

Action Memorandum for 200-BP-5 Operable Unit Groundwater Extraction

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



P.O. Box 550
Richland, Washington 99352

Action Memorandum for 200-BP-5 Operable Unit Groundwater Extraction

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By Julia Raymer at 7:12 am, Sep 22, 2016

Release Approval

Date

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Signature Sheet

Signature sheet for the Action Memorandum for 200-BP-5 Operable Unit groundwater within the Hanford 200 Area National Priorities List (NPL) site.

U.S. Department of Energy, Richland Operations Office

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Signature Sheet

Signature sheet for the Action Memorandum for 200-BP-5 Operable Unit groundwater within the Hanford 200 Area National Priorities List (NPL) site. This action is conducted by the U.S. Department of Energy with the approval of the U.S. Environmental Protection Agency.

Having considered the extent of which the Action Memorandum, DOE/RL-2016-41, *Action Memorandum for 200-BP-5 Operable Unit Groundwater Extraction*, could be inconsistent with *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* processes or could alter schedules set forth in Appendix D of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al., 1989a), the U.S. Environmental Protection Agency approves pursuant to Section 7.2.4 of the *Hanford Federal Facility Agreement and Consent Order Action Plan* (Tri-Party Agreement Action Plan) (Ecology et al., 1989b).

U.S. Environmental Protection Agency

Print Name

Signature

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Having considered the extent of which the Action Memorandum, DOE/RL-2016-41, *Action Memorandum for 200-BP-5 Operable Unit Groundwater Extraction*, could be inconsistent with *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* processes or could alter schedules set forth in Appendix D of the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) (Ecology et al., 1989a), the Washington State Department of Ecology approves pursuant to Section 7.2.4 of the *Hanford Federal Facility Agreement and Consent Order Action Plan* (Tri-Party Agreement Action Plan) (Ecology et al., 1989b).

Washington State Department of Ecology

Print Name

Signature

Date

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Executive Summary

The purpose of this action memorandum (AM) is to request and document approval of the selection of the recommended alternative for a non-time-critical removal action (NTCRA) for the 200-BP-5 Operable Unit (OU) within the Hanford 200 Area National Priorities List¹ (NPL) site. This AM was prepared in accordance with the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*,² as amended by the *Superfund Amendments and Reauthorization Act of 1986*³ and the “National Oil and Hazardous Substances Pollution Contingency Plan” (40 CFR 300).⁴ The AM was also prepared to meet the intent of EPA, 2009, *Superfund Removal Guidance for Preparing Action Memoranda*.⁵

The removal action supports the overall cleanup objectives in the *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement)⁶ as revised. The NTCRA described herein is for the 200-BP-5 OU groundwater generally in the B Complex area (Figure ES-1). Without this removal action, contaminated groundwater could potentially adversely impact human health.

The U.S. Department of Energy, U.S. Environmental Protection Agency, and Washington State Department of Ecology (collectively referred to as the Tri-Parties) considered two removal action alternatives for addressing contaminated 200-BP-5 OU groundwater under an NTCRA: (1) a required No Action alternative and (2) extracting groundwater

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

² *Comprehensive Environmental Response, Compensation, and Liability Act of 1980*, 42 USC 9601, et seq., Pub. L. 107-377, December 31, 2002. Available at: <http://epw.senate.gov/cercla.pdf>.

³ *Superfund Amendments and Reauthorization Act of 1986*, 42 USC, et seq. Available at: <http://www.epw.senate.gov/sara.pdf>.

⁴ 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>.

⁵ EPA, 2009, *Superfund Removal Guidance for Preparing Action Memoranda*, Office of Emergency Management, Office of Solid Waste and Emergency Response, United States Environmental Protection Agency, Washington, D.C. Available at: https://www.epa.gov/sites/production/files/2014-02/documents/superfund_removal_guide_for_preparing_action_memo.pdf.

⁶ 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>.

20 with elevated uranium and technetium-99 concentrations from the B Complex area of the
21 200-BP-5 OU.

22 Alternative 2 is selected for this NTCRA. Alternative 2 consists of extracting groundwater
23 from the B Complex area at a rate of up to 567 L/min (150 gpm), treatment at the
24 200 West Pump and Treat Facility (200 West P&T), and injection of treated water in the
25 200 West Area. Extracted groundwater will be conveyed to the 200 West P&T via an
26 aboveground pipeline.

27 This NTCRA will provide abatement of uranium and technetium-99 in groundwater by
28 removing and treating contaminated groundwater near the B Complex area that currently
29 exceeds federal and state drinking water standards.

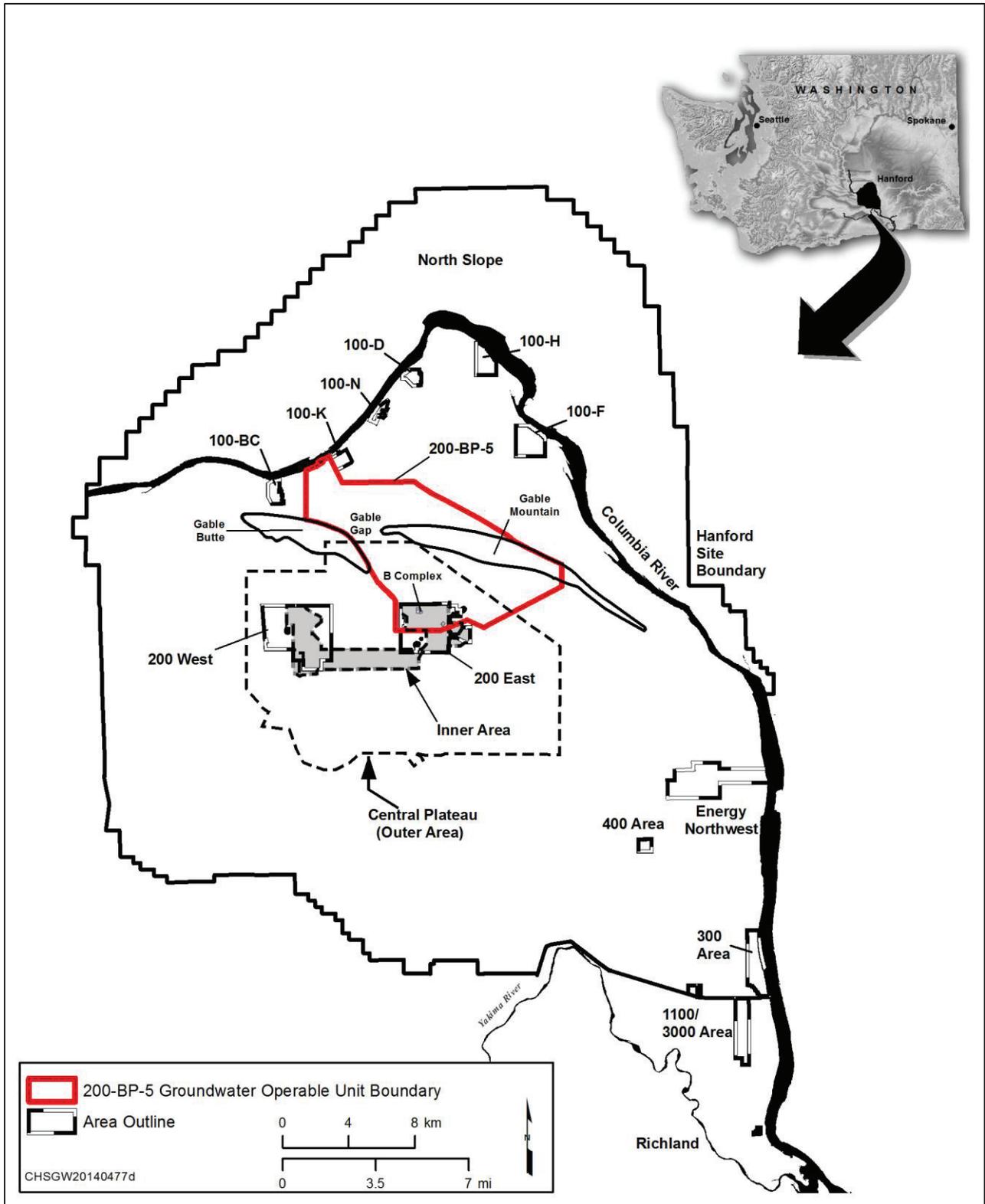
30 The selected alternative was recommended in the *Engineering Evaluation/Cost Analysis*
31 *for the 200-BP-5 Operable Unit Groundwater Extraction*,⁷ which was prepared and released
32 for public comment. No comments were received during the public comment period,
33 which ran from April 18 to May 20, 2016.

34 As detailed in this AM, the selected alternative is cost effective, reduces long-term risk to
35 human health and the environment, and promotes restoration of the environment
36 consistent with the Tri-Parties' goals. This removal action is designed to recover as much
37 contaminated groundwater as practical until one or more of the following occurs:

- 38 • Uranium and technetium-99 groundwater concentrations at the B Complex are below
39 10 times their respective DWSs. That is, measured uranium concentrations are below
40 300 micrograms per liter and measured technetium-99 concentrations are below
41 9,000 picocuries per liter.
- 42 • The Tri-Parties agree to terminate the removal action.
- 43 • The removal action is superseded by a remedial action record of decision for the
44 200-BP-5 OU.

