
Non-ferrous Metals	21.08
Plastic Bottles	41.72
Software/Media	1.22
Tires	52.89
Transformers	7.18
Wood Pallets	28.60
Total	1019.92
<i>Regulated Solid Wastes</i>	
Aerosol Cans	0.20
Antifreeze	3.60
Ballasts	4.16
Batteries	4.34
Fluorescent Bulbs	5.76
Lamps - Mercury Containing	0.01
Lead Acid Batteries	44.91
Toner Cartridges	5.31
Used Oil	36.89
Total	105.18

2.7.2.1 Pollution Prevention and Waste Minimization Awards.

The Hanford Site received one DOE, federal agency, state agency, or industry-sponsored award for pollution prevention and waste minimization accomplishments in CY 2019. The Green Electronics Council notified the Hanford Site that they received a five-star 2020 Electronic Product Environmental Assessment Tool (EPEAT) Purchasers Award for the combined application MSA submitted on behalf of MSA, CHPRC, WRPS, HPMC Occupational Medical Services, Veolia Nuclear Solutions – Federal Services, DOE-ORP, and DOE-RL for CY 2019. The goal of the EPEAT Purchaser Award is to recognize excellence in the procurement of green and sustainable electronics among a wide range of organizations. The EPEAT-registered product categories are computers and displays, imaging equipment, televisions, servers, and mobile phones with rating tiers of gold, silver, and bronze. EPEAT Purchasers earn one star for each product category, which they have a written policy in place that requires the purchase of EPEAT-registered electronics registered in the EPEAT green-rating system. Collectively, the Hanford Site reduced the use of primary materials by 323 metric tons, avoided the disposal of 32.6 metric tons of hazardous waste, eliminated 19 metric tons of solid waste, and avoided 1.4 metric tons of water

pollutant emissions. These efforts saved 1,472 MWh of electricity, reduced 702 metric tons of greenhouse gas emissions, and generated \$116,756 in lifetime cost avoidance.

2.7.2.2 Accomplishments.

The Hanford Site contractors recycled 38% of non-hazardous solid waste, excluding construction and demolition (C&D) debris. In 2019, 1,019.92 metric tons of non-hazardous (i.e., plastic, aluminum, cardboard, paper, wood, and metal) and 105.18 metric tons of universal waste (i.e., batteries and lamps) and other regulated (i.e., antifreeze and used oils) wastes were recycled through Hanford Site programs administered through the Mission Support Contract. Along with material recycling and diversion, the Hanford Site strives to reduce greenhouse gas emissions Scopes 1, 2, and 3. There was a 39% reduction in Scope 3 greenhouse gas emissions for the Hanford Site in FY 2019 from the FY 2008 baseline; emissions in FY 2019 were 25,234.2 metric tons of carbon dioxide equivalent, whereas emissions in FY 2008 were 41,427 metric tons of carbon dioxide equivalent. Greenhouse gas emissions from employee commuting, business travel, offsite wastewater treatment, and contracted solid waste disposal are primarily dependent on work locations and the number of workers employed at the Hanford Site.

During FY 2019, contractors at the Hanford Site continued to divert C&D debris from landfill disposal. The Hanford Site diverted approximately 16% (1,814.03 metric tons) of C&D debris from the inert landfill. The Hanford Site contractors continue to make efforts to divert C&D materials suitable for reuse and recycle from landfills. The following are some ongoing Hanford Site projects and operations expected to increase the generation of C&D debris in FY 2020:

- Upgrading electrical in future support to WTP
- Land clearing operations for construction
- Reducing Hanford Site footprint
- Reducing waterline pipe size and runs
- Excessing Project Technical Services old equipment
- Maintaining site infrastructure and utilities.

2.7.3 DOE O 436.1, Departmental Sustainability

MM Oates

DOE O 436.1, *Departmental Sustainability*, requires developing a Site Sustainability Plan integrated with the Hanford Site operational plans. In addition, DOE O 436.1 requires submittal of sustainability goal data and reports as well as EPCRA reporting. Implementation of DOE orders and executive orders by Hanford Site contractors is addressed in Section 3.0.

In addition, DOE O 436.1 requires that an Environmental Management System be established as the platform for managing environmental goals, as well as other impacts to the environment from Hanford Site operations and establishing environmental objectives.

