

**EXPLANATION OF SIGNIFICANT DIFFERENCES
FOR THE 100-NR-1 AND 100-NR-2 OPERABLE UNIT
INTERIM ACTION RECORD OF DECISION**

**Hanford Site
Benton County, Washington**

EPA ID: WA 1890090078

June 2019

SITE NAME AND LOCATION

U.S. Department of Energy
100-NR-2 Groundwater Operable Unit
Hanford Site – 100 Area
Benton County, Washington

INTRODUCTION TO THE SITE AND STATEMENT OF PURPOSE

This decision document presents an explanation of significant differences (ESD) for EPA/ROD/R10-99/112, *Interim Remedial Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington* (hereinafter referred to as the 100-NR-2 Operable Unit [OU] Interim Action Record of Decision [ROD]). The U.S. Department of Energy (DOE) 100 Area National Priorities List (40 CFR 300, “National Oil and Hazardous Substances Pollution Contingency Plan” [hereinafter referred to as the National Contingency Plan (NCP)], Appendix B, “National Priorities List”) site is located in Benton County, Washington.

The 100 Area of the Hanford Site, which encompasses approximately 68 km² (26 mi²) bordering the southern shore of the Columbia River, is the site of nine retired plutonium-production reactors. The groundwater impacted by operations associated with the nine reactor areas has been divided into five groundwater OUs. One of the five groundwater OUs (100-NR-2) was addressed in the 100-NR-2 OU Interim Action ROD (EPA/ROD/R10-99/112).

The 100-NR-2 Groundwater OU interim remedial action is being conducted under the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). The 100-NR-2 OU Interim Action ROD (EPA/ROD/R10-99/112), as amended (EPA et al, 2010, *U.S. Department of Energy 100-NR-1 and NR-2 Operable Units Hanford Site – 100 Area Benton County, Washington Amended Record of Decision, Decision Summary and Responsiveness Summary*; EPA et al., 2011, *Explanation of Significant Differences for the 100-NR-1 and 100-NR-2 Operable Units Interim Remedial Action Record of Decision Hanford Site Benton County, Washington*), selected the interim remedy of groundwater pump and treat (P&T) to intercept the strontium-90 plume under the 100-N Area and then treatment using an ion-exchange technology. Subsequently, a permeable reactive barrier (PRB) using apatite forming minerals was authorized under the ROD amendment (EPA et al., 2010) to replace the previous P&T remedy. The PRB barrier has been partially installed at this time. The barrier will be used to reduce the flux of strontium-90 into the Columbia River unit a final remedy is in place.

The following conclusions form the bases for the decisions provided in this ESD:

- Implementation of the remedy includes routine maintenance and sampling activities for groundwater wells associated with the 100-NR-2 OU and the PRB. These activities, including characterization and monitoring, well maintenance, well decommissioning, and water table level measurements, generate small amounts of miscellaneous solid waste that are stored for eventual disposal.
- The miscellaneous solid waste generated in support of 100-NR-2 interim actions is physically similar to miscellaneous solid waste generated from other Hanford Site groundwater OUs. A centralized location in the Central Plateau for storing and managing solid waste from these Hanford Site groundwater OUs has been proposed to facilitate safe and efficient storage of the solid waste prior to disposal. Solid waste from each groundwater OU will be segregated and not commingled.

DOE is the lead agency for the 100-NR-2 OU, the Washington State Department of Ecology (Ecology) is the lead regulatory agency, and the U.S. Environmental Protection Agency (EPA) is the support agency,

as described in EPA et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*. These three agencies (hereinafter referred to as the Tri-Parties) are issuing this ESD to provide public notice regarding significant changes to the 100-NR-2 OU Interim Action ROD (EPA/ROD/R10-99/112).

STATUTORY CITATION FOR AN EXPLANATION OF SIGNIFICANT DIFFERENCES

The Tri-Parties are issuing this ESD in accordance with CERCLA Section 117(c), “Public Participation,” and the NCP (40 CFR 300.435(c)(2)(i) “Remedial Design/Remedial Action, Operation and Maintenance”). The purpose of this ESD is to provide public notice regarding a change to the selected interim remedial action that will allow for more efficient and cost-effective management of miscellaneous solid waste generated during routine 100-NR-2 OU groundwater remedial activities using a centralized solid waste storage area in the Central Plateau. All waste management activities associated with centralized waste management storage will be completed pursuant to the requirements set forth in DOE/RL-2001-27, *Remedial Design/Remedial Action Work Plan for the 100-NR-2 Operable Unit*; and DOE/RL-2000-41, *Interim Action Waste Management Plan for 100-NR-2 Operable Unit*.

