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Revision 0

Hanford Facility Dangerous Waste Closure/Postclosure Plan for the 216-B-63 Trench

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

United States Department of Energy
P.O. Box 550
Richland, Washington 99352

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TERMS

200-CS-1	200-CS-1 Chemical Sewer Group
CFR	*Code of Federal Regulations*
DOE	U.S. Department of Energy
Ecology	Washington State Department of Ecology
HEIS	*Hanford Environmental Information System* database
N/A	not applicable
OU	operable unit
RCRA	*Resource Conservation and Recovery Act of 1976*
Tri-Party Agreement	Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent Order*
Tri-Party Agreement Action Plan	Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan*
TSD	treatment, storage, and/or disposal
WAC	*Washington Administrative Code*

METRIC CONVERSION CHART

Into Metric Units			Out of Metric Units		
If You Know	*Multiply By*	*To Get*	*If You Know*	*Multiply By*	*To Get*
Length			**Length**		
inches	25.4	Millimeters	millimeters	0.039	inches
inches	2.54	Centimeters	centimeters	0.394	inches
feet	0.305	Meters	meters	3.281	feet
yards	0.914	Meters	meters	1.094	yards
miles	1.609	Kilometers	kilometers	0.621	miles
Area			**Area**		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.093	sq. meters	sq. meters	10.76	sq. feet
sq. yards	0.0836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.6	sq. kilometers	sq. kilometers	0.4	sq. miles
acres	0.405	Hectares	hectares	2.47	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	Grams	grams	0.035	ounces
pounds	0.454	Kilograms	kilograms	2.205	pounds
ton	0.907	metric ton	metric ton	1.102	ton
Volume			**Volume**		
teaspoons	5	Milliliters	milliliters	0.033	fluid ounces
tablespoons	15	Milliliters	liters	2.1	pints
fluid ounces	30	Milliliters	liters	1.057	quarts
cups	0.24	Liters	liters	0.264	gallons
pints	0.47	Liters	cubic meters	35.315	cubic feet
quarts	0.95	Liters	cubic meters	1.308	cubic yards
gallons	3.8	Liters			
cubic feet	0.028	cubic meters			
cubic yards	0.765	cubic meters			
Temperature			**Temperature**		
Fahrenheit	subtract 32, then multiply by 5/9	Celsius	Celsius	multiply by 9/5, then add 32	Fahrenheit
Radioactivity			**Radioactivity**		
picocuries	37	Millibecquerel	millibecquerel	0.027	picocuries

1.0 INTRODUCTION

The original closure plan for the 216-B-63 Trench (DOE/RL-93-74, *200-BP-11 Operable Unit RFI/CMS and 216-B-3 Main Pond, 216-B-63 Trench, and 216-A-29 Ditch Work/Closure Plan*) was submitted to the Washington State Department of Ecology (Ecology) pursuant to Ecology et al., 1989a, *Hanford Federal Facility Agreement and Consent Order* (Tri-Party Agreement) Milestone M-20-36 in April 1995. The Draft A version of this document was submitted to Ecology in March 2006 to supersede the April 1995 closure plan. This closure plan has been written to update and finalize the March 2006 closure plan.

The 216-B-63 Trench treatment, storage, and/or disposal (TSD) unit will be incorporated into a future revision of the WA789000896, *Hanford Facility Resource Conservation and Recovery Act Permit, Dangerous Waste Portion, Revision 8C, for the Treatment, Storage, and Disposal of Dangerous Waste*. When the TSD unit is incorporated, the provisions of Permit Condition II.Y.2.c will apply. Permit Condition II.Y.2.c establishes the corrective-action status of the waste site following certification of closure.

Because this closure plan is being coordinated with the activities associated with the 200-CS-1 Chemical Sewer Group (200-CS-1) Operable Unit (OU), the closure plan is written to address only the constituents of concern relating to *Resource Conservation and Recovery Act of 1976* (RCRA) TSD unit operations. Any other constituents of concern described in DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit* (pending), are related to past-practice activities at this waste site and will be addressed under past-practice authority, in accordance with Permit Condition II.Y.2. Deferral of pre-existing contamination to other authorities that occurred prior to dangerous waste management activities is described in Ecology Publication 94-111, *Guidance for Clean Closure of Dangerous Waste Units and Facilities*, Section 2.8. Any physical activities necessary to complete remediation of non-TSD unit constituents is outside the scope of this closure plan and will be performed in conjunction with Tri-Party Agreement past-practice activities for the 200-CS-1 OU and the 200-BP-5 Groundwater OU.

The development of this closure plan has been coordinated with the 200-CS-1 OU remediation activities. This coordinated approach was established in June 2002 following the completion of negotiations between the U.S. Department of Energy (DOE), the U.S. Environmental Protection Agency, and Ecology on the modifications to 200 Areas waste-site cleanup milestones through Tri-Party Agreement change requests M-13-02-01, M-15-02-01, M-16-02-01, and M-20-02-01. As a result, much of the text contained in this closure plan has been obtained from existing 200-CS-1 OU *Comprehensive Environmental Response, Compensation, and Liability Act of 1980* documentation.

The proposed closure strategy for the 216-B-63 Trench soils, structures, and groundwater is clean closure without the need for further field activities. This strategy is based on analytical data provided in DOE/RL-2005-63, Appendices A and B and groundwater data contained in the *Hanford Environmental Information System* (HEIS) database. Groundwater data from the HEIS database were used to show that the TSD unit has not impacted groundwater. Analytical data from vadose zone characterization activities (DOE/RL-2005-63, Appendices A and B) were used to show that the TSD unit will not impact groundwater in the future. Sampling of the soils will be performed to confirm waste site remedy selection was implemented to achieve clean closure.

