

Description of Work for the Installation of Two Boreholes in the 200-DV-1 Operable Unit, FY2020

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

Contractor for the U.S. Department of Energy
under Contract DE-AC06-08RL14788

CH2MHILL
Plateau Remediation Company

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TERMS

ALARACT	As Low As Reasonable Achievable Control Technology
BTR	Buyer's Technical Representative
CCU	Cold Creek Unit
COPC	contaminants of potential concern
DOE	U.S. Department of Energy
DOW	Description of Work
Ecology	Washington State Department of Ecology
EPA	U.S. Environmental Protection Agency
ft	foot/feet
gpm	gallons per minute
IHT	Industrial Hygiene Technician
in	inch(es)
PNNL	Pacific Northwest National Laboratory
QA	quality assurance
RCRA	<i>Resource Conservation and Recovery Act of 1976</i>
RCT	Radiological Control Technician
SAP	sampling and analysis plan
SGRP	Soil and Groundwater Remediation Project
TD	total depth
TPA	Tri-Party Agreement
WAC	Washington Administrative Code
WDOH	Washington Department of Health

1 Introduction/Scope of Work

This description of work (DOW) describes the drilling, sampling, and decommissioning activities associated with the installation of two 200-DV-1 Operable Unit (OU) boreholes. The work associated with this DOW is planned for fiscal year 2020. Boreholes D0208 and D0209 are being drilled to collect polychlorinated biphenyl (PCB) characterization information from the 216-T-19 crib for D0208 and the 216-S-13 crib for D0209.

The drilling of the two boreholes supports Ecology et al., (1989), *Hanford Federal Facility Agreement and Consent Order*, also known as the Tri-Party Agreement (TPA), and will be in compliance with substantive requirements of the *Resource Conservation and Recovery Act of 1976* (RCRA), as well as the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA).

The activities to be carried out during the drilling of the new boreholes include well drilling, soil sampling, and decommissioning in accordance with DOE/RL-2011-104, *Characterization Sampling and Analysis Plan for the 200-DV-1 Operable Unit* and TPA Change Notice TPA-CN-0884.

A project site map with locations of the two boreholes is presented in Figure 1. Boreholes D0208 and D0209 are located in the 200 West Area of the Hanford Site. Table 1 lists the borehole identification numbers, borehole names, and location information.

Drilling activities will consist of advancing the boreholes approximately 6 to 15 feet (ft) below ground surface (bgs). The entire borehole will be decommissioned after reaching total depth (TD) in accordance with the substantive standards of *Washington Administrative Code* (WAC) 173-160.

Sampling activities will include most, if not all, of the following: 1) collection of soil grab samples for archive purposes; and 2) continuous soil samples in the vadose zone for PCB contaminant analysis.

All drilling, and decommissioning activities will be performed by a drilling subcontractor and appropriate drilling method. Sampling and testing will be performed by CH2M Hill Plateau Remediation Company (CHPRC).

Table 1. Well Identification and Location Summary

Borehole ID	Borehole Name	Easting (m)	Northing (m)	Elevation (m)
D0208	D0208	566849.5	136032.0	TBD
D0209	D0209	567157.5	134013.3	TBD

m = meters



Figure 1. Proposed Locations for Two New 200-DV-1 OU Boreholes

2 Background

The following section discusses site geology and contaminants of concern associated with the proposed boreholes in the 200-DV-1 OU.

All measurements in this document will be listed in English standard notation.

2.1 Historic Site Operations and Resulting Contamination

The Hanford Site covers approximately 580 square miles. Past nuclear weapons production activities at the Site resulted in approximately 450 billion gallons of liquid waste being released to the ground. Some of the associated contaminants remain in the vadose zone, but some have reached the groundwater. Hazardous chemical contaminants include various organics, chromium, and nitrate. Radioactive contaminants include iodine-129, cobalt-60, cesium-137, nickel-63, carbon-14, strontium-90, technetium-99, tritium, and uranium. The U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency (EPA), and the Washington State Department of Ecology (Ecology) have developed a remediation plan for remediating the Central Plateau. The Soil and Groundwater Remediation Project (SGRP) is largely responsible for ensuring the plan is implemented.