45

⁷ DOE/RL-2015-26, 2016, *Engineering Evaluation/Cost Analysis for the 200-BP-5 Operable Unit Groundwater Extraction*, Rev. 0, U.S. Department of Energy, Richland Operations Office, Richland, Washington. Available at: <http://pdw.hanford.gov/arpir/pdf.cfm?accession=0077225H>.



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Figure ES-1. Location of the B Complex Area within the 200-BP-5 Groundwater OU

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Terms

200 West P&T	200 West Pump and Treat Facility
AM	action memorandum
ARAR	applicable or relevant and appropriate requirement
CERCLA	<i>Comprehensive Environmental Response, Compensation, and Liability Act of 1980</i>
DOE	U.S. Department of Energy
DWS	drinking water standard
Ecology	Washington State Department of Ecology
EE/CA	engineering evaluation/cost analysis
EPA	U.S. Environmental Protection Agency
ERDF	Environmental Restoration Disposal Facility
FS	feasibility study
FY	fiscal year
gpm	gallons per minute
HHE	human health and the environment
MCL	maximum contaminant level
NCP	National Contingency Plan (40 CFR 300, “National Oil and Hazardous Substances Pollution Contingency Plan”)
NPL	National Priorities List (40 CFR 300, Appendix B)
NTCRA	non-time-critical removal action
OU	operable unit
P&T	pump and treat
RAWP	removal action work plan
RI	remedial investigation
ROD	record of decision
TBC	to be considered
Tri-Parties	DOE, EPA, and Ecology
Tri-Party Agreement	<i>Hanford Federal Facility Agreement and Consent Order</i>
UPR	unplanned release

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1 Purpose

2 The purpose of this action memorandum (AM) is to request and document approval of the selection of the
3 recommended alternative for a non-time-critical removal action (NTCRA) for the 200-BP-5 Operable
4 Unit (OU) at the Hanford Site (Figure 1). The selected alternative was recommended in
5 DOE/RL-2015-26, *Engineering Evaluation/Cost Analysis for 200-BP-5 Operable Unit Groundwater*
6 *Extraction*, hereafter referred to as the engineering evaluation/cost analysis (EE/CA).

7 This AM has been prepared in accordance with the *Comprehensive Environmental Response,*
8 *Compensation, and Liability Act of 1980* (CERCLA), as amended by the *Superfund Amendments and*
9 *Reauthorization Act of 1986*; and 40 CFR 300, “National Oil and Hazardous Substances Pollution
10 Contingency Plan” (hereafter referred to as the National Contingency Plan [NCP]). This removal action
11 supports the overall cleanup objectives specified in Ecology et al., 1989a, *Hanford Federal Facility*
12 *Agreement and Consent Order* (hereinafter called the Tri-Party Agreement), as revised. The AM has also
13 been prepared to meet the intent of EPA, 2009, *Superfund Removal Guidance for Preparing Action*
14 *Memoranda*. The NTCRA will reduce elevated uranium and technetium-99 concentrations in the
15 groundwater generally beneath the B Complex area (B, BX, and BY Tank Farms area) in the 200 East
16 Area of the Central Plateau. Without this removal action, contaminated groundwater could adversely
17 impact human health and the environment (HHE).

18 The U.S. Department of Energy (DOE), U.S. Environmental Protection Agency (EPA), and Washington
19 State Department of Ecology (Ecology) (also referred to collectively as the Tri-Parties) considered two
20 alternatives for the 200-BP-5 OU groundwater contamination under an NTCRA: (1) a required No Action
21 alternative (40 CFR 300) and (2) extraction of groundwater containing elevated uranium and technetium-
22 99 from the B Complex area of the 200-BP-5 OU (Figure 2).

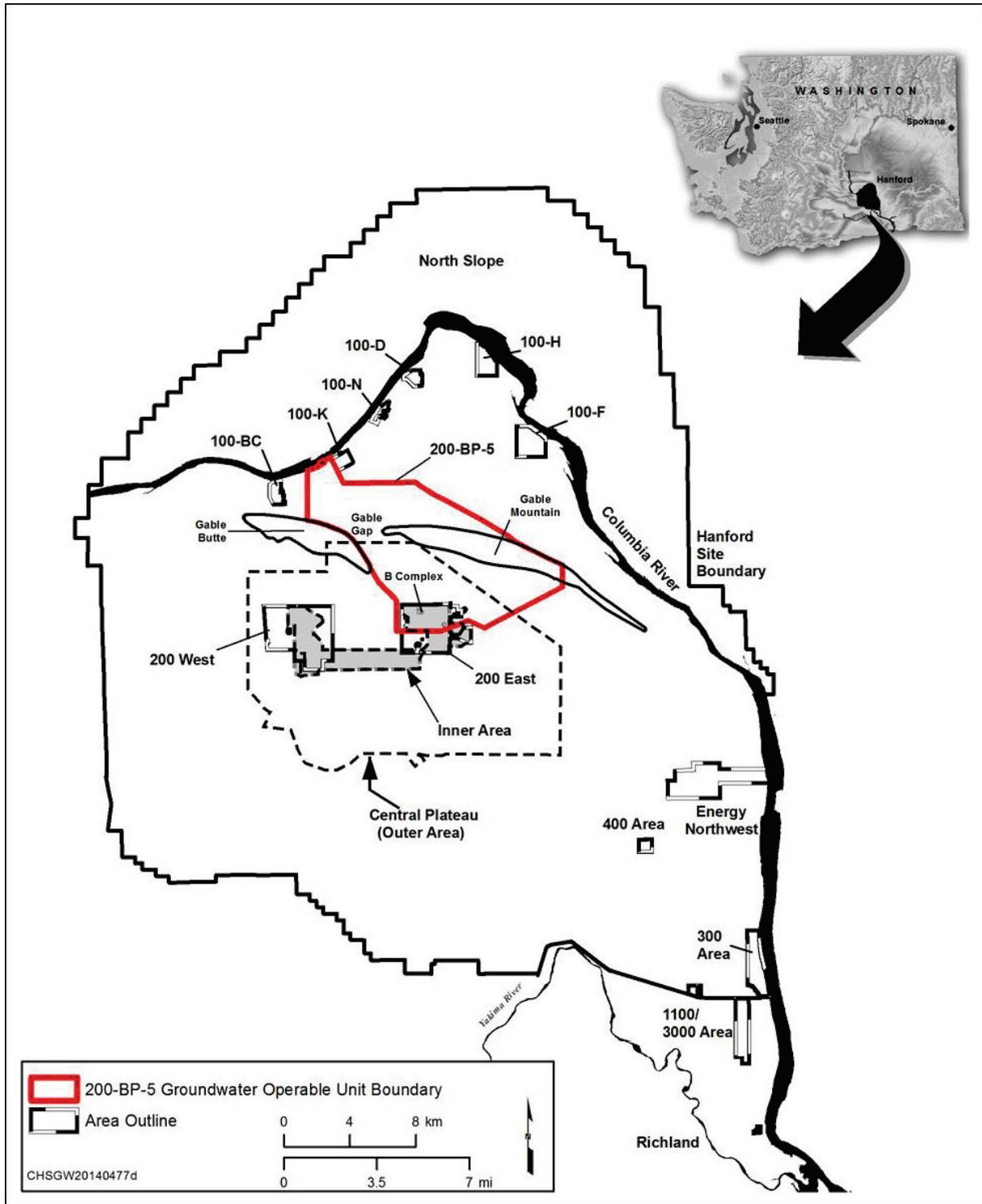
23 Alternative 2 is the selected alternative, which consists of extracting groundwater at the B Complex area,
24 treatment at the 200 West Pump and Treat Facility (200 West P&T), and injection of treated groundwater
25 in the 200 West Area. Extracted groundwater will be conveyed to the 200 West P&T via an aboveground
26 pipeline.

27 This AM provides a concise written record of the selection and approval of the removal action and
28 includes information related to site history, current activities being performed, health and environmental
29 threats, details related to the action to be taken, and project costs. Appendix A identifies the applicable or
30 relevant and appropriate requirements (ARARs) and describes specific regulatory requirements that are
31 ARARs for this removal action. A 30-day public comment and review period (from April 18 to May 20,
32 2016) was held for the EE/CA. No public comments were received.