2.0 UNIT DESCRIPTION

This chapter provides a physical description of the 216-B-63 Trench and describes security related to the trench.

2.1 PHYSICAL DESCRIPTION AND OPERATIONS

The 216-B-63 Trench is located in the 200 East Area of the Hanford Site (Figure 2-1). The 216-B-63 Trench was constructed before 1970 as a percolation trench to receive emergency cooling water and chemical sewer waste from the 221-B Plant Canyon Building (B Plant). The trench was taken out of service in 1992. The trench was an open, unlined, artificial, earthen trench that was closed at one end (it did not convey effluent to another facility). The trench was approximately 427 m (1,400 ft) long, 1.2 m (4 ft) wide, and averaged 3 m (10 ft) deep. The side slope was 1:1.5. The first 3.1 m (10 ft) of the trench contained a 5.1 cm (2 in.) rockfill. The TSD unit also includes a 38 cm (15 in.) diameter vitrified clay pipe extending from the 207-B Retention Basin to the trench. The 38 cm (15 in.) diameter pipe ends in a 40.6 m (16-in.) diameter carbon steel inlet pipe, approximately 1.5 m (5 ft) long, that branched off into the trench approximately 1 m (3 ft) below grade and an approximately 4 m (13-ft) long valved-off dead leg. The dead leg was isolated at the tee where the 40.6 m (16-in.) inlet pipe branches off. The 40.6 m (16 in.) inlet pipe fed into a 1.8 by 2.1 m (6 by 7 ft) weir box before emptying into the trench. The weir box has been filled with concrete. The carbon steel pipe and weir box are not identified in the Hanford Facility Dangerous Waste Part A Permit Application form for the 216-B-63 Trench (02-RCA-0385, "Transfer of Hanford Facility Dangerous Waste Part A Permit Application, Form 3s for Certification in Support of Contract Transition for Central Plateau"), but will be included as part of the structures subject to the closure plan.

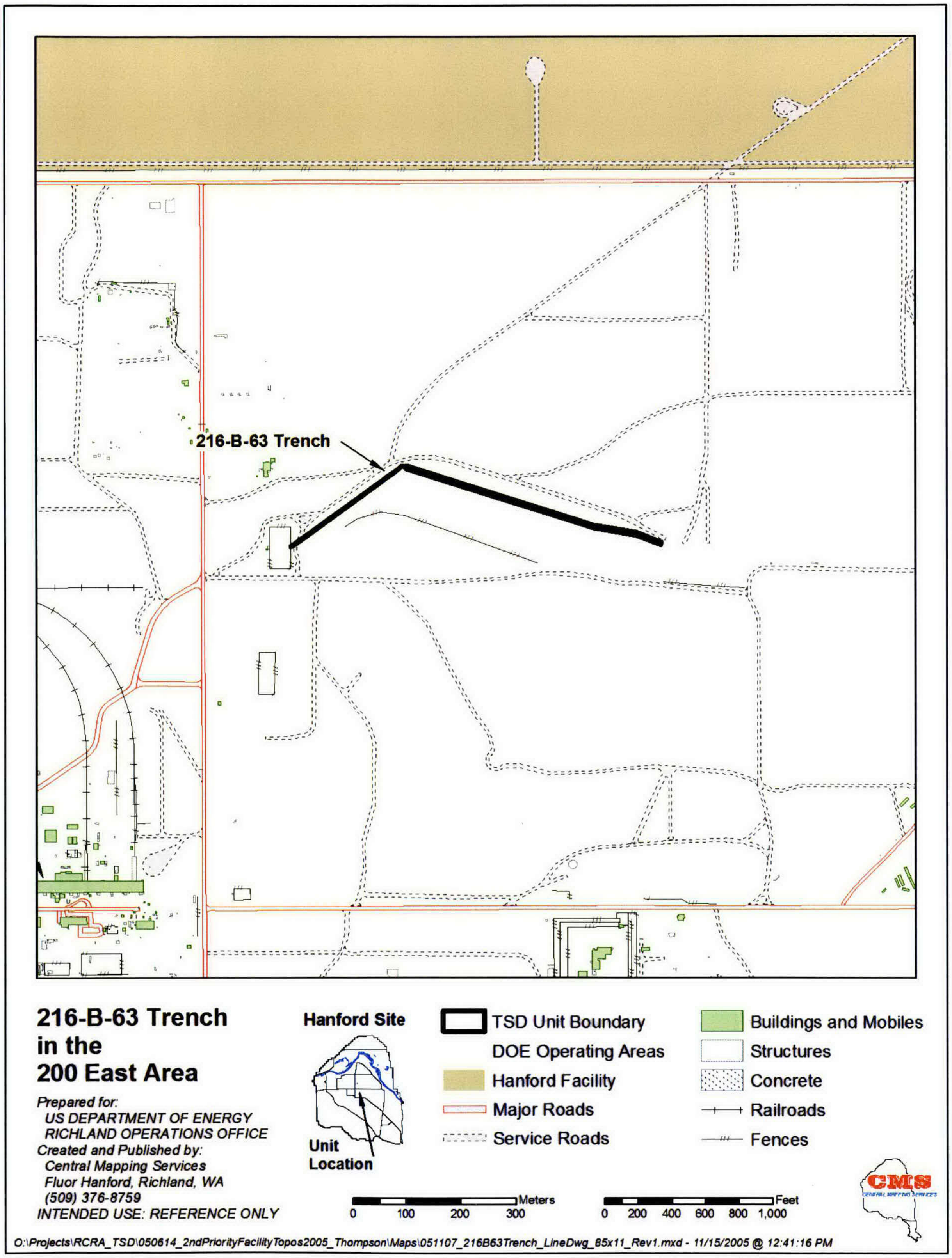
The 216-B-63 Trench received waste between March 1970 and February 1992. The 216-B-63 Trench received effluent from many buildings at the B Plant Complex. The trench terminated south of the 218-E-12B Burial Ground. It was designed to receive diverted emergency cooling water, to prevent the diverted water from reaching the 216-B-3 Pond. In February 1992, the B Plant Chemical Sewer effluent was combined with the B Plant cooling water effluent and discharged into the 216-B-3 Pond.

