

Borehole Summary Report for the 28 Shallow Characterization Boreholes in the 200-DV-1 Operable Unit, FY 2018

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

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



**P.O. Box 1600
Richland, Washington 99352**

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Freestone Environmental, Inc.

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APPROVED

By Janis D. Aardal at 2:33 pm, May 17, 2018

Release Approval

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Terms

bgs	below ground surface
CHPRC	CH2M Hill Plateau Remediation Company
ft	feet or foot
H1	Hanford formation gravel-dominated unit
HEIS	Hanford Environmental Information System
Holt	Holt Services, Inc.
ID	identification
in.	inch
IH	industrial hygienist
OD	outer diameter
SAP	sampling and analysis plan
TD	total depth
OU	Operable Unit
VOC	volatile organic compound
WAC	<i>Washington Administrative Code</i>

Metric Conversion Chart

Into Metric Units			Out of Metric Units		
<i>If you know</i>	<i>Multiply by</i>	<i>To get</i>	<i>If you know</i>	<i>Multiply by</i>	<i>To get</i>
Length			Length		
inches	25.40	millimeters	millimeters	0.0394	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 (statute)	1.609	kilometers	kilometers	0.621	miles (statute)
Area			Area		
sq. inches	6.452	sq. centimeters	sq. centimeters	0.155	sq. inches
sq. feet	0.0929	sq. meters	sq. meters	10.764	sq. feet
sq. yards	0.836	sq. meters	sq. meters	1.196	sq. yards
sq. miles	2.591	sq. kilometers	sq. kilometers	0.386	sq. miles
acres	0.405	hectares	hectares	2.471	acres
Mass (weight)			Mass (weight)		
ounces (avoir)	28.349	grams	grams	0.0353	ounces (avoir)
pounds	0.454	kilograms	kilograms	2.205	pounds (avoir)
tons (short)	0.907	ton (metric)	ton (metric)	1.102	tons (short)
Volume			Volume		
teaspoons	5	milliliters	milliliters	0.034	ounces
tablespoons	15	milliliters	liters	2.113	pints
ounces	29.573	milliliters	liters	1.057	quarts
cups	0.24	liters	liters	0.264	gallons
pints	0.473	liters	cubic meters	35.315	cubic feet
quarts	0.946	liters	cubic meters	1.308	cubic yards
gallons	3.785	liters			
cubic feet	0.0283	cubic meters			
cubic yards	0.764	cubic meters			
Radioactivity			Radioactivity		
picocurie	37	millibecquerel	millibecquerel	0.027	picocurie

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1 Introduction

This report presents field-generated records and summarizes field activities performed during the drilling, core sampling, and decommissioning of twenty-eight boreholes in the 200-DV-1 Operable Unit (OU) of the Hanford Site. The report also presents information for 10 boreholes that did not reach total depth, and/or did not recover enough sediment during a sampling interval for analysis, and had to be replaced. This report focuses on the advancement of boreholes in accordance with SGW-61226, *Description of Work for the Installation Twenty-Eight Shallow Characterization Boreholes in the 200-DV-1 Operable Unit, FY 2018*, Rev. 0 and DOE/RL-2011-104-ADD2, Rev. 0, *Characterization Sampling and Analysis Plan for the 200-DV-1 Operable Unit Addendum 2: Supplemental Shallow Soil Risk Characterization Sampling* (hereafter referred to as the Rev. 0 sampling and analysis plan [SAP]). The purpose of advancing the boreholes was to characterize contaminant concentrations and their vertical distribution in the shallow vadose zone at 200-DV-1 OU waste sites.

The forty-three 200-DV-1 OU waste sites are located in three areas on the Central Plateau at the Hanford Site. The 200-DV-1 OU waste sites are primarily the cribs and trenches adjacent to, and associated with, the 241-B/BX/BY, 241-T/TX/TY, and 241-S/SX Tank Farms, referred to as the B Complex, the T Complex, and the S Complex, respectively. The 200-DV-1 OU was created in 2010 to support remedy selection for waste sites with deep vadose zone contamination. In general, deep vadose zone contamination poses a potential threat to groundwater and is not easily remediated using typical surface remedies.

The 200-DV-1 OU contaminants of potential concern are identified in Table 3 of the Rev. 0 SAP as revised by Tri-Party Agreement (Ecology et al., (1989), the *Hanford Federal Facility Agreement and Consent Order*) change order TPA-CN-688.

Holt Services, Inc. (Holt) under the direction of CH2M Hill Plateau Remediation Company (CHPRC), conducted drilling and decommissioning activities associated with the 200-DV-1 OU boreholes between January 9, 2018, and March 13, 2018. Freestone Environmental Services, Inc., provided well-site geology and well decommissioning documentation services.

1.1 Purpose and Scope

The purpose of this report is to compile field data and summarize observations made during drilling, core sampling, and decommissioning activities for the 200-DV-1 OU boreholes. This report includes field notes and completed field forms, borehole decommissioning information, radiological data, geologic observations, civil survey results, and records of investigation-derived waste management and disposition.

The primary controlling documents for the drilling, core sampling, and decommissioning activities were SGW-61226, and the Rev. 0 SAP.

Drilling and sampling of the twenty-eight final and the 10 incomplete boreholes support the planned characterization activities detailed in the Rev. 0 SAP. Figure 1-1, Figure 1-2, and Figure 1-3 depict the borehole location and associated waste sites. Unsuccessful drilling attempts are represented on the location maps by the borehole ID in parentheses. Borehole identification, location, and drilling summary information are presented in Table 1.

The Well Summary Sheets, borehole geologic logs, and Well Survey Data Reports for each borehole are in Appendices A, B, and C, respectively. Sample details including Hanford Environmental Information System (HEIS) numbers, sample interval depths, dates, and % recovery are summarized in Section 3.

Table 1-1. Borehole Identification, Location, Waste Site Association, and Drilling Information

Borehole ID	Associated Waste Site	Northing ^a	Easting ^a	Elevation of Brass Survey Marker ^b	Total Drilled Depth (ft bgs)	Field Activity Dates	
						Initiate Drilling	Conclude Field Work
		(meters) ^c					
C9839	216-B-5 Crib	136730.22	573778.92	209.61	14.5	Jan. 9, 2018	Jan. 11, 2018
C9558 (Replacement borehole for C9839)	216-B-5 Crib	136730.87	573778.58	209.64	10.1	Jan. 15, 2018	Jan. 15, 2018
C9840	216-B-9 Crib	136831.24	573855.66	207.97	10.1	Jan. 9, 2018	Jan. 11, 2018
C9559 (Replacement borehole for C9840)	216-B-9 Crib	136830.05	573854.93	208.09	10.0	Jan. 15, 2018	Jan. 15, 2018
C9841	216-B-9 Crib	136862.90	573860.48	207.34	10.0	Jan. 10, 2018	Jan. 11, 2018
C9842	216-B-9 Crib	136837.56	573863.58	207.68	10.0	Jan. 10, 2018	Jan. 11, 2018
C9843	216-B-35 Trench	137277.11	573448.46	203.83	12.6	Jan. 10, 2018	Jan. 11, 2018
C9844	216-B-35 Trench	137292.16	573403.74	203.84	10.2	Jan. 11, 2018	Jan. 11, 2018
C9845	216-B-39 Trench	137373.92	573458.27	200.96	6.7	Jan. 11, 2018	Jan. 15, 2018
C9560 (Replacement borehole for C9845)	216-B-39 Trench	137373.50	573458.57	200.99	10.1	Jan. 11, 2018	Jan. 15, 2018
C9846	216-B-40 Trench	137403.15	573431.43	200.14	10.0	Jan. 15, 2018	Jan. 15, 2018
C9847	216-B-41 Trench	137429.20	573449.70	199.34	10.0	Jan. 15, 2018	Jan. 15, 2018
C9855	216-T-5 Trench	136722.33	566672.45	206.79	10.0	Jan. 24, 2018	Jan. 24, 2018
C9856	216-T-5 Trench	136727.39	566674.46	206.82	10.0	Jan. 24, 2018	Jan. 24, 2018
C9857	216-T-14 Trench	136856.60	566947.30	212.61	10.0	Jan. 24, 2018	Jan. 24, 2018

Table 1-1. Borehole Identification, Location, Waste Site Association, and Drilling Information

Borehole ID	Associated Waste Site	Northing ^a	Easting ^a	Elevation of Brass Survey Marker ^b	Total Drilled Depth (ft bgs)	Field Activity Dates	
						Initiate Drilling	Conclude Field Work
		(meters) ^c					
C9940 (Replacement borehole for C9857)	216-T-14 Trench	136856.62	566946.64	212.62	8.6	Jan. 24, 2018	Jan. 24, 2018
C9858	216-T-15 Trench	136849.93	566973.24	213.15	10.1	Jan. 24, 2018	Jan. 25, 2018
C9941 (Replacement borehole for C9858)	216-T-15 Trench	136849.87	566972.49	213.14	10.2	Jan. 24, 2018	Jan. 25, 2018
C9859	216-T-16 Trench	136805.03	567007.57	213.50	6.3	Jan. 25, 2018	Jan. 25, 2018
C9942 (Replacement borehole for C9859)	216-T-16 Trench	136805.06	567008.27	213.53	10.1	Jan. 25, 2018	Jan. 25, 2018
C9860	216-T-17 Trench	136843.01	567021.98	213.65	10.0	Jan. 25, 2018	Jan. 25, 2018
C9861	216-T-18 Crib	136463.38	566944.22	205.30	10.0	Mar. 12, 2108	Mar. 12, 2018
C9862	216-T-18 Crib	136454.98	566946.91	205.12	10.1	Mar. 12, 2018	Mar. 12, 2018
C9863	216-T-18 Crib	136455.71	566958.51	205.25	10.0	Mar. 12, 2018	Mar. 12, 2018
C9864	216-T-26 Crib	136405.16	566929.09	205.73	15.1	Mar. 12, 2018	Mar. 12, 2018
C9943 (Replacement borehole for C9864)	216-T-26 Crib	136405.24	566929.87	205.76	14.9	Mar. 12, 2018	Mar. 13, 2018
C9865	216-T-26 Crib	136396.61	566926.71	205.73	15.0	Mar. 13, 2018	Mar. 13, 2018
C9944 (Replacement borehole for C9865)	216-T-26 Crib	136395.95	566926.69	205.72	15.1	Mar. 13, 2018	Mar. 13, 2018
C9866	216-T-26 Crib	136390.97	566930.04	205.74	13.5	Mar. 13, 2018	Mar. 13, 2018

Table 1-1. Borehole Identification, Location, Waste Site Association, and Drilling Information

Borehole ID	Associated Waste Site	Northing ^a	Easting ^a	Elevation of Brass Survey Marker ^b	Total Drilled Depth (ft bgs)	Field Activity Dates	
						Initiate Drilling	Conclude Field Work
		(meters) ^c					
C9945 (Replacement borehole for C9866)	216-T-26 Crib	136390.88	566930.88	205.76	15.5	Mar. 13, 2018	Mar. 13, 2018
C9848	216-S-9 Crib	134508.49	567156.35	208.05	15.0	Jan. 16, 2018	Jan. 18, 2018
C9849	216-S-9 Crib	134484.55	567167.58	209.41	15.2	Jan. 18, 2018	Jan. 22, 2018
C9939 (Replacement for C9849)	216-S-9 Crib	134484.98	567167.55	209.42	15.1	Jan. 18, 2018	Jan. 22, 2018
C9850	216-S-9 Crib	134451.37	567180.74	209.47	15.1	Jan. 22, 2018	Jan. 22, 2018
C9851	216-S-9 Crib	134474.54	567184.31	209.33	15.1	Jan. 22, 2018	Jan. 22, 2018
C9852	216-S-9 Crib	134456.53	567194.84	208.29	15.2	Jan. 22, 2018	Jan. 22, 2018
C9853	216-S-21 Crib	134405.42	566615.78	203.03	10.0	Jan. 23, 2018	Jan. 23, 2018
C9854	216-S-21 Crib	134413.15	566607.84	202.69	10.1	Jan. 23, 2018	Jan. 23, 2018

a. Coordinates are in Washington State Plane South (FIPS 4602) using the *North American Datum of 1983* (NAD83).

b. Elevation values are based on NAVD88, *North American Vertical Datum of 1988*.

ID = identification.

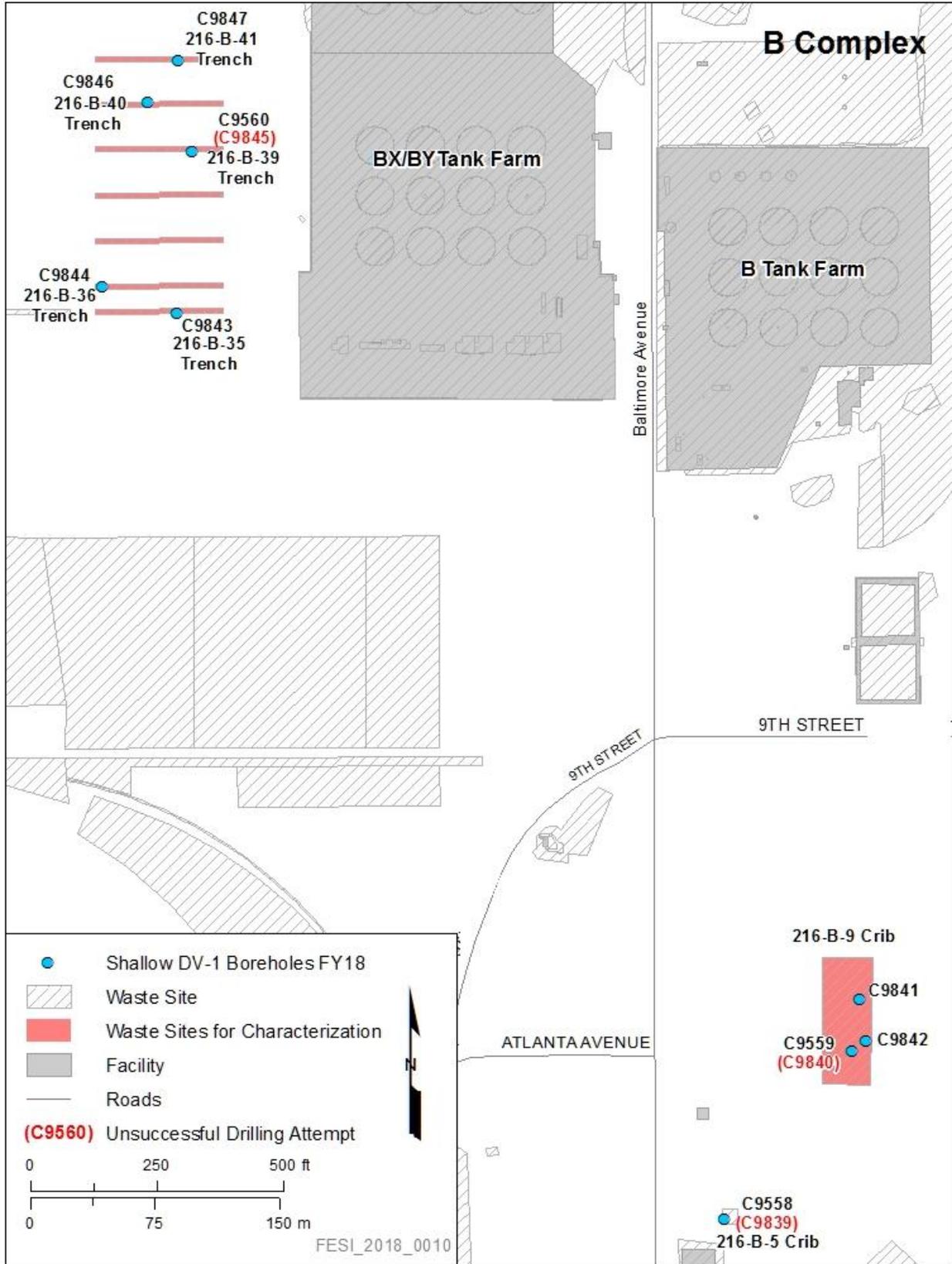


Figure 1-1. Borehole Locations in B Complex.