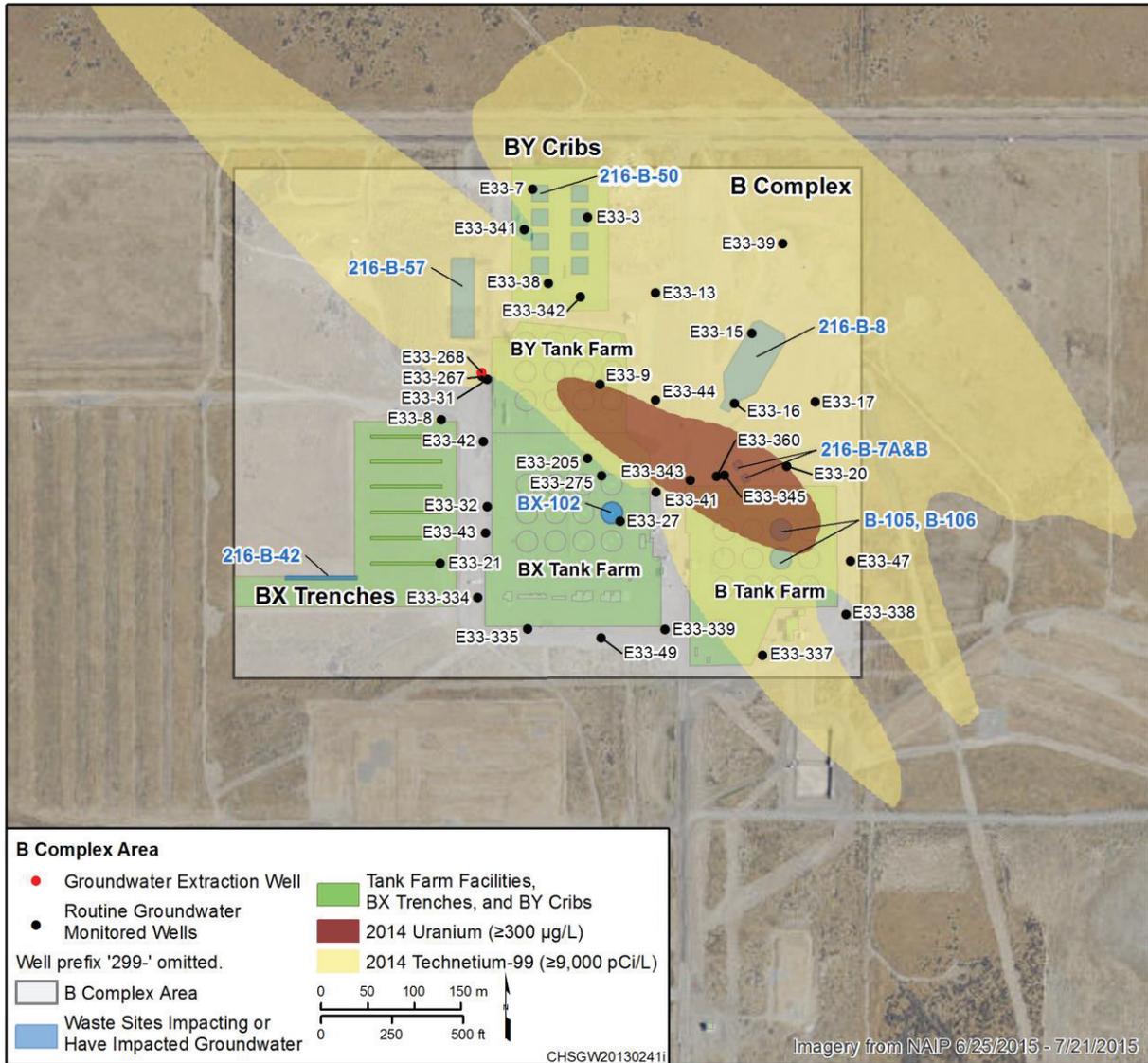
33 This removal action is designed to recover elevated levels of groundwater contamination while awaiting
34 completion of the CERCLA remedial investigation (RI)/feasibility study (FS) process and issuance of a
35 200-BP-5 OU record of decision (ROD). The removal action will continue until one or more of the
36 following occurs:

- 37 • Uranium and technetium-99 concentrations at the B Complex are below 10 times their respective
38 drinking water standards (DWSs). That is, measured uranium concentrations are below
39 300 micrograms per liter (µg/L) and measured technetium-99 concentrations are below
40 9,000 picocuries per liter (pCi/L).
- 41 • The Tri-Parties agree to terminate the removal action.
- 42 • The removal action is superseded by a remedial action ROD for the 200-BP-5 OU.

43 Additional cleanup actions for the OU, if needed, will be identified in the 200-BP-5 OU ROD.



1
2 **Figure 1. Location of the B Complex Area in the 200 East Area and 200-BP-5 OU on the Hanford Site**



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Figure 2. Map of the B Complex Area Illustrating Underlying Uranium and Technetium-99 Groundwater Plumes

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2 Site Conditions and Background

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This chapter provides an overview of site conditions and background information for the 200-BP-5 OU NTCRA and historical context for the alternatives considered for the removal action. A summary of the Hanford Site; B Complex area; and operational history, previous investigations, and remediation activities of the 200-BP-5 OU are also included.

9

2.1 Site Description and Background

10

The Hanford Site encompasses 1,517 km² (586 mi²) in southeastern Washington State. The area is located just north of the confluence of the Columbia, Yakima, and Snake Rivers. Figure 1 shows the location of the Hanford Site. The Hanford Site was selected for plutonium production in 1942 as part of the Manhattan Project, primarily because of the availability of water from the Columbia River and access to

13

1 power from the Bonneville and Grand Coulee Dams. The remote location and weather conditions of the
2 area, which allowed for nearly year-round construction, also contributed to the selection. Between 1943
3 and 1964, nine plutonium production reactors were built along the Columbia River in six areas: 100-BC
4 (two reactors), 100-K (two reactors), 100-N, 100-D (two reactors), 100-H, and 100-F. From 1944 to 1989,
5 fuel processing, isotope recovery operations, and associated waste management activities occurred within
6 the Central Plateau 200 East Area (B Plant and Plutonium-Uranium Extraction Plant) and 200 West Area
7 (T Plant, Reduction-Oxidation Plant, U Plant, and Plutonium Finishing Plant). Each chemical processing
8 facility generated multiple waste streams and used multiple sites for waste management and disposal.

9 In 1989, EPA placed the 100, 200, 300, and 1100 Areas of the Hanford Site on the National Priorities List
10 (NPL) (40 CFR 300, Appendix B), pursuant to CERCLA. The 200 Area NPL (40 CFR 300, Appendix B)
11 site (CERCLIS ID WA 1890090078) contains the 200 East and 200 West Areas, which include waste
12 management facilities, interim storage and staging of irradiated fuel, inactive fuel reprocessing facilities,
13 and waste sites located on the Central Plateau and southwest of Gable Mountain. The 200 Area was the
14 center of activity for plutonium processing at the Hanford Site starting in the mid-1940s. Liquid wastes
15 are considered the most significant type of discharges to the environment in terms of volume and numbers
16 of constituents. Detailed information on 200 Area historical operations and waste generation mechanisms
17 is provided in Section 1.2 of DOE/RL-2001-54, *Central Plateau Ecological Evaluation*.

18 The B Complex contains several crib and trench disposal sites and three single-shell tank farms
19 (Figure 2). At the B Complex, moderate-activity liquid waste stored in underground storage tanks was
20 discharged to the ground from unplanned releases (UPRs) and intentional releases to address limited tank
21 space (DOE/RL-2009-127, *Remedial Investigation Report for the 200-BP-5 Groundwater Operable Unit*,
22 Draft A). The majority of the discharges were from 1946 through 1955 and were associated with early
23 plutonium and uranium recovery process wastes that were generated at B Plant and U Plant, respectively
24 (WHC-MR-0227, *Tank Waste Discharged Directly to the Soil Column at the Hanford Site*). The sites
25 associated with B Complex have released nearly 346 million L (91 million gal) of waste liquids
26 containing approximately 12,000 kg (26,455 lb) of uranium and 145 Ci of technetium-99. The primary
27 source of the uranium was from a 1951 241-BX-102 single-shell tank overflow event, and the primary
28 source of technetium-99 in groundwater is from the 216-BY Cribs (PNNL-19277, *Conceptual Models for*
29 *Migration of Key Groundwater Contaminants Through the Vadose Zone and Into the Unconfined Aquifer*
30 *Below the B Complex*).

31 The 200-BP-5 Groundwater OU extends from the 200 East Area northwest through Gable Gap and along
32 the eastern flank of Gable Mountain to the Columbia River (Figure 1). The 200-BP-5 OU addresses
33 groundwater and the associated contaminant plumes beneath the northern half of the 200 East Area and
34 adjacent portions of the surrounding 600 Area. The overlying area includes associated cribs, trenches,
35 tanks farms, and UPRs, which are identified as sources of contamination associated with groundwater
36 within the 200-BP-5 OU. During 200-BP-5 OU groundwater sampling, concentrations of uranium and
37 technetium-99 were detected at more than 10 times the DWSs in the groundwater at the B Complex.

38 2.2 Previous Investigations and Removal Actions

39 In 2009, the Tri-Parties agreed to an amendment to the 200-BP-5 RI/FS Work Plan (DOE/RL-2007-18,
40 *Remedial Investigation/Feasibility Study Work Plan for the 200-BP-5 Groundwater Operable Unit*) as
41 modified by Tri-Party Agreement Milestone M-015-82 (Ecology et al., 1989a). The amendment and
42 associated Tri-Party Agreement milestone consisted of a treatability test to evaluate if the aquifer could
43 sustain a 189 L/min (50 gpm) pump and treat (P&T) system beneath the B Complex to contain and reduce
44 uranium and technetium-99 groundwater contamination. The treatability test is described in
45 DOE/RL-2010-74, *Treatability Test Plan for the 200-BP-5 Groundwater Operable Unit*, and was

1 completed in 2015. The test results are reported in DOE/RL-2015-75, *Aquifer Treatability Test Report for*
2 *the 200-BP-5 Groundwater Operable Unit* (Draft A). The report concluded that pumping rates greater than
3 586 L/min (150 gpm) can be sustained in the unconfined aquifer at B Complex, capture is sufficiently wide
4 to consider P&T as a plausible alternative in the 200-BP-5 OU FS, and treatment to reduce uranium and
5 technetium-99 concentrations in groundwater is achieved by the 200 West P&T Facility.