In accordance with the NCP (40 CFR 300.435(c)(2)(i)(A); 40 CFR 300.825(a)(2), “Record Requirements After the Decision Document Is Signed”), this ESD and its supporting documents will become part of the 100-NR-2 OU Interim Action Administrative Record. The ESD and supporting information are available at the DOE Tri-Party Agreement (Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent Order*) Administrative Record office and at the public information repositories available at <http://pdw.hanford.gov/arpir/> and the following locations:

U.S. Department of Energy, Richland Operations Office

Administrative Record and Public Access Room

2440 Stevens Center, Room 1101

P.O. Box 950, Mail Stop H6-08

Richland, WA 99352

(509) 376-2530

Email: Heather_M_Childers@rl.gov

Hours of operation: Monday through Thursday, 6:00 a.m. to 4:30 p.m. (except 12:00 to 1:00 p.m.)

Gonzaga University

Foley Center Library

East 502 Boone Avenue

Spokane, WA 99258

(509) 313-6110

Email: spenceratkins@gonzaga.edu

SITE HISTORY, CONTAMINATION, AND SELECTED REMEDY

Nine water-cooled, graphite-moderated reactors were constructed along the Columbia River at the Hanford Site between 1943 and 1963. The N Reactor, the last plutonium-production reactor to be built at Hanford, is located in the 100 Area in the northern portion of the Hanford Site, on a broad strip of land along the Columbia River (about 48 km [30 mi] northwest of the city of Richland, Washington).

The N Reactor differs from the other reactors at Hanford not only because of its closed-loop cooling system, but because it was designed as a dual-purpose reactor, capable of producing both special nuclear material and generating steam for electrical power.

The N Reactor operated between 1963 and 1987. Byproduct steam generated from reactor operation was used to produce electricity in the adjacent Hanford Generating Plant (HGP), a Bonneville Power Administration switching station. The N Reactor went into production in December 1963, and the HGP was completed and started producing electrical power in April 1966. Both the reactor and the HGP operated continuously (except during periodic shutdowns for maintenance and repairs) until January 1987. The reactor was retired in October 1989 and was permanently shut down in October 1991.

Activities conducted to support operation of the nine reactors within the 100 Area resulted in the creation of hundreds of waste sites and contamination of the soil and groundwater. Primary contaminants include radionuclides and inorganic constituents. In November 1989, the 100 Area was listed on the National Priorities List under CERCLA (40 CFR 300, Appendix B). Since then, sampling and remediation activities have been ongoing in the 100 Area, and several interim remedial action RODs have been issued to address cleanup of contaminated soil, structures, and debris.

Two CERCLA interim remedial action RODs have been issued for the 100-N Area. The first CERCLA interim remedial action ROD (the 100-NR-1/100-NR-2 OU ROD [EPA/ROD/R10-99/112]) was issued in September 1999 to address cleanup of 100-NR-1 OU source waste site (e.g., contaminated soil, in-ground structures, and debris disposal waste sites), as well as the underlying groundwater (the 100-NR-2 OU). The second was issued in January 2000 (EPA, 2010) to address cleanup of contaminated soils, structures, and pipelines associated with two *Resource Conservation and Recovery Act of 1976* treatment, storage, and disposal units and an associated waste site.

The 100-NR-2 OU Interim Action ROD (EPA/ROD/R10-99/112) directed the removal of strontium-90 from groundwater under the 100-N Reactor Area. Furthermore, petroleum hydrocarbons have been observed in two monitoring wells, and free-floating product will be removed if observed during future monitoring activities. The 100-NR-2 OU is located on a broad strip of land in the north-central portion of the Hanford Site, along the Columbia River. This OU includes the groundwater underlying the 100-N Reactor Area. The 100-NR-2 OU Interim Action ROD was revised for the selected interim remedial action regarding strontium-90. The revised interim remedial action replaces the P&T system with an apatite PRB. This amended interim remedial action decision, based on information contained in the DOE Administrative Record for the 100-NR-2 OU, is necessary to protect public health and welfare and the environment from actual or potential releases of strontium-90.

The selected remedy combines apatite sequestration, monitored natural attenuation, and institutional controls to prevent human and ecological exposure and to reduce the strontium-90 flux to the Columbia River. The mass of apatite to be emplaced within the PRB footprint is designed to sequester strontium-90 entering the PRB from the upgradient portion of the plume over the next 300 years.