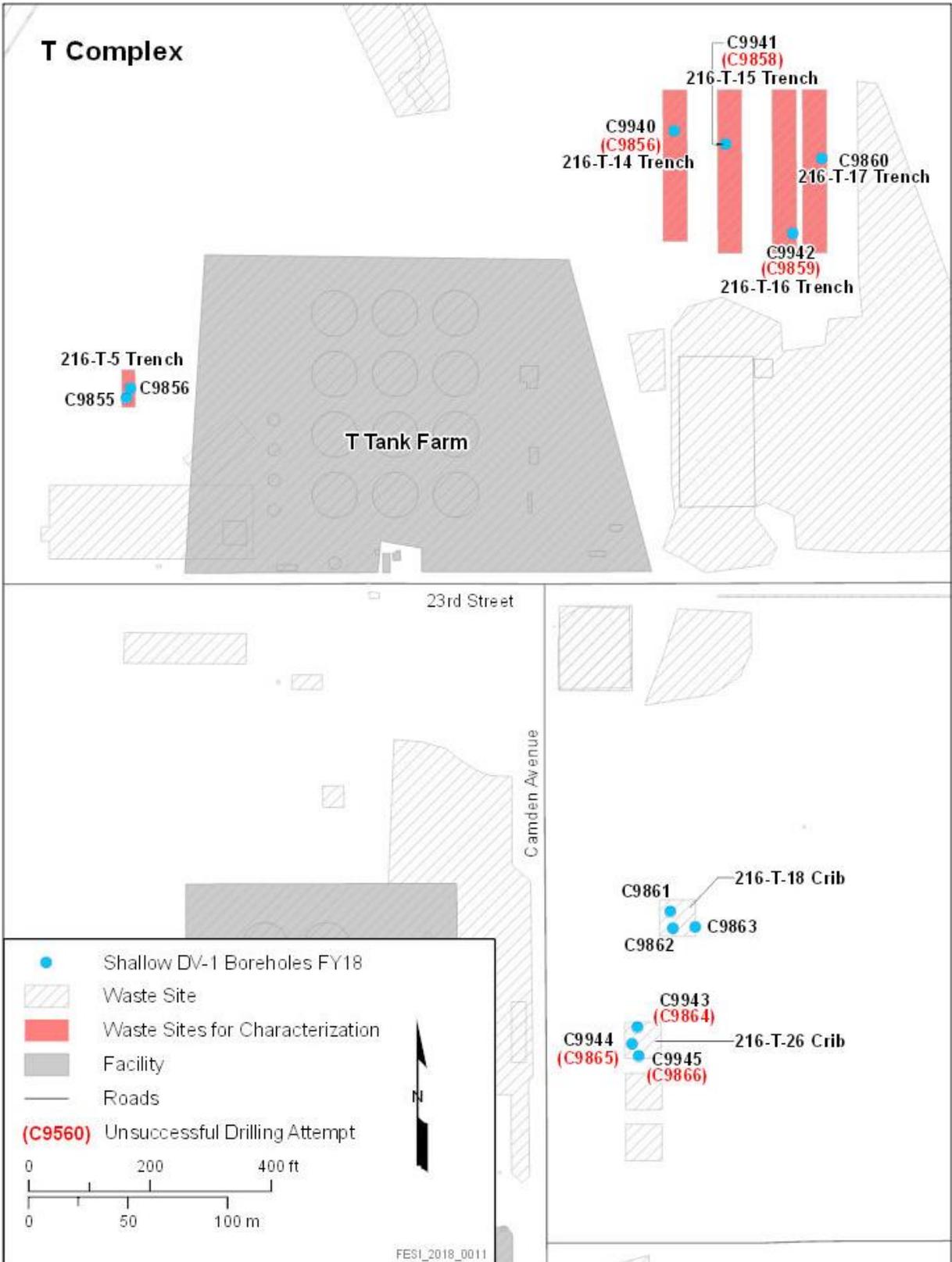


Figure 1-2. Borehole Locations in T Complex

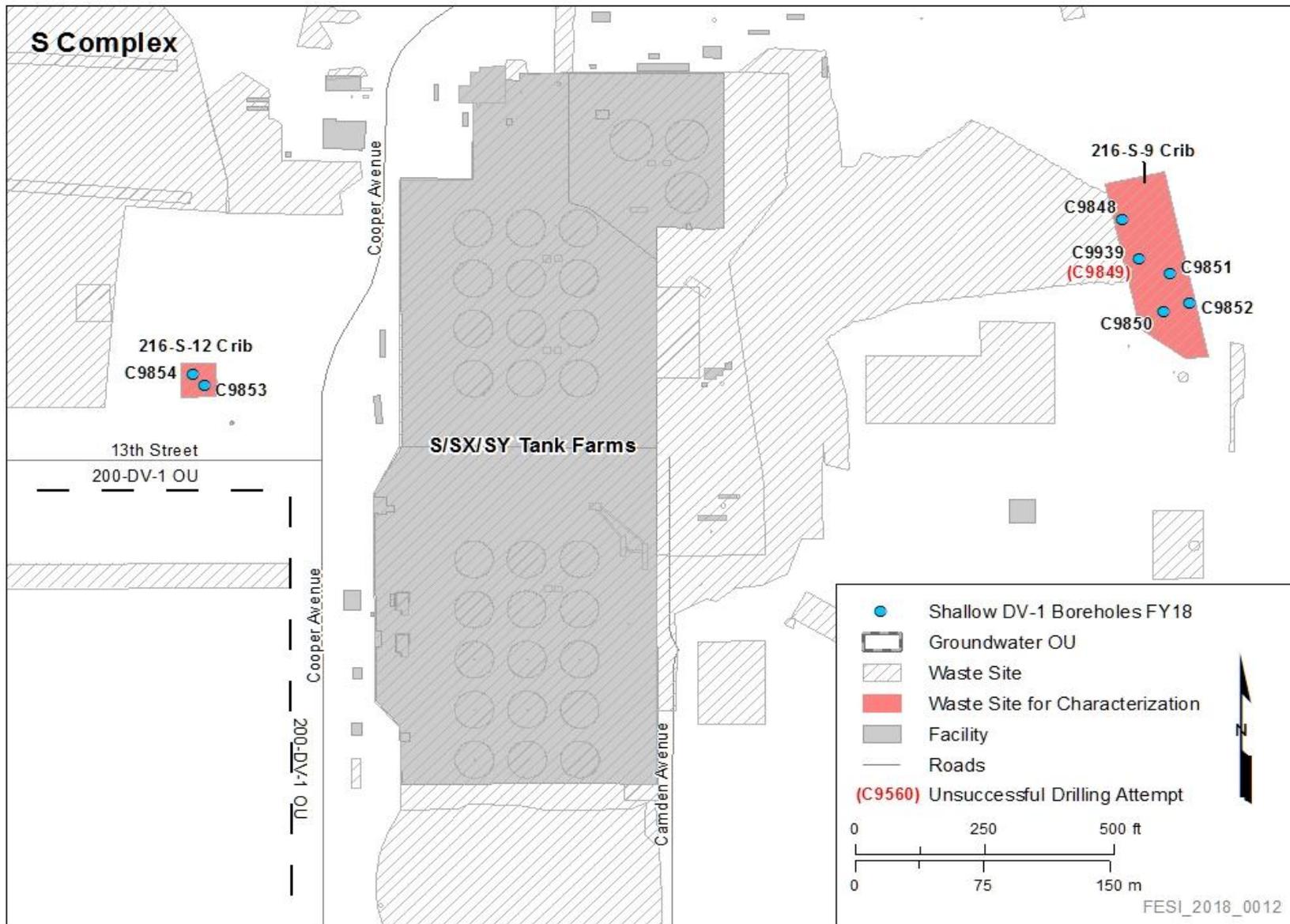


Figure 1-3. Borehole Locations in S Complex

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2 General Description of Field Activities

This section summarizes the drilling, sampling, and decommissioning details common to all of the 200-DV-1 OU boreholes. Borehole-specific details are included in Chapter 3. The boreholes were drilled and decommissioned to Washington State standards as detailed in the Washington Administrative Code (WAC) 173-160, *Minimum Standards for Construction and Maintenance of Wells*. Radiological surveys were performed in accordance with CHPRC procedure SGRP-PRO-RP-52789, *Radiological Control Coverage and Survey Requirements for S&GRP Well Activities*. Well decommissioning activities were recorded in accordance with CHPRC procedures GRP-EE-02-14.1, *Drilling, Remediating, and Decommissioning Resource Protection Wells and Geotechnical Soil Borings*. Due to the drilling and sampling methods, soil cuttings were not available for photographs, sieve analysis or detailed geologic logging at the drill site. To the extent possible, soil cuttings were logged in the field in accordance with CHPRC procedure GRP-EE-01-7.0, *Geologic Logging*.

2.1 Drilling, Sampling and Borehole Decommissioning

The 200-DV-1 OU shallow characterization boreholes were drilled in areas with the potential for elevated levels of radiological contamination. Direct-push drilling was used to reduce the potential for worker exposure to contaminated soil cuttings and reduce investigation-derived waste.

The Rev. 0 SAP (DOE/RL-2011-104) was written to support the use of direct-push technology to advance the boreholes and collect the required soil samples. Tri-Party Agreement (Ecology et al., 1989) change notice TPA-CN-668 incorporates the direct-push drilling continuous coring method into the Rev. 0 SAP field sampling plan. Drilling activities, performed by Holt, began January 9, 2018, using a Geoprobe® 7800 drill rig (Figure 2-1) and threaded, 4 1/2 inch (in.) outer diameter (OD) temporary casing. Geoprobe® direct-push drilling uses a hydraulic hammer coupled with the weight of the drill pipe and downward thrust of the drill head, to allow for penetration of the formation. The drilling and decommissioning activities, performed by Holt, concluded March 13, 2018.

Samples for laboratory analysis were collected during drilling using LEXAN™ liners. Continuous core samples were collected by driving a decontaminated 3 in. OD liner through the sampling interval or until refusal. LEXAN™ liner sample depths and associated HEIS numbers are included for each individual borehole in Section 3.

Well summary sheets included in Appendix A provide visual representations of each decommissioning profile. Annular seal materials include 3/8-in. diameter granular bentonite crumbles or pellets.

High-strength concrete mix was used to seal the top two feet (ft) of annular space. Borehole-specific decommissioning details are listed in Table 2-2, and discussed in Section 2.2.

The surface completion consists of a cement marker at the location of the decommissioned borehole. The cement marker contains a brass survey marker that is die-stamped with the borehole identification (ID) and date of decommissioning.

™ LEXAN is a trademark of Saudi Basic Industries Corporation, Houston, Texas.



Figure 2-1. Geoprobe® 7800 drill rig.

2.2 Health and Safety Screening

A radiological control technician performed continuous radiological surveys of any soil cuttings generated during drilling, LEXAN™ liners, temporary drive casing, core barrel and drill rods, and driller's control station using standard field screening instruments. No radiological activity levels greater than background were recorded.

Air quality monitoring for volatile organic compounds (VOCs) and ammonia was performed during drilling and sampling activities by an industrial hygienist professional (IH). The drillers' breathing zone near the wellhead, and the fresh soil generated during drilling were surveyed for VOCs using a photo-ionization detector. Field measurements of contaminant concentrations above background levels are discussed in Section 3.

3 Borehole-Specific Summary of Field Activities

This section summarizes the borehole drilling, sampling, and decommissioning activities specific to each borehole. All measurements are reported in the original units in which they were measured in the field.

3.1 Boreholes Located in the B Complex

This section includes boreholes located in the B Complex. Decommissioning information for each borehole is summarized in Table 3-1.

Table 3-1. Decommissioning Information for B Complex Boreholes

Borehole ID	Total Depth Drilled (ft bgs)	Surface Seal ^a (ft bgs)	Bentonite Backfill (ft bgs)
C9839	14.5	0.0 – 2.1	2.1 – 14.5
C9558	10.1	0.0 – 2.5	2.5 – 10.1
C9840	10.1	0.0 – 2.2	2.2 – 10.1
C9559	10.0	0.0 – 1.8	1.8 – 10.0
C9841	10.0	0.0 – 2.3	2.3 – 10.0
C9842	10.0	0.0 – 2.5	2.5 – 10.0
C9843	12.6	0.0 – 2.3	2.3 – 12.6
C9844	10.2	0.0 – 2.0	2.0 – 10.2
C9845	6.7	0.0 – 2.4	2.4 – 6.7
C9560	10.1	0.0 – 1.9	1.9 – 10.1
C9846	10.0	0.0 – 2.7	2.7 – 10.0
C9847	10.0	0.0 – 2.5	2.5 – 10.0

a. High-strength concrete mix.

ft bgs = feet below ground surface

ID = identification

3.1.1 Borehole C9839

Borehole C9839, located at 216-B-5 Crib, was drilled from ground surface to a total depth (TD) of 14.5 ft bgs on January 09, 2018. Five grab samples were successfully collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. The drilling of replacement borehole C9558 was required, following the insufficient recovery of one grab sample from the 8 to 10 ft interval.

Borehole decommissioning was performed from January 9, 2018 to January 11, 2018. The borehole was filled from depth to surface with 12.4 ft of bentonite pellets and 2.1 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-2.

Table 3-2. C9839 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/9/2018	2.0 – 5.3	100	B3FL00, B3FL03
1/9/2018	5.3 – 6.3	100	B3FL05, B3FL08
1/9/2018	6.3 – 10.0	100	B3FL10, B3FL13
1/9/2018	10.0 – 13.9	100	B3FL20, B3FL23, B3FL24, B3FL27
1/9/2018	13.9 – 14.5	100	B3FL29, B3FL32

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.2 Borehole C9558 (Replacement for C9839)

Borehole C9558, located at 216-B-5 Crib, was drilled from ground surface to a TD of 10.1 ft bgs on January 15, 2018. One grab sample was collected using a 3 1/2-in. OD core barrel and a 3-in. OD LEXAN™ liner.

Borehole decommissioning was performed on January 15, 2018. The borehole was filled from depth to surface with 7.6 ft of bentonite pellets and 2.5 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning.

All sample information is presented in Table 3-3.

Table 3-3. C9558 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/9/2018	8.4 – 10.1	100	B3FL34, B3FL37

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.3 Borehole C9840

Borehole C9840, located at 216-B-9 Crib, was drilled from ground surface to a TD of 10.1 ft bgs on January 09, 2018. Three grab samples were successfully collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. The drilling of replacement borehole C9559 was required, following the insufficient recovery of one grab sample from the 8 to 10 ft interval.

Borehole decommissioning was performed from January 9, 2018 to January 11, 2018. The borehole was filled from depth to surface with 7.9 ft of bentonite pellets and 2.2 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-4.

Table 3-4. C9840 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/9/2018	1.6 – 4.0	65	B3FL51, B3FL48
1/9/2018	4.0 – 6.0	100	B3FL56, B3FL53
1/9/2018	6.0 – 8.0	100	B3FL61, B3FL58
1/9/2018	8.0 – 10.0	0	Not Collected

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.4 Borehole C9559 (Replacement for C9840)

Borehole C9559, located at 216-B-9 Crib, was drilled from ground surface to a TD of 10.0 ft bgs on January 15, 2018. One grab sample was collected using a 3 1/2-in. OD core barrel and a 3-in. OD LEXAN™ liner.

Borehole decommissioning was performed on January 15, 2018. The borehole was filled from depth to surface with 8.2 ft of bentonite pellets and 1.8 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning.

All sample information is presented in Table 3-5.

Table 3-5. C9559 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/15/2018	8.1 – 10.0	5	B3FL68

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.5 Borehole C9841

Borehole C9841, located at 216-B-9 Crib, was drilled from ground surface to a TD of 10.0 ft bgs on January 10, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed from January 10, 2018 to January 11, 2018. The borehole was filled from depth to surface with 7.7 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-6.

Table 3-6. C9841 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/10/2018	1.8 – 4.5	100	B3FL83, B3FL82
1/10/2018	4.5 – 6.6	90	B3FL86, B3FL85, B3FL88, B3FL87
1/10/2018	6.6 – 8.6	100	B3FL91, B3FL90
1/10/2018	8.6 – 10.0	1.5	B3FL93

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.6 Borehole C9842

Borehole C9841, located at 216-B-9 Crib, was drilled from ground surface to a TD of 10.0 ft bgs on January 10, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed from January 10, 2018 to January 11, 2018. The borehole was filled from depth to surface with 7.7 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-7.

