Central Plateau Summary and Recommendations

Central Plateau – Summary

Spent fuel reprocessing, isotope recovery operations, and associated waste management activities occurred on the Central Plateau within the 200 East and West Areas. The groundwater operable units associated with this region are 200-ZP-1 and 200-UP-1, addressing the northern and southern parts of the 200 West Area, respectively, and 200-BP-5 and 200-PO-1 for the northern and southern parts of the 200 East Area. This section summarizes the 2012 groundwater monitoring results for these operable units, as well as groundwater remediation system operations and activities conducted for the deep vadose zone. Recommendations regarding future groundwater monitoring activities are also provided.

Groundwater Monitoring Results

Within the Central Plateau, groundwater monitoring during 2012 was conducted under CERCLA to track contaminants throughout the operable units, provide information for remedial investigations, and assess groundwater remediation systems. Groundwater monitoring was also performed to assess potential impacts to groundwater from specific facilities under RCRA and *Washington Administrative Code* requirements and to track radionuclide contaminants under the AEA. Table CP_Summ-1 lists the number of wells sampled and number of sample events (i.e., well trips) for each Central Plateau groundwater interest area. The results of this sampling are provided in Table CP_Summ-2, which lists the maximum concentration for selected groundwater constituents by interest area.

Within the 200 West Area, the overall extent of the carbon tetrachloride plume during 2012 was similar to that observed during 2011. The maximum sample result during 2012 was 2,200 µg/L in well 299-W11-87, which was the only well with a concentration exceeding 2,000 µg/L. The plume has moved into deeper parts of the aquifer as it has migrated east. The interim-action pump-and-treat system remediating the portion of this plume near the source at the Plutonium Finishing Plant was shut down during May 2012. This system operated for 16 years and reduced the areal extent of that portion of the plume above 2,000 µg/L by 45 percent. The final-remedy pump-and-treat system addressing carbon tetrachloride in the entire northern half of the 200 West Area began operating during July 2012.

Trichloroethene and chloroform occur in groundwater beneath the 200 West Area and are associated with the carbon tetrachloride plume. The maximum trichloroethene sample result during 2012 was 11 µg/L, which is ~10 times the 1 µg/L cleanup level for the 200-ZP-1 Operable Unit. Within 200-ZP-1, this constituent will be remediated by the final remedy pump-and-treat system. Trichloroethene is not a final contaminant of concern for the 200-UP-1 Operable Unit, but this constituent will continue to be routinely monitored within the operable unit in the future. All chloroform sample results were below the 80 µg/L drinking water standard for total trihalomethanes.

Nitrate and tritium occur above drinking water standards within all four Central Plateau groundwater interest areas. These constituents originate from multiple sources. The highest nitrate sample result during 2012 was 5,180 mg/L near the T Tank Farm in the northern 200 West Area, and the highest tritium result was 610,000 pCi/L at the PUREX Cribs in the 200 East Area. The tritium plume from the PUREX Cribs extends east through the 200-PO-1 interest area and discharges to the Columbia River. Concentrations of tritium are declining in many of the Central Plateau wells as the plumes attenuate naturally by radioactive decay and dispersion.

The largest iodine-129 plume occurs within 200-PO-1, but the highest concentrations occur in the 200 West Area. At the 1 pCi/L contour level, the 200-PO-1 plume extends 12 kilometers east of the 200 East Area, and its extent has changed very little over the last 18 years. While the contaminant continues to migrate downgradient, concentrations at the leading edge of the plume (at the 1 pCi/L level) are reduced by dispersion such that the contour position is stable (i.e., at steady state).

Table CP_Summ.1 Groundwater Sampling on the Central Plateau, 2012

Interest Area	Number of Wells Sampled	Number of Successful Well Trips	Number of Aquifer Tubes Sampled	Number of Successful Aquifer Tube Trips
200-ZP	100	198	n/a	n/a
200-UP	83	164	n/a	n/a
200-BP	146	316	5	9
200-PO	103	202	8	16
Total	432	880	13	25

Note:

A successful sampling trip was determined by presence of data in HEIS. This table includes routine sampling, characterization sampling, and sampling conducted to support groundwater remediation systems.

n/a = not applicable

Iodine-129 is detected in wells near the Columbia River shore indicating the contaminant is discharging to the river, but concentrations are diluted well below 1 pCi/L by mixing with river water entering the aquifer during high river stages. There is no significant reduction in concentrations due to radioactive decay, because iodine-129 has a long half-life. The maximum concentration of Iodine-129 within 200-PO-1 during 2012 was 11.4 pCi/L at the PUREX Cribs. The maximum iodine-129 sample result within the Central Plateau was 16 pCi/L in a well near the TX-TY Tank Farms in 200-ZP-1. An iodine-129 plume with concentrations greater than 10 pCi/L occurs east of the 200 West Area in 200-UP-1. The selected remedy for this plume is hydraulic control while treatment technologies are investigated.

