U.S. Department of Energy
Hanford Site

November 12, 2020

21-AMRP-0002

Ms. Stephanie N. Schleif, Acting Program Manager
Nuclear Waste Program
Washington State Department of Ecology
3100 Port of Benton Boulevard
Richland, Washington 99354

Dear Ms. Schleif:

SUBMITTAL OF SUPPLEMENTAL INFORMATION TO THE HANFORD FACILITY RESOURCE CONSERVATION AND RECOVERY ACT PERMIT RENEWAL (REVISION 9) APPLICATION FOR THE 216-A-29 DITCH, CLOSURE UNIT GROUP 11, 216-S-10 POND AND DITCH, CLOSURE UNIT GROUP 14, 216-B-63 TRENCH, CLOSURE UNIT GROUP 21, AND 216-B-3 MAIN POND, CLOSURE UNIT GROUP 22, ADDENDUM H, CLOSURE PLANS

The U.S. Department of Energy, Richland Operations Office (hereinafter referred to as the Permittee) submits Closure Units 216-A-29 Ditch, Closure Unit Group 11 (CUG-11), 216-S-10 Pond and Ditch, Closure Unit Group 14 (CUG-14), 216-B-63 Trench, Closure Unit Group 21 (CUG-21), and 216-B-3 Main Pond, Closure Unit Group 22 (CUG-22), Addendum H, Closure Plans, with certification statements, pursuant to the Washington Administrative Code (WAC) 173-303-840(1)(b) to support the Hanford Facility Resource Conservation and Recovery Act (RCRA) Permit, Revision 9, renewal. The purpose of this action is to clarify, modify, or supplement information previously submitted.

The Permittee has worked with your office on the content of the Closure Plans which represents the Permittee's intent to operate pursuant to Revision 9 of the Hanford Facility RCRA Permit upon the effective date of the permit. This supplemental information may not reflect current facility configurations and/or applicable permit conditions enforceable under the Hanford Facility RCRA Permit Revisions 8C. In accordance with WAC 173-303-806(7), the Permittees will comply with the Revision 8C of the Hanford Facility RCRA Permit until the effective date of Revision 9 of the Hanford Facility RCRA Permit.

Richland Operations Office
P.O. Box 550
Richland, Washington 99352

Office of River Protection
P.O. Box 450
Richland, Washington 99352

If you have any questions, please contact me or your staff may contact Bill Hamel, Assistant Manager for the River and Plateau, RL, on (509) 373-9971.

Sincerely,

Digitally signed by Brian T. Vance
DN: cn=Brian T. Vance, o=Office of River Protection, ou=Department of Energy, email=brian.t.vance@orp.doe.gov, c=US
Date: 2020.11.12 11:14:32 -08'00'

Brian T. Vance
Manager

AMRP:MK

Attachments:
1. Certification for Supporting permit application material for "216-A-29 Ditch Waste Management Unit, CUG-11, Addendum H, Closure Plan"
2. Certification for Supporting permit application material for "216-B-3 Main Pond Waste Management Unit, CUG-22, Addendum H, Closure Plan"
3. Certification for Supporting permit application material for "216-S-10 Pond & Ditch Waste Management Unit, CUG-14, Addendum H, Closure Plan"
4. Certification for Supporting permit application material for "216-B-63 Trench Waste Management Unit, CUG-21, Addendum H, Closure Plan"

cc w/attachs:
J. Bell, NPT
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L. Contreras, YN
J. L. Cantu, Ecology
D. R. Einan, EPA
S. Leckband, HAB
N. M. Menard, Ecology
M. Murphy, CTUIR
D. Thompson, Ecology
M. Woods, ODOE
Administrative Record
Ecology NWP Library
Environmental Portal
HF Operating Record (J. K. Perry, MSA)

cc w/o attachs:
S. G. Austin, CHPRC
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D. A. St. John, CHPRC
K. R. Welsch, Ecology

ATTACHMENT 1

CHPRC-2003515
CONTRACT NUMBER DE-AC06-08RL14788

**216-A-29 DITCH WASTE MANAGEMENT UNIT,
CLOSURE UNIT GROUP 11 (CUG-11), ADDENDUM H, CLOSURE PLAN
REG-0987, Revision 0**

D. A. St. John

Consisting of 21 pages,
including this cover page

Certification
for
Supporting Permit Application Material for Part V – Closure Units, 216-A-29 Ditch Waste Management Unit, Closure Unit Group 11 (CUG-11), Addendum H, "Closure Plan"

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

L. Ty Blackford — Signature — 9/29/2020

L. Ty Blackford, President and CEO
Co-Operator
CHPRC
Richland, Washington

Signature

Date

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Certification
for
Supporting Permit Application Material for Part V – Closure Units, 216-A-29 Ditch Waste Management Unit, Closure Unit Group 11 (CUG-11), Addendum H, "Closure Plan"

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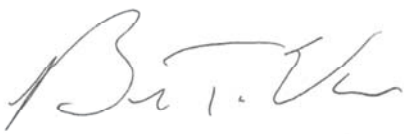

Digitally signed by Brian T. Vance
DN: cn=Brian T. Vance, o=Office of River Protection, ou=Department of Energy, email=brian.t.vance@orp.doe.gov, c=US
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Brian T. Vance, Manager Owner/Operator U.S. Department of Energy Richland Operations Office	Signature	Date

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Addendum H

Closure Plan

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Contents

Figures

Table

Terms

bgs	below ground surface
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DOE	U.S. Department of Energy
DWMU	dangerous waste management unit
Ecology	Washington State Department of Ecology
OU	operable unit
PUREX	Plutonium Uranium Extraction
RCRA	*Resource Conservation and Recovery Act of 1976*
TEDF	Treated Effluent Disposal Facility

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H1 Introduction

This addendum discusses closure activities for the 216-A-29 Ditch dangerous waste management unit (DWMU). This addendum also identifies the 200-E-187-PL and associated control structures as the primary conveyance system associated with the discharge to the 216-A-29 Ditch. Addendum A (Part A Form) identifies the 216-A-29 Ditch as an unlined, manmade surface impoundment. The 216-A-29 Ditch has been interim stabilized, is managed as an inactive underground waste management unit, and is located in the eastern portion of the 200 East Area (Figure H1). This closure plan addresses the requirements of WAC 173-303-610(2) through (6), "Dangerous Waste Regulations," "Closure and post-closure," as applicable to the physical components of the 216-A-29 Ditch.

The 216-A-29 Ditch is a surface impoundment (process code D83) that was uncovered, unlined, and followed a natural drainage channel. It conveyed liquid effluent from the Plutonium Uranium Extraction (PUREX) Plant to the 216-B-3-1 Ditch until July 1964, then to the 216-B-3-2 Ditch until September 1971 and later to the 216-B-3-3 Ditch until the 216-A-29 Ditch was taken out of service in 1991. Liquid effluent, including constituents now regulated under WAC 173-303, seeped from the 216-A-29 Ditch into the soil column and comingled in the soil column with waste constituents from one or more solid waste management units or areas of concern. The underlying soil is contaminated with a mixture of constituents subject to the dangerous waste requirements of WAC 173-303 and the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). The underlying groundwater is contaminated with a mixture of contaminants subject to CERCLA.

Dangerous waste closure processes will be coordinated through the integrated *Resource Conservation and Recovery Act of 1976* (RCRA)-CERCLA past-practice process for consistency in the remedy selection process, as described in Section 5.0 of Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order Action Plan* (hereinafter referred to as the Tri-Party Agreement Action Plan). The closure decision for the 216-A-29 Ditch physical components and the primary conveyance (Section H1.1) will be made together with the remedial action decisions for the 200-EA-1 Operable Unit and 200-IS-1 Operable Units (OU).[1] Future revisions to the closure plan will identify which conveyances will be closed via CERCLA decisions. Consistent with Section 5.5 of the Tri-Party Agreement Action Plan, groundwater contamination beneath the 216-A-29 Ditch will be addressed through the remedial action decision process for the 200-PO-1 and 200-BP-5 OUs (Figure H2).

The US Department of Energy (DOE) reevaluated the data used in the preparation of this closure plan to determine whether newer data were available and appropriate to use and incorporated the latest relevant data and information, wherever available, applicable, and referenceable.

H1.1 Physical Description

H1.1.1 216-A-29 Ditch

The 216-A-29 Ditch is 1,097 m (3,600 ft) long, varied in depth from 0.6 to 0.9 m (2 to 3 ft) at the south end of the ditch to 4.9 m (16 ft) at the north end, and is 1.8 m (6 ft) wide at the base. The 216-A-29 Ditch physical components includes a concrete headwall located at the head end of the ditch (Figure H3), and earthen dams and culverts overlain by clean fill. From 1989 to 1991, modifications upstream of the headwall were made to prevent future discharges to the ditch, and the ditch itself was backfilled and interim stabilized.

[1] Changes in waste site operable unit may require a revised closure plan and associated Class 1 permit modification.