Table 3-7. C9842 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/10/2018	1.8 – 4.3	100	B3FLB5, B3FLB4
1/10/2018	4.3 – 6.0	2	B3FLB7
1/10/2018	6.0 – 8.3	3	B3FLC1, B3FLC0
1/10/2018	8.3 – 10.0	3	B3FLC4, B3FLC3

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.7 Borehole C9843

Borehole C9843, located at 216-B-35 Trench, was drilled from ground surface to a TD of 12.6 ft bgs from January 10, 2018 to January 11 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 11, 2018. The borehole was filled from depth to surface with 10.3 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-8.

3.1.8 Borehole C9844

Borehole C9844, located at 216-B-36 Trench, was drilled from ground surface to a TD of 10.2 ft bgs on January 11, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 11, 2018. The borehole was filled from depth to surface with 8.2 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in

Table 3-9.

Table 3-8. C9843 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/10/2018	2.3 – 4.6	100	B3FLD5, B3FLD4
1/10/2018	4.6 – 6.6	100	B3FLD8, B3FLD7
1/10/2018	6.6 – 8.6	100	B3FLF1, B3FLF0
1/11/2018	8.6 – 10.1	0.5	B3FLF3, B3FLF4

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

Table 3-9. C9844 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/11/2018	2.1 – 4.0	100	B3FLH4, B3FLH5, B3FLK8, B3FLK9
1/11/2018	4.0 – 6.0	100	B3FLH8, B3FLH7
1/11/2018	6.0 – 8.0	100	B3FLJ1, B3FLJ0
1/11/2018	8.0 – 10.2	100	B3FLK7, B3FLK6

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.1.9 Borehole C9845

Borehole C9845, located at 216-B-39 Trench, was drilled from ground surface to a TD of 6.7 ft bgs on January 11, 2018. One grab sample was successfully collected using a 3 1/2-in. OD core barrel and a 3-in. OD LEXAN™ liner. The drilling of replacement borehole C9560 was required, following the insufficient recovery of one grab sample from the 4 to 6 ft interval.

Borehole decommissioning was performed on January 11, 2018. The borehole was filled from depth to surface with 4.3 ft of bentonite pellets and 2.4 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-10.

Table 3-10. C9845 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/11/2018	2.3 – 4.5	100	B3FLH5, B3FLM8, B3FLM9
1/11/2018	4.5 – 6.7	0	Not Collected

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.10 Borehole C9560 (Replacement for C9845)

Borehole C9560, located at 216-B-39 Trench, was drilled from ground surface to a TD of 10.1 ft bgs on January 11, 2018. Three grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed from January 11, 2018 to January 15, 2018. The borehole was filled from depth to surface with 8.2 ft of bentonite pellets and 1.9 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-11.

Table 3-11. C9560 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/11/2018	5.1 – 6.6	95	B3FLN2, B3FLN1
1/11/2018	6.6 – 8.7	1	B3FLN4
1/11/2018	8.7 – 10.1	1.5	B3FLN7, B3FLN8

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.11 Borehole C9846

Borehole C9846, located at 216-B-40 Trench, was drilled from ground surface to a TD of 10.0 ft bgs on January 15, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 15, 2018. The borehole was filled from depth to surface with 7.3 ft of bentonite pellets and 2.7 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-12.

Table 3-12. C9846 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/15/2018	2.1 – 4.4	100	B3FLV0, B3FLV1, B3FLV2, B3FLV3
1/15/2018	4.4 – 6.8	100	B3FLV5, B3FLV6
1/15/2018	6.8 – 8.5	100	B3FLV8, B3FLV9
1/15/2018	8.5 – 10.0	5	B3FLW1

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.1.12 Borehole C9847

Borehole C9847, located at 216-B-41 Trench, was drilled from ground surface to a TD of 10.0 ft bgs on January 15, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 15, 2018. The borehole was filled from depth to surface with 7.5 ft of bentonite pellets and 2.5 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-13.

Table 3-13. C9847 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/15/2018	2.3 – 4.5	100	B3FMC2, B3FMC3
1/15/2018	4.5 – 6.9	100	B3FMC5, B3FMC6
1/15/2018	6.9 – 8.3	100	B3FMC8, B3FMC9
1/15/2018	8.3 – 10.0	100	B3FMD1, B3FMD2

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2 Boreholes Located in the T Complex

This section includes boreholes located in the T Complex. Decommissioning information for each borehole is summarized in Table 3-14.

Table 3-14. Decommissioning Information for T Complex Boreholes

Borehole ID	Total Depth Drilled (ft bgs)	Surface Seal^a (ft bgs)	Bentonite Backfill (ft bgs)
C9855	10.0	0.0 – 2.0	2.0 – 10.0
C9856	10.0	0.0 – 2.4	2.4 – 10.0
C9857	10.0	0.0 – 3.0	3.0 – 10.0
C9940	8.6	0.0 – 2.0	2.0 – 8.6
C9858	10.1	0.0 – 2.1	2.1 – 10.1
C9941	10.2	0.0 – 2.1	2.1 – 10.2
C9859	6.3	0.0 – 2.5	2.5 – 6.3
C9942	10.1	0.0 – 2.0	2.0 – 10.1
C9860	10.0	0.0 – 2.0	2.0 – 10.0
C9861	10.0	0.0 – 2.3	2.3 – 10.0
C9862	10.1	0.0 – 2.3	2.3 – 10.1
C9863	10.0	0.0 – 2.3	2.3 – 10.0
C9864	15.1	0.0 – 2.3	2.3 – 15.1
C9943	14.9	0.0 – 2.0	2.0 – 14.9
C9865	15.0	0.0 – 2.0	2.0 – 15.0
C9944	15.1	0.0 – 2.0	2.0 – 15.1
C9866	13.5	0.0 – 2.0	2.0 – 13.5
C9945	15.5	0.0 – 2.0	2.0 – 15.5

a. High-strength concrete mix.

ft bgs = feet below ground surface

ID = identification

3.2.1 Borehole C9855

Borehole C9855, located at 216-T-5 Trench, was drilled from ground surface to a TD of 10.0 ft bgs on January 24, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 24, 2018. The borehole was filled from depth to surface with 8.0 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-15.

Table 3-15. C9855 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/24/2018	1.9 – 4.1	100	B3H0M0, B3H0L9
1/24/2018	4.1 – 6.3	100	B3H0M3, B3H0M2
1/24/2018	6.3 – 8.0	100	B3H0M6, B3H0M5
1/24/2018	8.0 – 10.0	100	B3H0M9, B3H0M8

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.2 Borehole C9856

Borehole C9856, located at 216-T-5 Trench, was drilled from ground surface to a TD of 10.0 ft bgs on January 24, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 24, 2018. The borehole was filled from depth to surface with 7.6 ft of bentonite pellets and 2.4 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-16.

Table 3-16. C9856 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/24/2018	2.1 – 4.1	100	B3H179, B3H180
1/24/2018	4.1 – 6.1	100	B3H182, B3H183, B3H184, B3H185
1/24/2018	6.1 – 8.0	100	B3H187, B3H188
1/24/2018	8.0 – 10.0	100	B3H190, B3H191

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.3 Borehole C9857

Borehole C9857, located at 216-T-14 Trench, was drilled from ground surface to a TD of 10.0 ft bgs on January 24, 2018. Three grab samples were successfully collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. The drilling of replacement borehole C9940 was required, following the insufficient recovery of one grab samples from the 6 to 8 ft interval.

Borehole decommissioning was performed on January 24, 2018. The borehole was filled from depth to surface with 7.0 ft of bentonite pellets and 3.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-17.

Table 3-17. C9857 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/24/2018	2.1 – 4.0	100	B3H1B1, B3H1B2
1/24/2018	4.0 – 6.7	100	B3H1B4, B3H1B5
1/24/2018	6.7 – 8.0	0	Not Collected
1/24/2018	8.0 – 10.0	100	B3H1C2, B3H1C3

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.4 Borehole C9940 (Replacement for C9857)

Borehole C9940, located at 216-T-14 Trench, was drilled from ground surface to a TD of 8.6 ft bgs on January 24, 2018. One grab sample was collected using a 3 1/2-in. OD core barrel and a 3-in. OD LEXAN™ liner.

Borehole decommissioning was performed on January 24, 2018. The borehole was filled from depth to surface with 6.6 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-18.

Table 3-18. C9940 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/24/2018	5.3 – 8.6	100	B3H1C5, B3H1C6, B3H1C8, B3H1C9

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.5 Borehole C9858

Borehole C9858, located at 216-T-15 Trench, was drilled from ground surface to a TD of 10.1 ft bgs on January 24, 2018. Two grab samples were successfully collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. The drilling of replacement borehole C9941 was required, following the insufficient recovery of two grab samples from the 6 to 10 ft interval.

Borehole decommissioning was performed from January 24, 2018 to January 25, 2018. The borehole was filled from depth to surface with 8.0 ft of bentonite pellets and 2.1 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-19.

Table 3-19. C9858 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/24/2018	2.0 – 4.2	100	B3H1D3, B3H1D4
1/24/2018	4.2 – 6.5	100	B3H1D6, B3H1D7
1/24/2018	6.5 – 8.0	0	Not Collected
1/24/2018	8.0 – 10.1	0	Not Collected

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.6 Borehole C9941 (Replacement for C9858)

Borehole C9941, located at 216-T-15 Trench, was drilled from ground surface to a TD of 10.2 ft bgs on January 24, 2018. Two grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 25, 2018. The borehole was filled from depth to surface with 8.1 ft of bentonite crumbles and 2.1 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-20.

Table 3-20. C9941 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/24/2018	5.2 – 7.9	20	B3H1F5, B3H1F6
1/24/2018	7.9 – 10.2	2	B3H1F8

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.7 Borehole C9859

Borehole C9859, located at 216-T-16 Trench, was drilled from ground surface to a TD of 6.3 ft bgs on January 25, 2018. One grab sample was collected using a 3 1/2-in. OD core barrel and a 3-in. OD LEXAN™ liner. The drilling of replacement borehole C9942 was required, following the insufficient recovery of one grab sample from the 4 to 6 ft interval.

Borehole decommissioning was performed on January 25, 2018. The borehole was filled from depth to surface with 3.8 ft of bentonite pellets and 2.5 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-21.

Table 3-21. C9859 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/25/2018	2.0 – 4.2	100	B3H1N0, B3H1M9
1/25/2018	4.2 – 6.3	0	Not Collected

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.8 Borehole C9942 (Replacement for C9859)

Borehole C9942, located at 216-T-16 Trench, was drilled from ground surface to a TD of 10.1 ft bgs on January 25, 2018. Three grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 25, 2018. The borehole was filled from depth to surface with 8.1 ft of bentonite crumbles and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-22.

Table 3-22. C9942 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/25/2018	4.0 – 6.2	100	B3H1N3, B3H1N2
1/25/2018	6.2 – 8.2	90	B3H1N6, B3H1N5
1/25/2018	8.2 – 10.1	100	B3H1N9, B3H1N8

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.9 Borehole C9860

Borehole C9860, located at 216-T-17 Trench, was drilled from ground surface to a TD of 10.0 ft bgs on January 25, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 25, 2018. The borehole was filled from depth to surface with 8.0 ft of bentonite crumbles and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-23.

Table 3-23. C9860 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/25/2018	2.1 – 4.1	100	B3H1T4, B3H1T3
1/25/2018	4.1 – 6.3	100	B3H1T7, B3H1T6
1/25/2018	6.3 – 7.9	100	B3H1V0, B3H1T9
1/25/2018	7.9 – 10.0	75	B3H1V2, B3H1V3

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.2.10 Borehole C9861

Borehole C9861, located at 216-T-18 Crib, was drilled from ground surface to a TD of 10.0 ft bgs on March 12, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

The IH detected a maximum of 68.6 parts per million by volume VOC from the sample collected at 6.5 ft bgs on March 12, 2018.

Borehole decommissioning was performed on March 12, 2018. The borehole was filled from depth to surface with 7.7 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-24.

Table 3-24. C9861 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/12/2018	2.5 – 4.3	50	B3H1W9, B3H1X0, B3H1Y0, B3H1Y1
3/12/2018	4.3 – 6.5	50	B3H1X2, B3H1X3
3/12/2018	6.5 – 8.2	15	B3H1X5, B3H1X6
3/12/2018	8.2 – 10.0	50	B3H1X8, B3H1X9

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.2.11 Borehole C9862

Borehole C9862, located at 216-T-18 Crib, was drilled from ground surface to a TD of 10.1 ft bgs on March 12, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

The IH detected a maximum of 4.2 parts per million by volume VOC from the sample collected at 6.4 ft bgs on March 12, 2018.

Borehole decommissioning was performed on March 12, 2018. The borehole was filled from depth to surface with 7.8 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-34.

Table 3-25. C9862 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/12/2018	2.3 – 4.3	75	B3H205, B3H206
3/12/2018	4.3 – 6.4	100	B3H208, B3H209
3/12/2018	6.4 – 8.0	80	B3H211, B3H212
3/12/2018	8.0 – 10.1	75	B3H214, B3H215

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.2.12 Borehole C9863

Borehole C9863, located at 216-T-18 Crib, was drilled from ground surface to a TD of 10.0 ft bgs on March 12, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

The IH detected a maximum of 0.8 parts per million by volume VOC from the sample collected at 4.6 ft bgs on March 12, 2018.

Borehole decommissioning was performed on March 12, 2018. The borehole was filled from depth to surface with 7.7 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-26.

Table 3-26. C9863 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/12/2018	2.2 – 4.6	100	B3H225, B3H226
3/12/2018	4.6 – 6.4	80	B3H228, B3H229
3/12/2018	6.4 – 8.4	90	B3H231, B3H232
3/12/2018	8.4 – 10.0	90	B3H234, B3H235
3/12/2018	Quality Control	-	B3H236, B3H237, B3H244, B3H245

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.13 Borehole C9864

Borehole C9864, located at 216-T-26 Crib, was drilled from ground surface to a TD of 15.1 ft bgs on March 12, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. Grab samples from the 10 to 15 ft interval could not be collected due to the coarse- to very-coarse grained gravel backfill of the crib, and the absence of fine material required for analysis. Borehole C9943 was drilled as a replacement borehole to collect the two samples from the 10 to 15 ft interval.

The IH detected a maximum of 0.8 parts per million by volume VOC from the sample collected at 8.3 ft bgs on March 12, 2018.

Borehole decommissioning was performed on March 12, 2018. The borehole was filled from depth to surface with 12.8 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-27.

Table 3-27. C9864 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/12/2018	2.2 – 4.3	100	B3H247, B3H248
3/12/2018	4.3 – 6.5	100	B3H250, B3H251
3/12/2018	6.5 – 8.3	100	B3H253, B3H254
3/12/2018	8.3 – 10.0	100	B3H256, B3H257
3/12/2018	10.0 – 12.3	80	Not Collected
3/12/2018	12.3 – 15.1	80	Not Collected

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.14 Borehole C9943 (Replacement for C9864)

Borehole C9943, located at 216-T-26 Crib, was drilled from ground surface to a TD of 14.9 ft bgs from March 12, 2018 to March 13, 2018. Two grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

The IH detected a maximum of 1.9 parts per million by volume VOC, and 2 nanograms of lead from the 12 to 15 ft bgs soil cuttings on March 13, 2018.

Borehole decommissioning was performed on March 13, 2018. The borehole was filled from depth to surface with 12.9 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-28.

Table 3-28. C9943 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/13/2018	10.1 – 12.3	50	B3H265
3/13/2018	12.3 – 14.9	90	B3H268

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.15 Borehole C9865

Borehole C9865, located at 216-T-26 Crib, was drilled from ground surface to a TD of 15.0 ft bgs on March 13, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. Grab samples from the 10 to 15 ft interval could not be collected due to the coarse- to very-coarse grained gravel backfill of the crib, and the absence of fine material required for analysis.

Borehole C9944 was drilled as a replacement borehole to collect the two samples from the 10 to 15 ft interval.

Borehole decommissioning was performed on March 13, 2018. The borehole was filled from depth to surface with 13.0 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-29.