The most substantial uranium plumes occur within the 200-BP-5 and 200-UP-1 interest areas. The 200-BP-5 plume originates from the B Complex where the maximum concentration in the unconfined aquifer was 4,470 µg/L during 2012 (well 299-E33-18). Uranium is entering the aquifer from a perched zone beneath the B Complex; the maximum measured concentration in the perched zone was 51,500 µg/L during 2012 (well 299-E33-344). A pumping test to remove uranium from this zone continued to operate during 2012. The uranium plume in 200-UP-1 occurs near U Plant and originates from the 216-U-1/2 Cribs. Further remediation of this plume is addressed by the ROD issued in September 2012 (EPA et al., 2012).

The largest technetium-99 plume occurs within the 200-BP-5 interest area and originates mainly from the BY Cribs. This plume extends to the northwest beyond the 200 East Area. Technetium-99 plumes also occur in association with the tank farms in both the 200 East and West Areas. The maximum sample result on the Central Plateau during 2012 was 51,000 pCi/L at the SX Tank Farm in the 200 West Area.

A cyanide plume originates from the BY Cribs in the 200-BP-5 interest area and is attributed to disposal of wastes from isotope recovery processes. This plume extends toward the northwest, but it is now migrating to the southeast in response to the recent groundwater flow direction change. The maximum concentration in this plume was 1,100 µg/L southeast of the BY Cribs. The B Tank Farm was also identified as a source of cyanide to the groundwater during the year. The maximum concentration in this area was 879 µg/L in well 299-E33-47.

Chromium plumes on the Central Plateau are associated with waste sites in the 200 West Area. One plume occurs east-southeast of the 200 West Area and originated from cribs and ponds associated with the REDOX Plant. The maximum concentration in this plume during 2012 was 134 µg/L. Chromium plumes also occur at the 200 West Area tank farms. The largest of these is the plume from the SX Tank Farm, which extends nearly 500 meters downgradient from the source area. The maximum concentration in this plume during 2012 was 1,150 µg/L. A groundwater extraction system to remove this plume from the aquifer began operating during August 2012.

Groundwater monitoring regulated by RCRA and the *Washington Administrative Code* continued in 2012 at facilities in all four groundwater interest areas (Table CP_Summ-3). The only result indicating a potentially new impact to groundwater quality was an exceedance of total organic carbon in a well at LLWMA-1. Assessment monitoring was performed between June and October 2012, but no dangerous waste constituents were found in the groundwater. The site has returned to detection monitoring for 2013.

A new upgradient well, 299-W9-2, was installed at LLWMA-3 during 2011, and sample results from this well have allowed statistical upgradient/downgradient sample comparisons to resume. Statistical evaluations had been suspended for this site because the former upgradient well, 299-W9-1, went dry during 2000.

Groundwater Remediation

During 2012, the 200-ZP-1 interim-action pump-and-treat system was shut down and the final remedy pump-and-treat system began operating. A groundwater pump-and-treat system began operating near WMA S-SX and soil vapor extraction continued within 200-ZP-1. There are no active groundwater remedial actions occurring within the 200 East Area groundwater operable units, although a pumping test continued within the perched zone beneath the B Complex as part of the deep vadose zone operable unit, 200-DV-1.

The interim-action pump-and-treat system remediating the portion of the carbon tetrachloride plume near the source at the Plutonium Finishing Plant was shut down during May 2012. This system operated for 16 years and successfully contained the high concentration portion of the plume (greater than 2,000 µg/L) in the upper 15 meters of the aquifer. The system reduced the areal extent of this portion of the plume by 45 percent. A total of 6.0 billion liters of water has been extracted by this system since startup, and 13,720 kilograms of carbon tetrachloride removed from the aquifer.