2.2 SECURITY

Security information for the Hanford Facility is discussed in Permit Condition II.M and Attachment 33 to the Permit (WA7890008967). Because the 216-B-63 Trench is located in the 200 East Area, the security information pertaining to the 200 Areas applies to this TSD unit.

Changes to security are expected to occur during the course of 200 East Area deactivation and decommissioning activities. Security measures will remain in place that limit entry to authorized personnel and that preclude unknowing access by unauthorized individuals. Following clean-closure certification of this TSD unit (Section 7.8), security provisions no longer will apply.

Figure 2-1. 216-B-63 Trench Location and Site Plan.



3.0 PROCESS INFORMATION

The B Plant Chemical Sewer was discharged to the 216-B-63 Trench. The major sources of waste contributions to the 216-B-63 Trench were the 2902-B High Tank (potable sanitary water), cooling water from the B Plant, 225-B Waste Encapsulation and Storage Facility air-compressor after-coolers, a portion of the B Plant steam condensate, and the demineralizer effluent. Minor contributions came from chemical makeup overflow systems, air conditioning units, and space heaters. These minor contributions were determined to be controlled to levels below dangerous waste designation limits. Further information regarding these sources is in WHC-EP-0342, Addendum 6, *B Plant Chemical Sewer Stream-Specific Report*. Section 7.1 provides additional information on physical isolation of the TSD unit.

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4.0 WASTE CHARACTERISTICS

This section identifies the estimate of maximum inventory and the characteristics of the waste disposed of at the 216-B-63 Trench.

4.1 ESTIMATE OF MAXIMUM INVENTORY OF WASTE

The approximate average flow rate of wastewater discharged to the 216-B-63 Trench varied from 378,000 to 1,408,000 L/d (100,000 to 400,000 gal/d). Approximately 68,100,000 kg/yr (473,000 L/d [125,000 gal/d]) of corrosive wastes were managed in the 216-B-63 Trench for the period from 1970 to 1985.

4.2 WASTE CHARACTERISTICS

Chemical discharges to the 216-B-63 Trench after the effective date of regulation (non-radioactive hazardous waste: November 19, 1980) that designate as a dangerous waste constitute the waste codes appearing on the Hanford Facility Dangerous Waste Part A Permit Application form for the 216-B-63 Trench (02-RCA-0385). The waste codes on the form are based on documented discharges to the TSD unit. These discharges are identified in WHC-EP-0342, Addendum 6.

The primary dangerous wastes received at the 216-B-63 Trench are sodium hydroxide, sulfuric acid, and nitric acid. These chemicals are regulated under WAC 173-303, "Dangerous Waste Regulations," as dangerous wastes because they displayed the characteristic of corrosivity (D002) (closure parameter is pH). The 216-B-63 Trench received corrosive dangerous waste from the regeneration of B Plant Facility demineralizers (271-B Building) and a spill. The demineralizer column effluents were routine corrosive discharges (D002) of sulfuric acid and sodium hydroxide solutions. The corrosive discharges occurred from 1970 until October 1985. After 1985, the cation column effluent was treated with sodium carbonate and the anion column effluent was treated with monosodium phosphate to maintain a combined pH of between 4 and 10. Dangerous waste flows from the demineralizer columns to the trench ceased in 1985 and all liquid flows to the trench ceased in 1992. A 2,858 kg (6,300-lb) nitric acid spill to the trench occurred in April 1987. For additional information, refer to WHC-EP-0342, Addendum 6. There are no other closure parameters because disassociated anions/cations of acids and bases do not result in a dangerous waste designation. They are not subject to the numerical closure performance standard comparison in WAC 173-303-610(2)(b)(i), "Closure Performance Standard," because none of them constitute a "dangerous waste, dangerous waste constituent, or residue."

Based on the dangerous waste received at the 216-B-63 Trench, the TSD unit constituent of concern for RCRA closure is pH. This parameter constitutes the scope of the TSD unit RCRA closure activities (Table 4-1). The pH for the trench soils is 9.5 and is well within the noncorrosive range from WAC 173-303-090(6), "Characteristic of Corrosivity."

Table 4-1. Comparison of 216-B-63 Trench Remedial Investigation Data to Residential [a] Clean-Closure Levels.