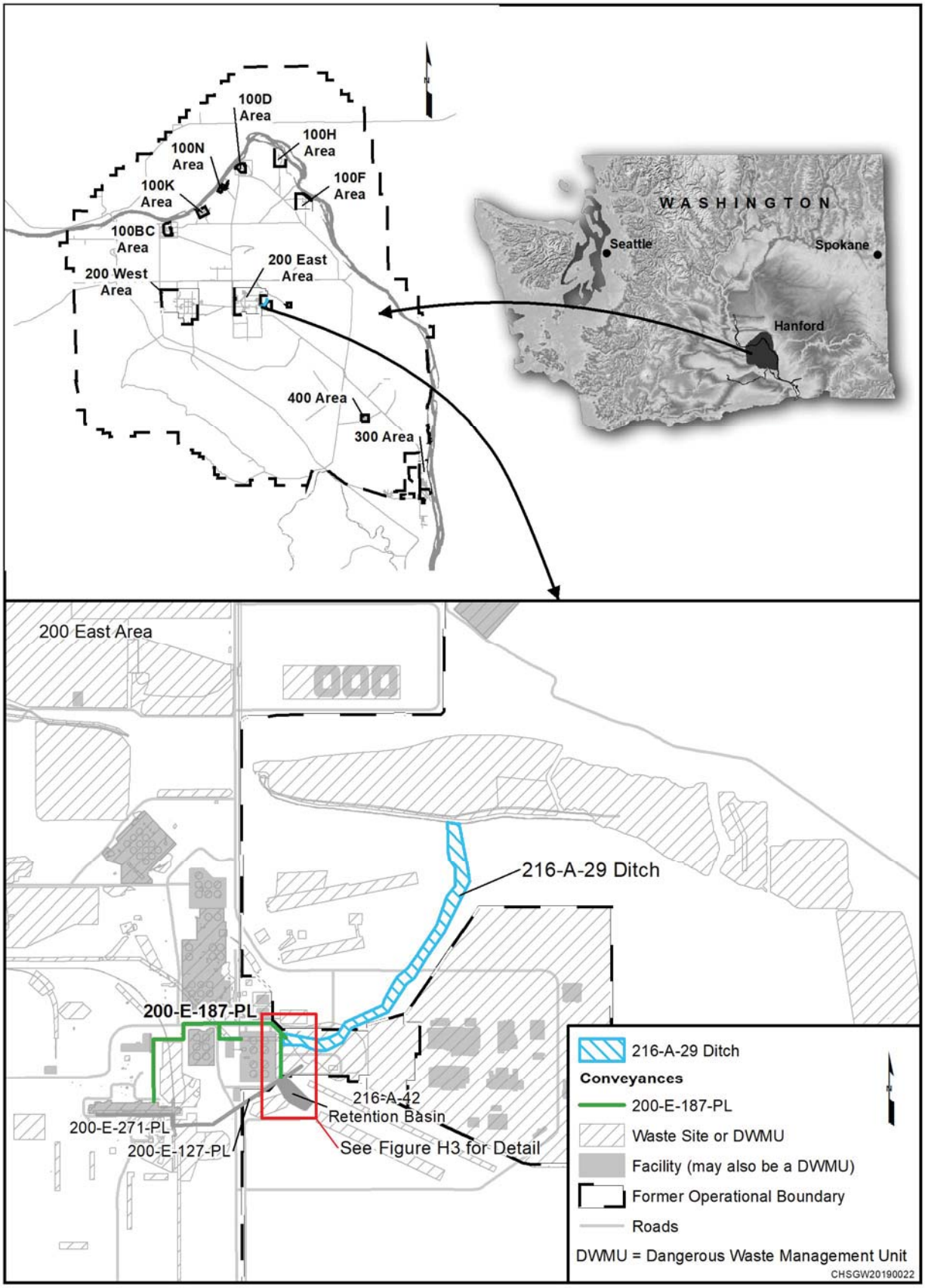

Figure H1. Site Location Map

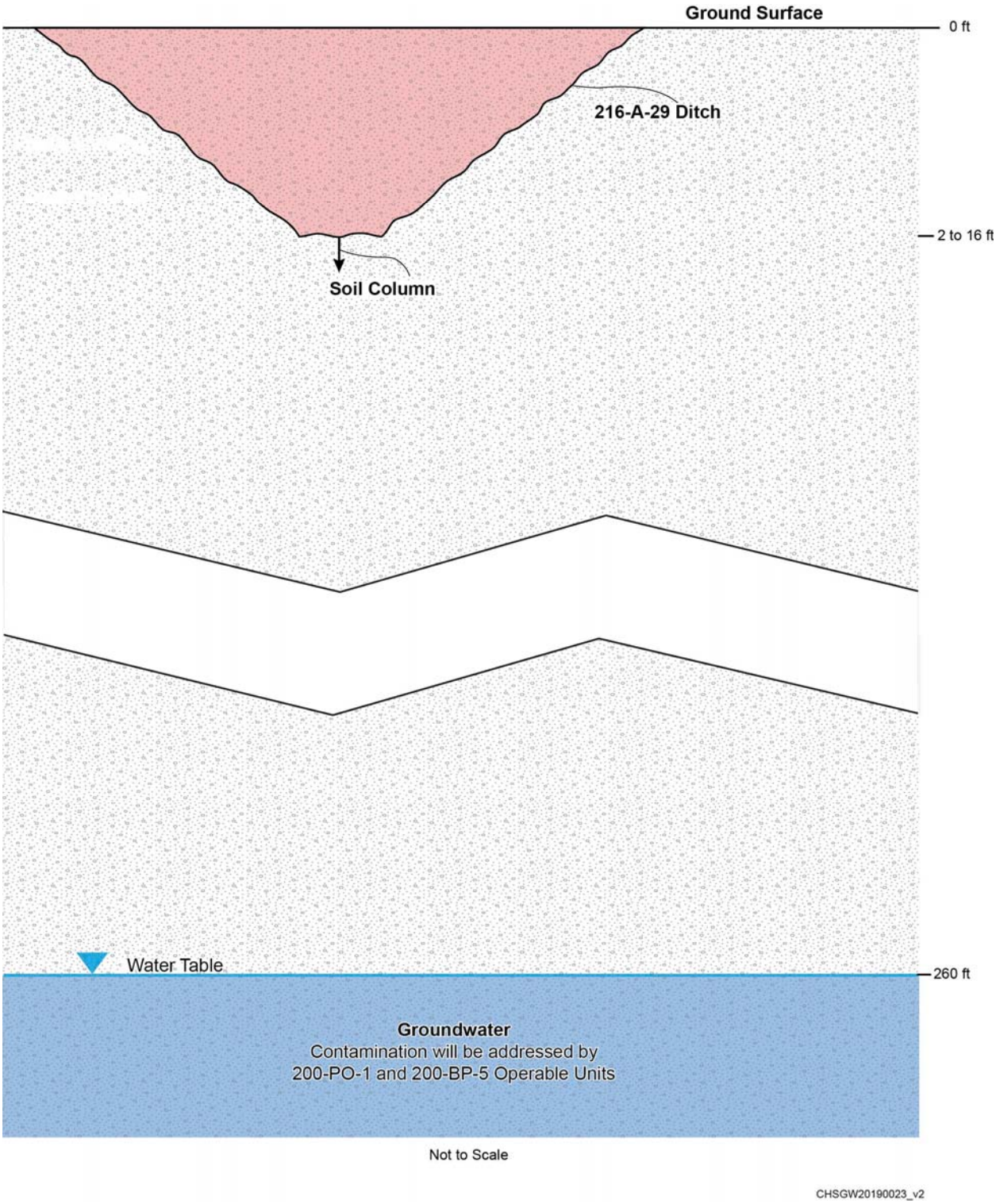

Figure H2. Scope of the 216-A-29 Ditch Closure Plan and OU Elements

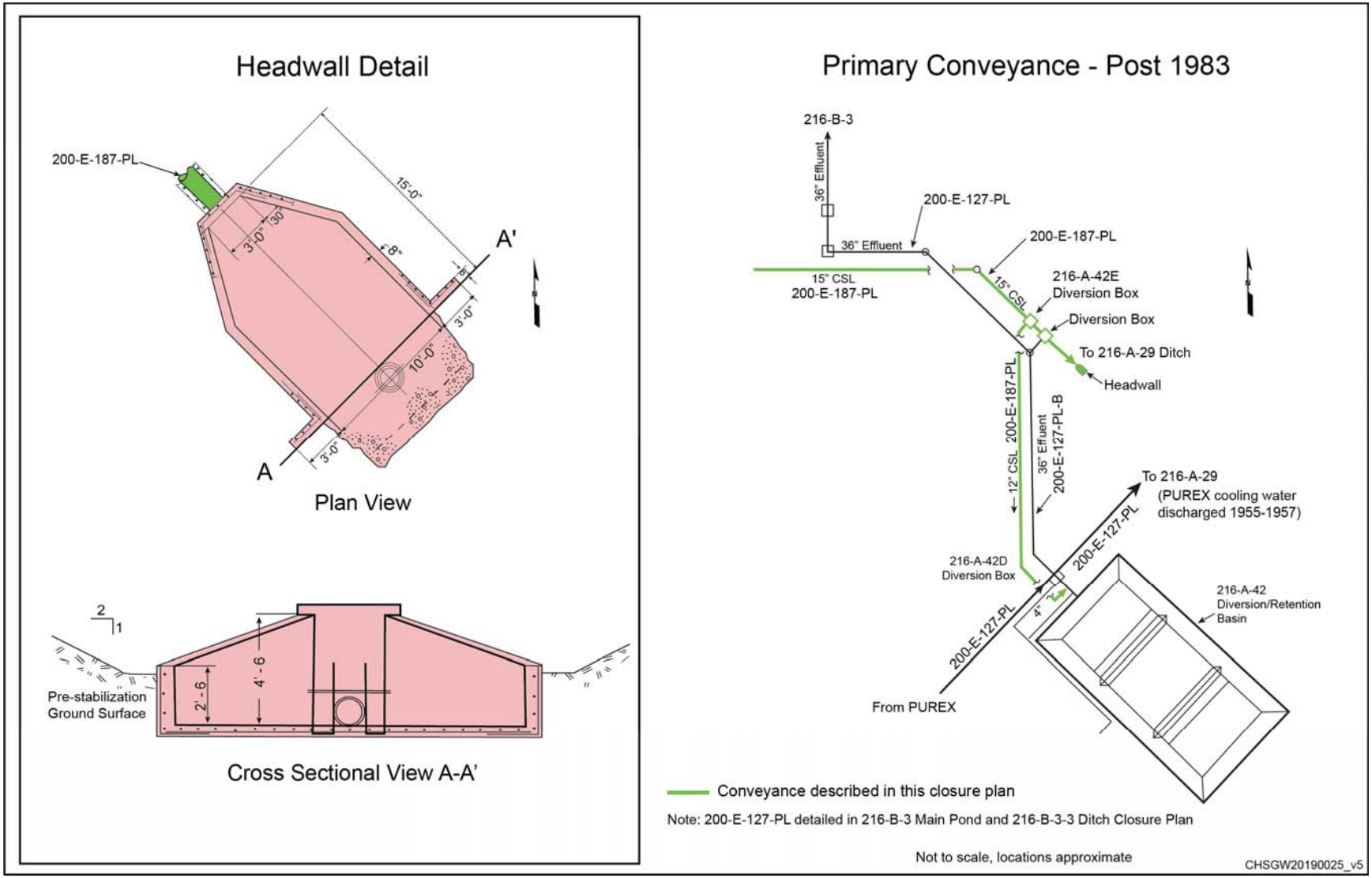

Figure H3. Construction Diagram of the 216-A-29 Ditch

H1.1.1 Discharge Conveyance History

The primary discharge conveyance to the 216-A-29 Ditch described in this closure plan is the 200-E-187-PL and associated control structures (Figure H1). The 200-E-187-PL pipeline is an inactive underground radioactive process sewer pipeline that transferred PUREX chemical sewer effluent to the 216-A-29 Ditch from November 1955 to July 1991. The 200-E-187-PL pipeline was rerouted in 1983 to allow construction of the AP Tank Farms. The pipeline was routed through a new diversion box (216-A-42E) to the concrete headwall (Figure H3). In its final configuration the 200-E-187-PL was a gravity flow, direct buried, 1,070 m (3,512 ft) long vitrified clay pipe ranging in diameter from 30.5 cm (12 in.) to 38 cm (15 in.).

To support a full understanding of the history of the 216-A-29 Ditch, secondary conveyances that contributed to the ditch for short durations are identified in this section, and are fully-described in other closure plans. PUREX cooling water was discharged to the 216-A-29 Ditch for a brief period from November 1955 to December 1957 via the 200-E-271-PL and the 200-E-127-PL (Figure H4). In 1977, the 216-A-42 Retention Basin was constructed to retain PUREX effluents exceeding pH and/or radiological release limits. The retained effluent was analyzed and either pumped back to the PUREX facility for reprocessing or to cribs for disposal. Discharge conveyance from the 216-A-42 Retention Basin to the 216-B-3 Main Pond is addressed in the 216-B-3 Main Pond and 216-B-3-3 Ditch Closure Plan.

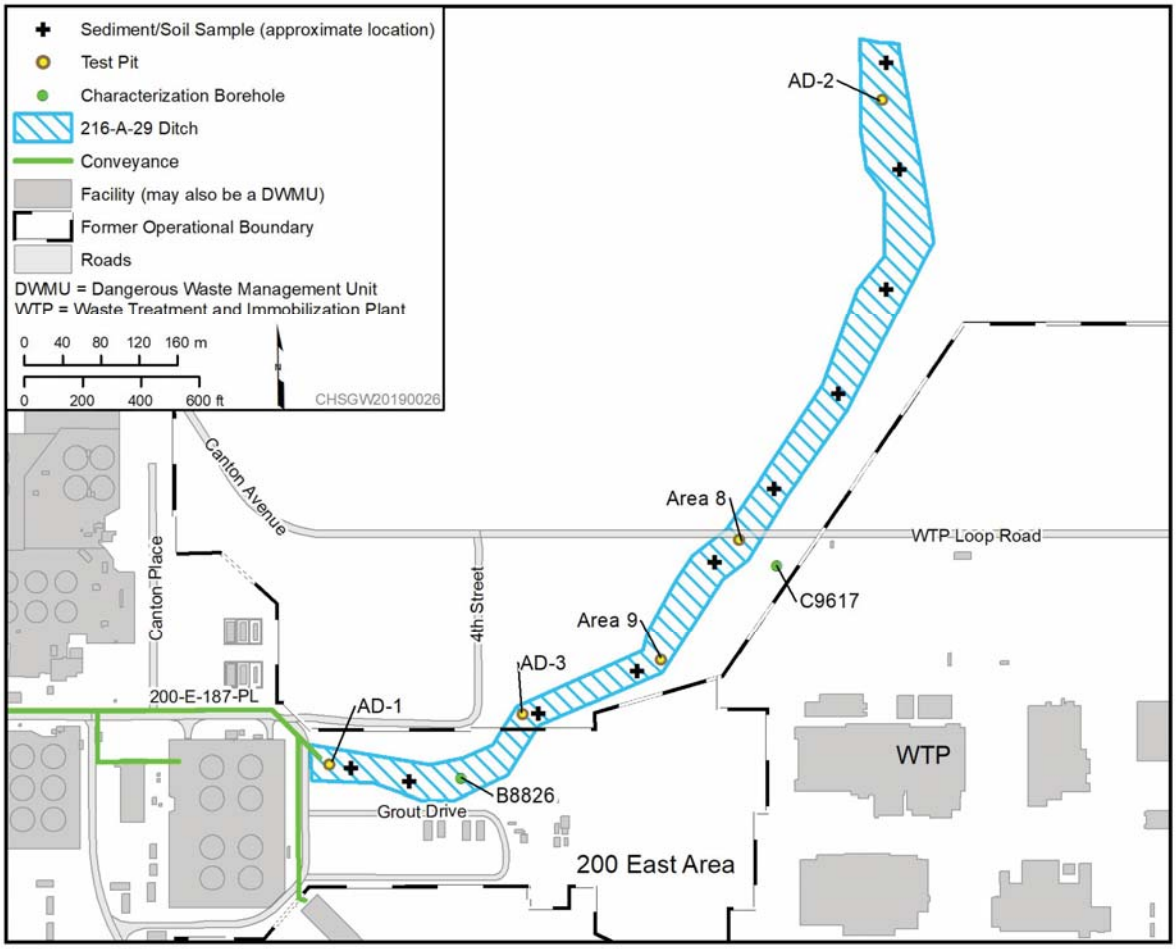

Figure H4. Location of Characterization Samples, Test Pits, and Boreholes Relevant to the 216-A-29 Ditch

In 1989, an unnamed diversion box was constructed approximately 20 m (65 ft) southeast of the 216-A-42E Diversion Box (Figure H3). The unnamed diversion box connected the 200-E-187-PL to the 200-E-127-PL permanently diverting discharge from the 216-A-29 Ditch to the 216-B-3 Main Pond. The combined PUREX chemical sewer and PUREX cooling water effluents were discharged to the 216-B-3-3 Ditch from July 1991 to May 1994. All discharges were permanently routed to the Treated Effluent Disposal Facility (TEDF) in May 1994. These secondary conveyance systems are addressed in the 216-B-3 Main Pond and 216-B-3-3 Ditch Closure Plan.

H1.2 Process Information

The 216-A-29 Ditch conveyed 202-A (PUREX) cooling water and chemical sewer wastewater. The cooling water consisted of raw water used for general utility purposes and cooling in PUREX Plant process equipment. The chemical sewer wastewater consisted of aqueous makeup unit wastes, liquids from the pipe and operating gallery floor drains, liquids from the 211-A chemical storage area floor drains, acid fractionator steam condensate, vacuum pump seal cooling water, and plant demineralizer regeneration effluent. Between 1984 and April 1987, physical and operational changes were made to the PUREX Plant to eliminate the potential for dangerous waste discharges into the chemical sewer (DOE/RL-89-28, *216-B-3 Pond System Closure/Postclosure Plan*, Rev. 0). DOE/RL-89-28 summarizes the PUREX chemical sewer contributions to the 216-A-29 Ditch. The PUREX cooling water and chemical sewer discharge conveyances are described in Section H1.1.2

H1.3 Waste Inventory and Characteristics

The 216-A-29 Ditch operated from November 1955 until July 1991. According to Addendum A (Part A Form), approximately 22,700,000 L/day (6,000,000 gal/day) of liquid wastewater reached the ditch. Addendum A (Part A Form) identifies the following constituents for the 216-A-29 Ditch (Table H1 provides estimated annual quantities): corrosive acids and caustics (D002), cadmium (D006), and state-only dangerous waste (WT02).

Table H1. Estimated Annual Quantity of Constituents for the 216-A-29 Ditch

Waste Constituent (Dangerous Waste Number)	Estimated Annual Quantity of Waste (lb)
Corrosive Acids and Caustics (D002)(measured as pH)[a]	3,300,000,000[b]
Cadmium (D006)	35
State-Only Dangerous Waste (WT02)	50,000

Source: Section XIV in Addendum A (Part A Form).

a. D002 code resulted from the plant demineralizer effluent prior to 1985.

b. Estimated annual quantity based on average daily discharge including water.

H2 Groundwater Monitoring

RCRA indicator evaluation groundwater monitoring was initiated at the 216-A-29 Ditch in 1988. In 1990, monitoring at the ditch changed to a groundwater quality assessment monitoring program based on statistical analysis of specific conductance in one downgradient well, but then reverted to an indicator evaluation program in 1995. In January 2016, the 216-A-29 Ditch was again placed into a groundwater quality assessment program based on statistical analysis of specific conductance in three downgradient wells (DOE/RL-2016-23, *Interim Status Groundwater Quality Assessment Monitoring Plan*). In 2017,

four upgradient wells and four downgradient wells were monitored for the 216-A-29 Ditch, and groundwater flow was to the west-southwest (DOE/RL-2017-65*, Hanford Site RCRA Groundwater Monitoring Report for 2017*). The network groundwater monitoring wells were monitored for select dangerous waste constituents, site-specific constituents (ammonia, nitrate, and sulfate), supporting constituents (e.g., anions and metals), and field parameters (e.g., pH, specific conductance, temperature).

H3 Closure Performance Standards

Closure of the 216-A-29 Ditch and the primary discharge conveyance will meet WAC 173-303-610(2)(a) closure performance standards. The 216-A-29 Ditch is situated among other solid waste management units where releases to the soil column have occurred, and the releases have commingled. Therefore, the permittee may request alternative requirements protective of human health and the environment in accordance with WAC 173-303-610(1)(e). If requesting the use of alternative requirements for closure of the 216-A-29 Ditch, DOE will submit a Coordinated Closure Proposal as a permit modification request pursuant to WAC 173-303-830(4). The Coordinated Closure Proposal shall be submitted to Washington State Department of Ecology (Ecology) at the same time as the Proposed Corrective Action Decision/Proposed Plan for the 200-EA-1 OU is submitted to Ecology. Numerical closure performance standards for constituents identified in Table H1 shall be included in a revised closure plan prior to initiating closure activities.

H4 Closure Activities

The 216-A-29 Ditch was interim stabilized in 1991 (WHC-SD-DD-TI-060, *216-A-29 Ditch Interim Stabilization Final Report*). As part of this effort, the portion of the 216-A-29 Ditch inside the 200 East Area former operational boundary was backfilled and brought to grade with clean material. Outside the boundary, material from the ditch sides and spoil piles was placed in the bottom of the ditch, culverts under roads were sealed with concrete, and the entire ditch was covered with clean material in the form of terraces. Some areas disturbed by the stabilization activities were revegetated.

The following characterization activities were performed to identify the nature and extent of contamination for the 216-A-29 Ditch (Figure H4 shows characterization activity locations):

- Sediment and soil samples were collected from 10 locations in 1988 (HNF-SD-TWR-TI-005, *Soil/Sediment Characterization for the 216-A-29 Ditch*).
- Test pits in Areas 8 and 9 were excavated in 1998 (DOE/RL-2004-17, *Remedial Investigation report for the 200-CS-1 Chemical Sewer Group Operable Unit*).
- Test pits AD-1 through AD-3 were excavated in 2001 (DOE/RL-2004-17).
- Borehole B8826 was drilled in 2003, and soil samples were collected to a depth of 83.2 m (273 ft) below ground surface (bgs) (DOE/RL-2004-17).
- Borehole C9617 was drilled in 2017 to a depth of 92.0 m (302 ft) bgs, and soil samples were collected (SGW-61096, *Borehole Summary Report for the Installation of Five M-24 Monitoring Wells at the 200-PO-1 and 200-BP-5 Operable Unit, FY 2017*; VSR17-012, *Data Validation Report for CH2M Hill Plateau Remediation Company Project 200-EA-1 Chemical & Radiochemical Validation – Level C*).

Borehole, sediment, and test pit samples were analyzed for multiple constituents, including anions, pH, and metals (e.g., cadmium). Cadmium concentrations ranged from <30 µg/kg to 28,000 µg/kg at test pit AD-1 (1.5 m [4.9 ft] bgs). No pH values were reported ≤2.0 or ≥12.5. Additional characterization will occur at the 216-A-29 Ditch in coordination with other 200 Area activities.

In accordance with Section 5.5 of the Tri-Party Agreement Action Plan (Ecology et al., 1989), alternatives development and evaluation for the 216-A-29 Ditch and the primary conveyance system will be integrated with the 200-EA-1 and the 200-IS-1 OU processes.

216-A-29 Ditch closure will need to be integrated with adjacent permitted units and with existing infrastructure, including the roadway and utility crossing for the Waste Treatment and Immobilization Plant. Closure will also need to be integrated with future construction, operation, and closure of the Low-Activity Waste Pretreatment System and the Waste Treatment and Immobilization Plant due to geographic proximity (Figure H4).

H4.1 Security, Inspection, and Training Information

[RESERVED]

H4.2 Removal of Wastes and Waste Residues

[RESERVED]

H4.3 Removal of Unit, Parts, Equipment, Piping, the Containment Structure, and other Ancillary Equipment

[RESERVED]

H4.4 Unit Inspection Prior to Decontamination

[RESERVED]

H4.5 Decontamination

[RESERVED]

H4.6 Identifying and Managing Contaminated Environmental Media

[RESERVED]

H4.7 Closure Confirmation

[RESERVED]

H4.8 Sampling and Analysis Plan

[RESERVED]

H4.8.1 Constituents to be Analyzed

[RESERVED]

H4.8.2 Revisions to the Sampling and Analysis Plan and the Constituents to be Analyzed

[RESERVED]

H5 Contingent Closure Plan

[RESERVED]

H6 Schedule for Closure

A closure schedule for the 216-A-29 Ditch will be provided in the 200-EA-1 OU remedial action work plan, following the Record of Decision and Hanford Facility RCRA Permit modification. The 200-IS-1 OU's remedial action work plan will include a closure schedule for the conveyances discussed in Section H1.1.2.