The interim-action pump-and-treat system at WMA T was shut down in May 2012. This system operated from 2007 and was primarily aimed at removing technetium-99 from the aquifer, although carbon tetrachloride, trichloroethene, chromium, and nitrate were also removed. During 2012, 12.3 million liters of water were extracted and 5.5 grams (0.094 curies) of technetium-99 were recovered. Since startup in 2007, 245.2 million liters of water have been extracted and 81.7 grams (1.39 curies) of technetium-99 have been recovered.

The final-remedy pump-and-treat system addressing carbon tetrachloride and other contaminants in the entire northern half of the 200 West Area began operating during July 2012. The system is designed to remove carbon tetrachloride, chromium, nitrate, and technetium-99 from the groundwater. At the end of the year, 18 extraction wells and 14 injection wells were in use, and the treatment plant was operating at a flow rate of 5,300 liters per minute (56 percent of its design capacity). During 2012, the 200 West pump and treat removed 531 kilograms of carbon tetrachloride and 11,053 kilograms of nitrate from 569 million liters of water.

A groundwater extraction system addressing contaminant plumes from WMA S-SX began operating during August 2012. The system consists of three extraction wells with treatment occurring at the 200 West pump and treat. During 2012, 26.3 million liters of groundwater was extracted and 0.25 curie of technetium-99, 5.4 kilograms of chromium, 2,166 kilograms of nitrate, and 2.2 kilograms of carbon tetrachloride were removed from the aquifer.

Table CP_Summ.2 Maximum Concentrations of Selected Groundwater Constituents in Central Plateau Interest Areas During 2011

Contaminant, Units	DWS (DCS)[a]	200-ZP	200-UP	200-BP	200-PO
Radionuclides					
Antimony-125, pCi/L	300	ND	ND	4.37	ND
Carbon-14, pCi/L	2,000 (62,000)	ND	18.1	441	NA
Cesium-137, pCi/L	200 (3,000)	ND	ND	40.9	ND
Cobalt-60, pCi/L	100 (7,200)	ND	ND	59	ND
Gross alpha, pCi/L	15	2.8	3.96	2,300[c]	20
Gross beta, pCi/L	50	4,300	2,100	26,000[c]	1,700
Iodine-129, pCi/L	1 (330)	16	13.3	7.45	11.4
Plutonium-239/240, pCi/L	N/A (140)	0.091	NA	1.0	NA
Strontium-90, pCi/L	8 (1,100)	3.8	2.2	2,400	15
Technetium-99, pCi/L	900 (44,000)	8,000	51,000	35,100	2,500
Tritium, pCi/L	20,000 (1,900,000)	200,000	350,000	35,000	610,000
Uranium, µg/L	30	260	229	4,470[c]	59.9
Metals[b]					
Arsenic (filtered), µg/L	10	3.01	5.84	53.7	11.2
Arsenic, µg/L	10	9.7	5.39	51.8	12.1
Barium (filtered), µg/L	2,000	53.9	116	308	150
Barium, µg/L	2,000	627	134	317	153
Beryllium (filtered), µg/L	4	NA	NA	NA	NA
Beryllium, µg/L	4	0.59	0.218	ND	ND
Chromium (filtered), µg/L	100	45.6	1,150	84.6[c]	25.2
Chromium, µg/L	100	761	1,070	98[c]	190
Hexavalent Chromium (filtered), µg/L	48	NA	95.8	NA	NA
Hexavalent Chromium, µg/L	48	339	988	34[c]	ND
Mercury (filtered), µg/L	2	ND	0.226	1.6	ND
Mercury, µg/L	2	0.373	0.245	1.54	ND
Selenium (filtered), µg/L	50	ND	4.96	17.8	4.68
Selenium, µg/L	50	8.81	6.43	16.9	4.54
Anions					
Cyanide, µg/L	200	146	ND	1,100	ND
Fluoride, mg/L	4	5.05	0.596	2.66[c]	1.14
Nitrate as NO_3, mg/L	45	5,180	3,340	1,570	151
Nitrite as NO_2, mg/L	3.3	0.473	0.755	0.663	1.1
Organics					
1,1,1-Trichloroethane, µg/L	200	ND	ND	ND	1.5
1,1-Dichloroethene, µg/L	7	0.48	ND	ND	ND
1,2-Dichloropropane, µg/L	5	0.14	ND	ND	ND
1,4-Dioxane, µg/L	3.98[d]	ND	5.9	ND	ND
Carbon tetrachloride, µg/L	5	2,200	790	0.32	0.21
Chloroform, µg/L	80	35	16	0.27	1.0
Methylene chloride, µg/L	5	0.85	2.2	1.8	0.39
Tetrachloroethene, µg/L	5	1.2	0.46	ND	1.7
Toluene, µg/L	1,000	1.0	0.22	ND	1.4
Trichloroethene, µg/L	5	11	8.2	3.8	0.56
Xylenes (total), µg/L	10,000	ND	ND	ND	1.4