TSD Unit Constituent Related to Part A Waste Code D002	Maximum Concentration Shallow-Zone Soil (mg/kg) [b]	Maximum Concentration Deep Zone Soil (mg/kg) [b]	90th Percentile Lognormal Hanford Site Background (mg/kg) [c]	Soil Concentration Protective of Groundwater [d] (mg/kg)	Human Health Protection Soil Direct Contact [e] (mg/kg)		Screening Levels for Ecological Protection (mg/kg) [f]	Clean Closure Driver [g]	Meet Clean Closure Standard?
					Carcinogen	Non-carcinogen			
pH	9.5	9.5	N/A	N/A	N/A	N/A	N/A	Non corrosive (>2.0 and <12.5)	Yes

[a] Clean closure evaluations for TSD units are required to use residential levels in WAC 173-340-740(3), "Method B Soil Cleanup Levels for Unrestricted Land Use," based on WAC 173-303-610(2)(b)(i), "Closure Performance Standard."
[b] DOE/RL-2005-63, *Feasibility Study for the 200-CS-1 Chemical Sewer Group Operable Unit,* Appendices A and B. Shallow zone is surface to 15 ft.
[c] DOE/RL-92-24, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes,* Vol. I.
[d] WAC 173-340-740(3)(b)(iii)(A), "Ground Water Protection." Point of compliance is soils throughout the site (WAC 173-340-740(6), "Point of Compliance").
[e] WAC 173-340-740(3)(b)(iii)(B)(I), ""Noncarcinogens," and (II), "Carcinogens." Equations are found in (I) and (II) for human health direct contact. Point of compliance is surface to 15 ft (WAC 173-340-740(6)).
[f] WAC 173-340-740(3)(b)(ii), "Environmental Protection," however only wildlife for industrial values from Table 749-3 are used [WAC 173-340-7493(2)(a)(i), "The Chemicals of Ecological Concern"]. Point of compliance is surface to 15 ft (WAC 173-340-7490(4)(b), "Standard Point of Compliance").
[g] Represents the most restrictive level after ensuring the most restrictive level is not less than natural background and for analytical considerations, as indicated in WAC 173-340-700(6)(d), "Natural Background and Analytical Considerations."

Part A = Hanford Facility Dangerous Waste Part A Permit Application form for the 216-B-63 Trench (02-RCA-0385, "Transfer of Hanford Facility Dangerous Waste Part A Permit Application, Forms 3s for Certification in Support of Contract Transition for the Central Plateau").

N/A = not applicable.
WAC = *Washington Administrative Code*.
TSD = treatment, storage, and/or disposal.

5.0 GROUNDWATER MONITORING

The 216-B-63 Trench groundwater closure approach is clean closure, in accordance with the Ecology et al., 1989b, *Hanford Federal Facility Agreement and Consent Order Action Plan* (Tri-Party Agreement Action Plan), Section 6.3.1, where any TSD unit is eligible for clean closure at the Hanford Site. The clean-closure approach is based on the data gathered to date from the monitoring network (PNNL-14112, *Groundwater Monitoring Plan for the 216-B-63 Trench on the Hanford Site*), data contained in the HEIS database, vadose zone characterization data, and DOE/RL-2008-01, *Hanford Site Groundwater Monitoring for Fiscal Year 2007*, Section 2.10.3.2 for the 216-B-63 Trench. Following clean closure of the groundwater, OU groundwater monitoring will continue, as appropriate, in the 200-BP-5 Groundwater OU for constituents under past-practice processes of the Tri-Party Agreement. Table 5-1 shows a comparison of the TSD unit constituent levels in groundwater to clean-closure levels. The clean-closure levels for groundwater are the maximum contaminant levels (when available), or the most restrictive level of the WAC 173-340-740(3)(b)(iii)(B)(I) and (II), "Noncarcinogens" and "Carcinogens," value for groundwater (unless this value is lower than analytical considerations as indicated in WAC 173-340-700(6)(d), "Natural Background and Analytical Considerations"). For pH, the clean closure level is non-corrosive (pH range >2.0 and <12.5). Following clean-closure certification of the 216-B-63 Trench (Section 7.8), the TSD unit groundwater-monitoring program will be discontinued.

The current interim-status groundwater-monitoring plan (as required by WAC 173-303-400, "Interim Status Facility Standards," and 40 CFR 265, Subpart F, "Ground-Water Monitoring") is contained in a separate document, DOE/RL-2008-60, *Interim Status Groundwater Monitoring Plan for the 216-B-63 Trench* (pending). This document contains further details regarding the geology, hydrology, and current groundwater monitoring programs for the TSD unit.

The following excerpts from DOE/RL-2008-01 provide more recent monitoring network and groundwater conditions.

> Interim-status RCRA detection monitoring at the 216-B-63 trench requires that the 12 network wells be sampled semiannually for the four contamination/indicator parameters (total organic carbon, total organic halides, specific conductance, and pH), temperature, and turbidity. Groundwater quality parameters including alkalinity, metals, anions and phenols are also monitored on an annual schedule.
>
> No specific evidence for hazardous waste originating from the 216-B-63 trench has been detected in groundwater at the facility. None of the four contamination indicators exceeded critical means in any of the 216-B-63 wells during FY 2007. Specific conductance continued to rise in nearly all wells in the 216-B-63 network during FY 2007, with exception of wells 299-E27-11 and 299-E27-19, which remain relatively unchanged. This rise can be attributed to increasing concentrations of nitrate, sulfate, and chloride [associated with regional increases of these constituents]. These anions may have reached a peak in the western extremity of the network, while in other wells concentrations are still climbing. Wells near the center of the facility, along an east-west line (e.g., 299-E34-12, 299-E27-11), display less obvious trends in these constituents.

Table 5-1. Comparison of 216-B-63 Trench Groundwater Data to Clean-Closure Levels.

TSD Unit Constituent Related to Part A Waste Code D002	Maximum Concentration in Groundwater from HEIS (μg/L) [a]	Overall Groundwater Cleanup Level (μg/L) [b]	Clean Closure Driver [b]	Meet Clean Closure standard?
pH	7.9 - 8.67 pH units	Non corrosive	WAC 173-303-090(6)	Yes

[a] HEIS queries date range back through 2002.