As the Hanford Site services and infrastructure contractor, MSA updated the sustainability plan (HNF-54800) for the Hanford Site in 2019 with input from DOE and Hanford Site contractors. The plan describes the energy management program and identifies planned energy efficiency, water conservation, transportation fleet management, and sustainable buildings activities, as required by DOE O 436.1. Environmental objectives were maintained in 2019, as were plans for recycling,

environmentally preferred procurement management, and electronic asset stewardship (see Section 3.0).

Environmental performance objectives are established to meet requirements provided by DOE O 436.1 and directed guidance for some Executive Orders. Executive Order 13834, *Efficient Federal Operations*, superseded Executive Order 13693, *Planning for Federal Sustainability in the Next Decade*, and established a policy for federal agencies to meet statutory requirements in a manner that increases efficiency, optimizes performance, eliminates unnecessary use of resources, and protects the environment. It allows agencies to conduct legally, environmentally, economically, and fiscally sound environmental and energy-related activities in an integrated, efficient, continuously improving, and sustainable manner.

2.8 Occurrence Reporting and Processing of Operations Information

CJ Nelson

Releases of radioactive and regulated materials to the environment are reported to DOE and other federal and state agencies as required by law. The specific agencies notified depend on the type, amount, and location of each release event. This section addresses releases or potential releases to the environment that may not be documented by other reporting mechanisms during the reporting period. All Hanford Site occurrences are reported to the Hanford Emergency Operations Center Shift Office and subsequently recorded in the Occurrence Reporting and Processing System. This system is a DOE electronic database that tracks occurrence reports across the DOE complex. Since October 2018, Occurrence Reporting Criteria are based on DOE O 232.2A, *Occurrence Reporting and Processing of Operations Information*, and associated Supplemented Contract Requirements Document. The Reporting Criteria provides a set of requirements that must be used to identify reportable occurrences. Report Levels provide a means to reflect the impact associated with a given occurrence in terms of health, safety, and security to personnel, the public, the environment, and the operational mission. The three report levels are: High (**H**), Low (**L**), and Informational (**I**). The following sections summarize occurrences that may have impacted the Hanford Site environment in 2019.

2.8.1 High-Level Report

Occurrences in this category meet any of the following conditions: Impact to worker or public safety and health, environmental harm, regulatory compliance, or potential for mission interruption. There were no Hanford Site Environmental High-Level Report occurrences.

2.8.2 Low-Level Report

Occurrences in this category are those that do not meet High-Level Report occurrences but involve personnel injury, environmental releases, equipment damage, or hazardous circumstances; additional time is appropriate for written notifications. There were no Hanford Site Environmental Low-Level Report occurrences.

2.8.3 Informational Level Report

Occurrences in this category are those that do not meet High- or Low-Level Report occurrences and generally meet the following conditions:

- Determined to be a safety, environmental, or mission concern

- Provide potential learning opportunities for others.

Discovery of legacy contamination is an “Informational Level Report” occurrence. There were 29 documented occurrences of legacy contamination from January 1, 2019, to December 31, 2019. Section 2.8.3.1 provides further details into legacy contamination spread from environmental conditions.

2.8.3.1 Discovery of Legacy Contamination.

Each year on the Hanford Site, legacy contamination is spread from environmental conditions. Some contamination is discovered during routine survey work. Biological vectors also spread contamination (e.g., tumbleweeds, rodents, and birds). Tumbleweeds have a deep taproot that can move contamination from below the soil surface into the plant body on the surface. Rodents eat vegetation located in contaminated areas and deposit contaminated feces outside of the contaminated area. Birds build nests and occasionally use materials from contaminated areas, resulting in contamination transfer to uncontaminated areas. Of these three biological vectors, contaminated tumbleweeds occur most frequently and have the potential to transfer contamination the farthest distance from the original locations. High winds may contribute to the spread of legacy contamination beyond posted areas. Legacy contamination that is discovered is consolidated into quarterly reports.

2.9 Environmental Permits

JK Perry, RA Kaldor, M Kamberg, JW Wilde

Hanford Site operations must be performed in accordance with environmental permit requirements. A general description of the primary environmental permits applicable to Hanford Site operations are listed in Table 2-8. Some of these permits are discussed elsewhere in this section in more detail.