Nine storage areas are currently being used for miscellaneous soil waste management pertaining to Hanford Site groundwater OU remedial actions. One of the storage areas is being used to support 100-NR-2 OU remedial action activities.

Small amounts of miscellaneous solid waste consisting primarily of paper wipes, latex gloves, plastic sheeting/bags/sleeving, filter media, plastic tubing, and absorbent material are generated as a result of remedial action activities, as well as excess soil and purge water. The individual OU waste container storage locations are commonly not located near the points of sample collection/maintenance activities, and a considerable amount of time is spent traveling to and from these storage locations throughout the day. The solid waste generated by these activities is physically similar, regardless of the location from which it was obtained.

DESCRIPTION OF SIGNIFICANT DIFFERENCES

This ESD allows for miscellaneous solid waste to be collected when generated from the 100-NR-2 groundwater OU, transported, and stored at a central location in the Central Plateau. This approach includes the following benefits:

- Provides easier management and regulation by combining many individual waste storage areas into one
- Improves workability
 - Samplers begin and end the day at the same facility
 - Well maintenance personnel end the day at one facility
 - Waste management personnel have one area to inspect
- Removes waste storage areas from along the Columbia River
- Results in safer and more green remediation, with fewer miles required for waste management
- Provides cost savings

The changes made by this ESD do not fundamentally alter the selected remedy described in the 100-NR-2 OU Interim Action ROD, as amended (EPA/ROD/R10-99/112). The significant difference is that routinely generated miscellaneous solid waste can be collected, transported, and stored at a centralized location. Collection, transport, and storage of the solid waste will be conducted in accordance with the applicable or relevant and appropriate requirements in DOE/RL-2001-27.

Costs associated with managing miscellaneous solid waste at a centralized storage location are within the estimates of the selected remedy in the 100-NR-2 OU Interim Action ROD (EPA/ROD/R10-99/112).

SUPPORT AGENCY COMMENTS

Ecology (the lead regulatory agency for the 100-NR-2 OU), and EPA (the support agency for this OU) concur with this ESD to the 100-NR-2 OU Interim Action ROD (EPA/ROD/R10-99/112).

AFFIRMATION OF STATUTORY DETERMINATIONS

The remedy, as revised by this ESD, continues to satisfy the requirements of CERCLA Section 121, "Cleanup Standards." The revised remedy is protective of human health and the environment, will comply

with the federal and state requirements that are legally applicable or relevant and appropriate to the remedial action, and is cost effective.

The preamble to the NCP (40 CFR 300) clarifies that when noncontiguous facilities are reasonably close to one another and wastes at these sites are compatible for a selected treatment or disposal approach, CERCLA Section 104(d)(4), “Response Authorities,” allows the lead agency to treat these related facilities as one site for response purposes and, therefore, allows the lead agency to manage waste transferred between such noncontiguous facilities without having to obtain a permit. The 100-NR-2 OU and the 200 Centralized Groundwater Waste Storage Area (6265A Building, located in the Central Plateau) are considered to be a single site for response purposes under the 100-NR-2 OU Interim Action ROD (EPA/ROD/R10-99/112), as amended and modified. Solid waste stored at the 6265A Building will be segregated by OU and will not be commingled. A list of the federal and state ARARs that are to be complied with by the Selected Remedy, as revised by this ESD, is provided in the 100-NR-2 OU Interim Action ROD and in Table 1. Attachment 1 provides a figure showing the 6265A Building location, and Attachment 2 provides photographs of the building.

Table 1. Federal and Washington State ARARs for the Selected Remedy, as revised by this ESD

Solid Wastes			
“Hazardous Waste Management” (RCW 70.105, as amended); “Dangerous Waste Regulations” (WAC 173-303)			
Regulatory Citation	Description of Regulatory Requirement	Rationale for Including	Application
“Land Disposal Restrictions” (WAC 173-303-140)	Establishes treatment requirements and disposal prohibitions for land disposal of dangerous waste and incorporates the federal land disposal restrictions (40 CFR 268).	Remediation may generate waste subject to land disposal restrictions.	Wastes subject to these requirements will be treated as required and disposed in a manner that satisfies standards.
“Requirements for Generators of Dangerous Waste” (WAC 173-303-170)	Establishes the requirements for dangerous waste generators. “Requirements for Generators of Dangerous Waste” (WAC 173-303-170[3]) which includes the substantive provisions of “Accumulating Dangerous Waste On-Site” (WAC 173-303-200) by reference.	Remedial actions may generate dangerous wastes.	Remediation wastes (e.g., contaminated soil, personnel protective gear, treatment chemicals) may be dangerous waste, and will be managed in accord with these requirements.
“Use and Management of Containers” (WAC 173-303-630), “Closure” (WAC 173-303-610(2), (4) and (5))	Establishes requirements for dangerous waste facilities that store containers of dangerous waste.	Remedial actions may involve management of dangerous waste in containers that are subject to this standard.	Investigation and remedial actions that produce or manage containers of dangerous waste will be managed to meet standards.