Table 3-29. C9865 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/13/2018	2.0 – 4.3	100	B3H273, B3H274
3/13/2018	4.3 – 6.3	100	B3H276, B3H277, B3H279, B3H280
3/13/2018	6.3 – 9.2	100	B3H282, B3H283
3/13/2018	9.2 – 11.7	95	B3H285, B3H286
3/13/2018	11.7 – 15.0	100	Not Collected

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.16 Borehole C9944 (Replacement for C9865)

Borehole C9944, located at 216-T-26 Crib, was drilled from ground surface to a TD of 15.1 ft bgs on March 13, 2018. One grab sample was collected using a 3 1/2-in. OD core barrel and a 3-in. OD LEXAN™ liner. The grab sample from the 13 to 15 ft interval could not be collected due to the coarse- to very-coarse grained gravel backfill of the crib, and the absence of fine material required for analysis. No further attempts were made to collect the 13 to 15 ft grab sample.

Borehole decommissioning was performed on March 13, 2018. The borehole was filled from depth to surface with 13.1 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-30.

Table 3-30. C9944 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/13/2018	10.5 – 12.0	60	B3H294
3/13/2018	12.0 – 15.1	35	Not Collected

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.2.17 Borehole C9866

Borehole C9861, located at 216-T-26 Crib, was drilled from ground surface to a TD of 13.5 ft bgs on March 13, 2018. Five grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. The grab sample from the 10 to 12 ft interval could not be collected due to the coarse- to very-coarse grained gravel backfill of the crib, and the absence of fine material required for analysis. Borehole C9945 was drilled as a replacement borehole to collect the two samples from the 10 to 12 ft interval and the 13 to 15 ft interval.

Borehole decommissioning was performed on March 13, 2018. The borehole was filled from depth to surface with 13.0 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-31.

Table 3-31. C9866 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/13/2018	2.1 – 4.2	100	B3H2B2, B3H2B3
3/13/2018	4.2 – 6.3	100	B3H2B5, B3H2B6
3/13/2018	6.3 – 8.2	100	B3H2B8, B3H2B9
3/13/2018	8.2 – 10.1	90	B3H2C1, B3H2C2
3/13/2018	10.1 – 12.0	40	Not Collected
3/13/2018	12.0 – 13.5	30	B3H2C7

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.2.18 Borehole C9945 (Replacement for C9866)

Borehole C9945, located at 216-T-26 Crib, was drilled from ground surface to a TD of 15.0 ft bgs on March 13, 2018. Two grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on March 13, 2018. The borehole was filled from depth to surface with 13.5 ft of bentonite pellets and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-32.

Table 3-32. C9945 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
3/13/2018	10.3 – 11.6	50	B3H2D0
3/13/2018	11.6 – 15.0	100	B3H2D3, B3H2D4

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.3 Boreholes Located in the S Complex

This section includes S Complex boreholes. Decommissioning information for each borehole is summarized in Table 3-33.

Table 3-33. Decommissioning Information for S Complex Boreholes

Borehole ID	Total Depth Drilled (ft bgs)	Surface Seal ^a (ft bgs)	Bentonite Backfill (ft bgs)
C9848	15.0	0.0 – 2.3	2.3 – 15.0
C9849	15.2	0.0 – 3.0	3.0 – 15.2
C9939	15.1	0.0 – 2.4	2.4 – 15.1
C9850	15.1	0.0 – 2.5	2.5 – 15.1
C9851	15.1	0.0 – 1.8	1.8 – 15.1
C9852	15.2	0.0 – 2.1	2.1 – 15.2
C9853	10.0	0.0 – 2.0	2.0 – 10.0

a. High-strength concrete mix

ft bgs = feet below ground surface

ID = identification

3.3.1 Borehole C9848

Borehole C9848, located at 216-S-9 Crib, was drilled from ground surface to a TD of 15.0 ft bgs from January 16, 2018 to January 18, 2018. Six grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 18, 2018. The borehole was filled from depth to surface with 12.7 ft of bentonite pellets and 2.3 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-34.

Table 3-34. C9848 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/16/2018	3.0 – 4.4	100	B3FMF2, B3FMF3
1/16/2018	4.4 – 6.2	100	B3FMF5, B3FMF6
1/16/2018	6.2 – 8.3	100	B3FMF8, B3FMF9
1/16/2018	8.3 – 10.0	100	B3FMH1, B3FMH2
1/16/2018	10.0 – 12.2	100	B3FMH4, B3FMH5
1/18/2018	13.0 – 15.0	100	B3FMH8, B3FMH7
1/18/2018	Quality Control	-	B3FMH9, B3FMJ0

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.3.2 Borehole C9849

Borehole C9849, located at 216-S-9 Crib, was drilled from ground surface to a TD of 15.2 ft bgs on January 18, 2018. Four grab samples were successfully collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners. The drilling of replacement borehole C9939 was required, following the insufficient recovery of two grab samples from the 10 to 15 ft interval.

Borehole decommissioning was performed from January 18, 2018 to January 22, 2018. The borehole was filled from depth to surface with 12.2 ft of bentonite pellets and 3.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-35.

Table 3-35. C9849 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/18/2018	2.2 – 4.4	100	B3FMK0, B3FMK1
1/18/2018	4.4 – 6.6	100	B3FMK3, B3FMK4
1/18/2018	6.6 – 8.3	100	B3FMK6, B3FMK7
1/18/2018	8.3 – 10.1	100	B3FMK9, B3FML0
1/18/2018	10.1 – 12.8	0	Not Collected
1/18/2018	12.8 – 15.2	0	Not Collected

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.3.3 Borehole C9939 (Replacement for C9849)

Borehole C9939, located at 216-S-9 Crib, was drilled from ground surface to a TD of 15.5 ft bgs on January 18, 2018. Two grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed from January 18, 2018 to January 22, 2018. The borehole was filled from depth to surface with 12.7 ft of bentonite pellets and 2.4 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-36.

Table 3-36. C9939 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/18/2018	10.1 – 12.0	100	B3FML9, B3FML8
1/18/2018	13.0 – 15.1	100	B3FMM2, B3FMM1

ft bgs = feet below ground surface

HEIS = Hanford Environmental Information System.

3.3.4 Borehole C9850

Borehole C9850, located at 216-S-9 Crib, was drilled from ground surface to a TD of 15.1 ft bgs on January 22, 2018. Six grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

The IH detected a maximum of 30.6 parts per million by volume VOC from the sample collected at 6.6 ft bgs on January 22, 2018.

Borehole decommissioning was performed on January 22, 2018. The borehole was filled from depth to surface with 12.6 ft of bentonite crumbles and 2.5 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-37.

Table 3-37. C9850 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/22/2018	1.9 – 4.5	100	B3FMM7, B3FMM6, B3FMN7, B3FMN8
1/22/2018	4.5 – 6.6	100	B3FMN0, B3FMM9
1/22/2018	6.6 – 8.4	100	B3FMN3, B3FMN2
1/22/2018	8.4 – 10.1	100	B3FMN6, B3FMN5
1/22/2018	10.1 – 12.0	100	B3FMP1, B3FMP0
1/22/2018	13.0 – 15.1	100	B3FMP4, B3FMP3

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.3.5 Borehole C9851

Borehole C9851, located at 216-S-9 Crib, was drilled from ground surface to a TD of 15.1 ft bgs on January 22, 2018. Six grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 22, 2018. The borehole was filled from depth to surface with 13.3 ft of bentonite crumbles and 1.8 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-38.

Table 3-38. C9851 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/22/2018	1.9 – 4.0	100	B3FMR5, B3FMR4
1/22/2018	4.0 – 6.5	100	B3FMR8, B3FMR7
1/22/2018	6.5 – 8.0	100	B3FMT1, B3FMT0
1/22/2018	8.0 – 10.1	100	B3FMT4, B3FMT3
1/22/2018	10.1 – 12.5	100	B3FMT7, B3FMT6
1/22/2018	12.5 – 15.1	100	B3FMV0, B3FMT9

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.3.6 Borehole C9852

Borehole C9852, located at 216-S-9 Crib, was drilled from ground surface to a TD of 15.2 ft bgs on January 22, 2018. Six grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 22, 2018. The borehole was filled from depth to surface with 13.1 ft of bentonite crumbles and 2.1 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-39.

Table 3-39. C9852 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/22/2018	2.2 – 4.2	100	B3FMW0, B3FMW1
1/22/2018	4.2 – 6.4	100	B3FMW3, B3FMW4
1/22/2018	6.4 – 8.0	100	B3FMW6, B3FMW7
1/22/2018	8.0 – 10.0	100	B3FMW9, B3FMX0
1/22/2018	10.0 – 12.5	100	B3FMX2, B3FMX3
1/22/2018	12.5 – 15.2	100	B3FMX5, B3FMX6

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.3.7 Borehole C9853

Borehole C9853, located at 216-S-21 Crib, was drilled from ground surface to a TD of 10.0 ft bgs on January 23, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 23, 2018. The borehole was filled from depth to surface with 8.0 ft of bentonite crumbles and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-40.

Table 3-40. C9853 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/23/2018	2.1 – 4.2	100	B3H0F8, B3H0F7, B3H0H6, B3H0H5
1/23/2018	4.2 – 6.4	100	B3H0H1, B3F0H0
1/23/2018	6.4 – 8.0	100	B3H0H4, B3H0H3
1/23/2018	8.0 – 10.0	100	B3H0H9, B3H0H8

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

3.3.8 Borehole C9854

Borehole C9854, located at 216-S-21 Crib, was drilled from ground surface to a TD of 10.1 ft bgs on January 23, 2018. Four grab samples were collected using a 3 1/2-in. OD core barrel and 3-in. OD LEXAN™ liners.

Borehole decommissioning was performed on January 23, 2018. The borehole was filled from depth to surface with 8.1 ft of bentonite crumbles and 2.0 ft of high-strength concrete. All 4 1/2-in. OD temporary casing was removed during decommissioning activities.

All sample information is presented in Table 3-41.

Table 3-41. C9854 Sediment Collection Summary

Date	Sample Depth (ft bgs)	Recovery %	HEIS number
1/23/2018	1.8 – 4.4	100	B3H0K0, B3H0J9
1/23/2018	4.4 – 7.2	100	B3H0K3, B3H0K2
1/23/2018	7.2 – 8.0	100	B3H0K6, B3H0K5
1/23/2018	8.0 – 10.1	100	B3H0K9, B3H0K8

ft bgs = feet below ground surface
 HEIS = Hanford Environmental Information System.

4 Geologic Observations

This section summarizes the general geology in the area of the 200-DV-1 OU boreholes and present the stratigraphy encountered during the drilling of each borehole. No sieve analysis was performed on the samples. Due to the drilling method and sampling method, limited visual observations of sediments were available. Exact geologic unit contacts, grain size distribution, lithology, and mineralogy were difficult to describe and estimate in the field. In addition, all reported observations are estimated. Stratigraphic unit contacts included in this document are based on soil cuttings examination in the field, when possible, and drilling observations (e.g. drill rate). Final stratigraphic unit contact depths will be determined during the remedial investigation and will incorporate the field observations, borehole geophysical logging information, and regional stratigraphic interpretations. The basis for the field stratigraphic unit contacts is included in the individual borehole summaries below.

4.1 Geology of the B Complex

The major stratigraphic unit encountered during drilling in the B Complex was the gravel-dominated Hanford formation unit 1 (H1). The H1 unit is a gravel-dominated flood sequence composed of mostly poorly-sorted, basaltic, sandy gravel to silty sandy gravel.

The following discussion focuses on the geologic conditions encountered at each individual borehole. The borehole logs are presented in Appendix B.

4.1.1 Borehole Geology for C9839

Sediments extracted from C9839 are comprised of the H1. From ground surface to 2.0 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.0 ft bgs, H1 sandy gravel is present and consists of approximately 40 % gravel, and 60 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular. The sand grain size varies between very fine and very coarse. The sandy gravel extends to TD of 14.5 ft bgs.

4.1.2 Borehole Geology for C9558 (Replacement for borehole C9839)

The sediments extracted from C9558 are comprised of the H1. The direct-push drilling method was used with no sediment recovered from ground surface to 8.4 ft bgs. At 8.4 ft bgs, H1 sandy gravel is present and consists of approximately 55 % gravel, and 45 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and coarse. The sandy gravel extends to TD of 10.1 ft bgs.

4.1.3 Borehole Geology for C9840

Sediments extracted from C9840 are comprised of the H1. From ground surface to 1.6 ft bgs sediment consisted of reworked Hanford formation backfill. At 1.6 ft bgs, H1 sandy gravel is present and consists of approximately 35 % gravel, 65 % sand, and trace amounts of silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are angular. The sand grain size varies between very fine and medium. The sandy gravel extends to 8.0 ft bgs. At 8.0 ft bgs, gravel is present and consists of approximately 85 % gravel, and 15 % sand. The gravel fraction contains clasts between medium pebble and small cobble (8 to 126 mm in diameter) that are angular. The sand grain size varies between very fine and very coarse. The gravel extends to TD of 10.1 ft bgs.

4.1.4 Borehole Geology for C9559 (Replacement for borehole C9840)

The sediments extracted from C9559 are comprised of the H1. The direct-push drilling method was used with no sediment recovered from ground surface to 8.1 ft bgs. At 8.1 ft bgs, H1 gravel is present and

consists of approximately 85 % gravel, and 15 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular to sub-angular. The sand grain size varies between fine and very coarse. The gravel extends to TD of 10.0 ft bgs.

4.1.5 Borehole Geology for C9841

Sediments extracted from C9841 are comprised of the H1. From ground surface to 1.8 ft bgs sediment consisted of reworked Hanford formation backfill. At 1.8 ft bgs, H1 sandy gravel is present and consists of approximately 40 % gravel, and 60 % sand. The gravel fraction contains clasts between fine pebble and small cobble (4 to 126 mm in diameter) that are angular to sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to 8.6 ft bgs. At 8.6 ft bgs, gravel is present and consists of approximately 80 % gravel, and 20 % sand. The gravel fraction contains clasts between fine pebble and small cobble (4 to 126 mm in diameter) that are angular to sub-angular. The sand grain size varies between very fine and very coarse. The gravel extends to TD of 10.0 ft bgs.

4.1.6 Borehole Geology for C9842

Sediments extracted from C9842 are comprised of the H1. From ground surface to 1.8 ft bgs sediment consisted of reworked Hanford formation backfill. At 1.8 ft bgs, H1 sandy gravel is present and consists of approximately 55 % gravel, and 45 % sand. The gravel fraction contains clasts between fine pebble and very coarse pebble (4 to 64 mm in diameter) that are angular to sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to 4.3 ft bgs. At 4.3 ft bgs, gravel is present and consists of approximately 85 % gravel, and 15 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular to sub-angular. The sand grain size varies between fine and very coarse. The gravel extends to 6.0 ft bgs. At 6.0 ft bgs, sandy gravel is present and consists of approximately 65 % gravel, and 35 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular. The sand grain size varies between fine and very coarse. The sandy gravel extends to TD of 10.0 ft bgs.

4.1.7 Borehole Geology for C9843

Sediments extracted from C9843 are comprised of the H1. From ground surface to 2.3 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.3 ft bgs, H1 sandy gravel is present and consists of approximately 30 % gravel, 65 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to TD of 12.6 ft bgs.

4.1.8 Borehole Geology for C9844

Sediments extracted from C9844 are comprised of the H1. From ground surface to 2.1 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.1 ft bgs, H1 sandy gravel is present and consists of approximately 30 % gravel, 65 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to TD of 10.2 ft bgs.

4.1.9 Borehole Geology for C9845

Sediments extracted from C9845 are comprised of the H1. From ground surface to 2.3 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.3 ft bgs, H1 sandy gravel is present and consists of approximately 30 % gravel, 65 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to TD of 10.2 ft bgs.

4.1.10 Borehole Geology for C9560 (Replacement borehole for C9845)

The sediments extracted from C9560 are comprised of the H1. The direct-push drilling method was used with no sediment recovered from ground surface to 5.1 ft bgs. At 5.1 ft bgs, H1 sandy gravel is present and consists of approximately 65 % gravel, 30 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to TD of 10.1 ft bgs.

4.1.11 Borehole Geology for C9846

Sediments extracted from C9846 are comprised of the H1. From ground surface to 2.1 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.1 ft bgs, H1 sandy gravel is present and consists of approximately 35 to 55 % gravel, 40 to 60 % sand, and up to 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular to sub-round. The sand grain size varies between very fine and coarse. The sandy gravel extends to TD of 10.0 ft bgs.