Table 2-8. Environmental Permits. (3 Pages)

Dangerous Waste Permit (RCRA)
Hanford Facility RCRA Permit (WA7890008967) was issued on September 27, 1994, and has undergone several revisions. The permit expired on September 27, 2004; however, Permit WA7890008967, Rev. 8C remains in effect until a new permit is issued. Ecology issued a draft permit for public review and comment from May 1, 2012, through October 22, 2012 (Ecology 2012). Ecology received more than 4,000 comments on the draft permit, including approximately 1,800 comments from the public and 3,000 comments from the DOE. Because information and arguments brought up during the comment period raised substantial new questions, Ecology plans to revise the draft permit and reopen the comment period (see Section 2.1.2.1).
Air Permits
Hanford Site Air Operating Permit 00-05-006, Renewal 2, was effective on April 1, 2013, with an expiration date of March 31, 2018. A permit renewal application was submitted to Ecology in August 2017 and determined to be complete by Ecology in November 2017. Renewal 2 remained in effect until Renewal 3 was issued. Ecology issued Renewal 3 of the Air Operating Permit for a period of 5 years, effective August 1, 2019. The AOP covers operations on the Hanford Site having a potential to emit airborne emissions. The permit is intended to provide a compilation of applicable Clean Air Act requirements for radioactive and nonradioactive emissions at the Hanford Site. It is implemented through federal and state programs.

Table 2-8. Environmental Permits. (3 Pages)

<p>Radioactive Air Emissions License for the Hanford Site (License FF-01) is issued to DOE-RL by WDOH. The current permit was effective October 20, 2017, and expires October 20, 2022. The FF-01 license is a compilation of all applicable radioactive air emission requirements and is incorporated into the Hanford Site Air Operating Permit as an Attachment, pursuant to WAC 246-247-060(7).</p>
<p>Drinking Water Permits</p>
<p>ID#00177 J is a permit to operate the 100-K Area drinking water system. WDOH issues the permit.</p>
<p>ID#00100 4 is a permit to operate the 200-West Area drinking water system. WDOH issues the permit.</p>
<p>ID#41840 8 is a permit to operate the 300 Area drinking water system. WDOH issues the permit.</p>
<p>ID#41947 0 is a permit to operate the 400 Area drinking water system. WDOH issues the permit.</p>
<p>Wastewater Permits</p>
<p>Permit CR-IU010, 300 Area Industrial Wastewater Discharge Permit, is issued to DOE-RL by the City of Richland. Permit CR-IU010 governs the discharges from the 300 Area facilities into the City of Richland sewer collection system. This permit expires March 6, 2023.</p>
<p>HAN002 through HAN075 permit onsite sewage systems to operate on the Hanford Site. WDOH issues these permits.</p>
<p>Permit ST-0004500, State Waste Discharge Permit, allows treated wastewater from the Effluent Treatment Facility to be discharged to the State-Approved Land Disposal Site. This permit expired December 31, 2019. A permit renewal application was submitted to and received by Ecology on December 12, 2019. A letter was received from Ecology on December 31, 2019, in which they accepted the permit application as complete and extended the term of the current permit for up to 5 years while the new permit is being drafted (19-NWP-212).</p>
<p>Permit ST0004502, State Waste Discharge Permit, allows treated effluent from the 200-East and 200-West Areas to be discharged to the 200 Areas Treated Effluent Disposal Facility. This permit expired June 30, 2017. ST0004502 required reapplication for permit renewal by June 30, 2016. The permit renewal application was verified as having been received by Washington State Department of Ecology on June 28, 2016. A letter was received from Ecology on May 24, 2017, in which they accepted the permit application as complete and extended the term of the current permit for up to 5 years while the new permit is being drafted.</p>
<p>Permit ST0004511 is a Categorical State Waste Discharge Permit that authorizes the discharge of wastewater from maintenance, construction, and hydro testing activities and allows for cooling water, condensate, and industrial stormwater discharges at the Hanford Site. This permit expired December 31, 2018. A permit renewal application was submitted to the Washington State Department of Ecology on July 24, 2018, and was received by Ecology on July 25, 2018. A letter was received from Ecology on November 7, 2018, accepting the permit application as sufficiently complete and extended the term of the current permit for up to 5 years while the new permit is being drafted.</p>
<p>Permit ST0045514, State Waste Discharge Permit, is for the 200-West Area Evaporative Sewage Lagoon a domestic wastewater treatment facility located northeast of the 200-West Area. The facility consists of double-lined evaporative lagoons and is designed to have no liquid discharge to the ground. The system provides domestic wastewater treatment for the 200-West and 600 Areas, and treatment for domestic wastewater hauled from the 200-East Area and other locations within the Hanford Site. This permit expires December 31, 2024.</p>
<p>Permit WAG-50-5180, Washington State Sand and Gravel General Permit for the Concrete Batch Plant in the 200-East Area. The Concrete Batch Plant supports construction of WTP; its primary function is making concrete. The permit provides coverage for discharges of process water and stormwater associated with Ready Mix Concrete operations. Bechtel National is the permit owner. This permit expires March 31, 2021.</p>
<p>Permit WAG-50-5181, Washington State Sand and Gravel General Permit for Pit 30 Quarry in the 200-East Area. Ecology issued the permit to Bechtel National, Inc. as owner/operator. The Pit 30 Quarry supports the construction of the WTP, and the primary function is making construction sand and gravel. This permit expires March 31, 2021.</p>