H7 Closure Costs

Closure cost estimates for Hanford Facility dangerous waste management units are not required per Hanford Facility RCRA Permit Condition II.H.

H8 Certification of Closure

DOE will submit to Ecology a certification of closure and subsequent permit modification documentation in accordance with WAC 173-303-610(6). An Independent Qualified Registered Professional Engineer will certify that the unit has been closed in accordance with the approved closure plan. The engineer will be responsible for documenting closure activities associated with closure of the 216-A-29 Ditch. The certification will be submitted by registered mail or an equivalent delivery service.

H9 References

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WAC 173-303, "Dangerous Waste Regulations," *Washington Administrative Code*, Olympia, Washington. Available at: http://apps.leg.wa.gov/WAC/default.aspx?cite=173-303.

173-303-610, "Closure and post-closure."

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ATTACHMENT 2

CHPRC-2003515
CONTRACT NUMBER DE-AC06-08RL14788

**216-B-3 MAIN POND WASTE MANAGEMENT UNIT,
CLOSURE UNIT GROUP 22 (CUG-22), ADDENDUM H, CLOSURE PLAN
REG-0992, Revision 0**

D. A. St. John

Consisting of 25 pages,
including this cover page

Certification
For
Supporting permit application material for "216-B-3 Main Pond Waste Management Unit, Closure Unit Group 22 (CUG-22), Addendum H, Closure Plan"

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

L. Ty Blackford — 9/29/2020

L. Ty Blackford, President and CEO
Co-Operator
CHPRC
Richland, Washington

Signature

Date

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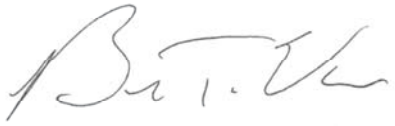

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Date: 2020.11.12 11:16:47 -08'00'

Brian T. Vance, Manager Owner/Operator U.S. Department of Energy Richland Operations Office	Signature	Date

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Addendum H

Closure Plan

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Contents

Figures

Table

Terms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DOE	U.S. Department of Energy
DWMU	Dangerous waste management unit
Ecology	Washington State Department of Ecology
HDPE	high-density polyethylene
OU	operable unit
PUREX	Plutonium Uranium Extraction
RCRA	*Resource Conservation and Recovery Act of 1976*
TOC	total organic carbon
TOX	total organic halogen

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H1 Introduction

This addendum discusses closure activities for the 216-B-3 Main Pond and 216-B-3-3 Ditch dangerous waste management unit (DWMU). Effluent streams from B-Plant and the Plutonium Uranium Extraction (PUREX) Plant were the primary effluent streams discharged to the 216-B-3 Main Pond. Addendum A (Part A Form) identifies the 216-B-3 Main Pond as an unlined, manmade surface impoundment. The 216-B-3-3 Ditch, an unlined manmade ditch, terminated at the 216-B-3 Main Pond. The 216-B-3 Main Pond and 216-B-3-3 Ditch have been interim stabilized, are managed as an inactive underground waste management unit, and are located in the eastern portion of the Outer Area (Figure H1). This closure plan addresses the requirements of WAC 173-303-610(2) through (6), "Dangerous Waste Regulations," "Closure and post-closure," as applicable to the physical components of the 216-B-3 Main Pond and 216-B-3-3 Ditch.

The 216-B-3 Main Pond and 216-B-3-3 Ditch (process code D83) were uncovered, unlined, and followed natural drainage channels. The 216-B-3-3 Ditch conveyed liquid effluent from multiple sources, including the PUREX Plant and B Plant, to the 216-B-3 Main Pond. The 216-B-3 Main Pond disposed liquid waste to the soil column, including constituents now regulated under WAC 173-303. Liquid waste also seeped from the 216-B-3-3 Ditch into the soil during the conveyance process. The 216-B-3 Main Pond discharges and 216-B-3-3 Ditch seepage commingled in the soil column with waste or constituents from one or more solid waste management units or areas of concern. The underlying soil is contaminated with a mixture of constituents subject to the dangerous waste requirements of WAC 173-303 and the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). The underlying groundwater is contaminated with a mixture of contaminants subject to CERCLA.

Dangerous waste closure processes will be coordinated through the integrated *Resource Conservation and Recovery Act of 1976* (RCRA)-CERCLA past-practice process for consistency in the remedy selection process, as described in Section 5.0 of Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order Action Plan* (hereinafter referred to as the Tri-Party Agreement Action Plan). The closure decision for the 216-B-3 Main Pond physical components (Section H1.1) will be made together with the remedial action decisions for the 200-CW-1 Operable Unit (OU).[1] The closure decision for the 216-B-3-3 Ditch physical components and conveyance systems (Section H1.1) will be made together with the remedial action decisions for the 200-OA-1 and 200-IS-1 OUs. Future revisions of the closure plan will identify which conveyances will be closed via CERCLA decisions. Consistent with Section 5.5 of the Tri-Party Agreement Action Plan, groundwater contamination, if detected, beneath the 216-B-3 Main Pond and 216-B-3-3 Ditch will be addressed through the remedial action decision process for the 200-PO-1 and 200-BP-5 OUs (Figures H2 and H3).

The U.S. Department of Energy (DOE) re-evaluated the data used in the preparation of this closure plan to determine whether newer data were available and appropriate to use, and incorporated the latest relevant data and information, wherever available, applicable, and referenceable.

[1] Changes in waste site operable unit assignment may require a revised closure plan and associated Class 1 permit modification.

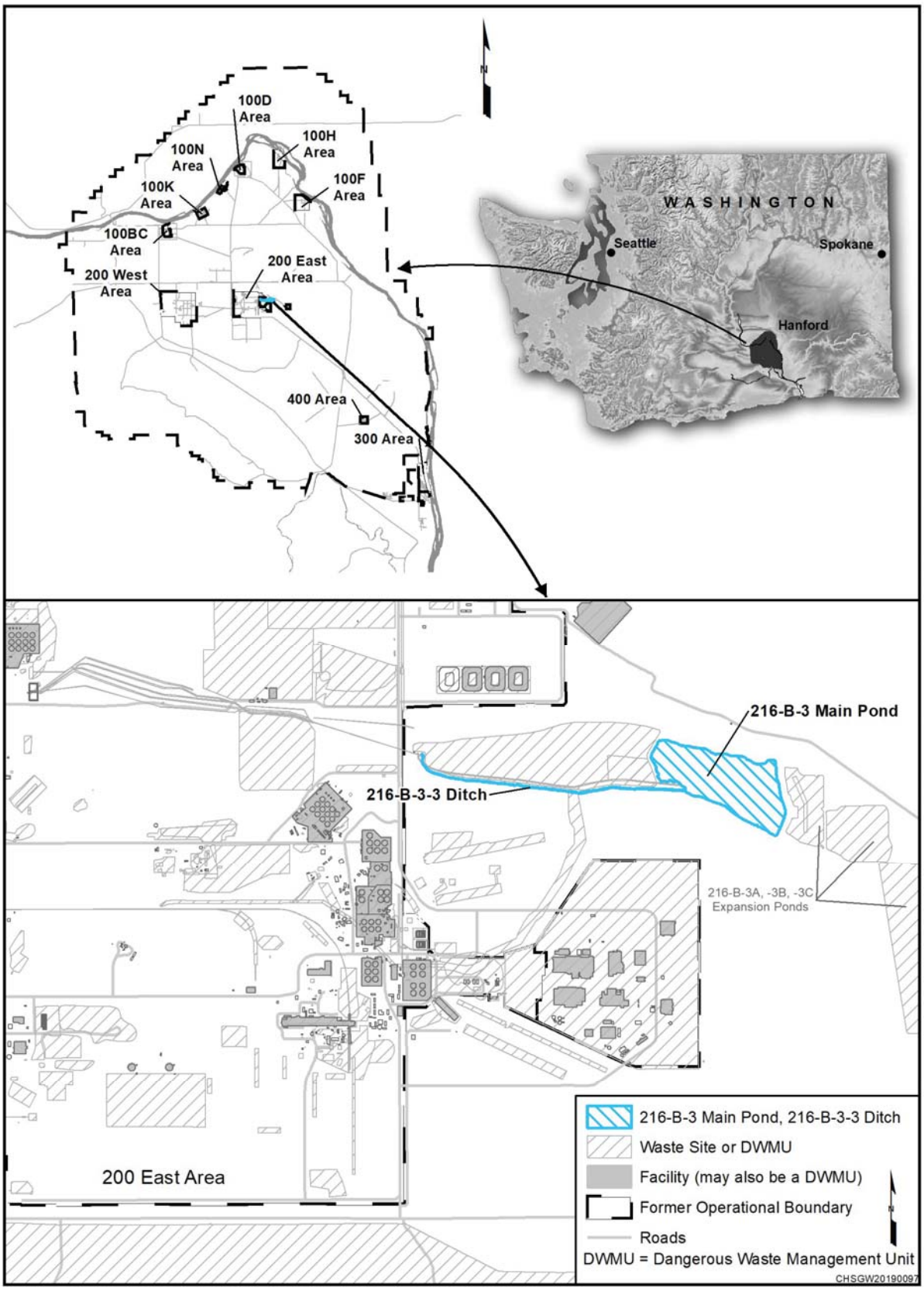

Figure H1. Site Location Map

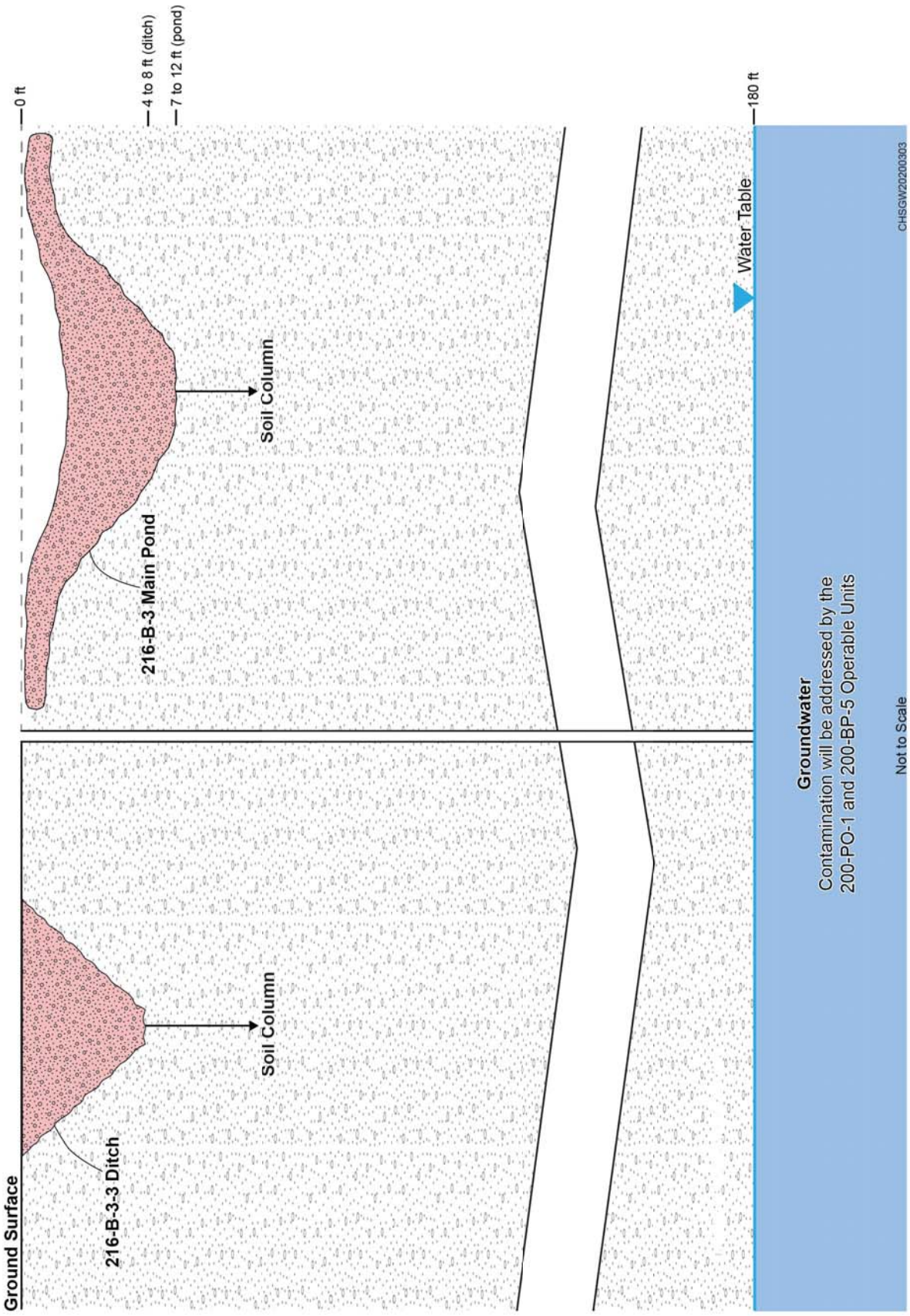

Figure H2. Scope of the 216-B-3 Main Pond and 216-B-3-3 Ditch Closure Plan and OU Elements (Profile View)

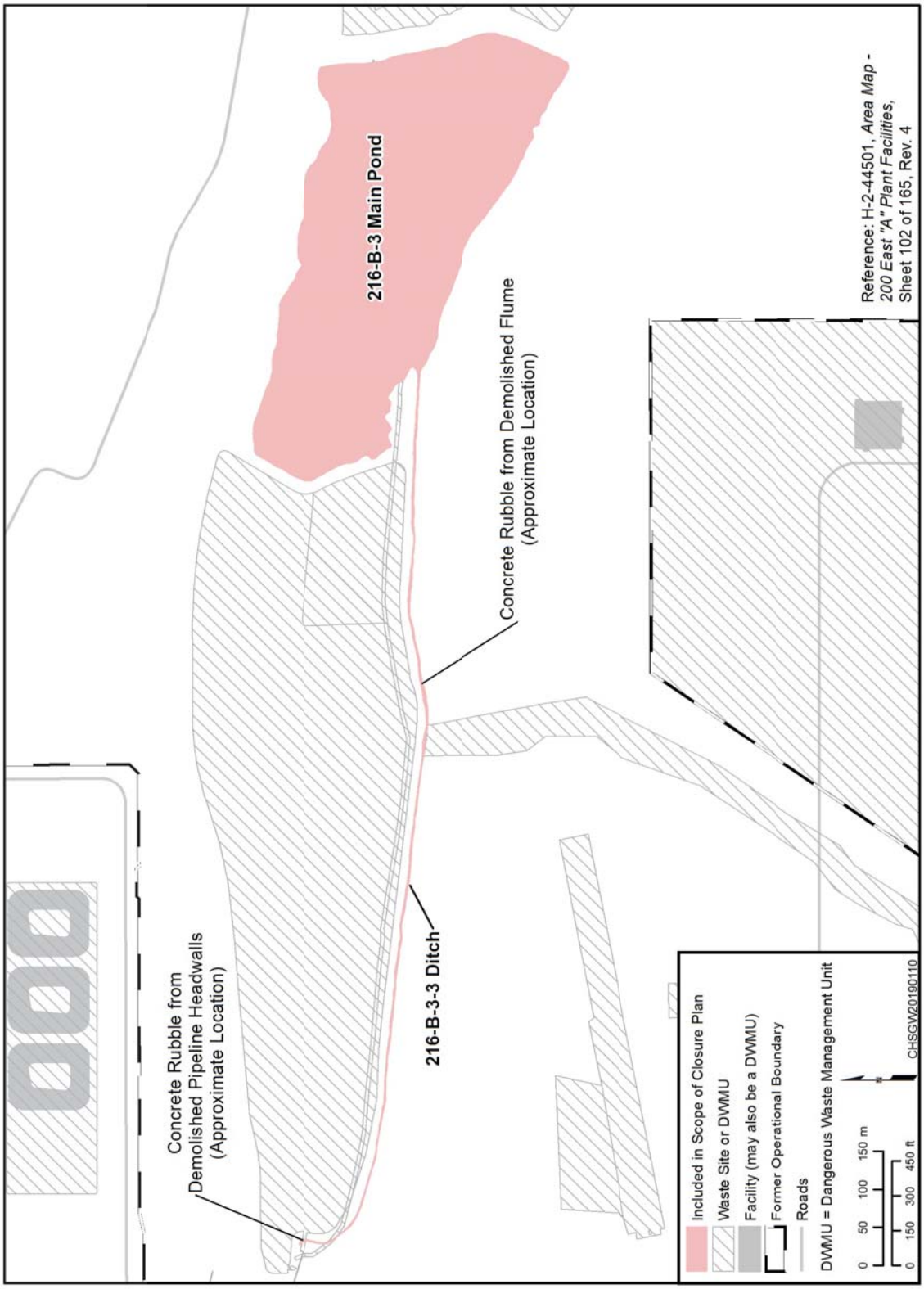

Figure H3. Scope of the 216-B-3 Main Pond and 216-B-3-3 Ditch Closure Plan (Plan View)

H1.1 Physical Description

H1.1.1 216-B-3 Main Pond and 216-B-3-3 Ditch

The 216-B-3 Main Pond is 14 ha (35 ac) with a maximum depth of 3.9 m (13 ft). The 216-B-3-3 Ditch is 1,128 m (3,700 ft) long, 1.2 to 2.4 m (4 to 8 ft) deep, 6 m (20 ft) wide at ground surface, and 2 m (6 ft) wide at the bottom. The 216-B-3-3 Ditch includes concrete rubble from both the demolished flume and the demolished pipeline headwalls. As part of decommissioning and interim stabilization, the 216-B-3 Main Pond was partially backfilled, and the 216-B-3-3 Ditch was backfilled to grade in 1994.