4.1.12 Borehole Geology for C9847

Sediments extracted from C9847 are comprised of the H1. From ground surface to 2.3 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.3 ft bgs, H1 sandy gravel is present and consists of approximately 35 to 60 % gravel, 40 to 60 % sand, and up to 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to TD of 10.0 ft bgs.

4.2 Geology of the T Complex

The major stratigraphic unit encountered during drilling in the T Complex consisted of sand and gravel of the Hanford formation and/or surficial deposits.

The following discussion focuses on the geologic conditions encountered at each individual borehole. The borehole logs are presented in Appendix B.

4.2.1 Borehole Geology for C9855

Sediments extracted from C9855 are comprised of the Hanford formation. From ground surface to 1.9 ft bgs sediment consisted of reworked Hanford formation backfill. At 1.9 ft bgs, Hanford sandy gravel is present and consists of approximately 55 % gravel, and 45 % sand. The gravel fraction contains clasts between very fine pebble and medium pebble (2 to 16 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to 4.1 ft bgs. At 4.1 ft bgs, gravelly sand is present and consists of approximately 15 % gravel, and 85 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The gravelly sand extends to 6.3 ft bgs. At 6.3 ft bgs, sand is present and consists of approximately 5 % gravel, 90 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and coarse pebble (2 to 32 mm in diameter) that are sub-angular. The sand grain size varies between very fine and coarse. The sand extends to TD of 10.0 ft bgs.

4.2.2 Borehole Geology for C9856

Sediments extracted from C9856 are comprised of the Hanford formation. From ground surface to 2.1 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.1 ft bgs, Hanford

sandy gravel is present and consists of approximately 55 % gravel, and 45 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between very fine and coarse. The sandy gravel extends to 4.1 ft bgs. At 4.1 ft bgs, sand is present and consists of approximately 5 % gravel, 90 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and medium pebble (2 to 16 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sand extends to TD of 10.0 ft bgs.

4.2.3 Borehole Geology for C9857

Sediments extracted from C9857 are comprised of the Hanford formation. From ground surface to 2.1 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.1 ft bgs, Hanford gravelly sand is present and consists of approximately 15 % gravel, and 85 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sand extends to TD of 10.0 ft bgs.

4.2.4 Borehole Geology for C9940 (Replacement borehole for C9857)

Sediments extracted from C9940 are comprised of the Hanford formation. The direct-push drilling method was used with no sediment recovered from ground surface to 5.3 ft bgs. At 5.3 ft bgs, Hanford gravelly sand is present and consists of approximately 15 % gravel, and 85 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and coarse. The gravelly sand extends to TD of 8.6 ft bgs.

4.2.5 Borehole Geology for C9858

Sediments extracted from C9858 are comprised of the Hanford formation. From ground surface to 2.0 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.0 ft bgs, Hanford gravelly sand is present and consists of approximately 10 % gravel, and 90 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and very coarse. They gravelly sand extends to 4.2 ft bgs. At 4.2 ft bgs sandy gravel is present and consists of 45 % gravel, and 55 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between very fine and very coarse. The sandy gravel extends to 6.5 ft bgs. From 6.5 ft bgs to a TD of 10.1 ft bgs, drilling produced no sediment recovery.

4.2.6 Borehole Geology for C9941 (Replacement borehole for C9858)

Sediments extracted from C9941 are comprised of the Hanford formation. The direct-push drilling method was used with no sediment recovered from ground surface to 5.2 ft bgs. At 5.2 ft bgs, Hanford sandy gravel is present and consists of approximately 60 % gravel, and 40 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The sandy gravel extends to TD of 10.2 ft bgs.

4.2.7 Borehole Geology for C9859

Sediments extracted from C9859 are comprised of the Hanford formation. From ground surface to 2.0 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.0 ft bgs, Hanford sandy gravel is present and consists of approximately 40 % gravel, and 60 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and coarse. They sandy gravel extends to 4.2 ft bgs. From 4.2 ft bgs to a TD of 6.3 ft bgs, drilling produced no sediment recovery.

4.2.8 Borehole Geology for C9942 (Replacement borehole for C9859)

Sediments extracted from C9942 are comprised of the Hanford formation. The direct-push drilling method was used with no sediment recovered from ground surface to 4.0 ft bgs. At 4.0 ft bgs, Hanford sandy gravel is present and consists of approximately 60 % gravel, and 40 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The sandy gravel extends to 6.2 ft bgs. At 6.2 ft bgs, gravel is present and consists of approximately 80 % gravel, and 20 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between medium and very coarse. The gravel extends to a TD of 10.1 ft bgs.

4.2.9 Borehole Geology for C9860

Sediments extracted from C9860 are comprised of the Hanford formation. From ground surface to 2.1 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.1 ft bgs, Hanford sandy gravel is present and consists of approximately 60 % gravel, and 40 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and coarse. The sandy gravel extends to 7.9 ft bgs. At 7.9 ft bgs, gravel is present and consists of approximately 85 % gravel, and 15 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between very fine and coarse. The gravel extends to TD of 10.0 ft bgs.

4.2.10 Borehole Geology for C9861

Sediments extracted from C9861 are comprised of the Hanford formation. From ground surface to 2.5 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.5 ft bgs, Hanford gravelly sand is present and consists of approximately 20 % gravel, 70 % sand, and 10 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are angular. The sand grain size varies between fine and coarse. The gravelly sand extends to 6.5 ft bgs. At 6.5 ft bgs, sand is present and consists of approximately 5 % gravel, 85 % sand, and 10 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are angular. The sand grain size varies between very fine and coarse. The sand extends to TD of 10.0 ft bgs.

4.2.11 Borehole Geology for C9862

Sediments extracted from C9862 are comprised of the Hanford formation. From ground surface to 2.3 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.3 ft bgs, Hanford sand is present and consists of approximately 91 % sand, and 9 % silt. The sand extends to 6.4 ft bgs. At 6.4 ft bgs, slightly silty sand is present and consists of approximately trace gravels, 85 % sand, and 15 % silt. The slightly silty sand extends to TD of 10.0 ft bgs.

4.2.12 Borehole Geology for C9863

Sediments extracted from C9863 are comprised of the Hanford formation. From ground surface to 2.2 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.2 ft bgs, Hanford gravelly sand is present and consists of approximately 11 % gravel, 85 % sand, and 9 % silt. The gravelly sand extends to 4.6 ft bgs. At 4.6 ft bgs, sand is present and consists of approximately 100 % sand. The sand extends to 6.4 ft bgs. At 6.4 ft bgs, gravelly sand is present and consists of approximately 15 % gravel, 80 % sand, and 5 % silt. The gravelly sand extends to a TD of 10.0 ft bgs.

4.2.13 Borehole Geology for C9864

Sediments extracted from C9864 are comprised of the Hanford formation. From ground surface to 2.2 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.2 ft bgs, Hanford gravelly sand is present and consists of approximately 15 % gravel, 80 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are angular. The sand grain size varies between very fine and very coarse. The gravelly sand extends to 8.3 ft bgs. At 8.3 ft bgs, sand is present and consists of approximately 5 % gravel, 90 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are angular. The sand grain size varies between very fine and coarse. The sand extends to TD of 10.0 ft bgs.

4.2.14 Borehole Geology for C9943 (Replacement borehole for C9864)

Sediments extracted from C9943 are comprised of the Hanford formation. The direct-push drilling method was used with no sediment recovered from ground surface to 10.1 ft bgs. At 10.1 ft bgs, Hanford gravel is present and consists of approximately 90 to 95 % gravel, 5 to 10 % sand, and trace silt. The gravel extends to TD of 14.9 ft bgs.

4.2.15 Borehole Geology for C9865

Sediments extracted from C9865 are comprised of the Hanford formation. From ground surface to 2.0 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.0 ft bgs, Hanford gravelly sand is present and consists of approximately 10 % gravel, 85 % sand, and 5 % silt. The gravelly sand extends to 11.7 ft bgs. At 11.7 ft bgs, gravel is present and consists of 100 % gravel. The gravel extends to TD of 15.0 ft bgs.

4.2.16 Borehole Geology for C9944 (Replacement borehole for C9865)

Sediments extracted from C9944 are comprised of the Hanford formation. The direct-push drilling method was used with no sediment recovered from ground surface to 10.5 ft bgs. At 10.5 ft bgs, Hanford gravel is present and consists of 100 % gravel. The gravel extends to TD of 15.1 ft bgs.

4.2.17 Borehole Geology for C9866

Sediments extracted from C9866 are comprised of the Hanford formation. From ground surface to 2.1 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.1 ft bgs, Hanford gravelly sand is present and consists of approximately 15 % gravel, 80 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are angular. The sand grain size varies between very fine and coarse. The gravelly sand extends to 12.0 ft bgs. At 12.0 ft bgs, gravel is present and consists of 100 % gravel. The gravel contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular to sub-angular. The gravel extends to TD of 13.5 ft bgs.

4.2.18 Borehole Geology for C9945 (Replacement borehole for C9866)

Sediments extracted from C9945 are comprised of the Hanford formation. The direct-push drilling method was used with no sediment recovered from ground surface to 10.3 ft bgs. At 10.3 ft bgs, Hanford gravel is present and consists of 100 % gravel. The gravel contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular to sub-angular. The gravel extends to 11.6 ft bgs. At 11.6 ft bgs, sandy gravel is present and consists of 70 % gravel, and 30 % sand. The gravel contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular to sub-angular. The sand grain size varies between very fine and very coarse. The sandy gravel extends to a TD of 15.0 ft bgs.

4.3 Geology of the S Complex

The major stratigraphic unit encountered during drilling in the S Complex consisted of sand and gravel of the Hanford formation and/or surficial deposits.

The following discussion focuses on the geologic conditions encountered at each individual borehole. The borehole logs are presented in Appendix B.

4.3.1 Borehole Geology for C9848

Sediments extracted from C9848 are comprised of the Hanford formation. From ground surface to 3.0 ft bgs sediment consisted of reworked Hanford formation backfill. At 3.0 ft bgs, Hanford sandy gravel is present and consists of approximately 35 % gravel, 60 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and coarse pebble (2 to 32 mm in diameter) that are sub-angular to sub-round. The sand grain size varies between fine and very coarse. The sandy gravel extends to 4.4 ft bgs. At 4.4 ft bgs, gravelly sand is present and consists of approximately 10 to 15 % gravel, 80 to 90 % sand, and up to 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The gravelly sand extends to 13.0 ft bgs. At 13.0 ft bgs, sand is present and consists of approximately 5 % gravel, and 95 % sand. The gravel fraction contains very fine pebble clasts (2 to 4 mm in diameter) that are sub-angular. The sand grain size varies between very fine and very coarse. The sand extends to TD of 15.0 ft bgs.

4.3.2 Borehole Geology for C9849

Sediments extracted from C9849 are comprised of the Hanford formation. From ground surface to 2.2 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.2 ft bgs, Hanford sandy gravel is present and consists of approximately 35 % gravel, 60 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are angular to sub-angular. The sand grain size varies between fine and very coarse. The sandy gravel extends to 6.6 ft bgs. At 6.6 ft bgs, gravelly sand is present and consists of approximately 20 % gravel, and 80 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The gravelly sand extends to 12.8 ft bgs. From 12.8 ft bgs to a TD of 15.2 ft bgs, drilling produced no sediment recovery.

4.3.3 Borehole C9939 (Replacement borehole for C9849)

Sediments extracted from C9939 are comprised of the Hanford formation. The direct-push drilling method was used with no sediment recovered from ground surface to 10.1 ft bgs. At 10.1 ft bgs, Hanford gravelly sand is present and consists of approximately 20 % gravel, and 80 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The gravelly sand extends to a TD of 15.1 ft bgs.

4.3.4 Borehole C9850

Sediments extracted from C9850 are comprised of the Hanford formation. From ground surface to 1.9 ft bgs sediment consisted of reworked Hanford formation backfill. At 1.9 ft bgs, Hanford sandy gravel is present and consists of approximately 35 to 60 % gravel, 35 to 60 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The sandy gravel extends to TD of 15.1 ft bgs.

4.3.5 Borehole C9851

Sediments extracted from C9851 are comprised of the Hanford formation. From ground surface to 1.9 ft bgs sediment consisted of reworked Hanford formation backfill. At 1.9 ft bgs, Hanford sandy gravel is present and consists of approximately 35 to 50 % gravel, 45 to 60 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The sandy gravel extends to 6.5 ft bgs. At 6.5 ft bgs, gravelly sand is present and consists of approximately 20 % gravel, 75 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The gravelly sand extends to TD of 15.1 ft bgs.

4.3.6 Borehole C9852

Sediments extracted from C9852 are comprised of the Hanford formation. From ground surface to 2.2 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.2 ft bgs, Hanford sandy gravel is present and consists of approximately 55 % gravel, 40 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between fine and very coarse. The sandy gravel extends to 4.2 ft bgs. At 4.2 ft bgs, gravelly sand is present and consists of approximately 25 % gravel, 70 to 75 % sand, and up to 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The gravelly sand extends to TD of 15.2 ft bgs.

4.3.7 Borehole C9853

Sediments extracted from C9853 are comprised of the Hanford formation. From ground surface to 2.1 ft bgs sediment consisted of reworked Hanford formation backfill. At 2.1 ft bgs, Hanford sandy gravel is present and consists of approximately 55 % gravel, 40 % sand, and 5 % silt. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The sandy gravel extends to 4.2 ft bgs. At 4.2 ft bgs, gravelly sand is present and consists of approximately 15 % gravel, and 85 % sand. The gravel fraction contains clasts between very fine pebble and very coarse pebble (2 to 64 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The gravelly sand extends to TD of 10.0 ft bgs.

4.3.8 Borehole C9854

Sediments extracted from C9854 are comprised of the Hanford formation. From ground surface to 1.8 ft bgs sediment consisted of reworked Hanford formation backfill. At 1.8 ft bgs, Hanford gravelly sand is present and consists of approximately 15 % gravel, and 85 % sand. The gravel fraction contains clasts between very fine pebble and small cobble (2 to 126 mm in diameter) that are sub-angular. The sand grain size varies between very fine and medium. The gravelly sand extends to TD of 10.1 ft bgs.

5 Waste Management

Waste from individual boreholes was managed according to DOE/RL-2012-20, *Waste Control Plan for the 200-DV-1 Operable Unit*. Waste generated during drilling activities included soil cuttings, decontamination water, personal protective equipment, and miscellaneous solid waste.

All vadose zone soil cuttings were released into tip dumpsters, and placed in designated waste roll-off boxes. Miscellaneous solid waste associated with soil cuttings, including nitrile gloves, plastic bags used to collect soil cuttings, and other waste associated with sampling activities, were contained in clear plastic bags and placed in the designated roll-off box. All waste was managed as investigation-derived waste and surveyed by the IH professional and RCTs in accordance with the site-specific Health and Safety Plan, and transferred for disposal to the Environmental Restoration Disposal Facility.

Decontamination fluids generated during borehole drilling and sample screening was managed as purgewater in accordance with purgewater guidance provided in DOE/RL-2009-80, *Investigation Derived Waste Purgewater Management Work Plan*, and DOE/RL-2011-41, *Hanford Site Strategy for the Management of Investigation Derived Waste*.

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6 Civil Survey

Vertical and horizontal surveys were performed following borehole decommissioning in accordance with CHPRC procedure SGRP-PRO-SMP-52857 (GRP-EE-01-1.6), *Survey Requirements and Techniques*. Vertical survey data were recorded using NAVD88, *North American Vertical Datum of 1988* and the horizontal coordinates were recorded using the Washington State Plane (South Zone) NAD83, *North American Datum of 1983*, with the 1991 adjustment for horizontal coordinates. Surveyed coordinates and elevation for all but three borehole locations are presented in Table 1-1 and Well Survey Data Reports are included in Appendix C.

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7 Borehole Acceptance

Borehole acceptance is the final step in the decommissioning process and represents confirmation of meeting requirements of the work scope. Borehole acceptance also serves as the contractual completion of the finished product.

Representatives from CHPRC and Holt, participated in the acceptance inspection for all 38 boreholes (including the replacement boreholes) 200-DV-1 OU boreholes on March 19, 2018. Final acceptance was documented by completion of a checklist and signatures from representatives of the drilling contractor and CHPRC. A Quality Assurance Work Site Assessment will be prepared to document well acceptance.