6 The draft RI report (DOE/RL-2009-127, Draft A) was prepared in 2015 to document completion of RI
7 activities for the 200-BP-5 OU, assess contaminant fate and transport, and evaluate potential risks to
8 HHE. The RI activities include drilling and constructing new wells, soil sampling, groundwater sampling
9 during drilling of new wells (including seven wells near the B Complex area), hydrologic testing,
10 geophysical investigations, and groundwater monitoring of existing and new wells. This NTCRA will
11 support the FS for the 200-BP-5 OU by providing information on contaminant mass that can be removed
12 from groundwater, and accurately predict pumping rates that can be maintained in the aquifer generally
13 beneath the B Complex area.

14 Perched water (saturated soils above the groundwater table), contaminated primarily with uranium, nitrate,
15 and technetium-99, occurs beneath the B Complex area in a sand lens (sand layer of limited extent) about 67
16 m (220 ft) below ground surface and approximately 4.6 m (15 ft) above the unconfined aquifer. The perched
17 water was identified during drilling associated with gathering information for the 200-BP-5 RI (DOE/RL-
18 2009-127, Draft A). Contamination within the perched water zone is contributing to groundwater
19 contamination in the underlying unconfined aquifer in the B Complex area. A separate perched water
20 removal action has been implemented under the 200-DV-1 OU to extract this perched water contamination
21 as described in DOE/RL-2014-34, *Action Memorandum for 200-DV-1 Operable Unit Perched*
22 *Water Pumping/Pore Water Extraction*; and DOE/RL-2014-37, *Removal Action Work Plan for*
23 *200-DV-1 Operable Unit Perched Water Pumping/Pore Water Extraction*.

24 Routine groundwater monitoring of the 200-BP-OU is performed under DOE/RL-2001-49, *Groundwater*
25 *Sampling and Analysis Plan for the 200-BP-5 Operable Unit*. Groundwater monitoring is evaluated
26 annually and reported in annual reports (e.g., DOE/RL-2015-07, *Hanford Site Groundwater Monitoring*
27 *Report for 2014*). Groundwater monitoring includes wells in the B Complex area.

28 **3 Threats to Human Health or the Environment**

29 For the purposes of this NTCRA, the NCP (40 CFR 300) considers the following factors in determining
30 the appropriateness of a removal action:

- 31 • Actual or potential exposure to nearby human populations, animals, or the food chain from hazardous
32 substances or pollutants or contaminants
- 33 • Other situations or factors that may pose threats to public health or welfare or the environment

34 Conditions persist with the B Complex area of the 200-BP-5 OU wherein potential threats to the public
35 health or the environment exist.

36 Contaminants addressed by this AM include both radioactive and chemical hazardous substances.
37 The groundwater is contaminated with uranium and technetium-99 at concentrations that exceed the
38 maximum contaminant levels (MCLs) by more than 10 times, and represent a risk. Table 1 provides
39 measured ranges of concentrations for the target contaminants plus other collocated radioactive and
40 nonradioactive constituents in groundwater samples in the B Complex area. The contaminant
41 concentrations from extracted 200-BP-5 OU groundwater are within the treatment capacities of the
42 200West P&T, and injection of the treated water will meet 200 West P&T effluent requirements.

Table 1. B Complex Area Groundwater Contaminant Concentrations

B Complex Area Groundwater Concentration Data from 2014 and 2015					
	Average	Maximum	Minimum	MCL	Units
Technetium-99	12,113	42,000	562	900	pCi/L
Uranium	221	5,600	4.5	30	µg/L
Nitrate (NO ₃)	532	1,780	54	45 ^a	mg/L
Iodine-129	2.2	3.7	Nondetect	1	pCi/L
Cyanide	364	1,680	8.4	200 ^b	µg/L
Tritium	12,199	25,000	3,970	20,000	pCi/L

a. 45 mg/L (expressed as the NO₃ ion) is an equivalent concentration to the federal drinking water standard for nitrate (10 mg/L expressed as NO₃-N). To convert nitrate as the NO₃ ion, the NO₃-N drinking water standard value is multiplied by 4.43.

b. For cyanide, the State of Washington groundwater cleanup level of 4.8 µg/L is calculated based on the WAC 173-340, “Model Toxics Control Act—Cleanup” Method B value.

1

2 Reducing concentrations of uranium and technetium-99 in groundwater beneath the B Complex will
 3 reduce risk to HHE that justifies this NTCRA.

4 **3.1 Statutory and Regulatory Authority**

5 The President of the United States is given authority by CERCLA Section 104, “Response Authorities,”
 6 when there is a threat to public health or welfare of the United States or the environment, to take any
 7 appropriate removal action to abate, prevent, minimize, stabilize, mitigate, or eliminate the release or
 8 threat of release of contaminants into the environment. This authority is delegated to DOE, as the
 9 CERCLA lead agency, through Executive Order 12580, *Superfund Implementation*.

10 The 200 Area is listed on the NCP (40 CFR 300), Appendix B, “National Priorities List”; consequently,
 11 the 200-BP-5 OU is subject to cleanup action under CERCLA. Cleanup activities are performed in
 12 accordance with the NCP (40 CFR 300) and the Tri-Party Agreement (Ecology et al. 1989a). Appendix C
 13 of the Tri-Party Agreement Action Plan (Ecology et al., 1989b) identifies the 200-BP-5 OU as potentially
 14 needing remedial action. The recommended removal action in this AM for groundwater will, to the extent
 15 practicable, contribute to the efficient performance of anticipated long-term remedial action(s) as required
 16 by the NCP (40 CFR 300.415(d), “Removal Action”). Information from this activity will contribute to the
 17 CERCLA RI/FS process for the 200-BP-5 OU. A final action decision for this OU will be addressed after
 18 completion of the 200-BP-5 OU RI/FS process through issuance of a ROD.

19 The treated water associated with the selected alternative (Alternative 2) will be conveyed through pipelines
 20 from the 200 West P&T to associated injection wells in the 200 West Area. Injection of treated groundwater
 21 in the 200 East Area may be evaluated in the removal action work plan (RAWP) for this alternative and will
 22 be evaluated as part of the FS for the 200-BP-5 OU. Injection of the treated groundwater using injection
 23 wells in the 200 West Area is allowed by CERCLA Section 104(d)(4), based on the following from the
 24 EE/CA (DOE/RL-2015-26):

25 *The preamble to the NCP states that when noncontiguous facilities are reasonably close*
 26 *to one another and wastes at these sites are compatible for a selected treatment or*
 27 *disposal approach, CERCLA Section 104(d)(4), “Response Authorities,” allows the lead*
 28 *agency to treat these related facilities as one site for response purposes and, therefore,*
 29 *allows the lead agency to manage waste transferred between such noncontiguous*
 30 *facilities without having to obtain a permit. The 200-BP-5 OU extraction wells and the*

5.1 Non-Time-Critical Removal Action Objectives

The overall objective of the NTCRA is to reduce contamination in groundwater generally under the B Complex by capture and removal of uranium and technetium-99. Specific objectives include the following:

- Capture and remove uranium and technetium-99 groundwater contaminant concentrations that exceed 10 times the DWSs.
- Use the 200 West P&T Facility for treatment of contaminated groundwater. Use an aboveground pipeline to convey water to the 200 West P&T Facility.

The selected removal action for the groundwater is protective of HHE and meets these objectives.

5.2 Alternatives Evaluated in the Engineering Evaluation/Cost Analysis

The Tri-Parties considered two removal action alternatives for treating the groundwater in the 200-BP-5 OU: a required No Action alternative, and a B Complex area groundwater extraction alternative with treatment at the 200 West P&T Facility. The EE/CA (DOE/RL-2015-26) documented the identification and evaluation of these alternatives. The removal action recommended in the EE/CA was Alternative 2.

5.2.1 Alternative 1 – No Action

Alternative 1 assumes that no extraction of groundwater would be performed at the B Complex area as an NTCRA. Implementation of any remedial actions would not proceed until completion of the RI/FS, proposed plan, and ROD for the 200-BP-5 OU. As a result, Alternative 1 would allow the contaminated groundwater to migrate farther from the sources; would not contribute to abatement (e.g., would not remove mass) of the uranium, technetium 99, and other co-contaminants (nitrate, iodine-129, tritium, and cyanide); and would not provide information to support the 200-BP-5 OU CERCLA process. This alternative does not meet objectives of this NTCRA and is used as a baseline for comparison only.

5.2.2 Alternative 2 – B Complex Area Groundwater Extraction

Alternative 2 consists of extracting groundwater in the B Complex area at a rate up to 567 L/min (150 gpm), treatment at the 200 West P&T, and injecting treated groundwater in the 200 West Area. Figure 3 provides a simplified illustration of Alternative 2.