PUBLIC PARTICIPATION COMPLIANCE

The public participation requirements set forth in the NCP (40 CFR 300.435(c)(2)(i)) are met through the issuance of this ESD and associated informational sheet, and through public notification via a newspaper publication placed in the *Tri-City Herald*.

REFERENCES

40 CFR 300, “National Oil and Hazardous Substances Pollution Contingency Plan,” *Code of Federal Regulations*. Available at: <http://www.gpo.gov/fdsys/pkg/CFR-2010-title40-vol27/xml/CFR-2010-title40-vol27-part300.xml>.

300.435, “Remedial Design/Remedial Action, Operation and Maintenance.”

300.825, “Record Requirements After the Decision Document Is Signed.”

Appendix B, “National Priorities List.”

Comprehensive Environmental Response, Compensation, and Liability Act of 1980, 42 USC 9601, et seq., Pub. L. 107-377, December 31, 2002. Available at:

<https://www.csu.edu/cerc/researchreports/documents/CERCLASummary1980.pdf>.

Section 104, “Response Authorities.”

Section 117, “Public Participation.”

Section 121, “Cleanup Standards.”

DOE/RL-2000-41, 2000, *Interim Action Waste Management Plan for the 100-NR-2 Operable Unit*, Rev. 1, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <https://pdw.hanford.gov/arpir/pdf.cfm?accession=D8479569>.

DOE/RL-2001-27, 2016, *Remedial Design/Remedial Action Work Plan for the 100-NR-2 Operable Unit*, Rev. 2, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0075571H>.

Ecology, EPA, and DOE, 1989a, *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=81>.

Ecology, EPA, and DOE, 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*, 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=82>.

EPA, 2010, *U.S. Department of Energy 100-NR-1 and NR-2 Operable Units Hanford Site – 100 Area Benton County, Washington Amended Record of Decision, Decision Summary and Responsiveness Summary*, U.S. Environmental Protection Agency, Seattle, Washington. Available at: <http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0084198>.