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8 References

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

SGRP-PRO-EN-50025 (GRP-EE-01-7.0), *Geologic Logging*

SGRP-PRO-EN-50030 (GRP-EE-02-14.1), *Drilling, Remediating, and Decommissioning Resource Protection Wells and Geotechnical Soil Borings*

SGRP-PRO-RP-52789, *Radiological Control Coverage and Survey Requirements for S&GRP Well Activities*

Other References:

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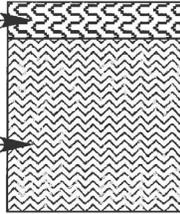
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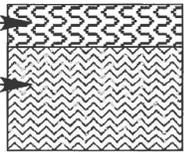
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Available at: <http://pdw.hanford.gov/arpir/index.cfm/viewDoc?accession=0081112H>.

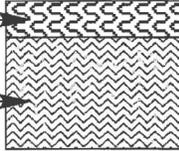
WAC 173-160, “Minimum Standards for Construction and Maintenance of Wells,” *Washington Administrative Code*, as amended, Washington State Department of Ecology, Olympia, Washington.

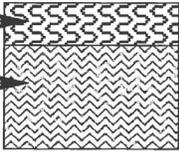
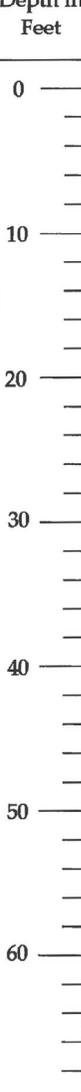
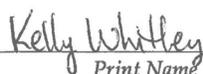
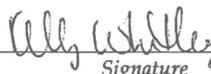
Appendix A
Well Summary Sheets

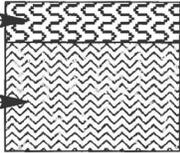
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WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9839		Well Name: N/A		Start Date: 1-09-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-5		Finish Date: 1-11-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Rapid Set Concrete Mix: 0.0 - 2.1 ft bgs		0		0.0 - 14.5 Sandy Gravel (sG)
3/8-in. Bentonite Pellets: 2.1 - 14.5 ft bgs		10		Total Depth: 14.5 ft bgs
		20		
		30		
		40		
		50		
		60		
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in.O.D. casing from 0.0 - 14.9 ft bgs All temporary drill casing was removed from the ground.				
Reported By:				
Tracy Mallgren		Geologist		
<i>Tracy Mallgren</i>		<i>Tracy Mallgren</i>		<i>1/17/18</i>
<small>Print Name</small>		<small>Title</small>		<small>Signature</small>
Reviewed By:				
		Well Coordinator		
<i>Kelly Whitley</i>		<i>Kelly Whitley</i>		<i>3/8/18</i>
<small>Print Name</small>		<small>Title</small>		<small>Signature</small>
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OR Doc Type:		WMU Code(s):		

WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9558		Well Name: N/A		Start Date: 1-15-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-5		Finish Date: 1-15-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Rapid Set Concrete Mix: 0.0 - 2.5 ft bgs 3/8-in Bentonite Pellets: 2.5 - 10.1 ft bgs			0.0 - 8.4 No sediment recovered, unable to determine. 8.4 - 10.1 Sandy Gravel (sG) Total Depth: 10.1 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.5 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Tracy Mallgren <i>Print Name</i> </div> <div style="text-align: center;"> Geologist <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 1/17/18 <i>Date</i> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Kelly Whitley <i>Print Name</i> </div> <div style="text-align: center;"> Well Coordinator <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 3/8/18 <i>Date</i> </div> </div>				
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OR Doc Type:		WMU Code(s):		

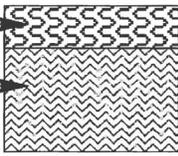
WELL SUMMARY SHEET				Page <u>1</u> of <u>1</u>	
Well ID : C9840		Well Name: N/A		Start Date: 1-09-2018	
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-9		Finish Date: 1-11-2018	
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)	
Rapid Set Concrete Mix: ————— 0.0 - 2.2 ft bgs 3/8-in. Bentonite Pellets: ————— 2.2 - 10.1 ft bgs		0 10 20 30 40 50 60		0.0 - 8.0 Sandy Gravel (sG) 8.0 - 10.1 Gravel (G) Total Depth: 10.1 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.					
Reported By: <u>Tracy Mallgren</u> Geologist <u>[Signature]</u> <u>1/17/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>					
Reviewed By: <u>Kelly Whitley</u> Well Coordinator <u>[Signature]</u> <u>3/8/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>					
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OR Doc Type:		WMU Code(s):			

WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9559		Well Name: N/A		Start Date: 1-15-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-9		Finish Date: 1-15-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Rapid Set Concrete Mix: 0.0 - 1.8 ft bgs 3/8-in Bentonite Pellets: 1.8 - 10.0 ft bgs			0.0 - 8.1 No sediment recovered, unable to determine. 8.1 - 10.0 Sandy Gravel (sG) Total Depth: 10.0 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.5 ft bgs All temporary drill casing was removed from the ground.				
Reported By:				
Tracy Mallgren <i>Print Name</i>		Geologist <i>Title</i>		 <i>Signature</i>
1/17/18 <i>Date</i>				
Reviewed By:				
 <i>Print Name</i>		Well Coordinator <i>Title</i>		 <i>Signature</i>
3/8/18 <i>Date</i>				
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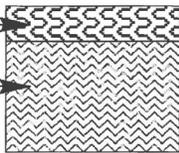
WELL SUMMARY SHEET				Page 1 of 1		
Well ID : C9844		Well Name: N/A		Start Date: 1-11-2018		
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-36		Finish Date: 1-11-2018		
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA			
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)			
Rapid Set Concrete Mix: 0.0 - 2.0 ft bgs			0.0 - 10.2 Sandy Gravel (sG)			
3/8-in Bentonite Pellets: 2.0 - 10.2 ft bgs			Total Depth: 10.2 ft bgs			
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.5 ft bgs All temporary drill casing was removed from the ground.		10				
		20				
		30				
		40				
		50				
		60				
				60		
				60		
				60		
				60		
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Tracy Mallgren <i>Print Name</i> </div> <div style="text-align: center;"> Geologist <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 1/17/18 <i>Date</i> </div> </div>						
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Kelly Whitley <i>Print Name</i> </div> <div style="text-align: center;"> Well Coordinator <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 3/8/18 <i>Date</i> </div> </div>						
For Office Use Only						
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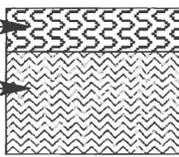
WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9845		Well Name: N/A		Start Date: 1-11-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-39		Finish Date: 1-15-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Rapid Set Concrete Mix: 0.0 - 2.4 ft bgs 3/8-in Bentonite Pellets: 2.4 - 6.7 ft bgs		0 10 20 30 40 50 60		0.0 - 6.7 Sandy Gravel (sG) Total Depth: 6.7 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 7.0 ft bgs All temporary drill casing was removed from the ground.				
Reported By:				
Tracy Mallgren <i>Print Name</i>		Geologist <i>Title</i>		 <i>Signature</i>
1/17/18 <i>Date</i>				
Reviewed By:				
Kelly Whitley <i>Print Name</i>		Well Coordinator <i>Title</i>		 <i>Signature</i>
3/8/18 <i>Date</i>				
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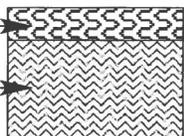
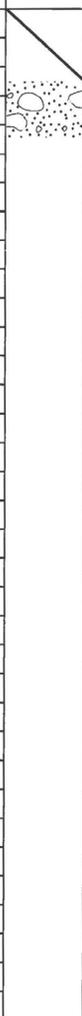
WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9560		Well Name: N/A		Start Date: 1-11-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-39		Finish Date: 1-15-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Rapid Set Concrete Mix: 0.0 - 1.9 ft bgs 3/8-in Bentonite Pellets: 1.9 - 10.1 ft bgs		0 10 20 30 40 50 60		0.0 - 5.1 No sediment recovered, unable to determine. 5.1 - 10.1 Sandy Gravel (sG) Total Depth: 10.1 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.5 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Tracy Mallgren <i>Print Name</i> </div> <div style="text-align: center;"> Geologist <i>Title</i> </div> <div style="text-align: center;"> <i>Signature</i> </div> <div style="text-align: center;"> 1/17/18 <i>Date</i> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Kelly Whitley <i>Print Name</i> </div> <div style="text-align: center;"> Well Coordinator <i>Title</i> </div> <div style="text-align: center;"> <i>Signature</i> </div> <div style="text-align: center;"> 3/8/18 <i>Date</i> </div> </div>				
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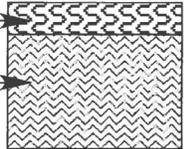
WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9847		Well Name: N/A		Start Date: 1-15-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-B-41		Finish Date: 1-15-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Rapid Set Concrete Mix: 0.0 - 2.5 ft bgs 3/8-in Bentonite Pellets: 2.5 - 10.0 ft bgs		0 10 20 30 40 50 60		0.0 - 10.0 Sandy Gravel (sG) Total Depth: 10.0 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.5 ft bgs All temporary drill casing was removed from the ground.				
Reported By:				
Tracy Mallgren <i>Print Name</i>		Geologist <i>Title</i>		 <i>Signature</i>
1/17/18 <i>Date</i>				
Reviewed By:				
 <i>Print Name</i>		Well Coordinator <i>Title</i>		 <i>Signature</i>
3/8/18 <i>Date</i>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

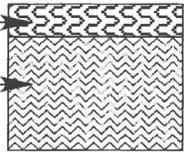
WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9855		Well Name: N/A		Start Date: 1-24-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-5		Finish Date: 1-24-2018
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: ———→ 0.0 - 2.0 ft bgs 3/8-in Bentonite Pellets: ———→ 2.0- 10.0 ft bgs		0 — — — 10 — — — 20 — — — 30 — — — 40 — — — 50 — — — 60 — — —		0.0 - 4.1 Sandy Gravel (sG) 4.1 - 6.3 Gravelly Sand (gS) 6.3 - 10.0 Sandy Gravel (sG) Total Depth: 10.0 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> Tracy Mallgren <i>Print Name</i> </div> <div style="text-align: center;"> Geologist <i>Title</i> </div> <div style="text-align: center;"> <i>Signature</i> </div> <div style="text-align: center;"> 1/29/18 <i>Date</i> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> Kelly Whitley <i>Print Name</i> </div> <div style="text-align: center;"> Well Coordinator <i>Title</i> </div> <div style="text-align: center;"> <i>Signature</i> </div> <div style="text-align: center;"> 3/4/18 <i>Date</i> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9856		Well Name: N/A		Start Date: 1-24-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-5		Finish Date: 1-24-2018
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: 0.0 - 2.4 ft bgs 3/8-in Bentonite Pellets: 2.4 - 10.0 ft bgs		0		0.0 - 4.1 Sandy Gravel (sG)
		10		4.1 - 10.0 Sand (S)
		Total Depth: 10.0 ft bgs		
		20		
		30		
		40		
		50		
		60		
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <u>Tracy Mallgren</u> Geologist <u>[Signature]</u> <u>1/29/18</u> <small>Print Name Title Signature Date</small>				
Reviewed By: <u>Kelly Whitley</u> Well Coordinator <u>[Signature]</u> <u>3/14/18</u> <small>Print Name Title Signature Date</small>				
For Office Use Only				
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WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9857		Well Name: N/A		Start Date: 1-24-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-14		Finish Date: 1-24-2018
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: ———→ 0.0 - 3.0 ft bgs 3/8-in Bentonite Pellets: ———→ 3.0 - 10.0 ft bgs		0 10 20 30 40 50 60		0.0 - 10.0 Gravelly Sand (gS) Total Depth: 10.0 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.4 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <u>Tracy Mallgren</u> Geologist <u>[Signature]</u> <u>1/29/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>				
Reviewed By: <u>Kelly Whitley</u> Well Coordinator <u>[Signature]</u> <u>3/14/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>				
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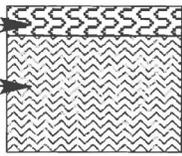
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9940		Well Name: N/A		Start Date: 1-24-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-14		Finish Date: 1-24-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: 0.0 - 2.0 ft bgs Bentonite Crumbles: 2.0 - 8.6 ft bgs		0 10 20 30 40 50 60		0.0 - 5.3 No sediment recovered, unable to determine. 5.3 - 8.6 Gravelly Sand (gS) Total Depth: 8.6 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 8.9 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>1/29/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/14/18</u> <small>Date</small> </div> </div>				
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OR Doc Type:		WMU Code(s):		

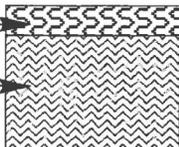
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9858		Well Name: N/A		Start Date: 1-24-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-15		Finish Date: 1-25-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: —————→ 0.0 - 2.1 ft bgs 3/8-in Bentonite Pellets: —————→ 2.1 - 10.1 ft bgs		0 10 20 30 40 50 60		0.0 - 4.2 Gravelly Sand (gS) 4.2 - 6.5 Sandy Gravel (sG) 6.5 - 10.1 No sediment recovered, unable to determine. Total Depth: 10.1 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>1/29/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <small>Date</small> </div> </div>				
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OR Doc Type:		WMU Code(s):		

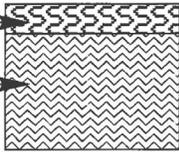
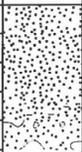
WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9941		Well Name: N/A		Start Date: 1-24-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-15		Finish Date: 1-25-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: 0.0 - 2.1 ft bgs Bentonite Crumbles: 2.1 - 10.2 ft bgs		0 10 20 30 40 50 60		0.0 - 5.2 No sediment recovered, unable to determine. 5.2 - 10.2 Sandy Gravel (sG) Total Depth: 10.2 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>1/29/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/14/18</u> <small>Date</small> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

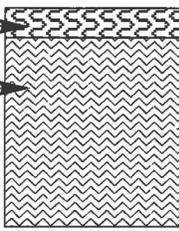
WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9859		Well Name: N/A		Start Date: 1-25-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-16		Finish Date: 1-25-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: ———→ 0.0 - 2.5 ft bgs Bentonite Crumbles: ———→ 2.5 - 6.3 ft bgs		0 10 20 30 40 50 60		0.0 - 4.2 Sandy Gravel (sG) 4.2 - 6.3 No sediment recovered, unable to determine. Total Depth: 6.3 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 6.7 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <u>Tracy Mallgren</u> Geologist <u>[Signature]</u> <u>1/29/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>				
Reviewed By: <u>Kelly Whitney</u> Well Coordinator <u>[Signature]</u> <u>3/14/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>				
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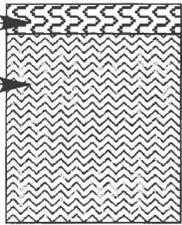
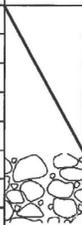
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>		
Well ID : C9942		Well Name: N/A		Start Date: 1-25-2018	
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-16		Finish Date: 1-25-2018	
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)	
Sakrete Concrete Mix: 0.0 - 2.0 ft bgs Bentonite Crumbles: 2.0 - 10.1 ft bgs			0.0 - 4.0 No sediment recovered, unable to determine. 4.0 - 6.2 Sandy Gravel (sG) 6.2 - 10.1 Gravel (G) Total Depth: 10.1 ft bgs		
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.					
Reported By:		Tracy Mallgren <small>Print Name</small>	Geologist <small>Title</small>	 <small>Signature</small>	1/29/18 <small>Date</small>
Reviewed By:		 <small>Print Name</small>	Well Coordinator <small>Title</small>	 <small>Signature</small>	3/14/18 <small>Date</small>
For Office Use Only					
OR Doc Type:		WMU Code(s):			

WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9860		Well Name: N/A		Start Date: 1-25-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-17		Finish Date: 1-25-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: 0.0 - 2.0 ft bgs Bentonite Crumbles: 2.0 - 10.0 ft bgs		0 10 20 30 40 50 60		0.0 - 7.9 Sandy Gravel (sG) 7.9 - 10.0 Gravel (G) Total Depth: 10.0 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Tracy Mallgren <i>Print Name</i> </div> <div style="text-align: center;"> Geologist <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 1/29/18 <i>Date</i> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;">  <i>Print Name</i> </div> <div style="text-align: center;"> Well Coordinator <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 3/14/18 <i>Date</i> </div> </div>				
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OR Doc Type:		WMU Code(s):		