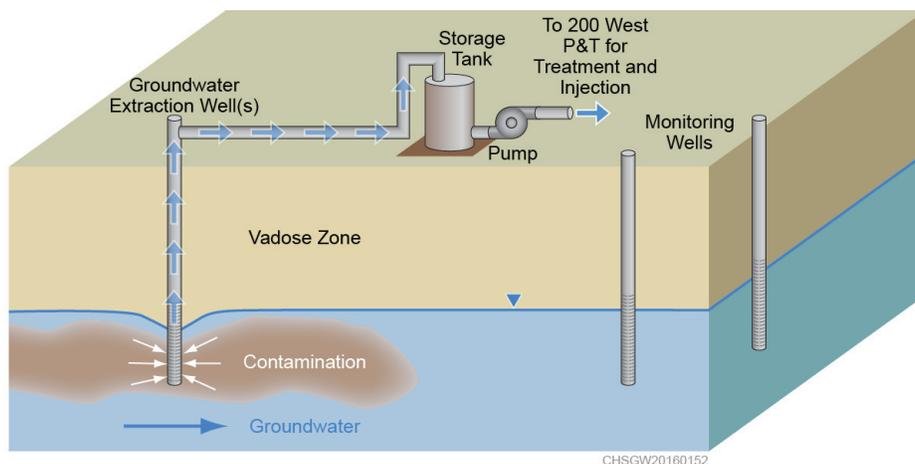


Figure 3. Conceptual Schematic of the Selected Alternative: B Complex Groundwater Extraction

1 Alternative 2 will use extraction well 299-E33-268 (Figure 2) and up to three additional wells
2 (e.g., 299-E33-360) that can be used as extraction wells. The estimated flow rates of extracted
3 groundwater are 189 to 567 L/min (50 to 150 gpm). Connection of additional wells and pumping rates
4 will be identified in the RAWP. The RAWP may also evaluate and include returning treated groundwater
5 to the 200 East Area for injection into the 200 East Area unconfined aquifer. Extracted groundwater will
6 be conveyed to the 200 West P&T via an aboveground pipeline system (Figure 4). Figure 5 provides a
7 process flow diagram for the extraction and treatment of groundwater at the 200 West P&T.

8 The 200 West P&T was constructed in 2012 and designed for cleanup of the 200-ZP-1 Groundwater OU
9 located in the 200 West Area. The 200 West P&T is designed to capture and treat contaminated
10 groundwater to reduce the mass of carbon tetrachloride, total chromium (trivalent and hexavalent), nitrate,
11 trichloroethene, and technetium-99. The system design also includes treatment of groundwater from the
12 200-UP-1 OU, including removal of uranium. The treatment capacity of the system is a maximum of
13 9,450 L/min (2,500 gpm) of extracted groundwater. Additional flow rate from this removal action can be
14 accommodated by the 200 West P&T. Large-scale hydraulic impacts from injecting additional water in
15 the 200 West Area from the 200-BP-5 OU are not expected. Groundwater level (hydraulic) monitoring
16 will continue in the 200 West Area to monitor changes in water levels and groundwater flow directions
17 from the injection of treated 200 West P&T effluent.

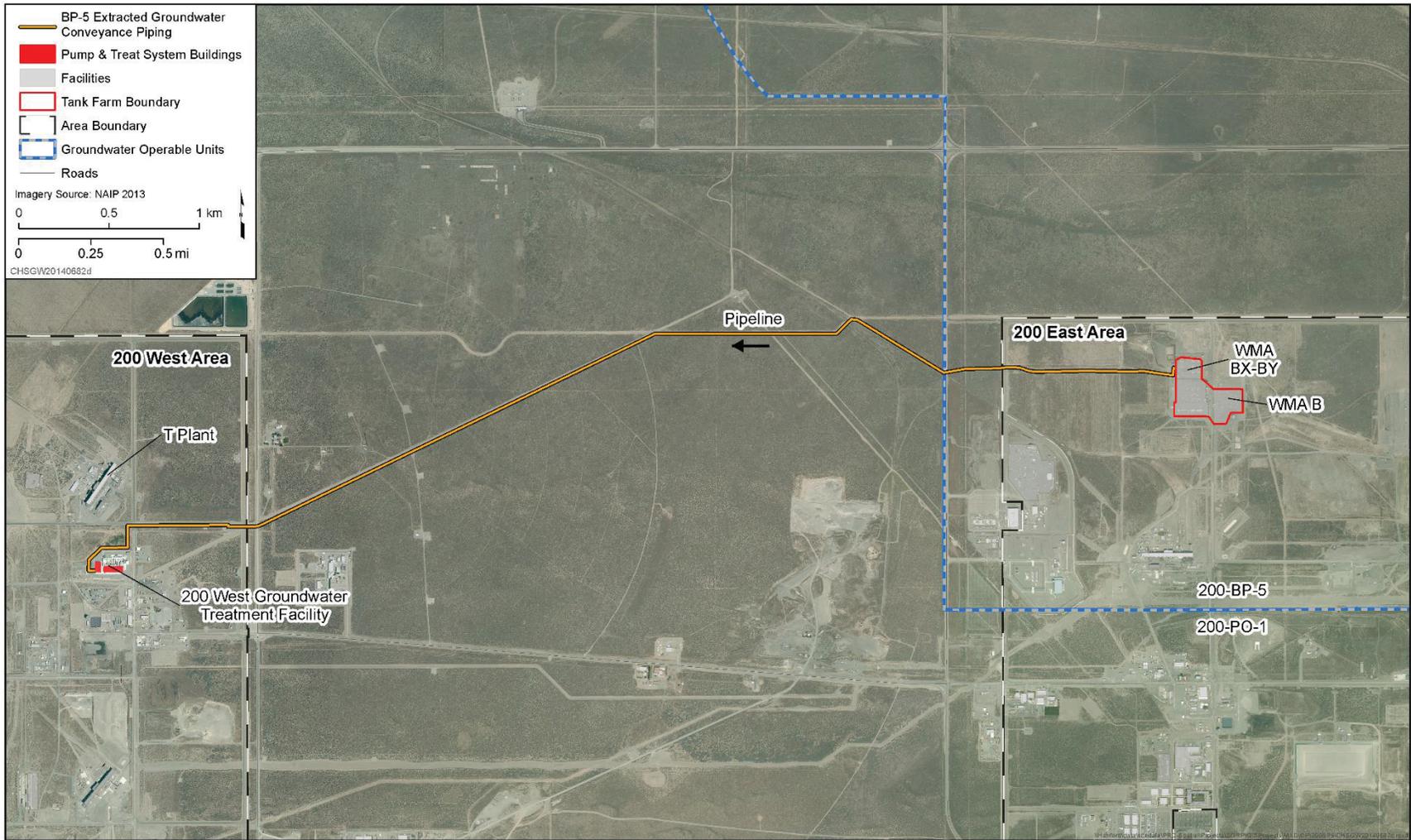
18 The 200-BP-5 OU treatability test (DOE/RL-2015-75, Draft A) was conducted in late 2015 to evaluate if
19 the aquifer could sustain a 189 L/min (50 gpm) P&T system beneath the B Complex to contain and
20 reduce uranium and technetium-99 groundwater contamination. Test results indicated that pumping rates
21 greater than 567 L/min (150 gpm) can be sustained in the unconfined aquifer at B Complex.

22 Alternative 2 is protective of HHE and can achieve objectives of this NTCRA. The alternative protects
23 HHE by reducing contaminated groundwater concentrations, hydraulically controlling groundwater
24 contamination near the sources, and removing uranium and technetium-99 mass from the groundwater.
25 Alternative 2 is also protective of workers during implementation because the Hanford Site has adequate
26 controls and procedures in place for worker protection. Alternative 2 would provide abatement of
27 groundwater contamination in the B Complex by intercepting and removing contaminants until one or
28 more of the following conditions occur:

- 29 • Uranium and technetium-99 groundwater concentrations at the B Complex are below 10 times their
30 respective DWSs. That is, measured uranium concentrations are below 300 µg/L, and measured
31 technetium-99 concentrations are below 9,000 pCi/L.
- 32 • The Tri-Parties agree to terminate the removal action.
- 33 • The removal action is superseded by a remedial action ROD for the 200-BP-5 OU.