[b] The reference to WAC 173-303-090(6) identified the corrosive waste designation range for dangerous waste. No other clean up level exists for pH.

Part A = Hanford Facility Dangerous Waste Part A Permit Application form for the 216-B-63 Trench (02-RCA-0385, "Transfer of Hanford Facility Dangerous Waste Part A Permit Application, Forms 3s for Certification in Support of Contract Transition for the Central Plateau").

WAC 173-303-090(6), "Characteristic of Corrosivity."

HEIS = *Hanford Environmental Information System* database.

TSD = treatment, storage, and/or disposal.

WAC = *Washington Administrative Code*.

The monitoring well network for the 216-B-63 Trench is shared with Low-Level Waste Management Area 2. Samples are gathered twice a year in the spring and fall. Because of the low hydraulic gradient in the 200 East Area, the rate of groundwater movement near the 216-B-63 Trench is low; however flow rates are not available. The monitoring network for the 216-B-63 Trench currently meets RCRA requirements, as defined in the monitoring plan.

5.1 HISTORY OF RCRA GROUNDWATER MONITORING

Quarterly RCRA groundwater sampling of the 216-B-63 Trench monitoring network was started in the third quarter of 1988 with an interim-status indicator parameter evaluation (detection-level) program (WHC-SD-EN-AP-165, *Interim-Status Groundwater Monitoring Plan for the 216-B-63 Trench*). The wells were sampled quarterly through calendar year 1993, and then semiannual sampling for indicator parameters evaluation was initiated, and has been performed since 2002 under PNNL-14112. This plan has recently been revised and reissued as DOE/RL-2008-60.

5.2 AQUIFER IDENTIFICATION

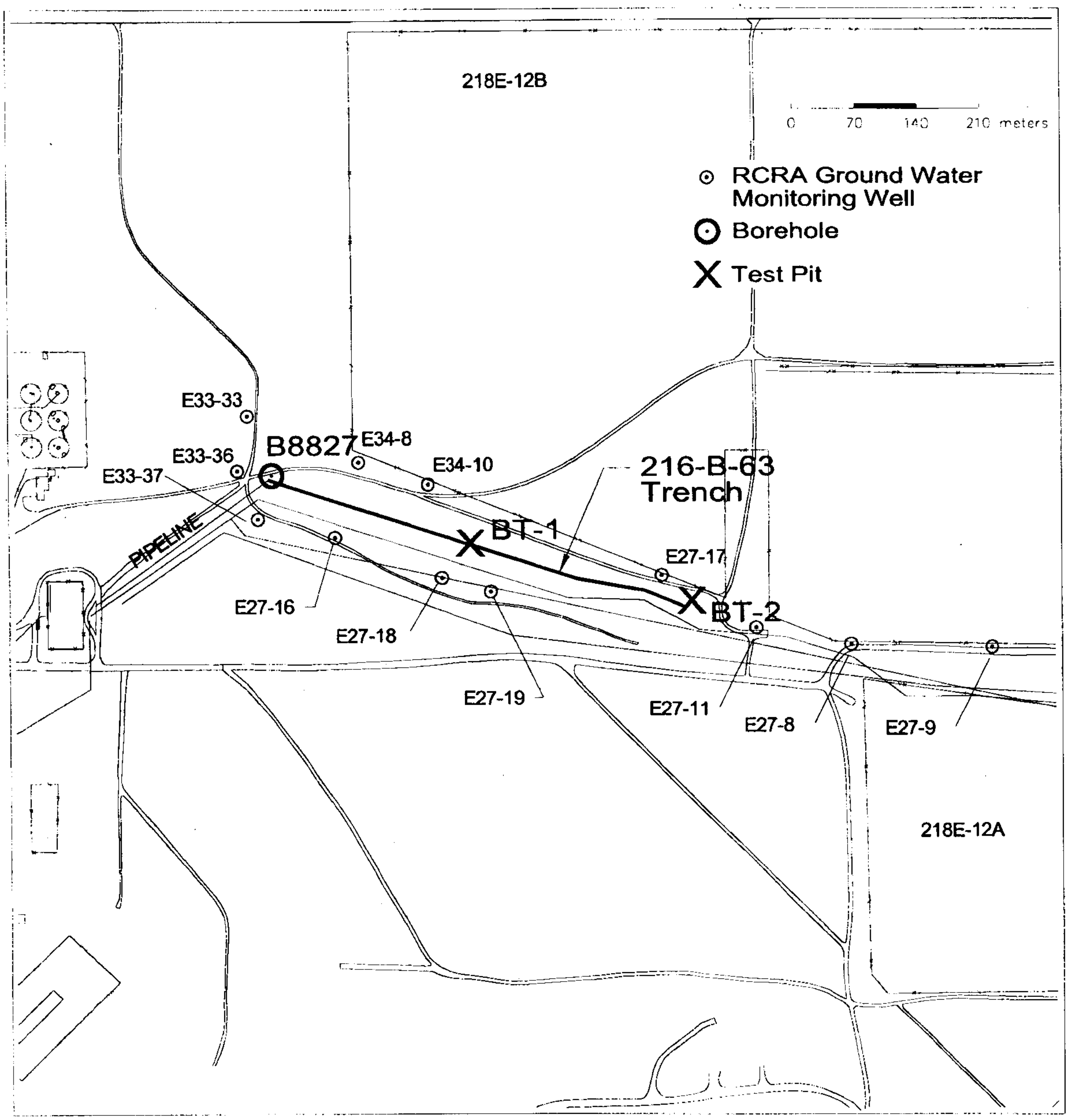
The uppermost or unconfined aquifer beneath the 216-B-63 Trench is 3.4 to 6.1 m (11.2 to 20.0 ft) thick and is contained within the sediments of the Hanford formation. The aquifer extends from the water table to the top of the basalt. The Ringold Formation is absent beneath the trench. Groundwater flow direction and rate beneath the 216-B-63 Trench remained indeterminate during fiscal year 2007. The hydraulic gradient is too low to define a dominant flow direction or rate with any degree of confidence. As such, the designation of upgradient and downgradient wells and the identification of specific sources of the anions is problematic. The pattern of increase and decline of anions, such as sulfate, in some wells suggests these constituents are possibly moving from northwest to southeast at the western end of the facility (DOE/RL-2008-01). Beneath the ditch, the water table is nearly flat and has been declining since discharges to the 216-B-3 Pond system ceased.