H1.1.2 Discharge Conveyance History

The effluent sources and conveyances to the 216-B-3 Main Pond varied over its 50-year operational history. Primary effluent streams included B-Plant chemical sewer and cooling water, and PUREX chemical sewer and cooling water, albeit, for shorter periods.

H1.1.2.1. B-Plant Effluent and Conveyance System

The B-Plant effluent included the chemical sewer and B-Plant cooling water (Figure H4). These effluent streams and conveyance systems varied over time. The dates of operation of primary discharge conveyances to the 216-B-3 Main Pond described in this closure plan were as follows:

B-Plant cooling water – B-Plant cooling water was conveyed to the 216-B-3 Main pond via the 200-E-112-PL pipeline to the 207-B Retention Basin where testing for pH and radiological contamination was performed. From mid-1987 to May 1994 cooling water was routed from the 207-B Retention Basin to the 216-B-3 Main Pond via the 200-E-205-PL and the 200-E-126-PL. The 200-E-112-PL is an inactive underground radioactive direct buried process sewer constructed with 61 cm (24 in.) vitrified clay pipe. The 200-E-205-PL is an inactive underground pipeline configured to drain to the 216-B-3-3 Ditch via 200-E-126-PL-B pipeline. The 200-E-205-PL includes two sections - a 38 cm (15 in.) direct buried vitrified clay pipe segment connecting to the B-Plant chemical sewer line (200-E-188-PL); and a 40.5 cm (16 in.) direct buried carbon steel segment connecting to the 207-B Retention Basin valve pit. The 200-E-126-PL-B is an inactive direct-buried 56 cm (22 in.) high-density polyethylene (HDPE) segment connecting to an inactive direct-buried 53 cm (21 in.) vitrified clay pipe. Prior to 1987 cooling water was conveyed to the 216-B-3 Main Pond via the 216-B-2 and 216-B-3 series ditches which were sequentially closed and replaced due to radiological contamination.

B-Plant chemical sewer - Prior to 1970, B-Plant chemical sewer was conveyed to the 216-B-3 Main Pond via the 200-E-188-PL, the 207-B valve pit, the 200-E-204-PL pipeline and 216-B-2 and 216-B-3 series of ditches. The 200-E-204-PL pipeline, the 216-B-2 and 216-B-3 series ditches were decommissioned and rerouted due to radiological contamination. From March 1970 to February 1992, the B-Plant chemical sewer effluent was diverted to the 216-B-63 Trench. The operation of the 216-B-63 Trench and the associated conveyance (e.g. 200-E-188-PL, 200-E-191-PL) is more fully-described in the *216-B-63 Trench Closure Plan.*

The combined B-Plant cooling water and chemical sewer effluent streams were conveyed to 216-B-3 Main Pond via the 207-B retention basin, the 200-E-205-PL, and the 200-E-126-PL and the 216-B-3-3 Ditch beginning February 1992 through May 1994. To facilitate conveyance of the combined effluent streams, a segment of 200-E-188-PL from B-Plant was replaced and tied into the 200-E-112-PL (e.g. 200-E-334-PL) to facilitate the combined discharge (Figure H4). The 200-E-334-PL is a component of the Treated Effluent Disposal Facility, an active, direct-buried 20 cm (8 in.) HDPE pipeline.

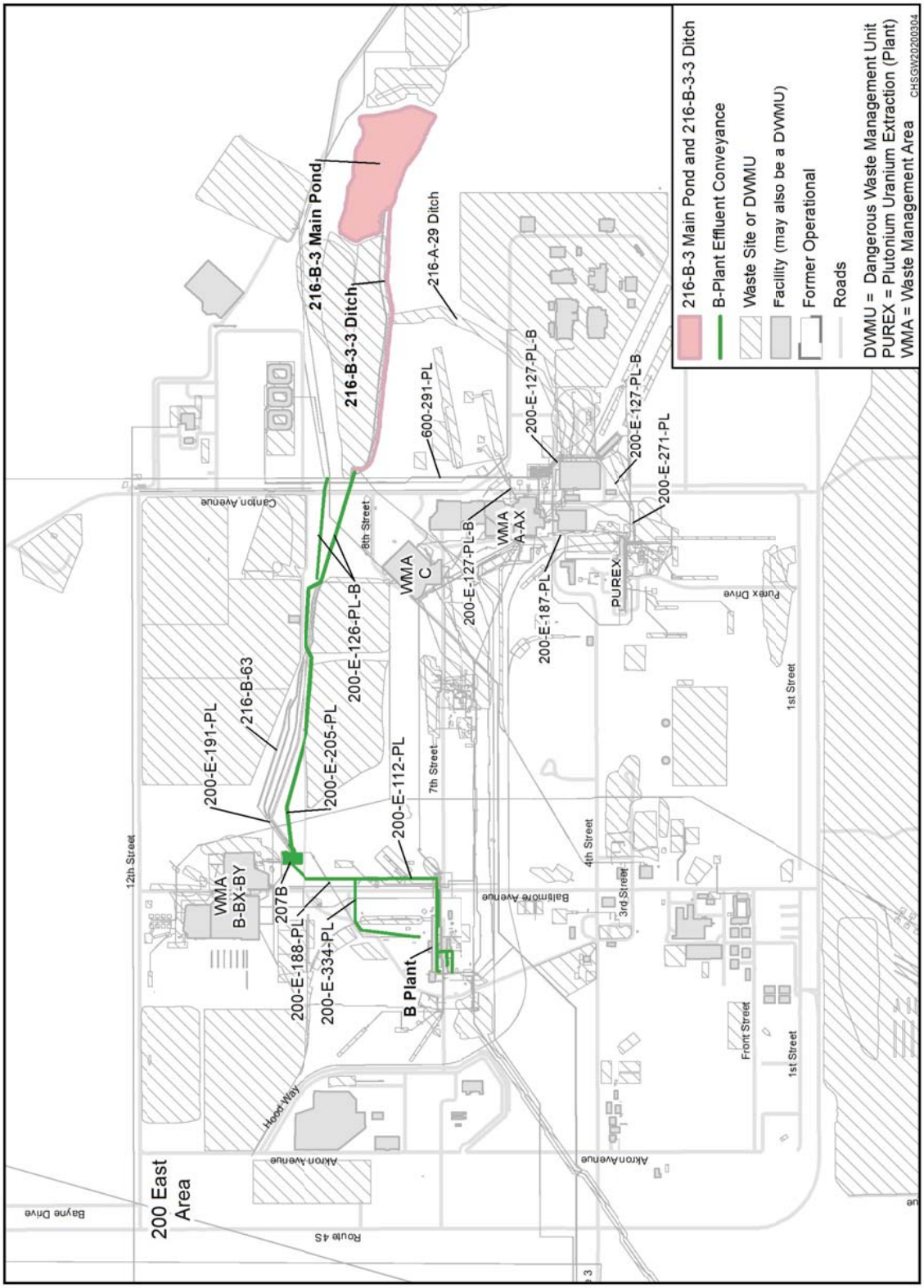

Figure H4. B-Plant Effluent Conveyances

H1.1.2.2 PUREX Effluent and Conveyances

PUREX Plant effluent included the chemical sewer and PUREX Plant cooling water. These effluent streams, conveyance systems and their disposition varied over time (Figure H5). The dates of operation of the primary PUREX effluent conveyances to the 216-B-3 Main Pond described in this closure plan were as follows:

PUREX cooling water – PUREX cooling water was conveyed to the 216-B-3 Main Pond via the 200-E-271-PL and the 200-E-127-PL and the 216-B-3-3 Ditch from January 1987 to May 1994. In 1977, the 216-A-42 Retention Basin was constructed to retain PUREX effluents exceeding pH and/or radiological release limits. The retained effluent was analyzed and either pumped back to the PUREX facility for reprocessing or to cribs for disposal. Occasional batch discharges from the 216-A-42 Retention Basin to the 216-B-3 Main Pond occurred in 1990, 1992 and 1993. The 216-A-42 Retention Basin consists of a rubber-lined trench divided into three holding basins with a combined holding capacity of 6 million L (1.6 million gal). The retention basin was deactivated and stabilized in 1997.

Prior to 1987 PUREX cooling water was discharged to two end points - the 216-A-29 Ditch (1955 through1957) and the 216-A-25 Pond (1957 through 1987). The operation of the 216-A-29 Ditch, its primary conveyance (e.g. 200-E-187-PL), and associated control structures are more fully-described in the 216-A-29 Ditch Closure Plan.

PUREX chemical sewer – Beginning February 1992 through May 1994 the combined PUREX Plant chemical sewer and cooling water effluent streams were conveyed to 216-B-3 Main Pond via the 200-E-127-PL and associated control structures (e.g. unnamed diversion box) connecting 200-E-187-PL to 200-E-127-PL.

H1.2 Process Information

The effluent stream contributors to the 216-B-3 Main Pond included steam condensate and chemical sewer wastewater from PUREX and B Plant, and cooling water from the PUREX and B Plant,. Sources of cooling water discharge that ended prior to August 1987 included 242-B Evaporator, 244-CR Vault, 244-BXR Vault, and 241-BY Tank Farm. Sources of cooling water discharge that continued to 1994 included 241-A431 Tank Farm Ventilation House, 284-E Powerhouse, 244-AR Vault, and 242-A Evaporator. The steam condensate consisted of condensed steam and raw water used to control process vessel temperature. The chemical sewer wastewater consisted of aqueous makeup unit wastes, liquids from the pipe and operating gallery floor drains, liquids from the chemical storage area floor drains, acid fractionator steam condensate, vacuum pump seal cooling water, and demineralizer regeneration wastes. Physical and operational changes were made in 1985 to eliminate the discharge of dangerous waste to the B-Plant chemical sewer (PNL-6862 and SGW-60594). The cooling water consisted of raw water used for cooling in-process equipment and general utility purposes (DOE/RL-89-28, *216-B-3 Pond System Closure/Postclosure Plan*, Rev. 0). The subject portions of the B Plant and PUREX chemical sewer conveyances are described in Section H1.1.2.

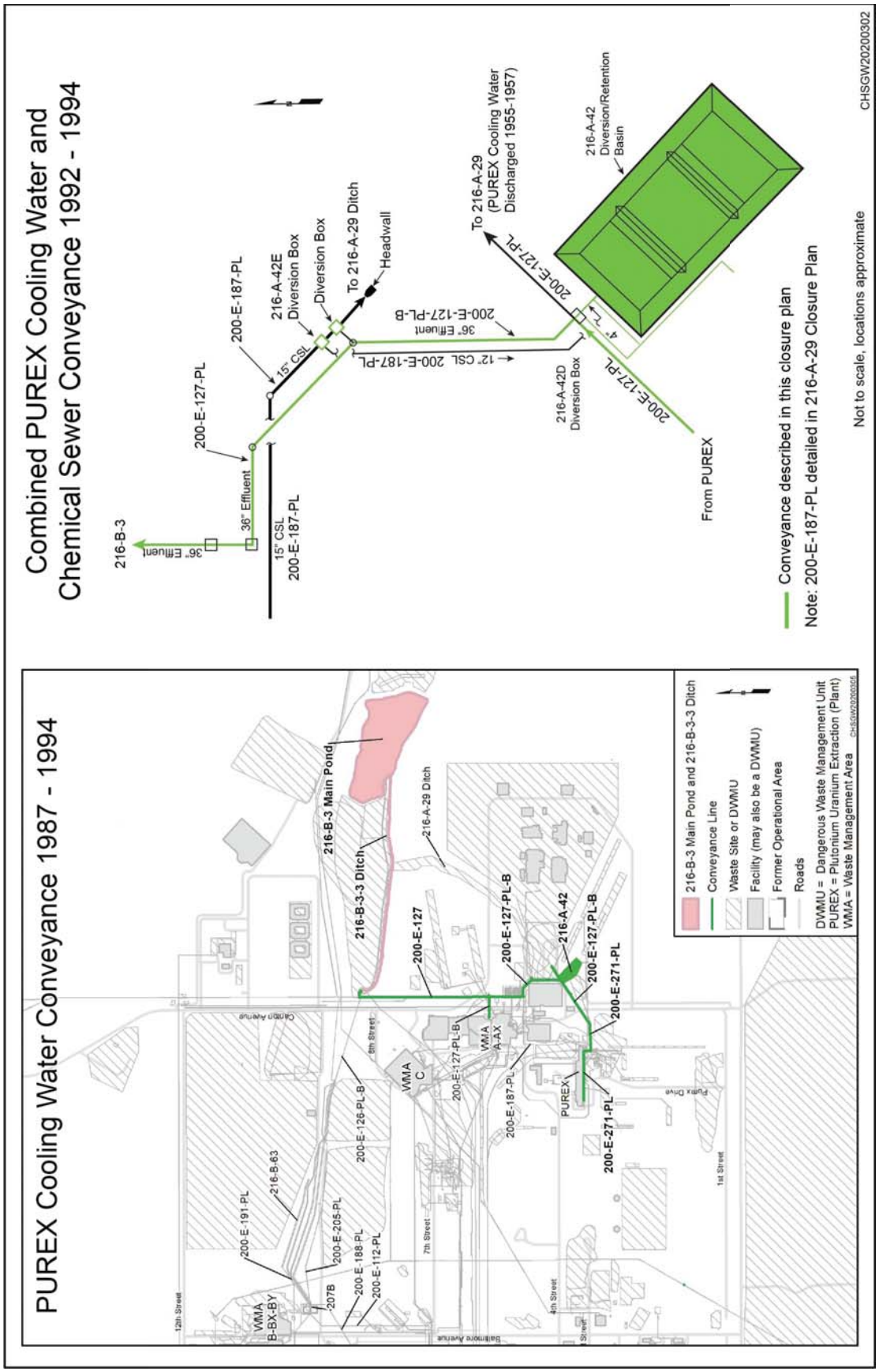

Figure H5. PUREX Effluent Conveyances

H1.3 Waste Inventory and Characteristics

The 216-B-3 Main Pond operated from 1945 until 1994, and the 216-B-3-3 Ditch operated from 1970 until 1994. According to Addendum A (Part A Form), the 216-B-3 Main Pond had a process design capacity of 3,180,000 L/day (840,000 gal/day) and a peak operational discharge of 83,280,000 L/day (22,000,000 gal/day).[2] Table H1 identifies the constituents and estimated annual quantities of waste for the 216-B-3 Main Pond.

Table H1. Estimated Annual Quantity of Constituents for the 216-B-3 Main Pond

Waste Constituent (Dangerous Waste Number)	Estimated Annual Quantity of Waste (lb)
Corrosive Acids and Caustics (D002) (measured as pH)[a]	3,500,000[b]
Cadmium (D006)	169,000
Cadmium (WT01)	19,000
Corrosive Acids and Caustics (WT02) (measured as pH)	77,000

Source: Addendum A (Part A Form, Rev. 8).

a. D002 waste code resulted from the plant demineralizer effluent from B Plant and PUREX (H1.2).

b. Estimated annual quantity based on average daily discharge including water.