34 Alternative 2 also meets the ARARs for this removal action identified in Appendix A.

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Figure 4. Diagram of the Conveyance Pipeline from Extraction Well 299-E33-268 Located in the 200 East Area to the 200 West P&T

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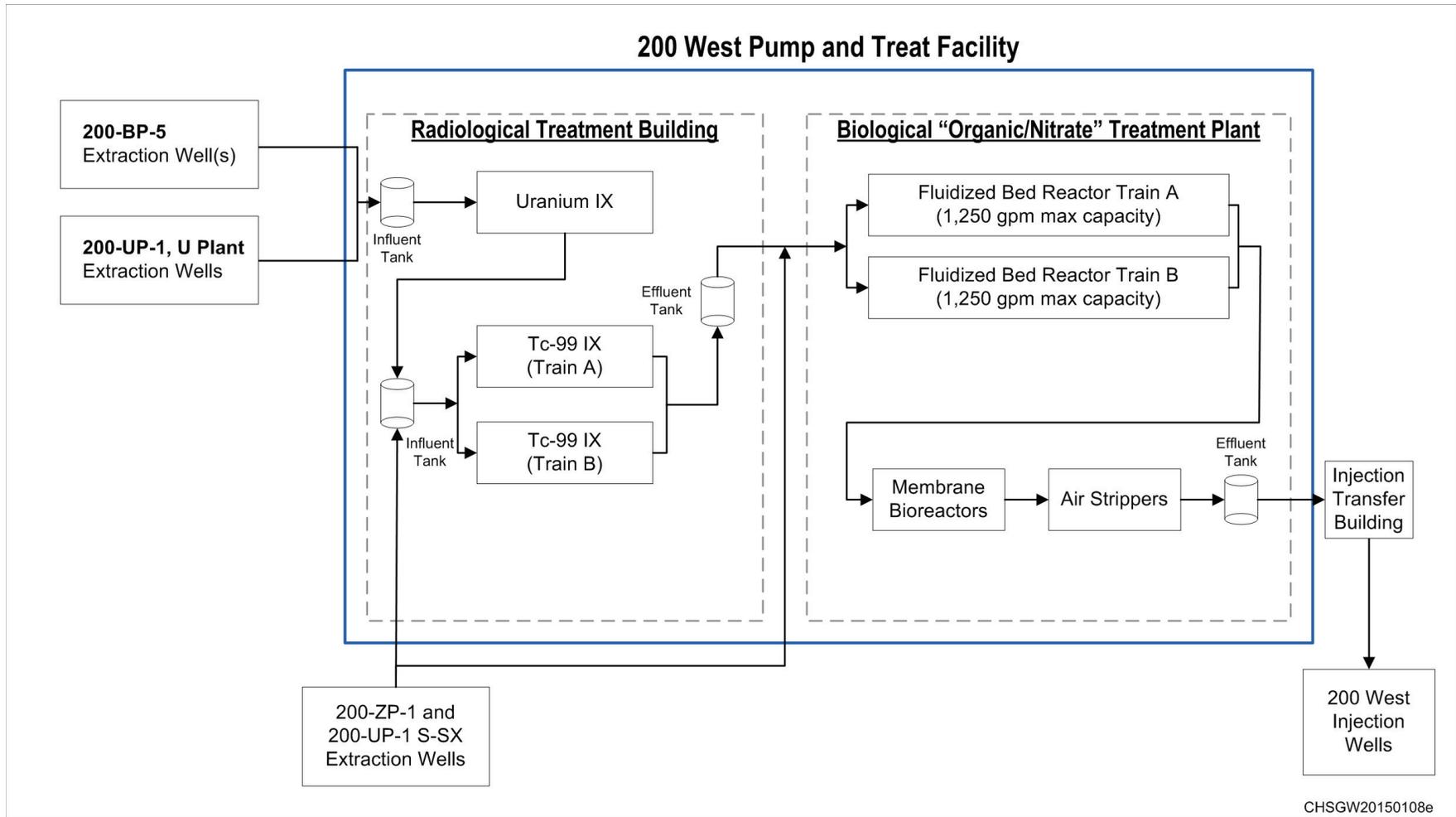


Figure 5. Process Flow Diagram for Extraction and Treatment of Groundwater at the 200 West P&T

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5.3 Environmental Regulations and Applicable or Relevant and Appropriate Requirements

CERCLA Section 121, “Cleanup Standards,” requires the responsible CERCLA implementing agency to ensure that the substantive standards of RCW 70.105, “Hazardous Waste Management,” and its implementing regulations (WAC 173-303, “Dangerous Waste Regulations”), as applicable; the *Resource Conservation and Recovery Act of 1976*; and other applicable laws will be incorporated into the federal agency’s design and operation of its long-term remedial actions and, to the extent practicable, into its more immediate removal actions. DOE is the implementing agency for this NTCRA. Ecology and EPA both concur that this NTCRA is warranted to protect HHE.

The NCP (40 CFR 300) requires that the removal action described in this AM complies with ARARs to the extent practicable. The ARARs are substantive requirements of environmental standards incorporated in promulgated regulations that have been evaluated and determined to be pertinent to the removal action. Appendix A identifies and describes specific regulatory requirements that are ARARs for this removal action. To be considered (TBC) information is also included in Appendix A for this removal action. TBC information includes nonpromulgated advisories or guidance issued by federal or state governments; TBC information is not binding legally and does not have the status of ARARs.

This NTCRA does not have socioeconomic impacts to offsite populations. Archeological, cultural, and ecological impacts are not expected because the proposed action is on disturbed soil and uses existing structures at existing locations.

Two RODs (EPA et al., 2008, *Record of Decision, Hanford 200 Area 200-ZP-1 Superfund Site, Benton County, Washington*; EPA et al., 2012, *Record of Decision for Interim Remedial Action, Hanford 200 Area Superfund Site, 200-UP-1 Operable Unit*) establish ARARs for treating and injecting treated water from the 200 West P&T.

5.4 Compliance with Treatment Operating Range for the 200 West Pump and Treat

The extracted B Complex area groundwater will be mixed with water from the 200-ZP-1 OU and 200-UP-1 OU extraction wells at the 200 West P&T prior to treatment. The groundwater contaminants of concern, with the exception of tritium, will be treated at the 200 West P&T to below MCLs. There is no treatment method for tritium, but the combined discharge concentration from the 200 West P&T is expected to be below the tritium MCL. Treated groundwater will comply with chemical-specific ARARs in the 200-ZP-1 OU ROD (EPA et al., 2008) and 200-UP-1 OU interim ROD (EPA et al., 2012) by meeting the treated effluent injection criteria for the 200 West P&T. As discussed in the EE/CA (DOE/RL-2015-26), the additional 200-BP-5 OU flow is within the treatment capacities of the 200 West P&T, and injecting the treated water will meet 200 West P&T effluent requirements. Details regarding 200 West P&T treatment processes are provided in DOE/RL-2009-124, *200 West Pump and Treat Operations and Maintenance Plan*.

5.5 Project Costs

The selected removal action will use existing B Complex area groundwater wells and conveyance pipelines, and the 200 West P&T for cost effectiveness. Table 2 provides the NTCRA cost estimate for fiscal year (FY) 2016 through FY 2020. These 5 years include planning, design, and construction activities in FY 2016, followed by removal action operations, and remedy performance monitoring and reporting from FY 2017 through FY 2020. Costs are estimated at \$2,000,000/yr for operations and \$96,000/yr for remedy performance monitoring and reporting. Design and construction costs are based on

1 extending the existing pipeline from well 299-E33-268 to well 299-E33-360. Final removal action
 2 requirements (e.g., wells, flow rates) will be defined in the RAWP.

Table 2. Removal Action Cost Summary for Fiscal Years 2015 through 2020

Activity	FY 2016	FY 2017	FY 2018	FY 2019	FY 2020	Total Cost
Action Memorandum	\$60,000	\$ -	\$ -	\$ -	\$ -	\$60,000
Removal Action Work Plan	\$365,000	\$ -	\$ -	\$ -	\$ -	\$365,000
Remedial Design	\$300,000	\$ -	\$ -	\$ -	\$ -	\$300,000
Construction	\$600,000	\$ -	\$ -	\$ -	\$ -	\$600,000*
Operations and Maintenance	\$ -	\$2,000,000	\$2,000,000	\$2,000,000	\$2,000,000	\$8,000,000
Remedy Performance Monitoring/Reporting	\$ -	\$96,000	\$96,000	\$96,000	\$96,000	\$384,000
Project Management	\$132,500	\$200,000	\$200,000	\$200,000	\$200,000	\$932,500
Totals	\$1,457,500	\$2,296,000	\$2,296,000	\$2,296,000	\$2,296,000	\$10,641,500

Note: This is a rough order of magnitude estimate. The accuracy is expected to be within +50% and -30%. A RAWP will be prepared to describe how the NTCRA will be implemented. The RAWP provides the plan and schedule for design, construction, operation, and monitoring activities, as needed, for successful implementation of the selected removal action. This includes finalizing extraction well location(s) and pumping rates. Pumping rates will consider aquifer properties, contaminant plume location, the treatment capacity of the 200 West P&T, and flow rates required to prevent freezing during winter months.

* Design and construction costs are limited to activities associated with extending the pipeline from well 299-E33-268 to well 299-E33-360. Construction costs are expected to range from \$600,000 to \$1,800,000 based on the number of extraction wells used in the NTCRA.

FY = fiscal year

NTCRA = non-time-critical removal action

RAWP = removal action work plan

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4 **5.6 Project Schedule**

5 Following approval of this AM the following activities will occur:

- 6 • Groundwater extraction performed under the 200-BP-5 treatability test plan (DOE/RL-2010-74) will
 7 transition to this NTCRA. The treatability test extraction system, using well 299-E33-268, will
 8 continue to operate as an initial step to implementing the removal action until a RAWP for this action
 9 is completed. This initial step may include continued extraction from well 299-E33-268 and/or use of
 10 extraction well 299-E33-360.
- 11 • Well 299-E33-360 will be added to the extraction system. The construction of a pipeline extension to
 12 well 299-E33-360 is expected to be completed in FY 2016.
- 13 • A RAWP will be prepared to describe how this removal action will be implemented to meet NTCRA
 14 objectives (Section 5.1) for this removal action. The RAWP will define pumping rates and well
 15 locations that will consider aquifer properties, contaminant plume locations, treatment capacity of the

1 200 West P&T, and/or flow rates required to prevent freezing during winter months. If further
2 expansion of the extraction system is needed, beyond wells 299-E33-268 and 299-E33-360, the
3 RAWP submitted to the regulator(s) for approval will provide a schedule for the design and
4 construction for the expanded system. The RAWP will also address monitoring activities for the
5 removal action. A Draft A RAWP will be provided to the regulators for review within 6 months after
6 this AM is approved.