Borehole D0208 is being installed near crib 216-T-19. Borehole D0209 is being installed near crib 216-S-13. The boreholes are being installed to collect additional soil characterization information near these cribs.

2.2 Site Stratigraphy and Hydrogeology

The following section summarizes the stratigraphic setting in the vicinity of the new boreholes. Table 2 provides the estimated geologic contact depths for each borehole planned in this document, based on contour maps developed from the nearest available well logs.

Table 2. Estimated Geologic Contacts for 200-DV-1 Boreholes

Borehole ID	Hanford and Surficial Deposits	Depth to Water	Cold Creek Unit	Estimated Total Depth
	feet below ground surface			
D0208	Ground surface to top of CCU.	275	105	6
D0209		240	135	15

2.2.1 Stratigraphic Setting

The Hanford Site lies within the semiarid, shrub-steppe Pasco Basin of the Columbia Plateau in southeast Washington state. The 200 Areas are located on a broad, relatively flat area that constitutes a local topographic high near the center of the Hanford Site.

The stratigraphy of the 200 Areas is composed of unconsolidated sedimentary deposits overlying the Columbia River Basalt Group and associated Ellensburg Formation sedimentary interbeds. Units overlying the basalt include, from youngest to oldest, Holocene alluvial, eolian, and anthropogenic deposits, the Pleistocene Hanford formation, the Cold Creek Unit (CCU), and the Miocene-Pliocene

Ringold Formation. Significant stratigraphic thickness differences are caused by the different structural, depositional, and erosional variations at each area.

The local stratigraphy applicable to the extent of drilling the two boreholes in this DOW consists of the following sedimentary units (in descending sequence):

- Sand and gravel backfill/disturbed surface sediments
- Sand and gravel of the Hanford formation

Depending on proximity to former facilities and/or remediation sites, the ground surface of the 200 Areas has been extensively disturbed by grading, construction, and demolition work. Disturbed sediments can extend more deeply, but in general range from 1 to 15 ft bgs.

2.2.2 Hydrogeology

The vadose zone at the borehole locations is generally composed of Holocene material and the silts, sands, and gravels of the Hanford formation, the CCU, and in the 200 West Area the upper Ringold formation (Rtf and upper part of Rwie). The unconfined aquifer beneath the 200 West Area is found within the Ringold Formation member of Wooded Island - unit E (Rwie). The base of the unconfined aquifer is silt and silty clay of the Rlm or top of basalt where the Rlm is absent.

Water is not expected to be encountered at these two boreholes as planned TD is 15 ft bgs.

2.3 Contaminants of Concern

The 200-DV-1 OU contaminants of potential concern (COPCs) are discussed in the SAP (DOE/RL-2011-104). The list of COPCs is presented in Table 3.

Table 3. Contaminants of Potential Concern

Radiological Constituents			
Americium-241	Europium 154	Plutonium-238	Technetium-99
Carbon-14	Europium-155	Plutonium-239/240	Uranium-234
Cesium-137	Hydrogen-3 (Tritium)	Strontium-90	Uranium-235
Cobalt-60	Iodine-129	Neptunium-237	Uranium-238
Europium-152		Nickel-63	Uranium-233
Inorganic Constituents			
Cadmium	Lead	Ammonia/Ammonium	Nitrate/Nitrite
Chromium	Mercury	Chloride	Phosphate
Chromium(VI)	Nickel	Cyanide	Sulfate
Copper	Silver	Fluoride	Aluminum
Antimony	Manganese	Selenium	Uranium (total)
Arsenic	Barium		

3 Description of Work Activities

Activities to be conducted at each well site include site preparation, drilling, sampling, and borehole abandonment. All activities described in this document will be conducted in accordance with the guidelines and requirements set forth in SGRP-PRO-EN-50030 (GRP-EE-02-14.1), *Drilling, Remediating, and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings*, and shall conform to minimum resource protection well substantive standards as defined in WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells." The Washington Department of Health (WDOH) (2012), *The Department of Energy Hanford Site Radioactive Air Emissions License #FF-01*, Enclosure 3, "ALARACT Agreements," As Low As Reasonable Achievable Control Technology (ALARACT) 18, "Environmental Restoration Program ALARACT Demonstration for Drilling," shall also apply. A record of borehole site activities will be maintained by the field geologist and recorded in daily field activity reports.