Note:
Table lists highest value for 2012 for each groundwater interest area, excluding data flagged F, R or Y, or nonroutine samples (e.g., characterization). Blue cells exceed drinking water standards. Yellow cells exceed derived concentration standards. Provided values based on HEIS as of Feb. 6, 2013.
a. References for drinking water standards and derived concentrations standards listed in Table 1-1 of DOE/RL-2011-118.
b. Antimony, cadmium, and thallium excluded because detection limits are typically higher than drinking water standards, creating false exceedances near the detection limits. Nickel excluded because it typically indicates corrosion of stainless steel well screens and casing.
c. Maximum result from the unconfined aquifer. Concentrations are higher in the perched water zone monitored by 299-E33-344 at WMA B-BX-BY.
d. Standard derived using WAC 173-340-720 Method B, documented in DOE/RL-2009-122, Table 6-1.
DCS = DOE Derived Concentration standard
DWS = drinking water standard
ND = not detected above method detection limits or minimal detectable activity
NA = not analyzed for
N/A = not applicable

Soil Vapor Extraction

Soil vapor extraction to remove carbon tetrachloride from the vadose zone near the Plutonium Finishing Plant in the 200 West Area continued to be performed during 2012. The remedy was implemented as an interim action for the 200-PW-1 source operable unit, but it continues as a final remedy under a ROD issued in 2011 (EPA, 2011, *Record of Decision—Hanford 200 Area Superfund Site: 200-CW-5 and 200-PW-1, 200-PW-3, and 200-PW-6 Operable Units, September 30, 2011*). Two soil vapor extraction systems, with a total design capacity of 28.4 cubic meters per minute, were used from March through September. The systems were maintained in standby mode during the winter to allow time for carbon tetrachloride vapor concentrations to rebound. During 2012, the two systems removed 162 kilograms of carbon tetrachloride from the vadose zone and treated 3.04 million cubic meters of vapor. Since startup of operations in 1992, 80,107 kilograms of carbon tetrachloride have been removed in 118 million cubic meters of soil vapor.

Passive soil vapor extraction systems operated during 2012 at eight wells near the disposal sites associated with the Plutonium Finishing Plant. Passive soil vapor extraction is a naturally occurring process driven by barometric pressure fluctuations. During 2012, this system removed ~5 kilograms of carbon tetrachloride from the vadose zone. Since operations began in 2001, the passive systems have removed ~ 110 kilograms of carbon tetrachloride.

Pacific Northwest National Laboratory conducted a treatability test in 2011 using one of the soil vapor extraction systems and associated vadose zone wells. The purpose of the test was to evaluate the flux of carbon tetrachloride from the vadose zone to the groundwater under site-specific conditions and to refine the conceptual site model of the location of the remaining carbon tetrachloride in the vadose zone. Results of this testing were published during 2012 (PNNL-21326). It was concluded that the primary remaining source of carbon tetrachloride in the vadose zone is within the Cold Creek unit.

Deep Vadose Zone

The pumping test that began in 2011 to evaluate the removal of uranium and other contaminants from the perched horizon beneath the B Complex continued during 2012. In total, 234,000 liters of water were pumped from well 299-E33-344 during the year, and 14 kilograms of uranium were recovered. Thus, the value of this system in reducing the potential for future groundwater contamination is evident, and this test is planned to continue for the foreseeable future.

During 2011, a soil desiccation treatability test was conducted in the BC Cribs and Trenches area to evaluate the potential use of desiccation as a remedy to inhibit the migration of contaminants in the deep vadose zone. The test was conducted on a high-moisture soil zone containing technetium-99. Soil gas flow was established by injection of nitrogen in a well and extraction of soil gas at a nearby well. Sensors indicated that desiccation occurred more rapidly in the higher permeability zones, as expected. The test demonstrated the field-scale effectiveness of the soil desiccation method by reducing subsurface soil moisture content to levels that would significantly decrease future vertical water and contaminant movement.