7 **6 Expected Change in the Situation Should Action Be Delayed or Not Taken**

8 Groundwater is being extracted and treated in accordance with the treatability test plan (DOE/RL-2010-74).
9 Groundwater extraction under the 200-BP-5 treatability test is expected to continue to be performed as an
10 initial step to the removal action until the RAWP is completed. This initial step may include continued
11 extraction from well 299-E33-268 and/or expansion to other existing or new wells near the B Complex.
12 If a removal action is not implemented, groundwater contaminants will continue to migrate through the
13 200-BP-5 OU towards the Columbia River and will continue to pose an unacceptable HHE risk.

14 If the proposed action is not implemented, then remediation of groundwater generally beneath the
15 B Complex area will be delayed until remedial action(s) are evaluated and implemented, as required, as part
16 of the CERCLA process for the 200-BP-5 OU.

17 **7 Outstanding Policy Issues**

18 There is no outstanding policy issue associated with this NTCRA.

19 **8 Enforcement**

20 DOE is conducting this removal action as the lead agency under the authority of Executive Order 12580,
21 affirmed by 40 CFR 300.5, "Definitions," and 40 CFR 300.415(b)(1).

22 **9 Recommendations**

23 This AM documents the intent to implement the selected removal action (Alternative 2) for P&T of
24 contaminated B Complex area groundwater. This decision document has been developed in accordance
25 with CERCLA, as amended by the *Superfund Amendments and Reauthorization Act of 1986*, and is
26 consistent with the NCP. The conditions of the groundwater meet the criteria specified in 40 CFR
27 300.415(b)(2) of the NCP.

28 The recommended removal action alternative identified in the EE/CA is Alternative 2, extraction of the
29 groundwater from the B Complex area of the 200-BP-5 OU and treatment at the 200 West P&T.
30 This alternative has been selected for implementation because it is the most cost effective alternative that
31 reduces long-term risk to HHE. DOE also considers the recommended removal action to be consistent
32 with and a contributor to the efficient performance of Hanford Site long-term remedial actions.
33 Furthermore, this alternative promotes restoration of the environment, consistent with goals identified in
34 the Tri-Party Agreement (Ecology et al., 1989a).

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Appendix A

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Applicable or Relevant and Appropriate Requirements

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1 **Contents**

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Terms

ALARA	as low as reasonably achievable
ALARACT	as low as reasonably achievable control technology
ARAR	applicable or relevant and appropriate requirement
BACT	best available control technology
BARCT	best available radiological control technology
NTCRA	non-time-critical removal action
OU	operable unit
RACT	reasonably available control technology
T-BACT	best available control technology for toxics
TBC	to be considered

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A1 Compliance with Applicable or Relevant and Appropriate Requirements

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The “National Oil and Hazardous Substances Pollution Contingency Plan” (40 CFR 300) requires that the removal action described in this action memorandum comply with applicable or relevant and appropriate requirements (ARARs) to the extent practicable. ARARs are defined to include only substantive requirements of environmental standards incorporated in promulgated regulations that have been evaluated and determined to be pertinent to the removal action. ARARs do not include administrative requirements, including requirements to obtain any federal, state, or local permits. This appendix identifies specific regulatory sections, citations, and explanations regarding why it is an ARAR. This appendix also identifies a requirement that is categorized as to be considered (TBC). A TBC requirement pertains to information that consists of nonpromulgated advisories or guidance issued by federal or state governments. A TBC requirement is not legally binding and does not have the status of an ARAR. However, regulations and guidance state that, as appropriate, TBC information should be considered in determining the removal action necessary for protection of human health and the environment.

ARARs for this removal action are listed in Table A-1 (federal ARARs), Table A-2 (state ARARs), and Table A-3 (TBC criteria). Onsite activities, such as this removal action, must comply with ARARs, but they only need to comply with the substantive parts of those requirements. How substantive requirements from the pertinent ARARs and TBCs will be implemented will be included in the removal action work plan and other associated removal action implementation documents.

Table A-1. Identification of Federal ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
Other Federal ARARs			
<i>Archeological and Historic Preservation Act of 1974</i> 16 USC 469a-1 through 469a-2(d)	ARAR	Requires that the removal action at the 200-BP-5 Groundwater OU does not cause the loss of any archaeological or historic data. This act mandates preservation of the data and does not require protection of the actual historical sites.	Archeological and historic sites have been identified within the 200 Areas; therefore, the substantive requirements of this act are applicable to actions that might disturb these sites. This requirement is action specific.
<i>National Historic Preservation Act of 1966</i> 36 CFR 60, “National Register of Historic Places” 36 CFR 65, “National Historic Landmarks Program” 36 CFR 800, “Protection of Historic Properties”	ARAR	Requires federal agencies to consider the impacts of their undertaking on cultural properties through identification, evaluation, and mitigation processes.	Cultural and historic sites have been identified within the 200 Areas; therefore, the substantive requirements of this act are applicable to actions that might disturb these types of sites. This requirement is location specific.

Table A-1. Identification of Federal ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
<p><i>Native American Graves Protection and Repatriation Act of 1990</i> 25 USC 3001, et seq. 43 CFR 10, “Native American Graves Protection and Repatriation Regulations”</p>	ARAR	<p>Establishes federal agency responsibility for discovery of human remains, associated and unassociated funerary objects, sacred objects, and items of cultural patrimony.</p>	<p>Substantive requirements of this act are applicable if remains and sacred objects are found during remediation. This is a location-specific requirement.</p>
<p><i>Endangered Species Act of 1973</i> 16 USC 1531 et seq., 16 USC 1536(c) 50 CFR 402, “Interagency Cooperation—Endangered Species Act of 1973, as Amended”</p>	ARAR	<p>Establishes requirements for actions by federal agencies that are likely to jeopardize the continued existence of listed species or result in the destruction or adverse modification of critical habitat. If remediation is within critical habitat or buffer zones surrounding threatened or endangered species, mitigation measures must be taken to protect the resource.</p>	<p>Substantive requirements of this act are applicable if threatened or endangered species are identified in areas where removal action will occur. This is a location-specific requirement.</p>
<p><i>Migratory Bird Treaty Act of 1918</i> 16 USC 703-712, et seq.</p>	ARAR	<p>Protects all migratory bird species and prevents “take” of protected migratory birds, their young, or their eggs.”</p>	<p>Remedial actions that require mitigation measures to deter nesting by migratory birds on, around, or within remedial action site and methods to identify and protect occupied bird nests. This requirement is location specific.</p>
<p><i>Clean Air Act of 1977 (42 USC 7401, et seq.); 40 CFR 60, “Standards of Performance for New Stationary Sources</i></p>			
<p>40 CFR 60, Subpart III, “Standards of Performance for Stationary Compression Ignition Internal Combustion Engines” 40 CFR 60, Subpart JJJJ, “Standards of Performance for Stationary Spark Ignition Internal Combustion Engines” 40 CFR 63, “National Emission Standards for Hazardous Air Pollutants for Source Categories”</p>	ARAR	<p>The requirements for stationary engines changed on May 3, 2013 to include timers, maintenance plans, and meeting monitoring requirements.</p>	<p>Stationary engines (e.g., used to support lighting poles) may be used during the removal action.</p>

Table A-1. Identification of Federal ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
40 CFR 63, Subpart ZZZZ, "National Emission Standard for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines"			

ARAR = applicable or relevant and appropriate requirement

OU = operable unit

TBC = to be considered

1

Table A-2. Identification of State ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
WAC 173-303, "Dangerous Waste Regulations"			
WAC 173-303-016, "Identifying Solid Waste"	ARAR	Identifies those materials that are and are not solid wastes.	Substantive requirements of these regulations are applicable because they define which materials are subject to the designation regulations. Specifically, materials that are generated during the removal action would, if a solid waste, be subject to the requirements for solid wastes. This requirement is action specific.
WAC 173-303-017, "Recycling Processes Involving Solid Waste"	ARAR	Identifies materials that are and are not solid wastes when recycled and includes provisions for exemption from WAC 173-303.	Substantive requirements of these regulations are applicable because they define which materials are subject to the designation regulations. Specifically, materials that are generated during the removal action, if a solid waste, would be subject to the requirements for solid wastes. This requirement is action specific.