H2 Groundwater Monitoring

RCRA indicator evaluation groundwater monitoring was initiated in 1988 for the 216-B-3 Main Pond and the portion of the 216-B-3-3 Ditch downstream from the 216-A-29 Ditch juncture. In 1990, monitoring at the 216-B-3 Main Pond and the 216-B-3-3 Ditch changed to a groundwater quality assessment monitoring program based on elevated levels of total organic halogen (TOX) in one downgradient well. In 1997, elevated TOX and total organic carbon (TOC) levels were identified in a second downgradient well. Because no dangerous waste or dangerous waste constituents associated with the 216-B-3 Main Pond or 216-B-3-3 Ditch could be correlated to the elevated TOC and TOX levels, the pond and ditch returned to indicator parameter monitoring in 1998 (PNNL-11903, *Groundwater Monitoring Plan for the Hanford Site 216-B-3 Pond RCRA Facility)*. In 2017, three upgradient wells and three downgradient wells were monitored for the 216-B-3 Main Pond, based on a groundwater flow direction to the southwest (DOE/RL-2017-65*, Hanford Site RCRA Groundwater Monitoring Report for 2017*). The network groundwater monitoring wells were monitored for RCRA indicator parameters (pH, specific conductance, TOC, and TOX), groundwater quality constituents (chloride, iron, manganese, phenols, sodium, and sulfate), select dangerous waste constituents and site-specific constituents (arsenic, cadmium, and nitrate), supporting constituents (e.g., anions and metals), and field parameters (e.g., pH, specific conductance, temperature). Dangerous waste constituents associated with the 216-B-3 Main Pond and 216-B-3-3 Ditch are not considered to have contaminated groundwater (DOE/RL-2008-59, *Interim Status Groundwater Monitoring Plan for the 216-B-3 Pond*, Rev. 2).

[2] The process capacity for the 216-B-3-3 Ditch is included in the 216-B-3 Main Pond design capacity.

H3 Closure Performance Standards

Closure of the 216-B-3 Main Pond and 216-B-3-3 Ditch will meet WAC 173-303-610(2)(a) closure performance standards. The 216-B-3 Main Pond and 216-B-3-3 Ditch are situated among other solid waste management units where releases to the soil column have occurred, and the releases have commingled. Therefore, the permittee may request alternative requirements protective of human health and the environment in accordance with WAC 173-303-610(1)(e). If requesting the use of alternative requirements for closure of the 216-B-3 Main Pond and 216-B-3-3 Ditch, DOE will submit a Coordinated Closure Proposal as a permit modification request pursuant to WAC 173-303-830(4). The Coordinated Closure Proposal shall be submitted to Washington State Department of Ecology (Ecology) at the same time as the Proposed Corrective Action Decision/Proposed Plan for the 200-OA-1 OU is submitted to Ecology. Numerical closure performance standards for constituents listed in Table H1 shall be included in a revised closure plan prior to initiating closure activities.

H4 Closure Activities

The following interim stabilization activities were performed for the 216-B-3 Main Pond and 216-B-3-3 Ditch in 1994 (BHI-00219, *216-B-3 Pond Interim Stabilization Final Report*):

- The 216-B-3 Main Pond was drained and partially backfilled.
- Pipelines between the 216-B-3 Main Pond and the 216-B-3A Expansion Pond were capped.
- Pipelines leading into the 216-B-3-3 Ditch were isolated.
- The two 216-B-3-3 Ditch headwalls were demolished with all concrete rubble left in place.
- The flow rate recorder (located in the 216-B-3-3 Ditch downstream from the 216-A-29 Ditch juncture) was removed, and the flume structure was demolished. All concrete rubble was left in place.
- Spoil piles from ditch construction and maintenance activities (e.g., dredging) were consolidated into the 216-B-3-3 Ditch, and the ditch was brought to grade with clean material.

The following characterization activities were performed to identify the nature and extent of contamination for the 216-B-3 Main Pond and 216-B-3-3 Ditch (Figure H6 shows characterization activity locations):

- Sediment and soil samples were collected from 33 locations in 1989 (WHC-SD-EN-AP-042, *Phase I Characterization of the 216-B-3 Pond System*).
- Ten test pits were excavated and one borehole was drilled in 1999 (BHI-01367, *200-CW-1 Operable Unit Borehole/Test Pit Summary Report*).

Sediment, test pit samples, and borehole samples were analyzed for multiple constituents, including anions, pH, and metals (e.g., cadmium). Cadmium concentrations ranged from <0.03 µg/g to 22.6 µg/g (DOE/RL-2000-35, *200-CW-1 Operable Unit Remedial Investigation Report*). No pH values were reported ≤2.0 or ≥12.5. Additional characterization will occur at the 216-B-3 Main Pond and 216-B-3-3 Ditch in coordination with other 200 Area activities.

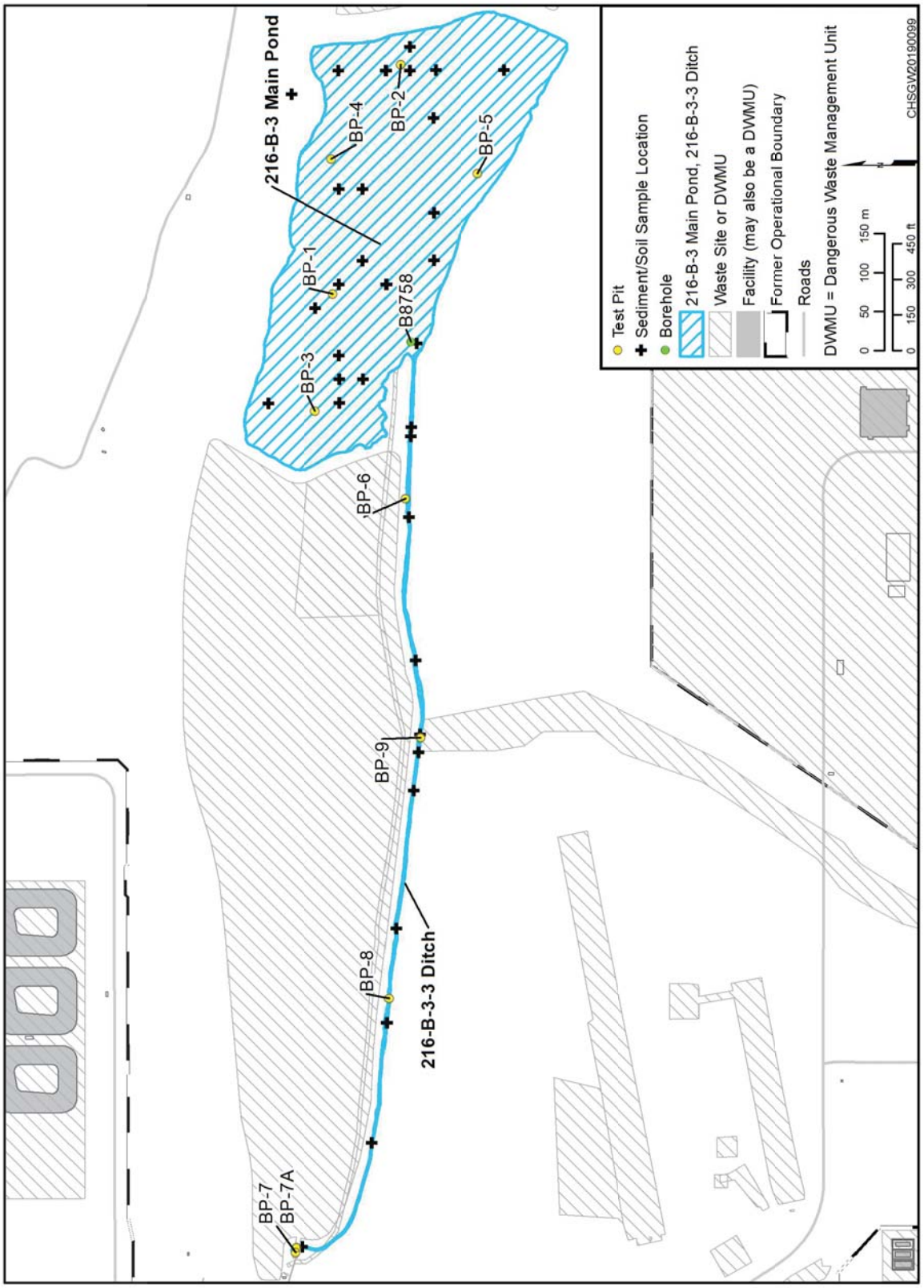

Figure H6. Location of Characterization Samples, Test Pits, and Boreholes Relevant to the 216-B-3 Main Pond and 216-B-3-3 Ditch

In accordance with Section 5.5 of the Tri-Party Agreement Action Plan (Ecology et al., 1989), alternatives development and evaluation are being integrated with the 200-CW-1 OU and 200-OA-1 OU processes. DOE/RL-99-07, *200-CW-1 Operable Unit RI/FS Work Plan and 216-B-3 RCRA TSD Unit Sampling Plan*, describes the following likely response actions and closure options for the 216-B-3 Main Pond and 216-B-3-3 Ditch:

- No action
- Institutional controls
- Engineered surface barriers with or without vertical barriers
- Excavation and disposal with or without ex situ treatment

H4.1 Security, Inspection, and Training Information

[RESERVED]

H4.2 Removal of Wastes and Waste Residues

[RESERVED]

H4.3 Removal of Unit, Parts, Equipment, Piping, the Containment Structure, and other Ancillary Equipment

[RESERVED]

H4.4 Unit Inspection Prior to Decontamination

[RESERVED]

H4.5 Decontamination

[RESERVED]

H4.6 Identifying and Managing Contaminated Environmental Media

[RESERVED]

H4.7 Closure Confirmation

[RESERVED]

H4.8 Sampling and Analysis Plan

[RESERVED]

H4.8.1 Constituents to be Analyzed

[RESERVED]

H4.8.2 Revisions to the Sampling and Analysis Plan and the Constituents to be Analyzed

[RESERVED]

H5 Contingent Closure Plan

[RESERVED]

H6 Schedule for Closure

A closure schedule for the 216-B-3 Main Pond will be provided in the 200-CW-1 OU remedial action work plan, and a closure schedule for the 216-B-3-3 Ditch will be provided in the 200-OA-1 OU remedial action work plan, following the respective Records of Decision and the Hanford Facility RCRA Permit modification.

H7 Closure Costs

Closure cost estimates for Hanford Facility dangerous waste management units are not required per Hanford Facility RCRA Permit Condition II.H.

H8 Certification of Closure

DOE will submit to Ecology a certification of closure and subsequent permit modification documentation in accordance with WAC 173-303-610(6). An Independent Qualified Registered Professional Engineer will certify that the unit has been closed in accordance with the approved closure plan. The engineer will be responsible for documenting closure activities associated with closure of the 216-B-3 Main Pond and 216-B-3-3 Ditch. The certification will be submitted by registered mail or an equivalent delivery service.

H9 References

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ATTACHMENT 3

CHPRC-2003515
CONTRACT NUMBER DE-AC06-08RL14788

216-S-10 POND & DITCH WASTE MANAGEMENT UNIT,
CLOSURE UNIT GROUP 14 (CUG-14), ADDENDUM H, "CLOSURE PLAN"
REG-1163, Revision 0
D. A. St. John

Consisting of 21 pages,
including this cover page

Certification
For
Supporting permit application material for "216-S-10 Pond & Ditch Waste Management Unit, Closure Unit Group 14 (CUG-14), Addendum H, Closure Plan"

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

L. Ty Blackford — L. Ty Blackford, President and CEO
Co-Operator
CHPRC
Richland, Washington

Signature

9/29/2020
Date

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Certification
for
Supporting Permit Application Material for Part V – Closure Units, 216-S-10 Pond & Ditch Waste Management Unit, Closure Unit Group 14 (CUG-14), Addendum H, "Closure Plan"

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Digitally signed by Brian T. Vance
DN: cn=Brian T. Vance, o=Office of River Protection, ou=Department of Energy, email=brian.t.vance@orp.doe.gov, c=US
Date: 2020.11.12 11:17:35 -08'00'

Brian T. Vance, Manager Owner/Operator U.S. Department of Energy Richland Operations Office	Signature	Date

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Addendum H

Closure Plan

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Contents

Figures

Table

Terms

bgs	below ground surface
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DOE	US Department of Energy
DWMU	dangerous waste management unit
Ecology	Washington State Department of Ecology
OU	operable unit
REDOX	Reduction-Oxidation
RCRA	*Resource Conservation and Recovery Act of 1976*

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H1 Introduction

This addendum discusses closure activities for the 216-S-10 Pond and Ditch dangerous waste management unit (DWMU). This addendum also identifies the 200-W-157-PL pipeline as the conveyance system associated with the discharge to the 216-S-10 Pond and Ditch. Addendum A (Part A Form) identifies the 216-S-10 Pond and Ditch as a surface impoundment. The 216-S-10 Pond and Ditch are located outside the southern boundary of the 200 West Area (Figure H1). This closure plan addresses the requirements of WAC 173-303-610(2) through (6), "Dangerous Waste Regulations," "Closure and post-closure," as applicable to the physical components of the 216-S-10 Pond and Ditch.

The 216-S-10 Pond and Ditch (process code D83) were uncovered, unlined, and percolated liquid effluent from the Reduction-Oxidation (REDOX) Plant and other facilities to the soil column. The 216-S-10 Pond and Ditch discharges included constituents now regulated under WAC 173-303 and commingled in the soil column with waste constituents from one or more solid waste management units or areas of concern. The underlying soil is contaminated with a mixture of constituents subject to the dangerous waste requirements of WAC 173-303 and the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA).

Dangerous waste closure processes will be coordinated through the integrated *Resource Conservation and Recovery Act of 1976* (RCRA)-CERCLA past-practice process for consistency in the remedy selection process, as described in Section 5.0 of Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order Action Plan* (hereinafter called the Tri-Party Agreement Action Plan). The closure decision for the 216-S-10 Pond and Ditch physical components and the conveyance (Section H1.1) will be made together with the remedial action decisions for the 200-OA-1 and 200-IS-1 Operable Units[1] (OU). Future revisions to the closure plan will identify which conveyances will be closed via CERCLA decisions. Consistent with Section 5.5 of the Tri-Party Agreement Action Plan, groundwater contamination beneath the 216-S-10 Pond and Ditch will be addressed through the remedial action decision process for the 200-UP-1 OU (Figure H2).

The US Department of Energy (DOE) reevaluated the data used in the preparation of this closure plan to determine whether newer data were available and appropriate to use and incorporated the latest relevant data and information, wherever available, applicable, and referenceable.

H1.1 Physical Description

H1.1.1 216-S-10 Pond and Ditch

The 216-S-10 Pond planned area was 20,234 m^2 (5 ac), but only a portion of this planned area was actually used to percolate liquids. The used (i.e., operational) area covered about 8,000 m^2 (2 ac) It and was shaped like a backward "E" with an extra leg, where each leg was a separate leaching trench up to 2.4 m (8 ft) deep. The 216-S-10 Ditch is 686 m (2,250 ft) long, 1.8 m (6 ft) deep, and 1.2 m (4 ft) wide at the base. Physical components added to the 216-S-10 Pond and Ditch include rip rap and a wooden sampling platform near the head end of the ditch (Figures H2 and H3). The 216-S-10 Pond and southern third of the 216-S-10 Ditch were backfilled and interim stabilized in 1984, and the ditch was permanently isolated in 1994.

[1] Changes in waste site operable unit assignment may require a revised closure plan and associated Class 1 permit modification.