Table 2-8. Environmental Permits. (3 Pages)

Wildlife Permits		
Permit MB60138B-0, Federal Fish and Wildlife Permit, issued by the U.S. Fish and Wildlife Service to DOE-RL, authorizes the collection of migratory birds for ecological monitoring, and danger to human safety and health including control of contamination.		
Review Reference Number 13260-2009-I-0121, Federal Fish and Wildlife Section 10.0 Review, issued to Environmental Assessment Services in July 2009 for the potential of incidental take of salmonids during the collection of fish for research activities in the Columbia River. This review has no expiration listed.		
Review Reference Number 13260-2011-I-0080, Federal Fish and Wildlife Section 7.0 Review, issued to DOE in July 2011 for the potential of incidental take of bull trout during the collection of fish for research activities in the Columbia River. This review has no expiration listed.		
Permit 18-113, Scientific Collection Permit issued by WDFW to MSA for 2018 through June 2019, authorizes food fish, shellfish, game fish, and wildlife collection for research purposes. This permit is renewed annually.		
Permit 19-124, Scientific Collection Permit issued by WDFW to MSA for 2019 through June 2020, authorizes the collection of food fish, shellfish, game fish, and wildlife for research purposes. This permit is renewed annually.		
Agency Contact Information		
State of Washington Department of Ecology P.O. Box 47600 Olympia, WA 98504-7600	U.S. Environmental Protection Agency Region 10 1200 Sixth Ave. Seattle, WA 98101	U.S. Department of Energy Richland Operations Office 2420 Stevens Center Pl Richland, WA 99354
U.S. Fish and Wildlife Service Migratory Bird Permit Office 911 NE 11th Ave. Portland, OR 97232-4181	Washington State Department of Health P.O. Box 47890 Olympia, WA 98504-7890	
DOE = U.S. Department of Energy DOE-RL = U.S. Department of Energy, Richland Operations Office Ecology = Washington State Department of Ecology MSA = Mission Support Alliance RCRA = <i>Resource Conservation and Recovery Act</i> WDFW = Washington State Department of Fish and Wildlife WDOH = Washington State Department of Health WTP = Waste Treatment and Immobilization Plant		

2.10 Environmental Enforcement Actions

SA Szendre

Hanford Site operations are affected and, in many cases, regulated by numerous federal and state agencies enforcing legal requirements that address environmental compliance. The EPA has delegated authority to Ecology and WDOH to implement state laws and regulations in lieu of RCRA, the *Clean Air Act*, and the *Clean Water Act*. State laws and regulations requiring licenses or permits apply to activities at the Hanford Site. Examples of such permits are Hanford Site Radioactive Air Emissions License, the RCRA Permit, the Air Operating Permit, and several State Waste Discharge Permits.

In general, the laws, regulations, and other requirements applicable to Hanford Site operations include, but may not be limited to, those that address the following:

- Environmental quality
- Air quality and noise
- Water resources

-
- Hazardous waste and materials management
 - Radioactive waste and materials management
 - Ecological resources
 - Cultural and paleontological resources
 - Worker safety and health
 - Radiological safety and radiation protection
 - Transportation
 - Emergency planning
 - Pollution prevention and conservation
 - Environmental justice.

It is DOE's policy to carry out its mission in a regulatory compliant and sustainable manner to maximize energy and water efficiency; minimize chemical toxicity and harmful environmental releases; promote renewable and other clean energy development; and conserve natural, cultural, and ecological resources while sustaining assigned mission activities.

This section discusses the environmental noncompliances alleged by regulatory agencies at the Hanford Site during 2019.

2.10.1 Enforcement Actions by Regulatory Program Area

During 2019 there were 10 regulatory agency compliance actions filed against the DOE and its contractors for alleged violations of regulatory requirements or other enforceable agreements. Ten compliance actions were issued by Ecology. Nine compliance actions resulted from regulatory agency inspections of DOE facilities on the Hanford Site (Section 2.1.2.2). The inspection reports also contained 24 concerns.