Table A-2. Identification of State ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
WAC 173-303-070(3), “Designation of Dangerous Waste”	ARAR	Establishes whether a solid waste is, or is not, a dangerous waste or an extremely hazardous waste.	Substantive requirements of these regulations are applicable to materials generated during the removal action. Specifically, solid waste that is generated during this removal action, if a dangerous waste, would be subject to the dangerous waste requirements. This requirement is action specific.
WAC 173-303-071, “Excluded Categories of Waste”	ARAR	Describes those categories of wastes that are excluded from the requirements of WAC 173-303 (excluding WAC 173-303-050, “Department of Ecology Cleanup Authority”).	This regulation is applicable to the removal action in the 200-BP-5 Groundwater OU should wastes identified in WAC 173-303-071 be generated. This requirement is action specific.
WAC 173-303-077, “Requirements for Universal Waste”	ARAR	Identifies those wastes exempted from regulation under WAC 173-303-140 and WAC 173-303-170 through 173-303-9906, “Special Waste Bill of Lading” (excluding WAC 173-303-960, “Special Powers and Authorities of the Department”). These wastes are subject to regulation under WAC 173-303-573, “Standards for Universal Waste Management.”	Substantive requirements of these regulations are applicable to universal waste generated during the removal action. Specifically, the substantive standards for management of universal waste are relevant and appropriate to the management of universal waste that will be generated during the removal action. This requirement is action specific.
WAC 173-303-120, “Recycled, Reclaimed, and Recovered Wastes” Specific subsections: WAC 173-303-120(3) WAC 173-303-120(5)	ARAR	These regulations define the requirements for recycling materials that are solid and dangerous waste. Specifically, WAC 173-303-120(3) provides for the management of certain recyclable materials, including spent refrigerants, antifreeze, and lead acid batteries. WAC 173-303-120(5) provides for the recycling of used oil.	Substantive requirements of these regulations are applicable to certain materials that might be generated during the removal action. Eligible recyclable materials can be recycled and/or conditionally excluded from certain dangerous waste requirements. This requirement is action specific.

Table A-2. Identification of State ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
WAC 173-303-140(4), “Land Disposal Restrictions”	ARAR	This regulation establishes state standards for land disposal of dangerous waste and incorporates, by reference, federal land disposal restrictions of 40 CFR 268, “Land Disposal Restrictions,” that are relevant and appropriate to solid waste that is designated as dangerous or mixed waste in accordance with WAC 173-303-070(3).	The substantive requirements of this regulation are applicable to materials generated during the removal action. Specifically, dangerous/mixed waste that is generated during the removal action would be subject to the relevant and appropriate substantive land disposal restrictions. The offsite treatment, disposal, or management of such waste would be subject to all applicable substantive and procedural laws and regulations, including land disposal restriction requirements. This requirement is action specific.
WAC 173-303-170, “Requirements for Generators of Dangerous Waste”	ARAR	Establishes the requirements for dangerous waste generators.	Substantive requirements of these regulations are applicable to materials generated during the removal action. Specifically, the substantive standards for management of dangerous/mixed waste are relevant and appropriate to the management of dangerous waste that will be generated during the removal action. For purposes of this removal action, WAC 173-303-170(3) includes the substantive provisions of WAC 173-303-200, “Accumulating Dangerous Waste On-Site,” by reference. WAC 173-303-200 further includes certain substantive standards from WAC 173-303-630, “Use and Management of Containers,” and WAC 173-303-640, “Tank Systems,” by reference. This requirement is action specific.

Table A-2. Identification of State ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
WAC 173-160, “Minimum Standards for Construction and Maintenance of Wells”			
WAC 173-160-161	ARAR	Identifies well planning and construction requirements.	The substantive requirements of these regulations are ARARs to actions that include construction of wells used for groundwater extraction and monitoring. These requirements are action specific.
WAC 173-160-171	ARAR	Identifies the requirements for locating a well.	
WAC 173-160-181	ARAR	Identifies the requirements for preserving natural barriers to groundwater movement between aquifers.	
WAC 173-160-400	ARAR	Identifies the minimum standards for resource protection wells and geotechnical soil borings.	
WAC 173-160-420	ARAR	Identifies the general construction requirements for resource protection wells.	
WAC 173-160-430	ARAR	Identifies the minimum casing standards.	
WAC 173-160-440	ARAR	Identifies the equipment cleaning standards.	
WAC 173-160-450	ARAR	Identifies the well sealing requirements.	
WAC 173-160-460	ARAR	Identifies the decommissioning process for resource protection wells.	
WAC 173-400, “General Regulations for Air Pollution Sources”; WAC 173-460, “Controls for New Sources of Toxic Air Pollutants”			
RCW 70.94, “Washington Clean Air Act” RCW 43.21A, “Department of Ecology” WAC 173-400, “General Regulations for Air Pollution Sources” Specific subsections: WAC 173-400-040(3) and (8), “General Standards for Maximum Emissions” WAC 173-400-113, “Requirements for New Sources in Attainment or Unclassifiable Areas”	ARAR	These laws and regulations require all sources of air contaminants to meet standards for visible emissions, fallout, fugitive emissions, odors, emissions detrimental to persons or property, sulfur dioxide, concealment and masking, and fugitive dust. Requires the use of RACT. WAC 173-400-113 applies to new and modified sources and requires controls to minimize releases of associated criteria and toxic air emissions. Emissions are to be minimized through application of BACT.	Substantive requirements of the general standards for control of fugitive emissions would be applied, as appropriate, to minimize the generation of dust that may occur during work under the NTCRA. These requirements are action specific. It is unlikely that the substantive provisions of WAC 173-400-113 would be triggered during the NTCRA. However, substantive requirements of this regulation would potentially be applicable if a treatment technology that emits regulated air emissions was necessary during implementation of the NTCRA.

Table A-2. Identification of State ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
			This requirement is action specific.
<p>WAC 173-460, “Controls for New Sources of Toxic Air Pollutants”</p> <p>Specific subsections: WAC 173-460-060, “Control Technology Requirements”</p> <p>WAC 173-460-150, “Table of ASIL, SQER and de Minimis Emission Values”</p>	ARAR	<p>These regulations apply for determination of de minimis emission values and establishment of control technology, as appropriate, for new or modified toxic air pollutant emissions. Requires BACT for regulated emissions of toxic air pollutants (T-BACT) and demonstration that emissions of toxic air pollutants will not endanger human health.</p>	<p>It is not anticipated that work done under the NTCRA will trigger standards for T-BACT. However, substantive requirements of these regulations would potentially be applicable to activities performed onsite if a treatment technology that emits toxic air emissions was necessary during implementation of the NTCRA. These requirements are action specific.</p>
WAC 246-247, “Radiation Protection—Air Emissions”			
<p>WAC 246-247-040(3) and (4), “General Standards”</p>		<p>These regulations require all new construction and significant modifications of emission units to use BARCT and require all existing emission units and nonsignificant modifications to use ALARACT in controlling emissions to the environment.</p>	<p>There is potential for encountering radionuclide contamination during the activities covered by this NTCRA. Substantive requirements of these standards are potentially applicable because fugitive, diffuse, and point source emissions of radionuclides to the ambient air may result from the removal activities associated with pipeline installation. These requirements are action specific.</p>
<p>WAC 246-247-075, “Monitoring, Testing, and Quality Assurance”</p> <p>Specific subsections: WAC 246-247-075(1), (2), (3), (4), and (8)</p>		<p>These regulations establish the monitoring, testing, and quality assurance requirements for radioactive air emissions from major sources. These regulations also include requirements for continuous sampling and provide for periodic sampling (grab samples) in cases where continuous sampling is not practical and radionuclide emission rates are relatively constant. These regulations also provide for the waste site owner or operator to use alternative effluent flow rate measurement procedures or site selection and sample extraction procedures, as approved by the lead agency.</p>	<p>There is potential for generating fugitive, diffuse, and/or point source emissions during the NTCRA. Substantive requirements of these standards are potentially applicable because fugitive and nonpoint source emissions of radionuclides to the ambient air may result from activities, such as operation of exhausters and vacuums, performed during the removal action. These requirements are action specific.</p>

Table A-2. Identification of State ARARs

ARAR Citation	ARAR	Requirement	Rationale for Use
		These regulations establish requirements to monitor nonpoint and fugitive emissions of radioactive material.	
WAC 173-480-050(1), “General Standards for Maximum Permissible Emissions”		This regulation establishes general standards for all radionuclide emission units and requires emission units to meet the requirements of WAC 246-247, which requires every reasonable effort to maintain radioactive materials in effluents to unrestricted areas ALARA. The regulation indicates that control equipment of sites operating under ALARA shall be defined as RACT and as ALARACT.	The potential for fugitive and diffuse emissions due to demolition and excavation and related activities may require efforts to minimize those emissions by meeting the requirements of WAC 246-247. This requirement is action specific.
WAC 173-480-070(2), “Emission Monitoring and Compliance Procedures”		This regulation applies for determining compliance with the radionuclide emission standard. Compliance with the public dose standard is determined by calculating exposure at the point of maximum annual air concentration in a location.	Removal action activities associated with pipeline installation have potential to emit radionuclides to unrestricted areas above maximum acceptable levels.

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Table A-3. Identification of TBC Criteria

Criteria TBC	Rationale for Use
EPA et al., 2008, <i>Record of Decision, Hanford 200 Area 200-ZP-1 Superfund Site, Benton County, Washington</i>	Contaminated water extracted from the 200-BP-5 OU and added to the 200 West Pump and Treat Facility influent for treatment will attain the cleanup levels for treated effluent.

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A2 References

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- 6 36 CFR 65, “National Historic Landmarks Program,” *Code of Federal Regulations*. Available at:
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