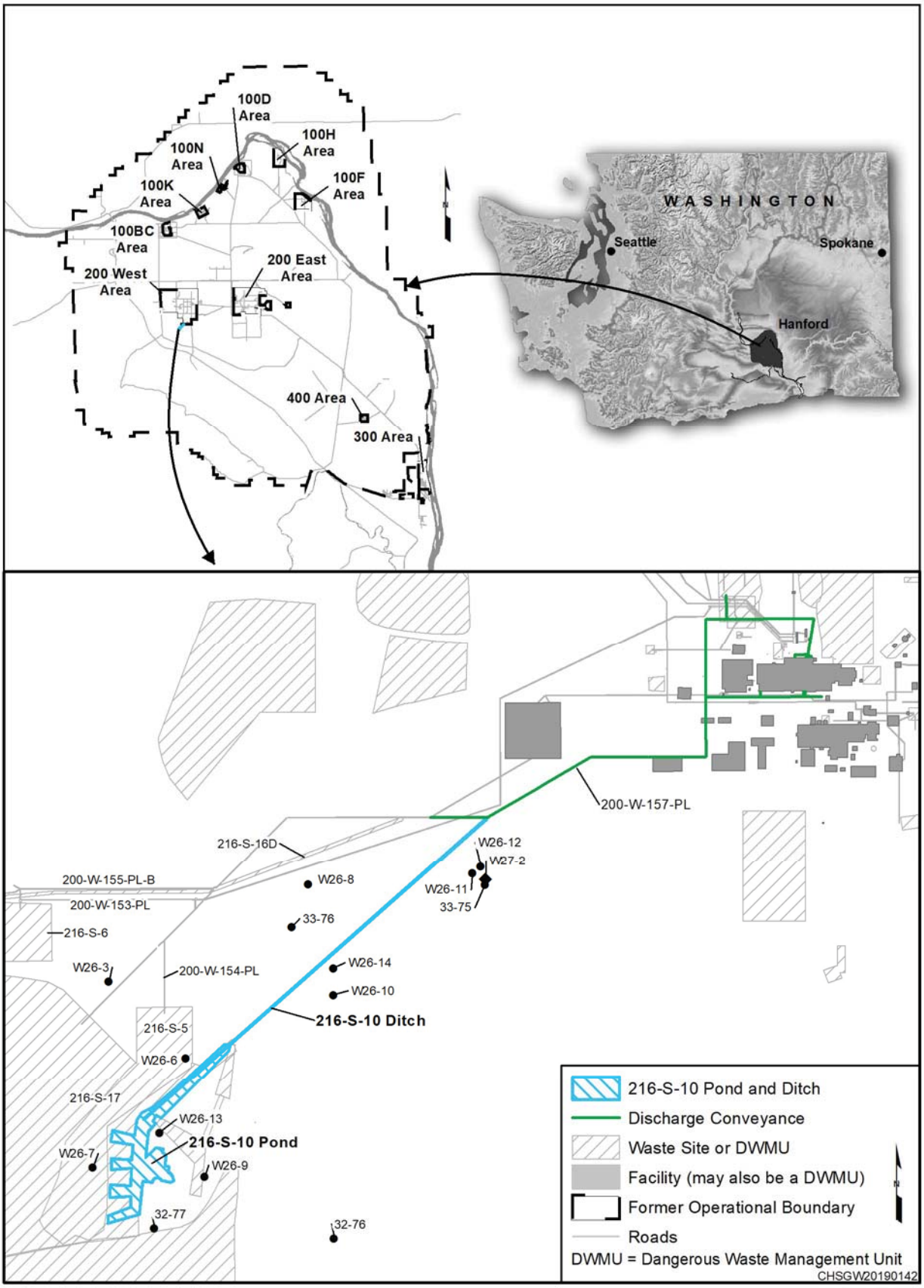

Figure H1. Site Location Map

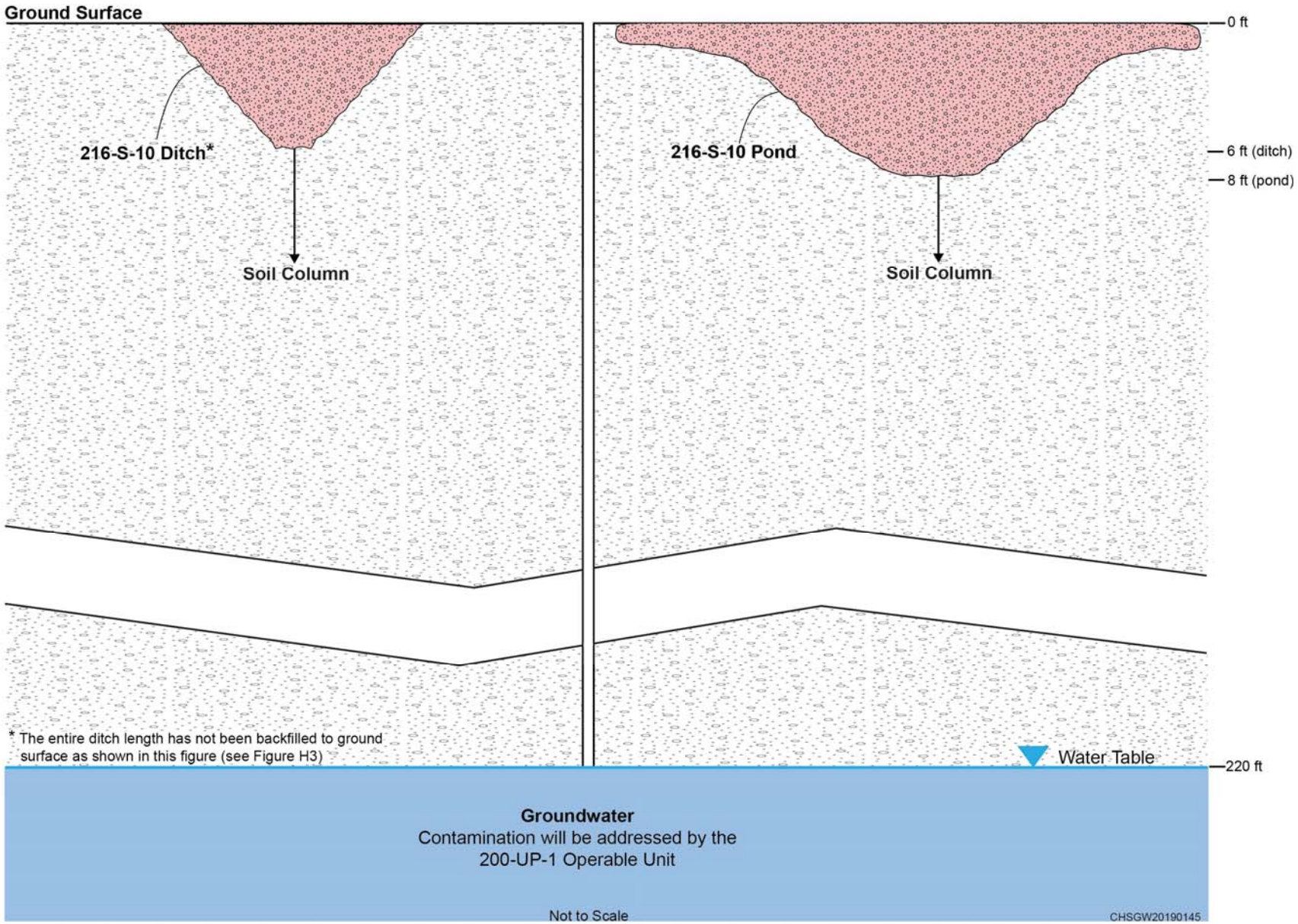

Figure H2. Scope of the 216-S-10 Pond and Ditch Closure Plan and OU Elements

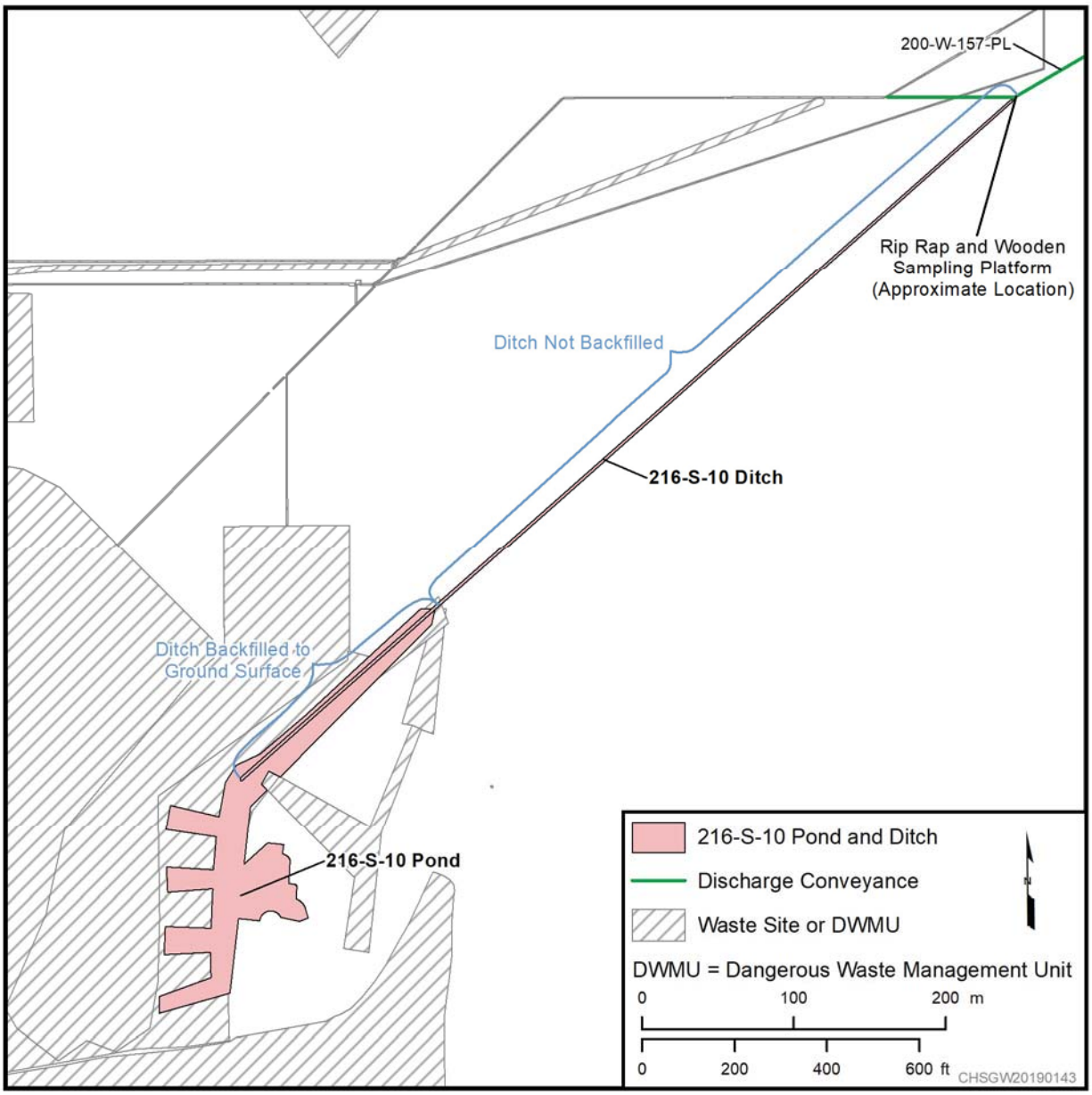

Figure H3. Construction Diagram of the 216-S-10 Pond and Ditch

H1.1.2 Discharge Conveyance

The 200-W-157-PL was the discharge conveyance system to the 216-S-10 Pond and Ditch (Figure H1). The 200-W-157-PL is an inactive underground radioactive process sewer pipeline that transferred effluents from the REDOX Plant buildings to the 216-S-10 Pond and Ditch. The 200-W-157-PL is a gravity flow, direct buried, 555 m (1,820 ft) long vitrified clay pipe that varies in diameter from 10 to 30.5 cm (4 to 12 in.).

H1.2 Process Information

The 216-S-10 Pond and Ditch received the following types of discharges:

- REDOX Plant cooling water and chemical sewer discharges. The cooling water consisted of raw and sanitary water used in air compressor and air conditioning systems. The chemical sewer discharges consisted of liquids from the pipe and operating gallery floor and funnel drains (WHC-EP-0342, *S Plant Wastewater Stream-Specific Report*, Addendum 9; H-2-45900, *Plot Plan 202-S Vicinity*).

- 2901-S Water Storage Tank sanitary water overflow from algal growth and freezing prevention activities for the tank (WHC-EP-0342).

- 205-S Makeup Building and Process Cell, 211-S Cold Chemical Makeup Tank Farm, 222-S Central Analytical Laboratory, and 276-S Cold Solvent Storage and Makeup Building chemical sewer discharges consisting of aqueous liquids used in facility maintenance and laboratory equipment cleaning, liquids from floor, pump, and rail unloading area drains, and steam condensate (WHC-EP-0342).

- Simulated double-shell tank slurry (one 450 kg [1,000 lb] mixed waste discharge in September 1983; Addendum A [Part A Form]). The waste consisted largely of sodium nitrate (46 percent, D001) and sodium hydroxide (41 percent, D002), with small quantities of sodium phosphate, sodium fluoride, sodium chloride, and potassium dichromate (D007) (DOE/RL-2008-61, *Interim Status Groundwater Monitoring Plan for the 216-S-10 Pond and Ditch*). Based on available data, the primary constituents, sodium nitrate and sodium hydroxide, are believed to be the basis for the ignitibility (D001) and the corrosivity (D002) characteristics, respectively.

H1.3 Waste Inventory and Characteristics

The 216-S-10 Pond operated from February 1954 until around 1965, and the 216-S-10 Ditch operated from August 1951 until October 1991. According to Addendum A (Part A Form), the 216-S-10 Pond and Ditch was designed to percolate up to 567,800 L/day (150,000 gal/day) of liquid waste. Table H1 summarizes the estimated annual quantities and associated waste codes.

Table H1. Estimated Annual Quantity of Constituents for the 216-S-10 Pond and Ditch

Waste Constituent (Dangerous Waste Number)	Estimated Annual Quantity of Waste (lb)
Ignitability (D001)[a]	1,000[b]
Corrosive Acids and Caustics (D002) (measured as pH) (D002, WT02)	Included with above
Chromium/Toxicity (D007, WT01)	Included with above

Source: Addendum A (Part A Form).

a. The physical components of the conveyances to the ditch and pond and the soils within the pond do not exhibit the characteristic of ignitability. No closure performance standards are required.

b. Entire quantity resulted from the double-shell tank slurry discharged in 1983 (Section H1.2).

H2 Groundwater Monitoring

RCRA indicator evaluation groundwater monitoring was initiated for the 216-S-10 Pond and Ditch in 1990. In 2018, one upgradient well and five downgradient wells were monitored for the 216-S-10 Pond and Ditch, and groundwater flow was to the east-southeast (DOE/RL-2018-65*, Hanford Site RCRA Groundwater Monitoring Report for 2018*). The network groundwater monitoring wells were sampled for the following (DOE/RL-2008-61, *Interim Status Groundwater Monitoring Plan for the 216-S-10 Pond and Ditch*):

- RCRA groundwater indicator parameters: pH, specific conductance, total organic carbon, and total organic halides
- Groundwater quality parameters: chloride, iron, manganese, phenols, sodium, and sulfate
- Site-specific constituents: carbon tetrachloride, chromium, hexavalent chromium, iron, manganese, nickel, nitrate, and major anions and cations

H3 Closure Performance Standards

Closure of the 216-S-10 Pond and Ditch and discharge conveyance will meet WAC 173-303-610(2)(a) closure performance standards. The 216-S-10 Pond and Ditch is situated among other solid waste management units where releases to the soil column have occurred, and the releases have commingled. Therefore, the permittee may request alternative requirements protective of human health and the environment in accordance with WAC 173-303-610(1)(e). If requesting the use of alternative requirements for closure of the 216-S-10 Pond and Ditch, DOE will submit a Coordinated Closure Proposal as a permit modification request pursuant to WAC 173-303-830(4). The Coordinated Closure Proposal shall be submitted to Washington State Department of Ecology (Ecology) at the same time as the Proposed Corrective Action Decision/Proposed Plan for the 200-OA-1 OU is submitted to Ecology. Numerical closure performance standards for constituents listed in Table H1 shall be included in a revised closure plan prior to initiating closure activities.

H4 Closure Activities

The 216-S-10 Pond and southern third of the 216-S-10 Ditch were backfilled to grade as part of interim stabilization in October 1984 (DOE/RL-88-30, *Hanford Site Waste Management Units Report*). The remaining portion of the ditch was permanently isolated in 1994 (DOE/RL-2004-17, *Remedial Investigation Report for the 200-CS-1 Chemical Sewer Group Operable Unit*).

The following characterization activities were performed to identify the nature and extent of contamination for the 216-S-10 Pond and Ditch (Figure H4 shows characterization activity locations).

- Four test pits in the 216-S-10 Pond (SP-1 through SP-4) and three test pits in the 216-S-10 Ditch (SD-1 through SD-3) were excavated in November 2002 (WMP-17755, *200-CS-1 Operable Unit Field Summary Report for Fiscal Year 2003*).
- Borehole B8817 was drilled in 1999 to a total depth of 73.2 m (240 ft) below ground surface (bgs), with seven soil samples collected from ground surface to 60.7 m (199 ft) bgs (PNNL-13198, *Borehole Data Package for the 216-S-10 Pond and Ditch Well 299-W26-13*).
- Borehole B8828 was drilled in 2003 to a depth of 81.4 m (267 ft) bgs, with nine soil samples collected from ground surface to 67.7 m (222 ft) bgs (WMP-17755).