5.3 WELL LOCATION AND DESIGN

The revised monitoring well network consists of seven wells (Figure 5-1). These wells include three upgradient wells (i.e., 299-E27-11, 299-E27-17, and 299-E34-10) and four downgradient wells (i.e., 299-E27-16, 299-E27-19, 299-E33-36, and 299-E33-37). All of the wells are sampled semiannually with dedicated sampling pumps.

Construction of the wells followed RCRA standard well construction specifications. The standards in WAC 173-160, "Minimum Standards for Construction and Maintenance of Wells," were used to set the basic design requirements. The seven wells of the interim-status groundwater-monitoring network for the 216-B-63 Trench were constructed from 1987 through 1992. All of the wells are constructed with screens at the water table. Construction summaries and details of drilling and design specifications for all of the wells in the interim-status groundwater monitoring system are in PNNL-14112.

Figure 5-1. Borehole and Test Pit Location Map for the 216-B-63 Trench.



5.4 RESULTS OF RCRA INTERIM-STATUS GROUNDWATER MONITORING DATA

The RCRA indicator parameters are specific conductance, pH, total organic carbon, and total organic halides. Groundwater quality parameters are chloride, iron (filtered), manganese (filtered), phenols, sodium (filtered), and sulfate. The 216-B-63 Trench has been in an interim-status indicator parameter evaluation (detection-level) program since 1988. There are no RCRA indicator parameters exceedances, nor are there significant detections that could be attributed to this trench.

The groundwater near the 216-B-63 Trench displays pH at levels above interim drinking water standards, but they are not considered attributable to the TSD unit. Unfiltered chromium and iron historically have exceeded drinking water standards in several wells. These concentrations have been attributed to well construction and oxidizing conditions in the aquifer. Results for filtered samples have not exceeded the drinking water standard.

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6.0 CLOSURE STRATEGY AND PERFORMANCE STANDARDS

This chapter identifies the 216-B-63 Trench closure strategy and closure performance standards for structures and soils. Groundwater is discussed in Chapter 5.0.

6.1 CLOSURE STRATEGY

The standards for closure of Hanford Site TSD units are in WAC 173-303-610, "Closure and Post-Closure." The option to clean close a surface impoundment or pursue landfill closure of a surface impoundment is identified in WAC 173-303-650(6), "Closure and Post-Closure Care." The possibility of clean closure for all TSD units at the Hanford Site is described in the Tri-Party Agreement Action Plan, Section 6.3.1.

The 216-B-63 Trench meets the clean closure standards for soils and structures based on existing data.

6.2 CLOSURE PERFORMANCE STANDARDS

This section identifies general clean-closure performance standards and the specific closure standards for the structures and soils.

6.2.1 Treatment, Storage, and/or Disposal Unit Closure Performance Standards

The closure performance standards of WAC 173-303-610(2)(a)(i - iii) require the owner or operator of a TSD unit to close the unit in a manner that ensures the following:

1. "Minimizes the need for further maintenance"
2. "Controls, minimizes, or eliminates to the extent necessary to protect human health and the environment, postclosure escape of dangerous waste, dangerous waste constituents, leachate, contaminated runoff, or dangerous waste decomposition products to the ground, surface water, groundwater, or the atmosphere"
3. "Returns the land to the appearance and use of surrounding land areas to the degree possible given the nature of the previous dangerous waste activity."

These standards can be met by one of the following methods:

1. Clean-closure according to the removal or decontamination standard of WAC 173-303-610(2)(b) based on WAC 173-303-650(6)(a)(i)
2. By landfill closure according to WAC 173-303-650(6)(a)(ii)
3. By implementing the alternative closure requirements of WAC 173-303-610(1)(e), "Applicability."

Potential contaminant exposures and health impacts to humans largely are dependent on land use. The land use for the 200 Areas selected by the DOE through 64 FR 61615, "Record of Decision: Hanford Comprehensive Land-Use Plan Environmental Impact Statement (HCP EIS)," is industrial-exclusive. Industrial cleanup standards are identified in WAC 173-340-745(5), "Method C Industrial Soil Cleanup Levels." Before WAC 173-340-745(5) standards are applied, however, the owner/operator can choose to pursue a clean-closure evaluation based on the traditional application of residential standards under WAC 173-340-740(3), "Method B Soil Cleanup Levels for Unrestricted Land Use," as described in WAC 173-303-610(2)(b)(i). If necessary, and if Ecology agrees, the standards in WAC 173-340-745(5) can be imposed through the alternative closure requirements of WAC 173-303-610(1)(e).