3.1 Well Site Preparation

Drilling sites will be accessed by existing roads wherever possible and wherever limited access roads have been constructed as necessary. A drill pad of sufficient size for operations and limited access roads will be constructed for each borehole. Grub surveys will be performed by a Radiological Control Technician (RCT) for each site prior to the drill pad and access road construction. Ground penetrating radar surveys will also be conducted as necessary and excavation permits obtained as part of site preparation prior to drilling.

3.2 Drilling

The drilling contractor shall be responsible for complying with well drilling and construction standards defined in the substantive standards of WAC 173-160 and applicable CHPRC procedures. The drill rig and all down-hole equipment shall be high temperature and pressure washed prior to use between boreholes, including boreholes located within the same OU, to minimize potential for cross-contamination. An environmentally-compatible non-petroleum lubricant, such as Jet-Lube Well-Guard¹ thread compound or equivalent, may be used for lubricating the threads of the stainless steel casing during installation activities. Hydrocarbon-based lubricants are not acceptable.

The two boreholes will be drilled with temporary casing extending to TD, to allow for soil sampling. The boreholes will be drilled to approximately 6 to 15 ft bgs. The nominal inner casing diameter for the borehole at TD must be no less than 4.5 inch (in.) to facilitate collection of soil samples.

Drilling aids such as bentonite, other clay-based agents, water, or any foreign matter capable of affecting the characteristics of the sediment samples will not be placed in the boreholes without prior approval of CHPRC.

During drilling and sampling, all reasonable efforts shall be made to minimize, or eliminate, the addition of water to the borehole. If water addition is necessary, contact the OU Project Technical Lead for direction. Only potable water shall be added during drilling. All volumes of water added to the boreholes will be accurately recorded in the drilling log and by the geologist in the field activity report, including volume added and depth interval.

Drilling activities for the two boreholes D0208 and D0209 have been evaluated as low radiological risk with specific controls based on the site histories, sampling of nearby waste sites and existing wells. RCT

¹ Jet-Lube Well-Guard® is a registered trademark of Jet-Lube, Inc. of Houston, Texas.

support is anticipated to consist of full time coverage for drilling and decommissioning activities. A grub survey is required prior to drilling pad installation and surface disturbance for the new proposed boreholes. Any other work will be identified and incorporated into applicable work instructions.

The planned frequency for Industrial Hygiene Technician (IHT) monitoring is full time during drilling and sampling activities for mercury and volatile organic compounds. Continued IHT support for decommissioning activities will be contingent upon data obtained during drilling. Additional sampling/monitoring may be required based on monitoring results, work activities conducted, and environmental conditions.

The boreholes will be decommissioned according to a well decommissioning profile developed by the Well Design Technical Lead. The nominal decommissioning profile shall be to backfill with granular bentonite crumbles from TD to 2 ft bgs with a cement grout surface seal from 0 to 2 ft bgs. A brass marker with the borehole ID number shall be set into the surface of the cement cap.

3.3 Sampling Requirements

All data collection requirements for this project meet the requirements established by the *Characterization Sampling and Analysis Plan for the 200-DV-1 Operable Unit* (DOE/RL-2011-104) and applicable change notices. A sampling summary of planned collection activities is in Table 4. Additional samples may also be collected if unusual or unexpected conditions are encountered in the field, in consultation with the Project OU Lead.

Table 4. Summary of Sample Intervals and Depths for 200-DV-1 Boreholes

Well ID/ Well Name	Geologic Grab Sample ^d	Continuous Soil Samples (ft bgs)
D0208	Every 5 ft or where lithologic changes occur; in one pint jar and a chip tray from drill cuttings.	0 – 6
D0209		0 – 15

ft bgs = feet below ground surface

3.3.1 Groundwater Samples

No groundwater samples will be collected during drilling.