Table CP_Summ.3 RCRA Monitoring Status for the Central Plateau, 2012

RCRA Unit	Report Section	Status for Reporting Period
216-A-29 Ditch	Section 3.5.10.4	Continued indicator evaluation[a].
216-A-36B Crib	Section 3.5.10.2	Continued indicator evaluation[a].
216-A-37-1 Crib	Section 3.5.10.3	Continued indicator evaluation[a].
216-B-3 Pond	Section 3.5.10.5	Continued indicator evaluation[a].
216-B-63 Trench	Section 3.4.11.3	Continued indicator evaluation[a].
216-S-10 Pond and Ditch	Section 3.3.10.3	Continued indicator evaluation[a].
IDF	Section 3.5.10.6	Not yet in use; monitoring results added to baseline data set.
LERF	Section 3.4.11.4	Continued indicator evaluation[a]; adequacy of monitoring approach under review by DOE and Ecology.
LLWMA-1	Section 3.4.11.5	A total organic carbon exceedance triggered assessment monitoring during 2012. No dangerous waste constituents were found in the aquifer. Indicator evaluation monitoring will resume in 2013.
LLWMA-2	Section 3.4.11.6	Continued indicator evaluation[a].
LLWMA-3	Section 3.2.10.3	Indicator evaluation[a]; new upgradient well installed during 2011 replacing former upgradient well that became dry in 2000; statistical evaluations have resumed.
LLWMA-4	Section 3.2.10.4	Continued indicator evaluation[a].
NRDWL	Section 3.5.10.8	Continued indicator evaluation[a]; new monitoring plan that combines monitoring for NRDWL and the Solid Waste Landfill into a single plan has been approved.
SST WMA A-AX	Section 3.5.10.1	Continued assessment (elevated specific conductance); assessment plan being revised.
SST WMA B-BX-BY	Section 3.4.11.1	Continued assessment (cyanide[b]).
SST WMA C	Section 3.4.11.2	Continued assessment (cyanide[b]).
SST WMA S-SX	Section 3.3.10.1	Continued assessment (chromium[b]).
SST WMA T	Section 3.2.10.1	Continued assessment (chromium[b]).
SST WMA TX-TY	Section 3.2.10.2	Continued assessment (chromium[b]).
SST WMA U	Section 3.3.10.2	Continued assessment (chromium[b]); new monitoring plan issued during 2012; will be implemented during 2013.

a. Analysis of RCRA contamination indicator parameters provided no evidence of groundwater contamination with dangerous waste/dangerous waste constituents from the unit.
b. Primary RCRA constituents at this unit.

The following recommendations are made regarding future groundwater monitoring and remedial action evaluations. Where possible, these recommendations provide sufficient detail to describe and plan the activity. As with any such recommendation, these warrant further review and their implementation depends on technical priorities and available funding. In some cases, these recommendations have already been implemented as process improvements, or are either planned for implementation in calendar year 2013 or were implemented earlier and will be continued.

General Recommendation

- As the Hanford Site moves from describing the extent of contamination to active cleanup, meaningful benchmarks for measuring cleanup progress are under development. As new data evaluation and reduction tools are implemented, establish final long-term benchmarks for measuring the progress of cleanup and remedy performance.

200-ZP-1

- During drilling of future wells, collect depth-discrete groundwater samples to assist in defining the vertical distribution of contamination, appropriate length of well screens, and proper positioning of the screens within the aquifer (will continue during 2013).
- Apply appropriate data analysis and computer modeling tools to assess the effectiveness of the pump-and-treat well configuration to continue to support plume capture and assess efficiency of sampling frequency for the monitoring well network (will continue during 2013).
- Evaluate all extraction and injection wells to determine any degradation in well efficiency. If well performance is found to have declined, well evaluation and rehabilitation should be performed (will continue during 2013).
- Review the current performance monitoring well network to confirm if sufficient coverage exists to determine plume extent and movement. Many wells in the monitoring well network went dry because of the regionally declining water table and additional wells will go dry over the next 10 years. Large-scale pumping from the new extraction wells will accelerate this in some areas. As the number of available wells decreases, the ability to effectively monitor remediation, contaminant concentrations, and changes in the plume configuration will be significantly impaired (will continue during 2013).
- Evaluate the current water-level monitoring network to determine how many additional wells need automated water-level monitoring equipment installed to support hydraulic monitoring of the final remedy pump-and-treat system (will continue during 2013).
- Evaluate for future monitoring for plutonium/americium contamination to provide continued support to the conceptual site model that plutonium/americium at waste sites in 200-ZP-1 is not mobile.