The first approach to examine for TSD unit closure is clean closure. Clean closure will eliminate the need for future inspections and maintenance necessitated by TSD unit constituent contamination. Clean closure also will eliminate the need for future postclosure monitoring and maintenance of the soils. Clean closure using the WAC 173-340-740(3) residential values were examined first because if the DOE/RL-2005-63, Appendices A and B data showed that the soils met WAC 173-340-740(3) residential values without further remediation, then the TSD unit clean closure could occur independent of the OU remediation activities.

If the TSD unit constituents cannot meet the WAC 173-340-740(3) residential values as is, then other closure strategies can be employed. Because the only parameter for clean closure is pH, other closure strategies are not described in this closure plan.

6.2.2 Soil Closure Standards

The clean-closure requirements are established in WAC 173-303-610(2)(b) and the surface impoundment standards are established in WAC 173-303-650(6)(a) to remove or decontaminate unit soils contaminated above clean-closure standards. These soil clean-closure cleanup levels are the numeric levels identified in WAC 173-340-740(3) that are either levels calculated using the most restrictive WAC 173-340-740(3) formulas for unrestricted use, or are background levels (DOE/RL-92-24, *Hanford Site Background: Part 1, Soil Background for Nonradioactive Analytes*) when the most restrictive WAC 173-340-740(3) formulas are more stringent than Hanford Site background concentrations. WAC 173-340-740(3) formulas for unrestricted use can include site-specific parameters.

WAC 173-340-740(3) contains the following potential clean-closure standards: environmental protection related to ecological receptors, soil concentrations protective of groundwater, soil direct-contact carcinogens, soil direct-contact non-carcinogens, soil direct-contact petroleum vapors, and soil vapors. The environmental protection related to ecological receptors, soil concentrations protective of groundwater, soil direct-contact carcinogens, and soil-direct contact noncarcinogens are applicable and are identified in Table 4-1. The soil direct-contact petroleum vapors and soil vapors standards do not apply because there are no petroleum compounds and no volatile organic compounds related to TSD unit closure, respectively.

6.2.3 Structure Closure Standard

The clean-closure standard for 216-B-63 Trench structures is established in accordance with WAC 173-303-610(2)(b)(ii) on a case-by-case basis. Structures identified as part of the TSD unit include the 38 cm (15-in.) diameter pipe extending from the 207-B Retention Basin to the trench. However, for purposes of this closure plan, the 40.6 m (16 in.) piping and the weir box are included. Achievement of a clean-closure standard for the piping and weir box will be demonstrated through use of process knowledge (Chapter 3.0), knowledge of waste characteristics (Chapter 4.0), and the following.

The piping and weir box were not sampled as part of the remedial investigation activities. However, the piping and weir box meet clean-closure requirements without further investigation because they are not reasonably expected to be contaminated with TSD unit constituents above clean-closure levels (corrosive residues). The piping is considered to be empty and the weir box is filled with concrete. No liquid has been added since 1992, and the piping was sloped. Dangerous waste residues would not reasonably exist on internal piping and weir box surfaces contacted by waste, given that the effluent was primarily water (Section 4.1) and was very low in solids. Base on this, no reasonable potential exists for TSD unit constituents to exist in the piping or the weir box as residues at levels that could practically display the characteristic of corrosivity.

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7.0 CLOSURE ACTIVITIES

This chapter summarizes clean-closure activities for the 216-B-63 Trench performed in coordination with the 200-CS-1 OU remediation process. Physical closure activities included TSD unit physical isolation, borehole and test pit drilling, and sampling and analysis of soils. Except for sampling and analysis of the soils, these activities are completed.

The unit soils are planned to be clean closed, based on the results of DOE/RL-2005-63, Appendices A and B and sampling of the soils, to confirm waste site remedy selection was implemented to achieve clean closure.

7.1 TREATMENT, STORAGE, AND/OR DISPOSAL UNIT PHYSICAL ISOLATION

To preclude any further discharges to the unit, and in support of TSD unit closure, the 216-B-63 Trench was physically isolated from receipt of the B Plant Chemical Sewer effluent in 1992. The trench was backfilled with dirt in November 1994. The inlet pipe and weir box was filled with cement in December 1994. The trench no longer can accept dangerous waste.

7.2 TREATMENT, STORAGE, AND DISPOSAL UNIT SAMPLING AND ANALYSIS

The following sections describe sampling and analyses activities that have been completed for the 216-B-63 Trench. Additional sampling of the soils will be performed to confirm waste site remedy selection was implemented to achieve clean closure.

7.2.1 Completed Soil Sampling and Analysis

As part of the 200-CS-1 OU remedial investigation, data were collected to characterize the nature and vertical extent of contamination and the physical conditions in the vadose zone underlying the 216-B-63 Trench. Drilling, test pit excavation, surface and borehole geophysical surveys, and soil sampling and analysis were conducted during the field activities. Borehole and test pit locations are shown in Figure 5-1.

Borehole B8827 was drilled and sampled, and Test Pits BT-1 and BT-2A were excavated and sampled in the 216-B-63 Trench. The two samples scheduled to be taken from Test Pit BT-1 at depths of 6.1 and 7.6 m (20 and 25 ft) were not obtained, because the test pit caved in excessively. Excavation equipment regulated for use in contaminated environments was unavailable, so sampling at Test Pit BT-2 in fiscal year 2002 was terminated on November 2, 2001, after sampling at the 2.3 to 2.6 m (7.5 to 8.5 ft) depth. At that point, the soil was returned to the sampling pit in the reverse order from which it was excavated. Test Pit BT-2A was excavated and sampled to 7.6 m (25 ft) on November 11, 2002. This test pit was designated BT-2A to distinguish it from the fiscal year 2002 operations.