3.3.2 Grab Samples

Grab soil samples for archive purposes will be collected from drill cuttings every 5 ft and at other changes in lithology or at depths where unusual conditions are encountered (as determined by the field geologist) for lithologic descriptions, from ground surface to TD. Archive grab samples will be collected in one-pint glass jars and chip trays. Archive samples will not be collected if contamination is encountered. If insufficient material is recovered from the continuous soil samples, no archive samples will be collected. Priority will be placed on the collection of the analytical samples. The field geologist will collect grab samples for archives, examine material from the boreholes, and prepare borehole logs as specified in SGRP-PRO-EN-50025 (GRP-EE-01-7.0), *Geologic Logging*.

3.3.3 Continuous Soil Samples

Continuous split spoon samples or cores using a sonic core barrel of vadose zone sediment will be collected from each borehole for chemical analysis at depths described in Table 4. The split spoon samplers or the sonic core barrel will be equipped with 6 in. polycarbonate Lexan liners. The percent recovery for each sample will be recorded. If there is not enough sample volume recovered during the

sampling for the entire planned analysis, the OU Project Technical Lead will be consulted to determine the sample priority.

The field geologist will notify the drilling BTR who will contact the OU Project Technical Lead (or designee) if unexpected conditions are encountered in the field that may warrant collection of additional samples. Additional samples may be collected at the discretion of the project manager if unexpected conditions are encountered that indicate the need for additional data.

3.3.4 Geophysical Logging

There is no geophysical logging planned in these two boreholes.

3.4 Final Report

A borehole summary report will be prepared after well completion to compile and archive records, observations, and measurements associated with the borehole drilling. The borehole summary report will include field notes, forms prepared during the drilling, sampling information, geologic logs, civil surveys, and a summary of the management and disposition of drilling-derived waste.

4 Waste Management

Waste generated during the activities described in this document will be managed according to DOE/RL-2012-20, *Waste Control Plan for the 200-DV-1 Operable Unit* and applicable change notices. This waste management plan establish the requirements for the management and disposal of waste associated with the 200-DV-1 OU. Waste from drilling and sampling activities will be handled in accordance with *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*. Ultimate disposal of supplemental samples collected for other organizations (i.e., Pacific Northwest National Laboratory) will be the responsibility of those organizations.

Vadose and saturated zone soil cuttings and miscellaneous solid waste will be stored and managed as investigation-derived waste and surveyed by the IHT and RCT in accordance with the site-specific Health and Safety Plan. The contractor shall be responsible for packaging and handling all wastes generated during construction, testing, decontamination, and demobilization. The SGRP Waste Management Specialist will provide final waste management instructions for the project.

Purgewater will be collected and contained at the well head until it is transported to the Modular Storage Units. Purgewater, groundwater samples, and decontamination fluids generated during well drilling and sample screening shall be managed as purgewater in accordance with purgewater guidance provided in DOE/RL-2009-80, *Investigation Derived Waste Purgewater Management Work Plan*, and DOE/RL-2011-41, *Hanford Site Strategy for the Management of Investigation Derived Waste*.

5 Quality Assurance

Document PRC-MP-QA-599, *Quality Assurance Program*, describes how CHPRC implements the quality assurance (QA) requirements conveyed in DOE O 414.1D, *Quality Assurance*, and 10 Code of Federal Regulations (CFR) 830.121, “Nuclear Safety Management,” also shows how the TPA (Ecology et al. 1989) and DOE/RL-96-68, *Hanford Analytical Services Quality Assurance Requirements Document (HASQARD)*, apply to Environmental QA Program Plans. CHPRC has also issued CHPRC-00189, *CH2M Hill Plateau Remediation Company Environmental Quality Assurance Plan*. All work performed under this DOW will be performed in compliance with Project Hanford Management System overall QA program design (PRC-MP-QA-599). A project-specific QA Program plan for the SGRP scope is presented in Appendix B of CHPRC-00189.