200-UP-1

- Implement the interim groundwater monitoring requirements as listed in Appendix B of DOE/RL-2013-07. These requirements are designed as a transition from the sampling required for the remedial investigation (Appendix A of DOE/RL-92-76) to the monitoring that will be required by a future performance monitoring plan. Major changes in sampling include the reduction of sampling frequency in many wells (from quarterly or semi-annual to annual), and the removal of contaminants of potential concern identified for the remedial investigation that are not contaminants of concern or potential concern in the ROD (EPA et al., 2012).
- Replace the dry monitoring wells 699-35-70 and 299-W22-9. When drilling the replacement wells, conduct depth-discrete sampling to characterize the vertical profile of the iodine-129 and tritium groundwater plumes.
- It is recommended that one or more additional wells be installed in the eastern portion of the operable unit to characterize the full eastward extent of the iodine-129 plume.
- For the WMA S-SX Groundwater Extraction System, develop three-dimensional grids of the baseline plumes and estimate the mass (or activity) of each contaminant in groundwater. This information will be useful for evaluating cleanup progress by comparing the amount of contaminant removed from the aquifer over time to the amount initially present.
- For the WMA S-SX Groundwater Extraction System, collect manual water-level measurements from selected monitoring wells on a quarterly basis, and map the water levels to determine the extent of capture by the extraction wells. Evaluate the extent of capture compared to the contaminant plumes and make recommendations to modify pumping rates, as needed, to optimize plume capture.

200-BP-5

- In the 200 East Area, continue efforts to correct water-level measurements for barometric response and well deviations, along with performing precision well elevation surveys, to provide definitive flow direction and gradient magnitude determinations in accordance with RCRA site requirements.
- Reevaluate the well, constituent lists, and monitoring frequency specified in the monitoring plan (DOE/RL-2001-49), and provide updated requirements, including additional wells to monitor the extent and movement of deep-seated plumes and the B Complex plumes. Specifically, it is recommended that monitoring be discontinued for plutonium-239/240, strontium-90, and cesium-137 at locations other than at or adjacent to the 216-B-5 Injection Well and Gable Mountain Pond (planned for 2013).
- Continue pumping of perched water at 299-E33-344 (will continue in 2013).
- Determine ways to investigate residual liquid waste in the deep vadose zone beneath WMA C to understand the extent of continued residual liquid waste drainage of technetium-99.
- Revise the interim status RCRA monitoring plans for WMA C, LLWMA-1, and LLWMA-2 to accommodate the recent change in groundwater flow direction. Also, add a new downgradient monitoring well to WMA C to fill the gap along the east side of the 241-C Tank Farm.
- Decommission well 699-53-55A, which presents a possible contaminant migration pathway within the Rattlesnake Interbed.

200-PO-1

- Continue to improve water-level measurements in the eastern and southeastern portions of 200 East Area and at the NRDWL/SWL area by decreasing the amount of measurement error. The water table gradient in these areas is so low that errors in measuring the depth to water can be larger than the differences in water table elevations between wells. Wells in the IDF/216-A-36B Crib area were previously surveyed to a single benchmark and measured for deviation from vertical. It is recommended that this work also be performed in the vicinity of the 216-A-29 Ditch and 216-A-37-1 Crib to provide greater certainty in calculations of groundwater flow directions in these areas.

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Central Plateau References and Terms

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Terms

AEA	Atomic Energy Act of 1954
BTV	Background Threshold Value
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act of 1980
COCs	Constituents of Concern
COPCs	contaminants of potential concern
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
ETF	Effluent Treatment Facility
IDF	Integrated Disposal Facility
m/day	meters/day
NRDWL	Nonradioactive Dangerous Waste Landfill
OU	operable unit
P&T	Pump and Treat
PCE	tetrachloroethene
PUREX	Plutonium-Uranium Extraction
RCRA	Resource Conservation and Recovery Act of 1976
REDOX	Reduction Oxidation
RI/FS	Remedial Investigation/Field Study
ROD	Record of Decision
SAP	Sampling Analysis Plan
SWL	Solid Waste Landfill
TCE	trichloroethene
TEDF	Treated Effluent Disposal Facility
TOC	total organic carbon
WAC	Washington Administrative Code