Table 2-9 summarizes the alleged environmental noncompliance notices by program area. Table 2-10 summarizes the 22 alleged environmental noncompliance notices cited against the DOE and its contractors during 2019 including a short description of the alleged noncompliances. Figure 2-1 shows alleged environmental noncompliance concerns, violations, and associated fines.

To avoid litigation expense and to settle administrative or judicial claims or causes of action a regulatory agency may have against them, DOE and its contractors, without admitting fault or liability, may enter into Agreed Orders and other negotiated regulatory agreements to resolve regulatory agency allegations asserted therein. Nothing in the agreements or in the execution and implementation of the terms and conditions of the agreements shall be taken as an admission of liability by DOE and its contractors, and DOE and its contractors neither admit nor deny the specific factual allegations contained therein. Regulatory agencies progress through a variety of tools to gain compliance, usually starting with a warning letter or letter of noncompliance. If the warning does not result in compliance, then enforcement actions can escalate to notices, orders, or civil penalties issued by the Washington State Attorney General. Although DOE and its contractors may receive warning letters from regulatory agencies, such letters do not constitute formal enforcement actions represented by notices, orders, or civil penalties issued by the Washington State Attorney General that may be appealed.

Table 2-9. Alleged Environmental Noncompliance Summary by Program Area, 2014 through 2019.

Program Area	2014	2015	2016	2017	2018	2019
CAA	2	3	1	0	1	0
CWA	0	1	0	1	0	1
RCRA	7	16	22	33	21	9
CERCLA	0	0	1	0	0	0
Others	1	7	3	0	0	0
Total	10	27	27	34	22	10

CAA = Clean Air Act

CERCLA = Comprehensive Environmental Response, Compensation, and Liability Act

CWA = Clean Water Act

RCRA = Resource Conservation and Recovery Act

Table 2-10. Summary of Alleged Environmental Noncompliances for Calendar Year 2019.

Agency	Document Number	Title	Alleged Noncompliance Description
Ecology	2020-02	ECOLOGY WARNING LETTER REGARDING INSPECTION AT THE 216-A-29 DITCH	Alleged non-compliance for inadequate sampling for ammonia in Well 299-E6-13 for the 216-A-29 Ditch.
Ecology	2019-13	ECOLOGY WARNING LETTER BASED ON INSPECTION OF THE CENTRAL WASTE COMPLEX AND WASTE RECEIVING AND PROCESSING PLANT	Alleged non-compliance for inaccurate location information in the Operating Record for container 0005819.
WDOH	2019-12	ECOLOGY WARNING LETTER BASED ON INSPECTION OF THE T PLANT COMPLEX	Alleged non-compliances for inadequate Land Disposal Restriction notifications, inadequate designation of Tank M-101, and inadequate management of waste in 221-T Tank and Cell 11-L.
Ecology	2019-11	ECOLOGY WARNING LETTER BASED ON INSPECTION OF THE 222-S LABORATORY	Alleged non-compliance for not implementing the Contingency Plan when analytical instrumentation generated heats cause smoke in the laboratory.
Ecology	2019-10	ECOLOGY WARNING LETTER BASED ON INSPECTION OF THE 400 AREA WASTE MANAGEMENT UNIT	Alleged non-compliance for inadequate inspections of ignitable and reactive waste, and inadequate designation of sodium stored in the Interim Examination and Maintenance Cell.
Ecology	2019-07	NON-COMPLIANCE WITH ST0004511 STATE WASTE DISCHARGE PERMIT DISCOVERED	Two discharges from the field log were not recorded on the electronic version and annual submittal of the site wide Significant Discharge Log for Calendar Year 2017.
Ecology	= Washington State Department of Ecology		
WDOH	= Washington State Department of Health		



Figure 2-1. Alleged Environmental Noncompliance Violations, Concerns, and Associated Fines Summary.

2.10.2 Wastewater Permit Deviations

J Russell

During CY 2019, there were 18 non-compliances reported to regulatory agencies for wastewater permit deviations. Two of the events involved Large Onsite Sewage System permits and 16 involved State Waste Discharge Permits. In all cases, action was taken to repair and correct the non-compliant conditions; regulatory notifications were made in accordance with permit requirements. Table 2-11 shows the dates of non-compliance, applicable permit numbers, regulatory agencies, and reasons for each deviation.