All operations including drilling, sampling and well completion/decommissioning, testing and associated documentation are subject to surveillance by CHPRC, CHPRC’s authorizing agent, and/or owner. This surveillance shall in no way relieve the contractor of any contractual responsibilities. Note the term “surveillance” as used here may include inspection, survey, and/or assessment.

The surface of the ground adjacent to the borehole will be used as the “ground surface” reference for depth measurements. The elevation of the brass marker on the concrete well pad and the top of the protective casing will be surveyed after the well has been completed. A correlation of the measurements made while drilling to the surveyed elevation will be included in the final report.

Technical procedures to be followed are listed in Section 6.2 of this document.

6 General Requirements

Fieldwork for the boreholes will be conducted in accordance with existing CHPRC procedures and protocols and the specifications set forth in this DOW. The applicable procedures are discussed in the following sections.

6.1 Safety and Health

All personnel working at the drilling sites addressed by this plan will have completed, at a minimum:

- Occupational Safety and Health Administration Act 40-hour Hazardous Waste Site Worker training program (29 CFR 1910.120).
- CHPRC General Employee Training.
- Hanford Radiation Worker II training (as required).

Work will be performed in accordance with the following procedures:

- CHPRC-00073, *CH2M Hill Plateau Remediation Company Radiological Control Manual*.
- Site specific plans, as applicable:
 - Health and safety plans
 - Radiological evaluation/radiation work permits
 - Activity hazard analysis/job safety analysis
 - Site-specific Waste Packaging Instruction
- Hanford Site procedures.
- CHPRC procedures.
- Soil and Groundwater Remediation Project Radiological Control Procedures.
- CHPRC Environmental Procedures.

6.2 Technical Procedures/Specifications

This section identifies technical procedures/specifications applicable to field activities performed under this DOW. Activities associated with the drilling and installation of these boreholes and management of waste generated by these activities will adhere to, at a minimum, the following procedures and requirements:

- PRC-PRO-EP-15333, Environmental Protection Processes
- PRC-PRO-EP-15334, Effluent and Environmental Monitoring for Radionuclide Airborne Emissions
- PRC-PRO-EP-15335, Environmental Permitting and Document Preparation
- PRC-PRO-IRM-8310, Document Control Processes
- PRC-RD-EP-15332, Environmental Protection Requirements
- SGRP-PRO-EN-50025 (GRP-EE-01-7.0), *Geologic Logging*

- SGRP-PRO-EN-50030 (GRP-EE-02-14.1), Drilling, Remediating, and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings
- SGRP-PRO-EP-50026 (GRP-EE-01-7.4), Requirements for Use of Hydrogeologic Field Measurement & Monitoring Equipment
- SGRP-PRO-OP-50004 (GRP-EE-01-1.11), *Purgewater Management*
- SGRP-PRO-OP-50021 (GRP-EE-01-3.1), Environmental and IH Sample Preparation and Shipping Authorization
- SGRP-PRO-OP-50024 (GRP-EE-01-6.3), *Well Development and Testing*
- SGRP-PRO-OP-50037 (GRP-EE-05-1.21), Particle Size Distribution of Sediment - Wet Sieve Analysis
- SGRP-PRO-OP-50120, Waste Packaging and Handling at S&GRP
- SGRP-PRO-RP-52789 Radiological Control Coverage and Survey Requirements for S&GRP Activities
- SGRP-PRO-SMP-50015 (GRP-EE-01-2.7), Sample Management and Reporting Sample Issue Resolution
- SGRP-PRO-SMP-50043 (GRP-FS-04-G-004), Operational Monitoring Groundwater Sampling
- SGRP-PRO-SMP-50047 (GRP-FS-04-G-012), Sample Packaging, Transporting and Shipping
- SGRP-PRO-SMP-50060 (GRP-FS-04-G-028), Field Characterization and Treatment Monitoring Activities Groundwater Sampling
- SGRP-PRO-SMP-50061 (GRP-FS-04-G-029), *Non-VOC Soil and Sediment Sampling*
- SGRP-PRO-SMP-50062 (GRP-FS-04-G-030), *VOC Soil and Sediment Sampling*
- WAC 173-160, Minimum Standards for Construction and Maintenance of Wells