Borehole B8827 was drilled and sampled during fiscal year 2003. The borehole was drilled through the 216-B-63 Trench, from the ground surface to a depth of 31.4 m (103 ft). The borehole was logged using a high-resolution spectral gamma-ray logging system and a neutron-moisture logging system. The borehole was drilled to better define stratigraphy, to assess the nature and vertical extent of contamination, and to determine the physical properties of the soil beneath the TSD unit.

The test pit locations were prepared by removing 0.3 to 0.6 m (1 to 2 ft) of topsoil from the site. The test pits were excavated to a maximum depth of 7.6 m (25 ft) below ground surface, using a trackhoe. Samples were obtained directly from the trackhoe bucket at intervals of approximately 0.7 m (2.5 ft). Samples were analyzed for chemical and physical properties. The test pits were backfilled in the reverse order from which they were excavated, using the trackhoe, and a front-end loader was used to backfill the site with topsoil and/or gravel.

Soils from the boreholes and test pits were screened in the field both for indications of contamination and to assist in determining the discrete sample locations or depths before the samples were collected. Soil samples were collected for analysis and determination of physical properties. The sampling approach generally required a greater sample frequency near the bottom of the TSD unit, which is the area of highest suspected contamination. Sample collection always was attempted at depths of 4.6 and 7.6 m (15 and 25 ft) below ground surface to define contamination profiles. Sample frequency generally was reduced to 6.1 to 15.2 m (20 to 50 ft) intervals below a depth of 7.6 m (25 ft) in the boreholes.

Soil samples were analyzed for the constituents of concern from DOE/RL-2004-17, *Remedial Investigation Report for the 200-CS-1 Chemical Sewer Group Operable Unit*. Samples were analyzed selectively for field bulk density and moisture content. In addition, ditch bottom samples from each of the test pits were analyzed for an expanded list of compounds, to satisfy waste designation requirements. Soil descriptions were recorded to better define stratigraphic relationships in the OU. The results obtained from previous characterization activities also were evaluated as part of this remedial investigation.

7.2.2 Soil Sample Results and Verification Sampling

Analytical results obtained from the remedial investigation were intended for refining and/or validating the site conceptual contaminant distribution model and are defensible for use in this closure plan for determining constituents of concern (DOE/RL-99-44, *200-CS-1 Operable Unit RI/FS Work Plan and RCRA TSD Unit Sampling Plan*, Appendix B). Table 4-1 identifies the maximum concentration of TSD unit constituents in shallow soils and deep-zone soils from DOE/RL-2005-63, Appendices A and B. The maximum values are compared to the clean-closure levels described in Section 6.2.2. Table 4-1 shows that the TSD unit constituent, pH, meets the clean-closure standard. Further evaluation of data using the WAC 173-340-745(5) closure values was not necessary. Since achievement of clean closure does not require any soil removal, sampling and analysis verification of complete contaminant removal is not necessary.

7.2.3 Confirm Waste Site Remedy Selection was Implemented to Achieve Clean Closure

Additional sampling and analysis of the soil is planned to confirm waste site remedy selection was implemented to achieve clean closure. The sampling will be documented and developed as described in DOE/RL-2005-63, Appendix K.

7.3 OTHER ACTIVITIES REQUIRED FOR CLOSURE

A data quality objective process with follow-on sampling will be performed to determine if the clean-closure levels have been met, in coordination with the 200-CS-1 OU activities (DOE/RL-2005-63, Appendix K). After closure, the appearance of the land will be consistent with land-use determinations of the Hanford Site.

7.4 INSPECTIONS

The TSD unit has been inspected to meet interim-status requirements. Annual inspections are performed based on Ecology approval in 2003. Following closure certification (Section 7.8), inspections for the 216-B-63 Trench will be discontinued.

7.5 TRAINING

A dangerous waste training plan has been maintained for the TSD unit to meet interim-status requirements. The duties associated with dangerous waste management activities include performing inspections, notifying Ecology of any potential threats to human health and the environment, and performing groundwater monitoring. Following closure certification (Section 7.8), the dangerous waste training plan addressing the 216-B-63 Trench waste management duties will be discontinued.

7.6 SCHEDULE FOR CLOSURE

No OU-related activities are required for closure. Following submittal of this closure plan to Ecology, Ecology's 90-day review period begins in accordance with the Tri-Party Agreement Action Plan, Figure 9-2.

7.7 AMENDMENTS OF CLOSURE PLAN

As required by WAC 173-303-610(3)(b), "Closure Plan; Amendment of Plan," the closure plan will be amended if changes to closure activities require a modification of the approved closure plan. However, no changes are expected because closure activities relating to the soils, structures, and groundwater are complete.

7.8 CERTIFICATION OF CLOSURE

When sampling results have been evaluated, closure activities under this closure plan are planned to have been completed.

In accordance with WAC 173-303-610(6), "Certification of Closure," within 60 days of completion of TSD unit closure, the DOE will submit to the lead regulatory agency (Ecology) a certification of closure. Both the DOE and the Co-Operator identified on the current Part A Permit Application for the TSD unit will sign the certification of closure, and an independent registered professional engineer will state that the unit has been closed in accordance with the approved closure plan. The certification will be submitted by registered mail or an equivalent delivery service. Documentation supporting the independent registered professional engineer's certification will be placed in the Administrative Record.

8.0 POSTCLOSURE PLAN

The closure strategy for the 216-B-63 Trench is clean closure with regard to TSD unit constituents for soils, structures, and groundwater; therefore, no postclosure plan is required.

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