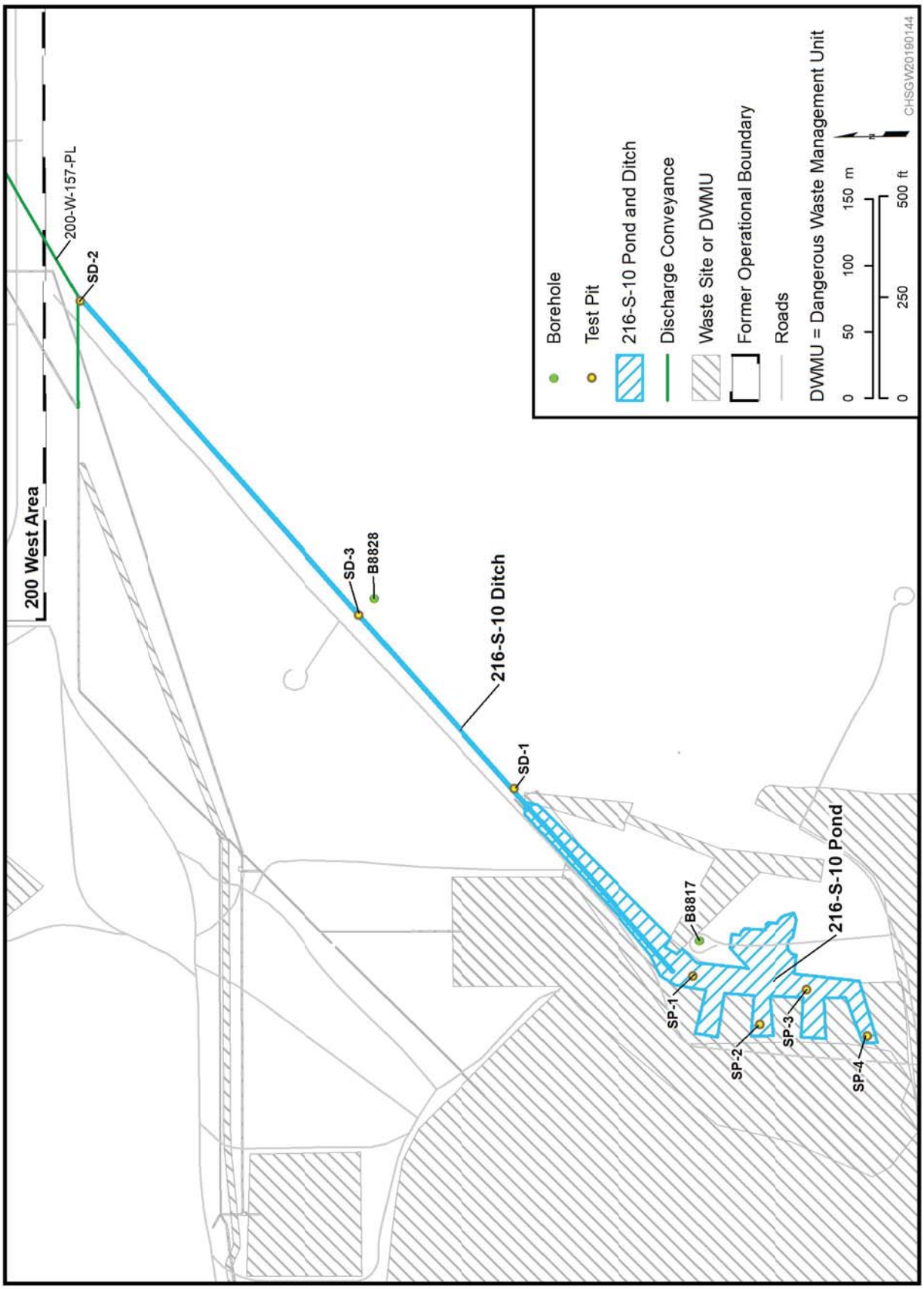

Figure H4. Location of Characterization Test Pits and Boreholes Relevant to the 216-S-10 Pond and Ditch

Borehole and test pit sediment samples were analyzed for multiple constituents, including pH and metals (e.g., chromium). Chromium concentrations ranged from 6.3 to 815 mg/kg. No pH values were reported ≤2.0 or ≥12.5 (DOE/RL-2004-17). Any additional characterization will occur at the 216-S-10 Pond and Ditch in coordination with other 200 Area activities.

In accordance with Section 5.5 of the Tri-Party Agreement Action Plan (Ecology et al., 1989), alternatives development and evaluation for the 216-S-10 Pond and Ditch and the conveyance system will be integrated with the 200-OA-1 OU and 200-IS-1 OU processes. DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit*, describes the following likely response actions and closure options for the 216-S-10 Pond and Ditch:

- No action
- Leave-in place with institutional controls
- Removal, treatment, and disposal
- Engineered barrier

H4.1 Security, Inspection, and Training Information

[RESERVED]

H4.2 Removal of Wastes and Waste Residues

[RESERVED]

H4.3 Removal of Unit, Parts, Equipment, Piping, the Containment Structure, and other Ancillary Equipment

[RESERVED]

H4.4 Unit Inspection Prior to Decontamination

[RESERVED]

H4.5 Decontamination

[RESERVED]

H4.6 Identifying and Managing Contaminated Environmental Media

[RESERVED]

H4.7 Closure Confirmation

[RESERVED]

H4.8 Sampling and Analysis Plan

[RESERVED]

H4.8.1 Constituents to be Analyzed

[RESERVED]

H4.8.2 Revisions to the Sampling and Analysis Plan and the Constituents to be Analyzed

[RESERVED]

H5 Contingent Closure Plan

[RESERVED]

H6 Schedule for Closure

A closure schedule for the 216-S-10 Pond and Ditch will be provided in the 200-OA-1 OU remedial action work plan, following the Record of Decision and Hanford Facility RCRA Permit modification. This remedial action work plan and the 200-IS-1 OU's remedial action work plan will include the respective conveyances discussed in Section H.1.1.2.

H7 Closure Costs

Closure cost estimates for Hanford Facility dangerous waste management units are not required per Hanford Facility RCRA Permit Condition II.H.

H8 Certification of Closure

DOE will submit to Ecology a certification of closure and subsequent permit modification documentation in accordance with WAC 173-303-610(6). An Independent Qualified Registered Professional Engineer will certify that the unit has been closed in accordance with the approved closure plan. The engineer will be responsible for documenting closure activities associated with closure of the 216-S-10 Pond and Ditch. The certification will be submitted by registered mail or an equivalent delivery service.

H9 References

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ATTACHMENT 4

CHPRC-2003515
CONTRACT NUMBER DE-AC06-08RL14788

216-B-63 TRENCH WASTE MANAGEMENT UNIT,
CLOSURE UNIT GROUP 21 (CUG-21), ADDENDUM H, "CLOSURE PLAN"
REG-1164, Revision 0
D. A. St. John

Consisting of 21 pages,
including this cover page

Certification
for
Supporting Permit Application Material for Part V – Closure Units, 216-B-63 Trench Waste Management Unit, Closure Unit Group 21 (CUG-21), Addendum H, "Closure Plan"

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

L. Ty Blackford —  — 9/29/2020

L. Ty Blackford, President and CEO
Co-Operator
CHPRC
Richland, Washington

Signature

Date

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Certification
for
Supporting Permit Application Material for Part V – Closure Units, 216-B-63 Trench Waste Management Unit, Closure Unit Group 21 (CUG-21), Addendum H, "Closure Plan"

"I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations."

Digitally signed by Brian T. Vance
DN: cn=Brian T. Vance, o=Office of River Protection, ou=Department of Energy, email=brian.t.vance@orp.doe.gov, c=US
Date: 2020.11.12 11:18:23 -08'00'

Brian T. Vance, Manager Owner/Operator U.S. Department of Energy Richland Operations Office	Signature	Date

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Addendum H

Closure Plan

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Contents

Figures

Table

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Terms

CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DOE	U.S. Department of Energy
DWMU	dangerous waste management unit
Ecology	Washington State Department of Ecology
OU	operable unit
RCRA	*Resource Conservation and Recovery Act of 1976*

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H1 Introduction

This addendum discusses closure activities for the 216-B-63 Trench dangerous waste management unit (DWMU). This addendum also identifies 200-E-188-PL pipeline, 207-B valve pit, and 200-E-191-PL pipeline as the conveyance system associated with the discharge to the 216-B-63 Trench. Addendum A (Part A Form) identifies the 216-B-63 Trench as an uncovered, unlined, manmade surface impoundment. The 216-B-63 Trench has been interim stabilized, is managed as an inactive underground waste management unit, and is located in the northern portion of the 200 East Area (Figure H1). This closure plan addresses the requirements of WAC 173-303-610(2) through (6), "Dangerous Waste Regulations," "Closure and post-closure," as applicable to the physical components of the 216-B-63 Trench.

The 216-B-63 Trench is an excavated surface impoundment (process code D83) that received liquid effluent from B Plant and the 241-BY-ITS2 Condenser Vessel and Heat Flush Tank. The 216-B-63 Trench disposed liquid waste to the soil column, including constituents now regulated under WAC 173-303, and the discharges comingled in the soil column with waste constituents from one or more solid waste management units or areas of concern. The underlying soil is contaminated with a mixture of constituents subject to the dangerous waste requirements of WAC 173-303 and the *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* (CERCLA). The underlying groundwater is contaminated with a mixture of contaminants subject to CERCLA.

Dangerous waste closure processes will be coordinated through the integrated *Resource Conservation and Recovery Act of 1976* (RCRA)-CERCLA past-practice process for consistency in the remedy selection process, as described in Section 5.0 of Ecology et al., 1989, *Hanford Federal Facility Agreement and Consent Order Action Plan* (hereinafter called the Tri-Party Agreement Action Plan). The closure decisions for the 216-B-63 Trench physical components and the conveyance system (Section H1.1) will be made together with the remedial action decision for the 200-EA-1 and 200-IS-1 Operable Units[1] (OU). Future revisions of the closure plan will identify which conveyances will be closed via CERCLA decisions. Consistent with Section 5.5 of the Tri-Party Agreement Action Plan, groundwater contamination beneath the 216-B-63 Trench, if detected, will be addressed through the remedial action decision process for the 200-BP-5 OU (Figure H2).

The U.S. Department of Energy (DOE) re-evaluated the data used in the preparation of this closure plan to determine whether newer data were available and appropriate to use, and incorporated the latest relevant data and information, wherever available, applicable, and referenceable.

H1.1 Physical Description

H1.1.1 216-B-63 Trench

The 216-B-63 Trench is 488 m (1,600 ft) long, up to 2.1 m (7 ft) deep, and 2.4 m (8 ft) wide at the base (H-2-33119, *216-B-63 Ditch for Cool H2O Emergency Disposal–Plan & Profile*; and H-2-33120, *216-B-63 Ditch for Cool H2O Emergency Disposal–Det's. & Sect.*). The 216-B-63 Trench includes a concrete weir box located at the head end, and the first 3.1 m (10 ft) at the head end of the trench is lined with rock fill (Figure H2; Figure H3; H-2-33120; and H-2-37455, *216-B-63 Ditch Weir Box Installation Plot Plan, Sections, Detail*). In December 1994 and January 1995, the trench was backfilled and interim stabilized.

[1] Changes in waste site operable unit assignment may require a revised closure plan and associated Class 1 permit modification.