7 Project Documentation

Documentation requirements for these activities are separated into scoping documents, field activity documents, and reporting documents. The following documents will be prepared to support the well drilling activity:

- Scoping Documents
 - DOW (this document)
 - Drilling specifications/subcontractor scope of work (procurement package)
 - Excavation permit
 - SGRP-PRO-OP-50120, Waste Packaging and Handling at S&GRP
 - Additional waste management documents, as required
 - Radiological Hazard Screening Form
- Field Documentation
 - Well Drilling/Decommissioning Planning form
 - Daily Field Activity Reports
 - Sample collection, custody, and shipment documentation for waste samples
 - Well logs (borehole, lithologic, and completion)
 - Borehole Geophysical Log Data Reports
 - Field Logbook
 - Well Construction summary reports
 - Well Summary sheets
 - Field Cleaning and/or Decontamination sheets
 - Well Development and Test data sheets
 - Sieve Analysis sheets
 - Well Survey Data Reports
 - Well Acceptance Reports
- The WDOH (2012) ALARACT Agreements(s)
- Reporting Documents
 - Field documentation will be transmitted to Drilling Operations for incorporation into the well database
 - Borehole Summary Report

- State of Washington Resource Protection Well Report (generated by driller)

The records produced for this project will undergo technical and management review in accordance with CHPRC practices and procedures. The required reviewers will be identified prior to document completion, and the review time will be established as soon as practical.

8 References

CH2M HILL Plateau Remediation Company Soil and Groundwater Remediation Project Procedures:

- PRC-MP-QA-599, *Quality Assurance Program*
- PRC-PRO-EP-15333, *Environmental Protection Processes*
- PRC-PRO-EP-15334, *Effluent and Environmental Monitoring for Radionuclide Airborne Emissions*
- PRC-PRO-EP-15335, *Environmental Permitting and Document Preparation*
- PRC-PRO-IRM-8310, *Document Control Processes*
- PRC-RD-EP-15332, *Environmental Protection Requirements*
- SGRP-PRO-EN-50025 (GRP-EE-01-7.0), *Geologic Logging*
- SGRP-PRO-EN-50030 (GRP-EE-02-14.1), *Drilling, Remediating, and Decommissioning Resource Protection Wells, and Geotechnical Soil Borings*
- SGRP-PRO-EP-50026 (GRP-EE-01-7.4), *Requirements for Use of Hydrogeologic Field Measurement & Monitoring Equipment*
- SGRP-PRO-OP-50004 (GRP-EE-01-1.11), *Purgewater Management*
- SGRP-PRO-OP-50021 (GRP-EE-01-3.1), *Environmental and IH Sample Preparation and Shipping Authorization*
- SGRP-PRO-OP-50024 (GRP-EE-01-6.3), *Well Development and Testing*
- SGRP-PRO-OP-50037 (GRP-EE-05-1.21), *Particle Size Distribution of Sediment - Wet Sieve Analysis*
- SGRP-PRO-OP-50120, *Waste Packaging and Handling at S&GRP*
- SGRP-PRO-OP-52998, *Gamma 1 and 4 Geophysical Logging System Set Up and Power Up*
- SGRP-PRO-OP-53002, *Gamma 1 and 4 Geophysical Logging System Shutdown*
- SGRP-PRO-OP-53023, *Perform SGLS Logging*
- SGRP-PRO-OP-53024, *Perform NMLS Logging*
- SGRP-PRO-RP-52789, *Radiological Control Coverage and Survey Requirements for S&GRP Activities*
- SGRP-PRO-SMP-50015 (GRP-EE-01-2.7), *Sample Management and Reporting Sample Issue Resolution*
- SGRP-PRO-SMP-50043 (GRP-FS-04-G-004), *Operational Monitoring Groundwater Sampling*
- SGRP-PRO-SMP-50047 (GRP-FS-04-G-012), *Sample Packaging, Transporting and Shipping*
- SGRP-PRO-SMP-50060 (GRP-FS-04-G-028), *Field Characterization and Treatment Monitoring Activities Groundwater Sampling*
- SGRP-PRO-SMP-50061 (GRP-FS-04-G-029), *Non-VOC Soil and Sediment Sampling*