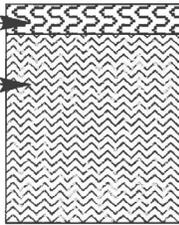
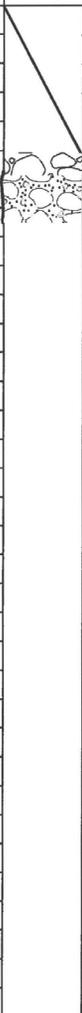
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9861		Well Name: N/A		Start Date: 3-12-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-18		Finish Date: 3-12-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Sakrete Concrete Mix: 0.0 - 2.3 ft bgs 3/8-in. Bentonite Chips 2.3 - 10.0 ft bgs			0.0 - 6.5 Gravelly Sandy (gS) 6.5 - 10.0 Sand (S) Total Depth: 10.0 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.5 ft bgs All temporary drill casing was removed from the ground.		0 10 20 30 40 50 60		
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

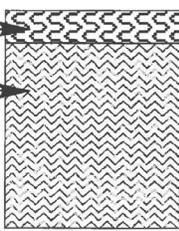
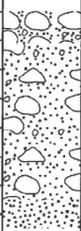
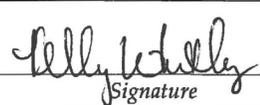
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9862		Well Name: N/A		Start Date: 3-12-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-18		Finish Date: 3-12-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Sakrete Concrete Mix: 0.0 - 2.3 ft bgs 3/8-in. Bentonite Chips: 2.3 - 10.1 ft bgs			0.0 - 6.4 Sand (S) 6.4 - 8.0 Slightly Silty Sand ((m)S) 8.0 - 10.1 Gravelly Sand (gS) Total Depth: 10.1 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.5 ft bgs All temporary drill casing was removed from the ground.		10 20 30 40 50 60		
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/12/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
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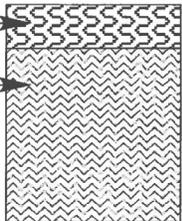
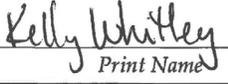
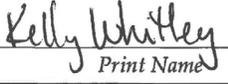
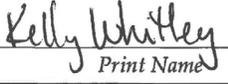
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9864		Well Name: N/A		Start Date: 3-12-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-26		Finish Date: 3-13-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Sakrete Concrete Mix: ———→ 0.0 - 2.3 ft bgs 3/8-in. Bentonite Chips: ———→ 2.3 - 15.1 ft bgs			0 - 8.3 Gravelly Sand (gS) 8.3 - 10.0 Sand (S) 10.0 - 15.1 Gravel (G) Total Depth: 15.1 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.5 ft bgs All temporary drill casing was removed from the ground.		0 10 20 30 40 50 60		
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

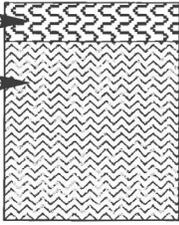
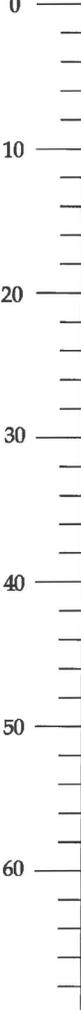
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9943		Well Name: N/A		Start Date: 3-12-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-26		Finish Date: 3-13-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: 0.0 - 2.0 ft bgs 3/8-in. Bentonite Chips: 2.0 - 14.9 ft bgs		0 10 20 30 40 50 60		0.0 - 10.1 No sediment recovered, unable to determine. 10.1 - 14.9 Gravel (G) Total Depth: 14.9 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

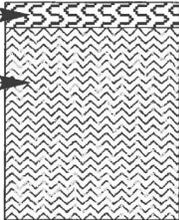
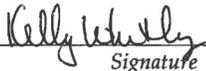
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9944		Well Name: N/A		Start Date: 3-13-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-26		Finish Date: 3-13-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Sakrete Concrete Mix: ———→ 0.0 - 2.0 ft bgs 3/8-in. Bentonite Chips: ———→ 2.0 - 15.1 ft bgs			0.0 - 10.5 No sediment recovered, unable to determine. 10.5 - 15.1 Gravel (G) Total Depth: 15.1 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <u>Tracy Mallgren</u> Geologist <u>[Signature]</u> <u>3/23/18</u> <i>Print Name Title Signature Date</i>				
Reviewed By: <u>Kelly Whitley</u> Well Coordinator <u>[Signature]</u> <u>3/28/18</u> <i>Print Name Title Signature Date</i>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

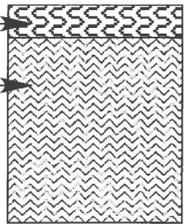
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9945		Well Name: N/A		Start Date: 3-13-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-T-26		Finish Date: 3-13-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: 0.0 - 2.0 ft bgs 3/8-in. Bentonite Chips: 2.0 - 15.0 ft bgs		0 10 20 30 40 50 60		0.0 - 10.3 No sediment recovered, unable to determine. 10.3 - 11.6 Gravel (G) 11.6 - 15.0 Sandy Gravel (sG) Total Depth: 15.0 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.5 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/28/18</u> <small>Date</small> </div> </div>				
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OR Doc Type:		WMU Code(s):		

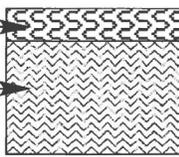
WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9848		Well Name: N/A		Start Date: 1-16-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-S-9		Finish Date: 1-18-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Sakrete Concrete Mix: ———→ 0.0 - 2.3 ft bgs 3/8-in Bentonite Pellets: ———→ 2.3- 15.0 ft bgs			0.0 - 4.4 Sandy Gravel (sG) 4.4 - 13.0 Gravelly Sand (gS) 13.0 - 15.0 Sand (S) Total Depth: 15.0 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.4 ft bgs All temporary drill casing was removed from the ground.		0 10 20 30 40 50 60		
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Tracy Mallgren <i>Print Name</i> </div> <div style="text-align: center;"> Geologist <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 1/30/18 <i>Date</i> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Kelly Whitley <i>Print Name</i> </div> <div style="text-align: center;"> Well Coordinator <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 3/15/18 <i>Date</i> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

WELL SUMMARY SHEET			Page 1 of 1											
Well ID : C9849		Well Name: N/A		Start Date: 1-18-2018										
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-S-9		Finish Date: 1-22-2018										
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA											
Description	Diagram		Graphic Log	Lithologic Description (ft bgs)										
Sakrete Concrete Mix: 0.0 - 3.0 ft bgs 3/8-in Bentonite Pellets: 3.0 - 15.2 ft bgs		0 10 20 30 40 50 60		0.0 - 6.6 Sandy Gravel (sG) 6.6 - 12.8 Gravelly Sand (gS) 12.8 - 15.2 No sediment recovered, unable to determine. Total Depth: 15.2 ft bgs										
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.5 ft bgs All temporary drill casing was removed from the ground.														
Reported By: <table style="width:100%; border: none;"> <tr> <td style="width: 30%; text-align: center;">Tracy Mallgren</td> <td style="width: 20%; text-align: center;">Geologist</td> <td style="width: 20%; text-align: center;"></td> <td style="width: 10%; text-align: center;">1/30/18</td> <td style="width: 10%;"></td> </tr> <tr> <td style="text-align: center;"><i>Print Name</i></td> <td style="text-align: center;"><i>Title</i></td> <td style="text-align: center;"><i>Signature</i></td> <td style="text-align: center;"><i>Date</i></td> <td></td> </tr> </table>					Tracy Mallgren	Geologist		1/30/18		<i>Print Name</i>	<i>Title</i>	<i>Signature</i>	<i>Date</i>	
Tracy Mallgren	Geologist		1/30/18											
<i>Print Name</i>	<i>Title</i>	<i>Signature</i>	<i>Date</i>											
Reviewed By: <table style="width:100%; border: none;"> <tr> <td style="width: 30%; text-align: center;"></td> <td style="width: 20%; text-align: center;">Well Coordinator</td> <td style="width: 20%; text-align: center;"></td> <td style="width: 10%; text-align: center;">3/15/18</td> <td style="width: 10%;"></td> </tr> <tr> <td style="text-align: center;"><i>Print Name</i></td> <td style="text-align: center;"><i>Title</i></td> <td style="text-align: center;"><i>Signature</i></td> <td style="text-align: center;"><i>Date</i></td> <td></td> </tr> </table>						Well Coordinator		3/15/18		<i>Print Name</i>	<i>Title</i>	<i>Signature</i>	<i>Date</i>	
	Well Coordinator		3/15/18											
<i>Print Name</i>	<i>Title</i>	<i>Signature</i>	<i>Date</i>											
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OR Doc Type:		WMU Code(s):												

WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9939		Well Name: N/A		Start Date: 1-18-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-S-9		Finish Date: 1-22-2018
CONSTRUCTION DATA		Depth in Feet	GEOLOGIC/HYDROLOGIC DATA	
Description	Diagram	Graphic Log	Lithologic Description (ft bgs)	
Sakrete Concrete Mix: ———→ 0.0 - 2.4 ft bgs 3/8-in Bentonite Pellets: ———→ 2.4 - 15.1 ft bgs			0.0 - 10.1 No sediment recovered, unable to determine. 10.1 - 15.1 Gravelly Sand (gS) Total Depth: 15.1 ft bgs	
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.5 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <u>Tracy Mallgren</u> Geologist <u>[Signature]</u> <u>1/30/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>				
Reviewed By: <u>Kelly Whitley</u> Well Coordinator <u>[Signature]</u> <u>3/15/18</u> <i>Print Name</i> <i>Title</i> <i>Signature</i> <i>Date</i>				
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WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9851		Well Name: N/A		Start Date: 1-22-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-S-9		Finish Date: 1-22-2018
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: ———→ 0.0 - 1.8 ft bgs 3/8-in Bentonite Pellets: ———→ 1.8 - 15.1 ft bgs <i>Crumbles 3/15/18</i>		0 10 20 30 40 50 60		0.0 - 6.5 Sandy Gravel (sG) 6.5 - 15.1 Gravelly Sand (gS) Total Depth: 15.1 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.4 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>1/30/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between;"> <div style="text-align: center;"> <u>Kelly Whitney</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/15/18</u> <small>Date</small> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

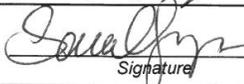
WELL SUMMARY SHEET			Page 1 of 1	
Well ID : C9852		Well Name: N/A		Start Date: 1-22-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-S-9		Finish Date: 1-22-2018
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: 0.0 - 2.1 ft bgs Bentonite Crumbles: 2.1 - 15.2 ft bgs		0 10 20 30 40 50 60		0.0 - 4.2 Sandy Gravel (sG) 4.2 - 15.2 Gravelly Sand (gS) Total Depth: 15.2 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 15.4 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Tracy Mallgren <i>Print Name</i> </div> <div style="text-align: center;"> Geologist <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 1/30/18 <i>Date</i> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> Kelly Whitley <i>Print Name</i> </div> <div style="text-align: center;"> Well Coordinator <i>Title</i> </div> <div style="text-align: center;">  <i>Signature</i> </div> <div style="text-align: center;"> 3/15/18 <i>Date</i> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

WELL SUMMARY SHEET			Page <u>1</u> of <u>1</u>	
Well ID : C9853		Well Name: N/A		Start Date: 1-23-2018
Project: Installation of 28 Boreholes in 200-DV-1 OU		Location: 216-S-21		Finish Date: 1-23-2018
CONSTRUCTION DATA		GEOLOGIC/HYDROLOGIC DATA		
Description	Diagram	Depth in Feet	Graphic Log	Lithologic Description (ft bgs)
Sakrete Concrete Mix: ———→ 0.0 - 2.0 ft bgs Bentonite Crumbles: ———→ 2.0 - 10.0 ft bgs		0 10 20 30 40 50 60		0.0 - 4.2 Sandy Gravel (sG) 4.2 - 10.0 Gravelly Sand (gS) Total Depth: 10.0 ft bgs
Depths are in ft below ground surface. Borehole drilled with 4 1/2-in O.D. casing from 0.0 - 10.3 ft bgs All temporary drill casing was removed from the ground.				
Reported By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Tracy Mallgren</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Geologist</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>1/30/18</u> <small>Date</small> </div> </div>				
Reviewed By: <div style="display: flex; justify-content: space-between; align-items: flex-end;"> <div style="text-align: center;"> <u>Kelly Whitley</u> <small>Print Name</small> </div> <div style="text-align: center;"> <u>Well Coordinator</u> <small>Title</small> </div> <div style="text-align: center;">  <small>Signature</small> </div> <div style="text-align: center;"> <u>3/15/18</u> <small>Date</small> </div> </div>				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

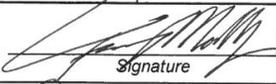
Appendix B

Borehole Geologic Logs for the Shallow Characterization Boreholes in 200-DV-1 Operable Unit

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BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C 9554</u>		Well Name: <u>N/A</u>		Date: <u>1/15/18</u>
Project: <u>Install 28 Shallow Characterization Btts in 200-DU</u>			Location: <u>ZUG-B-9</u>	
Reference Measure Point: <u>Ground Surface</u>				
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0			<u>0-8.1: Direct push with no sediment recovery.</u>	<u>GeoProbe drilling using 4 1/2" 3 3/4" temporary casing from 0.0-10.5' Samples collected from 8.1-10.0' bgs using a 5' 3" Lexan liner.</u>
5				
10	<u>25 sec. 5.1</u>	<u>0.0: 3.0'</u>	<u>8.1-10.0': Gravel (G) g=85% s=15%. Gravel: 2mm-65mm, v. fine pebbles to small cobbles. Angular-sub angular. Sand: f-v. coarse grained, angular. Moist.</u>	
Reported By: <u>Tracy Mallgren</u> <u>Geologist</u>  <u>1/15/18</u> <small>Print Name Title Signature Date</small>				
Reviewed By: <u>Sarah Springer</u> <u>Sr. Geologist</u>  <u>03-13-18</u> <small>Print Name Title Signature Date</small>				
OR Doc Type:		For Office Use Only		
		WMU Code(s):		

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9841</u>		Well Name: <u>N/A</u>		Date: <u>11/10/18</u>
Project: <u>Installation 28 Shallow Characterization Bts in 2005-1</u>			Location: <u>Z16-B-9</u>	
Reference Measure Point: <u>Ground Surface</u>				
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0		○	0 - 8.6' sandy Gravel (SG) s=60% g=40% Sand: v fine to med grained. Gravel: 8-90 mm, 30 mm avg. Fine pebbles to small cobbles, angular to subangular. Moist @ 4.5' g ↑ 70% s ↓ 30%.	GeoProbe drilling using 4 1/2" 3 3/4" temporary casing from 0.0-10.4' Samples collected from 1.8-10.0' bgs using a 5' 3" lexon liners
1.5 min		○		
100%		○		
5		○		
2.5 min		○		
90%		○		
2.5 min		○		
100%		○	8.6-10.0' Gravel (G) g=80% s=20% Gravel: 8-90mm, 40mm avg. fine pebbles to small cobbles, angular to subangular. Moist	Total Depth 4 1/2" casing: 10.4' Borehole: 10.0'
10		○		
2.5 sec		○		
1.5 min		○		

Reported By:	Tracy Mallgren <small>Print Name</small>	Geologist <small>Title</small>	
			11/10/18 <small>Date</small>
Reviewed By:	Sarah Springer <small>Print Name</small>	Sr. Geologist <small>Title</small>	
			03-13-18 <small>Date</small>
For Office Use Only			
OR Doc Type:	WMU Code(s):		