Table 2-11. CY 2019 Wastewater Permit Deviations. (3 Pages)

Date	Permit Number Deviated	Reported To	Reason(s)
January 2	ST0004511	Ecology	Potable water leak within 300 ft of crib 216-A-29 and ditch 200-E-286.
January 27	ST0004511	Ecology	Potable water line leak resulting in approximately 96,000 gal of water to the ground.
February 2	ST0004511	Ecology	The permit limit for discharge duration was exceeded during water line flushing activities due to an operator inadvertently leaving the water line open.
March 18	ST0004502	Ecology	TEDF discharge permit ST0004502 Special Condition S2.A requires quarterly sampling for chloroform at TEDF Building 6653. The monthly average effluent limit for chloroform is 7 µg/L per Special Condition S1.A. Results from the February 20, 2019, sample were 9.40 µg/L, which exceeded the monthly average effluent limit for chloroform.

Table 2-11. CY 2019 Wastewater Permit Deviations. (3 Pages)

Date	Permit Number Deviated	Reported To	Reason(s)
April 2	ST0004502	Ecology	A leak was detected in an air vacuum relief valve at Manhole TL-03 of the TEDF transfer line and reported per ST0004502 Special Condition S3.E.
April 29	ST0004500	Ecology	State-Approved Land Disposal Site (SALDS) discharge permit ST0004500 Special Condition S4.A requires the implementation of instructions and procedures within the operations and maintenance manual. Once a month, the samplers obtain "depth-to-water" readings at groundwater wells 699-48-77C and 699-48-77D. In February and March 2019, these readings were not obtained due to weather preventing vehicle access to the SALDS.
May 8	ST0004502	Ecology	A leak was detected in an air vacuum relief valve at Manhole TL-07 of the TEDF transfer line and reported per ST0004502 Special Condition S3.E.
May 11	ST0004511	Ecology	Potable water line leak east of MO291 resulting in 72,000 gal of water released to the ground. The discharge limit exceeded 150 gal/min, resulting in an S8 Upset Condition.
May 23	ST0004511	Ecology	Potable water leak west of MO159 was within 300 feet of ditch 200-E-286 and crib 216-A-37-1.
June 17	HAN071	Health	25 gal of sewage was released to the ground from 2607-1E11 lift station holding tank. A leaking faucet resulted in the tank filling up ahead of the normal pumping schedule.
June 22	HAN068	Health	1,000 gal of sewage was released to the ground from 2601-W6 lift station vault. A leaking sprinkler resulted in the tank filling up inside the vault.
July 18	ST0004511	Ecology	500 gal potable water leak within 300 ft of crib 216-A-29 and ditch 200-E-286.
August 8	ST0004502	Ecology	TEDF discharge permit ST0004502 Special Condition S2.A requires monthly sampling for iron at TEDF Building 6653. The monthly average effluent limit for iron is 300 µg/L per Special Condition S1.A. The monthly average for July 2019 was 301 µg/L.
August 8	ST0004511	Ecology	500 gal potable water leak within 300 ft of crib 216-A-29 and ditch 200-E-286.
September 3	ST0004502	Ecology	A leak was detected in an air vacuum relief valve at Manhole TL-20 of the TEDF transfer line and reported per ST0004502 Special Condition S3.E.
October 29	ST0004500	Ecology	The SALDS discharge permit ST0004500 was noncompliant with Special Condition S2.A, because the semivolatile organic analysis were not extracted within its 7-day hold time. The noncompliance occurred because the GEL Laboratory in South Carolina was evacuated after Hurricane Dorian shifted its course.
November 7	ST0004502	Ecology	TEDF discharge permit ST0004502 Special Condition S4.A requires the implementation of instructions and procedures within the operations and maintenance manual. The sampling protocol required a nitric acid preservative be

Table 2-11. CY 2019 Wastewater Permit Deviations. (3 Pages)

Date	Permit Number Deviated	Reported To	Reason(s)
			added to the samples to ensure the pH is less than 2. Two manganese sample bottles were not properly prepared with the nitric acid preservative. The manganese samples were compliant with EPA method 200.8, because samples can be returned to the laboratory within 2 weeks of collection and acid preserved upon receipt in the laboratory. The manganese analyses were compliant with Special Condition S2.A, and the manganese monthly average was compliant with effluent limits in Special Condition S1.A.
November 20	ST0004511	Ecology	30,000 gal raw water line leak at B Reactor exceeded permit discharge rate limit of 150 gal/min.
Ecology = Washington State Department of Ecology Health = Washington State Department of Health TEDF = Treated Effluent Disposal Facility UV = ultraviolet WIDS = Waste Information Data System			

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