SGRP-PRO-SMP-50062 (GRP-FS-04-G-030), *VOC Soil and Sediment Sampling*

Other References:

- 10 CFR 830.121, "Nuclear Safety Management," *Code of Federal Regulations*, as amended.
- 29 CFR 1910.120, "Hazardous Waste Operations and Emergency Response," *Code of Federal Regulations*, as amended.
- ASTM B822-17, *Standard Test Method for Particle Size Distribution of Metals Powders and Related Compounds by Light Scattering*. Available at: <https://www.astm.org/Standards/B822.htm>.
- ASTM D6913/D6913M-17, *Standard Test Methods for Particle-Size Distribution (Gradation) of Soils Using Sieve Analysis*. Available at: <https://www.astm.org/Standards/D6913.htm>.
- ANSI, 1991, *ANSI Standard Z535.1, Safety Color Code*, American National Standards Institute, New York, New York.
- CHPRC-00073, 2013, *CH2M Hill Plateau Remediation Company Radiological Control Manual*, CH2M Hill Plateau Remediation Company, Richland, Washington
- CHPRC-00189, 2013, *CH2M Hill Plateau Remediation Company Environmental Quality Assurance Program Plan*, CH2M Hill Plateau Remediation Company, Richland, Washington
- Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 U.S.C. 9601, et seq. Available at: <http://epw.senate.gov/cercla.pdf>.
- DOE O 414.1D, *Quality Assurance*, U.S. Department of Energy, Washington, D.C. Available at: <https://www.directives.doe.gov/directives-documents/400-series/0414.1-BOrder-d-admchg1>
- DOE/RL-96-68, 2014, *Hanford Analytical Services Quality Assurance Requirements Document (HASQARD)*, Rev. 4, U.S. Department of Energy, Richland Operations Office, Richland, Washington.
- DOE/RL-2009-80, 2009, *Investigation Derived Waste Purgewater Management Work Plan*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington, available at: <http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0094946>.
- DOE/RL-2011-104, *Characterization Sampling and Analysis Plan for the 200-DV-1 Operable Unit*, U.S. Department of Energy, Richland Operations Office, Richland, Washington, available at: <https://pdw.hanford.gov/document/1202020261>
- DOE/RL-2011-41, 2011, *Hanford Site Strategy for Management of Investigation Derived Waste*, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0093937>
- DOE/RL-2012-20, *Waste Control Plan for the 200-DV-1 Operable Unit*, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <https://pdw.hanford.gov/document/1506301062>
- Ecology, EPA, and DOE, 1989, *Hanford Federal Facility Agreement and Consent Order*, 2 vols., as amended, Washington State Department of Ecology, U.S. Environmental Protection Agency, and U.S. Department of Energy, Olympia, Washington. Available at: <http://www.hanford.gov/?page=91&parent=0>

Resource Conservation and Recovery Act of 1976, 42 USC 6901, et seq. Available at:

<https://elr.info/sites/default/files/docs/statutes/full/rcra.pdf>

WAC 173-160, “Minimum Standards for Construction and Maintenance of Wells,” *Washington Administrative Code*, as amended.

WAC 173-160-420, “General Construction Requirements for Resource Protection Wells,” *Washington Administrative Code*, as amended.

WDOH, 2012, *The Department of Energy Hanford Site Radioactive Air Emissions License #FF-01*, Enclosure 3, “ALARACT Agreements,” ALARACT 18, “Environmental Restoration Program ALARACT Demonstration for Drilling,” Washington State Department of Health, Office of Radiation Protection, Radioactive Air Emissions Section, Richland, Washington. Available at: http://www.doh.wa.gov/Portals/1/Documents/4100/FF-01_a_.pdf

WHC-SD-EN-TI-011, 1992, *Geology of the Northern Part of the Hanford Site: An outline of Data Sources and the Geologic Setting of the 100 Areas*, Rev. 0, Westinghouse Hanford Company, Richland, Washington.

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