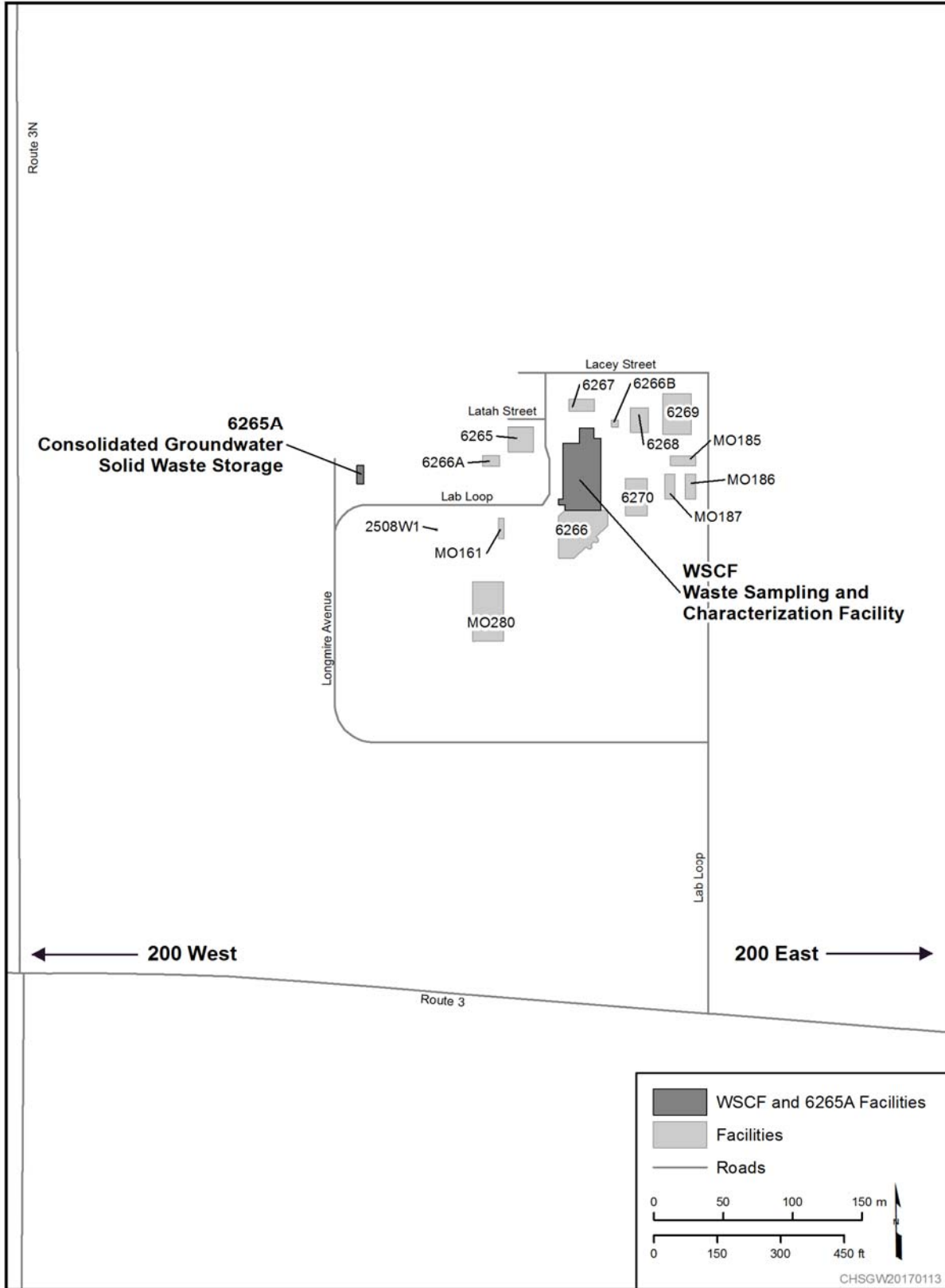
EPA, Ecology, and DOE, 2011, *Explanation of Significant Differences for the 100-NR-1 and 100-NR-2 Operable Units Interim Remedial Action Record of Decision Hanford Site Benton County, Washington*, U.S. Environmental Protection Agency, Washington State Department of Ecology, and U.S. Department of Energy, Olympia, Washington. Available at: <http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0093940>.

EPA/ROD/R10-99/112, 1999, *Interim Remedial Action Record of Decision for the 100-NR-1 and 100-NR-2 Operable Units, Hanford Site, Benton County, Washington*, U.S. Environmental Protection Agency, Region 10, Washington State Department of Ecology, and U.S. Department of Energy, Seattle, Washington. Available at: <http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=D9177845>.

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 173-303-200, “Dangerous Waste Regulations,” “Accumulating Dangerous Waste On-Site,” *Washington Administrative Code*, Olympia, Washington. Available at: <http://apps.leg.wa.gov/WAC/default.aspx?cite=173-303-200>.

Attachment 1. 6265A Building Location



Attachment 2. 6265A Building Photographs



Signature sheet for the *Explanation of Significant Differences for the 100-NR-2 Operable Unit Interim Action Record of Decision*, between the U.S. Department of Energy and U.S. Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.



U.S. Environmental Protection Agency

July 10, 2019

Date

This page intentionally left blank.

Signature sheet for the *Explanation of Significant Differences for the 100-NR-2 Operable Unit Interim Action Record of Decision*, between the U.S. Department of Energy and U.S. Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.

A handwritten signature in black ink, appearing to read "A. J. [unclear]", written over a horizontal line.

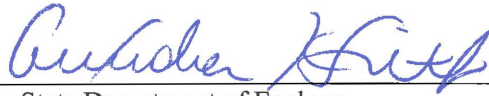
U.S. Department of Energy,
Richland Operations Office

A handwritten date "6/26/2019" written in black ink, positioned above a horizontal line.

Date

This page intentionally left blank.

Signature sheet for the *Explanation of Significant Differences for the 100-NR-2 Operable Unit Interim Action Record of Decision*, between the U.S. Department of Energy and U.S. Environmental Protection Agency, with concurrence by the Washington State Department of Ecology.



Washington State Department of Ecology

7/16/2019

Date

This page intentionally left blank.