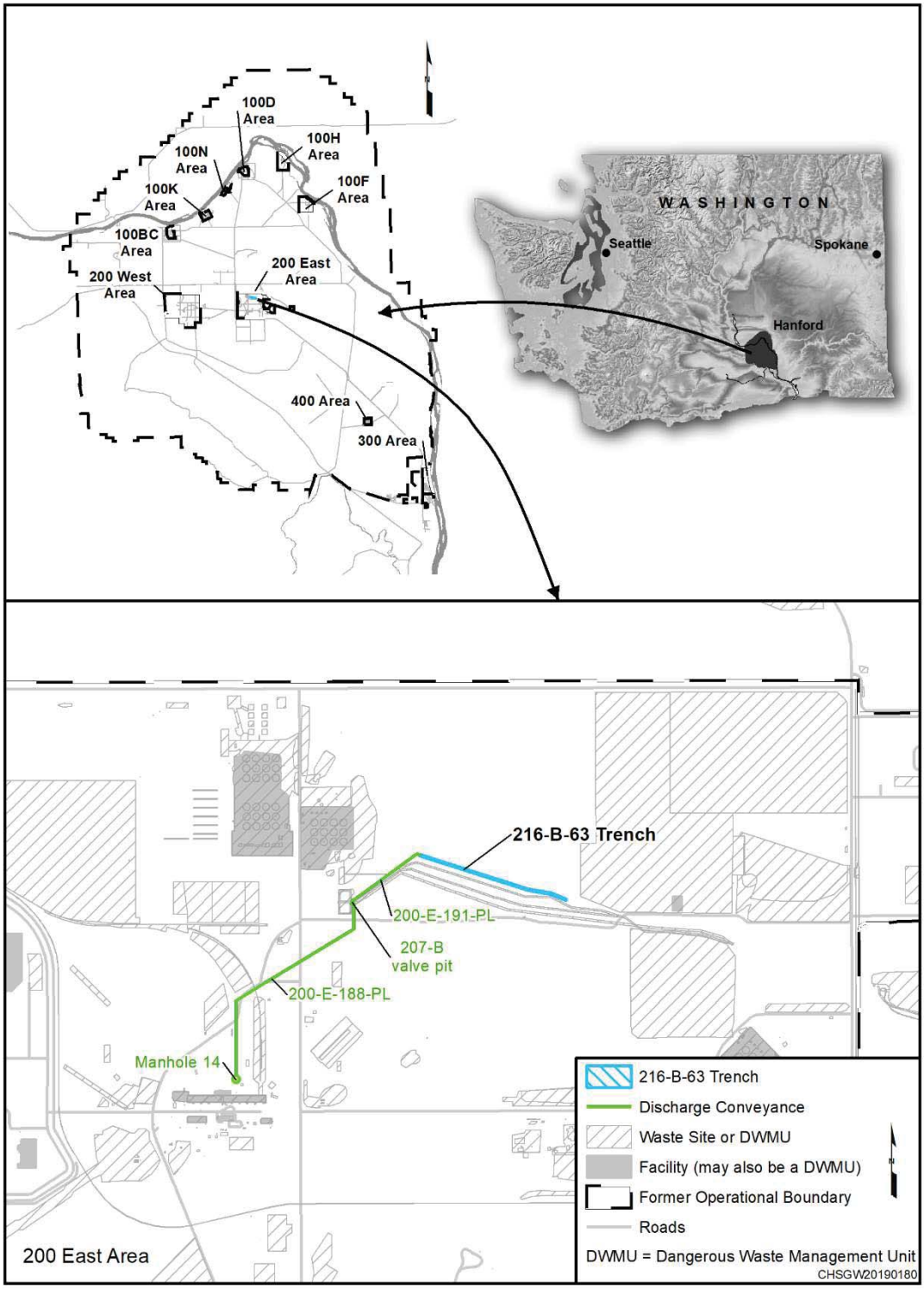

Figure H1. Site Location Map

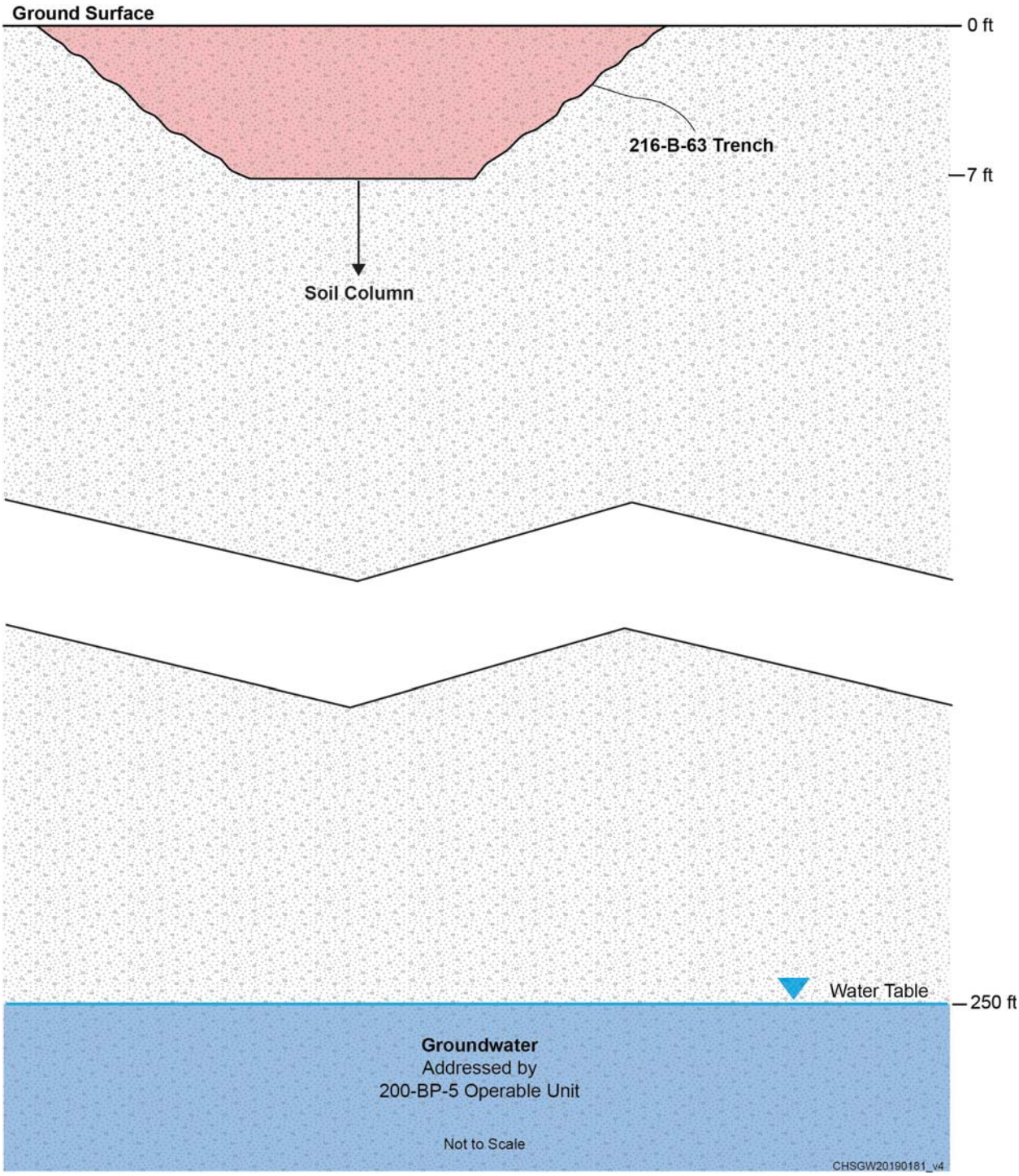

Figure H2. Scope of the 216-B-63 Trench Closure Plan and OU Elements

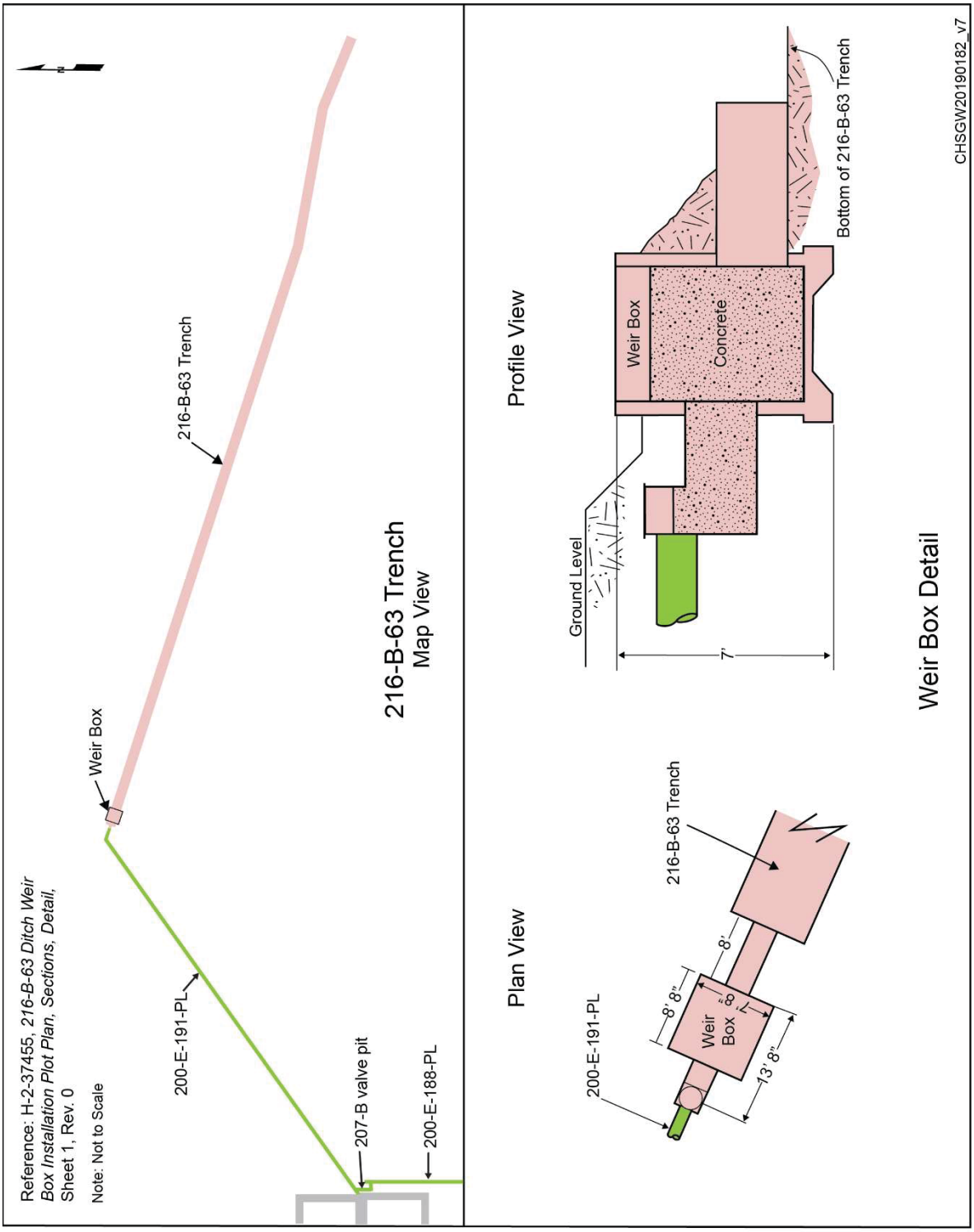

Figure H3. Construction Diagram of the 216-B-63 Trench

H1.1.2 Discharge Conveyances

The discharge conveyance system included the 200-E-188-PL, the 207-B valve pit, and the 200-E-191-PL (Figure H1). The 200-E-188-PL is an inactive underground radioactive process sewer pipeline that transferred B Plant effluent from Manhole 14 (MH-14) located north of B Plant to the 207-B valve pit located east of the 207-B Retention Basin. The 200-E-188-PL is a gravity flow, direct buried, 610 m (2,000 ft) long 38 cm (15 in.) vitrified clay pipe. The 200-E-191-PL is an inactive underground radioactive process sewer pipeline that transferred effluent from the 207-B valve pit to the 216-B-63 Trench. The 200-E-191-PL is a gravity flow, direct buried, 272 m (893 ft) long, 38 cm (15 in.) vitrified clay pipe. The pipelines are connected via 207-B valve pit.

H1.2 Process Information

The 216-B-63 Trench received liquid effluent that included B Plant cooling water, B Plant chemical sewer wastewater, and 241-BY-ITS2 Condenser Vessel and Heat Flush Tank cooling water. The B Plant cooling water consisted of raw water that passed once through the B Plant and Waste Encapsulation and Storage Facility vessel cooling coils, condensers and heat exchangers (WHC-EP-0342 Addendum 22, *B Plant Cooling Water Stream Specific Report*). The 241-BY-ITS2 Condenser Vessel and Heat Flush Tank cooling water consisted of raw water used in the condenser cooling loop (WHC-EP-0342 Addendum 6, *B Plant Chemical Sewer Stream Specific Report)*.

The B Plant chemical sewer wastewater consisted of chemical storage area drain waste, chemical makeup area drain waste, plant water demineralizer effluent, tank heating coil steam condensate, air compressor cooling water, rainwater, office area drainage, and B Plant water tower overflow. The B Plant chemical sewer discharge conveyance is described in Section H1.1.2.

H1.3 Waste Inventory and Characteristics

The 216-B-63 Trench operated from March 1970 until February 1992. According to Addendum A (Part A Form), the 216-B-63 Trench had a design capacity of 757,080 L/day (200,000 gal/day). Table H1 summarizes the estimated annual quantity and associated waste code.

Table H1. Estimated Annual Quantity of Constituents for the 216-B-63 Trench

Waste Constituent (Dangerous Waste Number)	Estimated Annual Quantity of Waste (lb)
Corrosive Acids and Caustics (D002) (measured as pH)[a]	780,000,000[b]

Source: Addendum A (Part A Form).

a. D002 waste code resulted from the plant demineralizer effluent from 1967 to 1985 (H1.2)

b. Estimated annual quantity based on average daily discharge including water.

H2 Groundwater Monitoring

RCRA indicator evaluation groundwater monitoring was initiated at the 216-B-63 Trench in 1989 (DOE/RL-2008-60, *Interim Status Groundwater Monitoring Plan for the 216-B-63 Trench*). In 2018, three upgradient and three downgradient wells were monitored for the 216-B-63 Trench, and groundwater flow was to the southeast (DOE/RL-2018-65*, Hanford Site RCRA Groundwater Monitoring Report for 2018*). The network groundwater monitoring wells were sampled for the following (DOE/RL-2008-60):

- RCRA groundwater indicator parameters: pH, specific conductance, total organic carbon, and total organic halides
- Groundwater quality parameters: chlorine, iron, manganese, phenols, sodium, and sulfate
- Supporting constituents: anions and metals
- Field parameters: pH, specific conductance, temperature, dissolved oxygen, and turbidity

Based on statistical analysis of RCRA groundwater indicator parameters, dangerous waste from the 216-B-63 Trench is not considered to have contaminated groundwater beneath the trench (DOE/RL-2008-60; DOE/RL-2018-65).

H3 Closure Performance Standards

Closure of the 216-B-63 Trench and discharge conveyances will meet WAC 173-303-610(2)(a) closure performance standards. The 216-B-63 Trench is situated among other solid waste management units where releases to the soil column have occurred, and the releases have commingled. Therefore, the permittee may request alternative requirements protective of human health and the environment in accordance with WAC 173-303-610(1)(e). If requesting the use of alternative requirements for closure of the 216-B-63 Trench, DOE will submit a Coordinated Closure Proposal as a permit modification request pursuant to WAC 173-303-830(4). The Coordinated Closure Proposal shall be submitted to Ecology at the same time as the Proposed Corrective Action Decision/Proposed Plan for the 200-EA-1 OU is submitted to Ecology. Numerical closure performance standards for constituents listed in Table H1 shall be included in a revised closure plan prior to initiating closure activities.

H4 Closure Activities

The 216-B-63 Trench was interim stabilized in December 1994 and January 1995 when it was backfilled and brought to grade with clean material (DOE/RL-2004-17, *Remedial Investigation Report for the 200-CS-1 Chemical Sewer Group Operable Unit*). The following characterization activities were performed to identify the nature and extent of contamination for the 216-B-63 Trench (DOE/RL-2004-17). Figure H4 shows characterization activity locations.

- Test pits BT-1 and BT-2(A) were excavated and sampled in 2002.
- Borehole B8827 was drilled in 2003, and soil samples were collected to a depth of 31.4 m (103.0 ft) below ground surface.

Borehole and test pit samples were analyzed for multiple constituents, including anions, pH, and inorganics (e.g., metals). No pH values were reported ≤2.0 or ≥12.5 (DOE/RL-2004-17). Any additional characterization will occur at the 216-B-63 Trench in coordination with other 200 Area activities.

In accordance with Section 5.5 of the Tri-Party Agreement Action Plan (Ecology et al., 1989), alternatives development and evaluation for the 216-B-63 Trench and the conveyance system will be integrated with the 200-EA-1 and the 200-IS-1 OU processes.

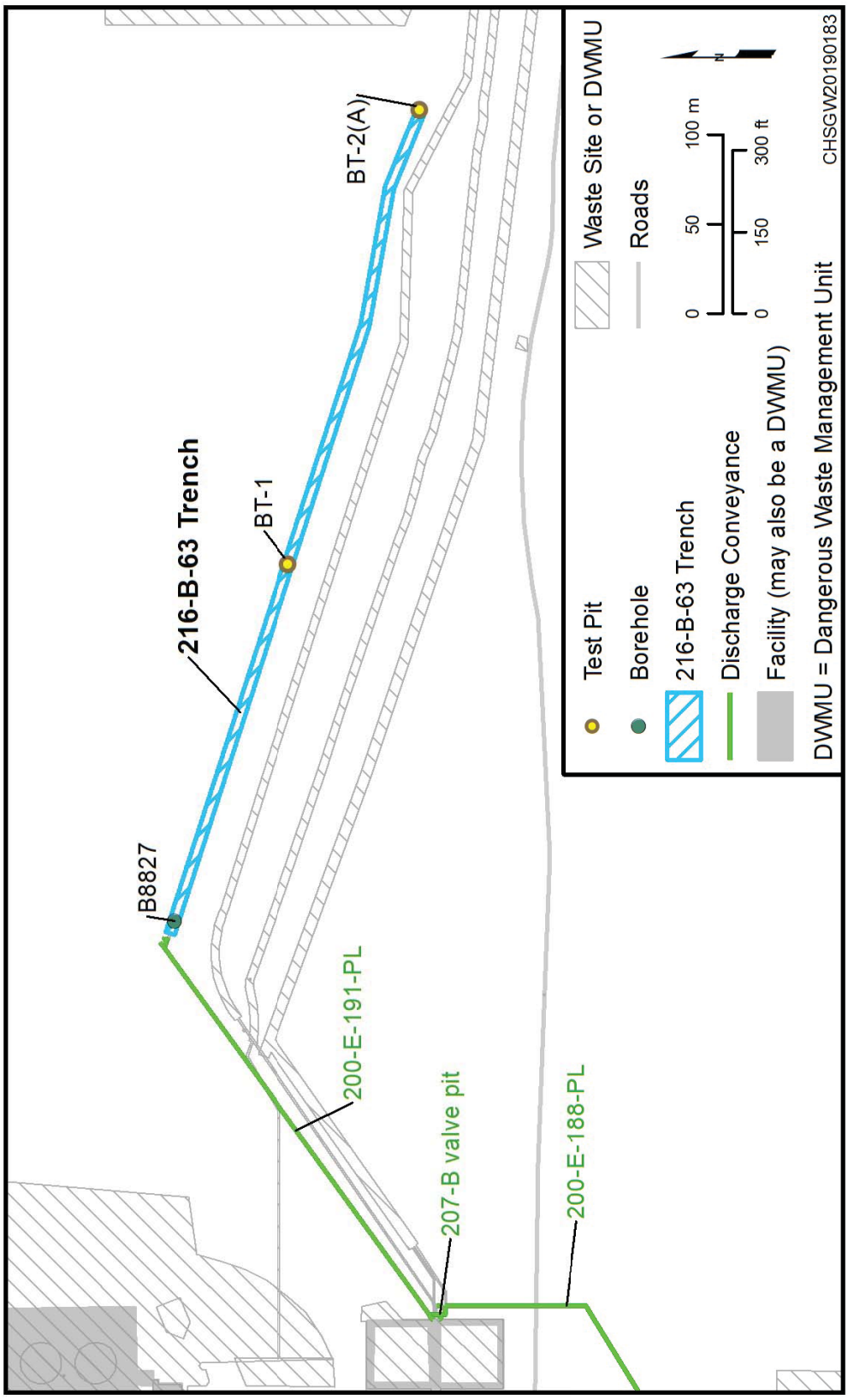

Figure H4. Location of Test Pits and Borehole Relevant to the 216-B-63 Trench

H4.1 Security, Inspection, and Training Information

[RESERVED]

H4.2 Removal of Wastes and Waste Residues

[RESERVED]

H4.3 Removal of Unit, Parts, Equipment, Piping, the Containment Structure, and other Ancillary Equipment

[RESERVED]

H4.4 Unit Inspection Prior to Decontamination

[RESERVED]

H4.5 Decontamination

[RESERVED]

H4.6 Identifying and Managing Contaminated Environmental Media

[RESERVED]

H4.7 Closure Confirmation

[RESERVED]

H4.8 Sampling and Analysis Plan

[RESERVED]

H4.8.1 Constituents to be Analyzed

[RESERVED]

H4.8.2 Revisions to the Sampling and Analysis Plan and the Constituents to be Analyzed

[RESERVED]

H5 Contingent Closure Plan

[RESERVED]

H6 Schedule for Closure

A closure schedule for the 216-B-63 Trench will be provided in the 200-EA-1 OU remedial action work plan, following the Record of Decision and Hanford Facility RCRA Permit modification. This remedial action work plan and the 200-IS-1 OU's remedial action work plan will include the respective conveyances discussed in Section H.1.1.2.

H7 Closure Costs

Closure cost estimates for Hanford Facility dangerous waste management units are not required per Hanford Facility RCRA Permit Condition II.H.

H8 Certification of Closure

DOE will submit to the Ecology a certification of closure and subsequent permit modification documentation in accordance with WAC 173-303-610(6). An Independent Qualified Registered Professional Engineer will certify that the unit has been closed in accordance with the approved closure plan. The engineer will be responsible for documenting closure activities associated with closure of the 216-B-63 Trench. The certification will be submitted by registered mail or an equivalent delivery service.

H9 References

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