BOREHOLE LOG				Page <u>1</u> of <u>1</u>										
Well ID: <u>C9856</u>		Well Name: <u>NIA</u>		Date: <u>1/24/18</u>										
Project: <u>Install 28 Shallow Characterization Boreholes in 200-D-100</u>		Location: <u>216-T-5</u> Reference Measure Point: <u>Ground Surface</u>												
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other										
0			0-4.1: Sandy Gravel (SG) g=55% s=45% Gravel: 2mm-75mm v fine pebbles to small cobbles, sub ang. Sand: v. fine to coarse, ang. Moist	Geoprobe drilling using 4 1/2" / 3 3/4" temporary casing from 0.0-10.3' bgs. Samples collected from 2.1-10.0' bgs with a 5' x 3" Lex lines.										
5	1min 100% 45 sec. 100% 45 sec. 100% 32 sec.		4.1-10.0: Sand (S) s=90% g=5% m=5% Gravel: 2mm-10mm, v fine to medium pebbles, sub ang. Sand: v. fine to medium. Moist											
10	100%			Total Depth 4 1/2" casing: 10.3 Borehole: 10.0										
<table style="width:100%; border: none;"> <tr> <td style="width: 30%;">Reported By:</td> <td style="width: 30%;"><u>Tracy Malgou</u> <small>Print Name</small></td> <td style="width: 30%;"><u>Geologist</u> <small>Title</small></td> <td style="width: 10%;"> <small>Signature</small></td> <td style="width: 10%;"><u>1/24/18</u> <small>Date</small></td> </tr> <tr> <td>Reviewed By:</td> <td><u>Sarah Springer</u> <small>Print Name</small></td> <td><u>Sr. Geologist</u> <small>Title</small></td> <td> <small>Signature</small></td> <td><u>03-13-18</u> <small>Date</small></td> </tr> </table>					Reported By:	<u>Tracy Malgou</u> <small>Print Name</small>	<u>Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>1/24/18</u> <small>Date</small>	Reviewed By:	<u>Sarah Springer</u> <small>Print Name</small>	<u>Sr. Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>
Reported By:	<u>Tracy Malgou</u> <small>Print Name</small>	<u>Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>1/24/18</u> <small>Date</small>										
Reviewed By:	<u>Sarah Springer</u> <small>Print Name</small>	<u>Sr. Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>										
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OR Doc Type:		WMU Code(s):												

BOREHOLE LOG				Page <u>1</u> of <u>1</u>										
Well ID: <u>C9859</u>		Well Name: <u>NIA</u>		Date: <u>1/25/18</u>										
Project: <u>Install 28 Shallow Characterization BH 200-DJ-100</u>		Location: <u>216-T-16</u>												
		Reference Measure Point: <u>Ground Surface</u>												
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other										
0			0 - 4.2': sandy Gravel (sG) s=60%, g=40% Gravel: 2mm-50mm, v. fine to v. coarse pebbles, subang. Sand: v. fine to coarse. Moist	Geoprobe drilling using 4 1/2" 3" 3/4" Temporary casing from 0.0-6.7' bgs. Samples collected from 2.0-4.2' bgs with 5' 3" Plexiglas liner										
5	2 min 100% 0%		4.2 - 6.3: No sediment recovery.											
10				Total Depth: 4 1/2" casing: 6.7' Borehole: 6.3'										
<table style="width:100%; border: none;"> <tr> <td style="width: 15%;">Reported By:</td> <td style="width: 35%;"><u>Tracy Mallon</u> <small>Print Name</small></td> <td style="width: 15%;">Geologist <small>Title</small></td> <td style="width: 15%;"> <small>Signature</small></td> <td style="width: 20%;"><u>1/25/18</u> <small>Date</small></td> </tr> <tr> <td>Reviewed By:</td> <td><u>Sarah Springer</u> <small>Print Name</small></td> <td>Sr. Geologist <small>Title</small></td> <td> <small>Signature</small></td> <td><u>03-13-18</u> <small>Date</small></td> </tr> </table>					Reported By:	<u>Tracy Mallon</u> <small>Print Name</small>	Geologist <small>Title</small>	 <small>Signature</small>	<u>1/25/18</u> <small>Date</small>	Reviewed By:	<u>Sarah Springer</u> <small>Print Name</small>	Sr. Geologist <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>
Reported By:	<u>Tracy Mallon</u> <small>Print Name</small>	Geologist <small>Title</small>	 <small>Signature</small>	<u>1/25/18</u> <small>Date</small>										
Reviewed By:	<u>Sarah Springer</u> <small>Print Name</small>	Sr. Geologist <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>										
OR Doc Type:		For Office Use Only												
		WMU Code(s):												

BOREHOLE LOG				Page <u>1</u> of <u>1</u>								
Well ID: <u>C9942</u>		Well Name: <u>N/A</u>		Date: <u>1/25/18</u>								
Project: <u>Install 28 Shallow Characterization BHs in ZUS-DJ-1</u>			Location: <u>Z16-T-16</u>									
			Reference Measure Point: <u>Ground Surface</u>									
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other								
0			0.0-4.0: Direct push with no sediment recovery.	Geoprobe drilling using 4 1/2" / 3" temporary casing from 0.0-10.3' bgs. Samples collected from 4.0-10.1' bgs using 5' 3" Lexan liners.								
5	3 min 100% 2.5 min 90% 1.5 min		4.0-6.2': sandy Gravel (sG) g=60%. s=40%. Gravel: 2mm-80mm, v. fine pebbles to small cobbles, sub ang. Sand: fine to v. coarse, ang. Moist.									
10	100% 0.5 min		6.2-10.1: Gravel (G) g=80%. s=20%. Gravel: 2mm-90mm, v. fine pebbles to small cobbles, sub ang. Sand: medium to v. coarse, ang. Moist.									
				Total Depth 4 1/2" casing: 10.3 Borehole: 10.1								
<table style="width:100%; border: none;"> <tr> <td style="width: 30%;">Reported By: <u>Tracy Mallgren</u> <small>Print Name</small></td> <td style="width: 20%;">Geologist <small>Title</small></td> <td style="width: 20%; text-align: center;"> <small>Signature</small></td> <td style="width: 20%; text-align: right;"><u>1/25/18</u> <small>Date</small></td> </tr> <tr> <td>Reviewed By: <u>Sarah Springer</u> <small>Print Name</small></td> <td>Sr. Geologist <small>Title</small></td> <td style="text-align: center;"> <small>Signature</small></td> <td style="text-align: right;"><u>03-13-18</u> <small>Date</small></td> </tr> </table>					Reported By: <u>Tracy Mallgren</u> <small>Print Name</small>	Geologist <small>Title</small>	 <small>Signature</small>	<u>1/25/18</u> <small>Date</small>	Reviewed By: <u>Sarah Springer</u> <small>Print Name</small>	Sr. Geologist <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>
Reported By: <u>Tracy Mallgren</u> <small>Print Name</small>	Geologist <small>Title</small>	 <small>Signature</small>	<u>1/25/18</u> <small>Date</small>									
Reviewed By: <u>Sarah Springer</u> <small>Print Name</small>	Sr. Geologist <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>									
OR Doc Type:		For Office Use Only										
		WMU Code(s):										

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9861</u>		Well Name: <u>N/A</u>		Date: <u>3-12-18</u>
Project: <u>Install 28 Shallow Characterization BtIs in 200-DV-100</u>			Location: <u>216-T-18</u>	
			Reference Measure Point: <u>Ground Surface</u>	
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0			0-6.5': gravelly Sand (gS), g=20% s=70% m=10%, Gravel: 2-55mm, v.fine to v.coarse pebbles, ang-subang. Sand: v.fine to coarse, ang.	Geoprobe drilling using 4 1/2" / 3 3/4" temporary casing from 0.0-10.5' bgs. Samples collected from 2.5-10.0' bgs using a 5' 3" OD Lexan Liners.
5	20 sec 50% rel 10 sec 50% rel 19 sec 15% rel 20 sec 15% rel		6.5-10.0': Sand (S) g=5% s=85% m=10% Gravel: 2-55mm, v.fine to v.coarse pebbles, ang- subang. Sand: v.fine to coarse, ang.	
10		Not used PP 3/12/2018		

Reported By:
Paul Prevora Print Name Geologist Title Paul Prevora Signature 3/12/2018 Date

Reviewed By:
Sarah Springer Print Name Gr. Geologist Title Sarah Springer Signature 04/06/2018 Date

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OR Doc Type: _____ WMU Code(s): _____

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9862</u>		Well Name: <u>N/A</u>		Date: <u>3-12-2018</u>
Project: <u>Install of 28 shallow characterization BH's in the 200-DU-300</u>			Location: <u>216-T-18</u>	
			Reference Measure Point: <u>Ground Surface</u>	
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0			0-2.3 ft: No textural data available	Geoprobe drilling using 4 1/2" / 3 3/4" temporary casing from 0.0-10.1 ft
			2.3-4.3 ft: Sand (S); 9% G, 91% S, 9% M	Samples collected from 2.3-10.1 ft bgs using 5 ft, 3" OD LEXAN liners
5	75% 20 sec		4.3-6.4 ft: Sand (S); 9% G, 91% S, 9% M	Observations were limited during ^{10.5-11.1 ft} drilling due to ^{drilling method}
	100% 19 sec		6.4-8.0 ft: (m)S (slightly silty sand); 9% G, 85% S, 15% M; Sand = 60% fel, 4% maf	4.2 ppm voc @ 6.4-8.0 ft cuttings
	80% 42 sec		8.0-10.1 ft: Gravelly sand (gs); 25% G, 66% S, 9% M	0.9 ppm voc @ 8.0-10.1 ft cuttings
10	75%			
<div style="position: absolute; top: 50%; left: 50%; transform: translate(-50%, -50%); opacity: 0.5;"> Not used PP 3/73/2018 </div>				
Reported By: <u>Paul Prevou</u> <u>Geologist</u> <u>Paul Prevou</u> <u>3/12/2018</u> Print Name Title Signature Date				
Reviewed By: <u>Sarah Springer</u> <u>Sr. Geologist</u> <u>Sarah Springer</u> <u>04/06/2018</u> Print Name Title Signature Date				
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OR Doc Type:		WMU Code(s):		

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9863</u>		Well Name: <u>N/A</u>		Date: <u>3-12-2018</u>
Project: <u>Install 28 shallow characterization BH's in the 200-DV-100</u>			Location: <u>216-T-18</u>	
			Reference Measure Point: <u>Ground Surface</u>	
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0			0-2.2 ft bgs: Direct push with no sediment recovery #3/22	Geoprobe drilling using 4 1/2" / 3 3/4" temporary casing from 0.0-10.0 ft bgs
			2.2-4.6 ft: gS (Gravelly Sand); 11% G, 85% S, 9% m	Sampler collected from 2.2-10.0 ft bgs using 5 ft, 2" dia LEXAN liner.
5	100%		4.6-6.4 ft: Sand (S); 100% S	0.8 ppm VOC in 4.6-6.4 ft cuttings
	80%		6.4-8.4 ft: Gravelly sand (gS); 15% G, 80% S, 5% m	observations were limited due to drilling method
	90%		8.4-10.0 ft: Gravelly sand (gS); 16% G, 80% S, 5% m	
10	90%			
15				Total Depth (TD): 10.0 ft bgs Bottom of Casing: 10.5 ft bgs
<p style="text-align: center;">Not used PP 3/27/2018</p>				
Reported By: <u>Paul Pevon</u> <u>Geologist</u> <u>Paul Pevon</u> <u>3/12/2018</u> Print Name Title Signature Date				
Reviewed By: <u>Sarah Springer</u> <u>Sr. Geologist</u> <u>Sarah Springer</u> <u>04/06/2018</u> Print Name Title Signature Date				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9864</u>		Well Name: <u>N/A</u>		Date: <u>3-12-18</u>
Project: <u>Install of 28 Shallow Characterization Boreholes in 200-800'</u>		Location: <u>210-T-26</u>		
		Reference Measure Point: <u>Ground Surface</u>		
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0			0- 8.3 : gravelly Sand (gS) g=15%. s=80%. m=5% Gravel: 2mm-3.5mm v.fine to v. coarse pebbles. ang. Sand: v.fine to v. coarse. ang.	Geoprobe drilling using 4 1/2" / 3/4" Temporary Casing from 0.0-15.5' Samples collected from 2.2-10.0' bgs using a 5' 3" OD Texon Liners.
5	20sec 100% 20sec 100% 62sec 100% 40sec 100%		8.3-10.0': Sand (S) g=5%. s=90%. m=5% Gravel: 2-8mm v.fine to fine pebbles. Sand: v.fine to v. coarse. ang.	observations were limited due to drilling method
10			10.0-15.1: Gravel (G) 100% g 10.0-15.1 m 3/4" - No sample recovery	
15	0%			Total Depths 4 1/2" casing: 15.5' Borehole: 15.1'
			Not Used PR 3/12/2018	
Reported By: <u>Paul Prevou</u> <u>Geologist</u> <u>Paul Prevou</u> <u>3/12/2018</u> Print Name Title Signature Date				
Reviewed By: <u>Sarah Springer</u> <u>Sr. Geologist</u> <u>Sarah Springer</u> <u>04/06/2018</u> Print Name Title Signature Date				
For Office Use Only				
OR Doc Type:		WMU Code(s):		

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9943</u>		Well Name:		Date: <u>3/12/2018</u>
Project: <u>Install of 28 shallow characterization BH's in the 200-DU-2 OU</u>		Location: <u>2/6-T-26</u>		Reference Measure Point: <u>Ground Surface</u>
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0			<u>0-10.1: Direct push with no sediment recovery</u>	<u>Geoprobe drilling using 4 1/2" / 3 3/4" Temp. casing from 0.8' - 14.9 ft bgs. Samples collected from 10.1 - 14.9 ft bgs. using 5 ft, 3" OD LEXAN liners.</u>
5				<u>Observations were limited due to drilling method</u>
10	<u>75 sec. 7m 20sec PP 3/27</u>		<u>10.1-12.3: Gravel (G); 90% G, 10% S, 0% M</u>	<u>1.8 ppm Voc, 2ug Pb @ 10.1-12.3 ft bgs cuttings</u>
12.3	<u>50% 7m 20sec</u>		<u>12.3-14.9: Gravel (G); 95% G, 5% S, 0% M</u>	<u>1.9 ppm Voc, 2ug Pb @ 12.3-14.9 ft bgs cuttings</u>
15	<u>90%</u>			
			<u>Total Depth (TD): 14.9 ft bgs</u> <u>Bottom of Casing (BOC): 15.3 ft bgs</u>	
			<u>Not used</u> <u>PP 3/27/2018</u>	

Reported By:			
<u>Paul Provo</u> Print Name	<u>Geologist</u> Title	 Signature	<u>3/12/2018</u> Date
Reviewed By:			
<u>Sarah Springer</u> Print Name	<u>Sr. Geologist</u> Title	 Signature	<u>04/06/2018</u> Date
For Office Use Only			
OR Doc Type:	WMU Code(s):		

BOREHOLE LOG				Page <u>1</u> of <u>1</u>																
Well ID: <u>C9944</u>		Well Name: <u>N11A</u>		Date: <u>3-13-18</u>																
Project: <u>Install 28 Shallow Characterization BtHs in 200-2001 20</u>			Location: <u>Z16-T-26</u>																	
Reference Measure Point: <u>Ground Surface</u>																				
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other																
0			<u>0-10.5': Direct Push with no sediment recovery.</u>	<u>Geoprobe drilling using 4 1/2" 13 3/4" Temporary casing. from 0.0-15.3' Samples collected from 10.5-12.0' bgs using a 5' 3" od Lexan Liners.</u>																
5																				
10																				
15	<u>30 sec 100%</u>		<u>10.5-12.0': Gravel (G) 100% g Gravel: 2-80mm, v. fine pebbles to small cobbles. Ang-sub ang.</u>	<u>Observations were limited due to drilling method</u>																
	<u>0%</u>		<u>12.0-15.1: Gravel - no sediment collected</u>																	
			<u>Not used PP 3/13/2018</u>	<u>Total Depths 4 1/2" casing: 15.3' Borehole: 15.1'</u>																
<table style="width:100%; border: none;"> <tr> <td style="width: 25%;">Reported By:</td> <td style="width: 25%;">Geologist</td> <td style="width: 25%;">Signature</td> <td style="width: 25%;">Date</td> </tr> <tr> <td><u>Paul Provon</u> <small>Print Name</small></td> <td></td> <td><u>Paul Provon</u> <small>Signature</small></td> <td><u>3/13/2018</u> <small>Date</small></td> </tr> <tr> <td>Reviewed By:</td> <td>Sr. Geologist</td> <td>Signature</td> <td>Date</td> </tr> <tr> <td><u>Sarah Springer</u> <small>Print Name</small></td> <td></td> <td><u>Sarah Springer</u> <small>Signature</small></td> <td><u>04/06/2018</u> <small>Date</small></td> </tr> </table>					Reported By:	Geologist	Signature	Date	<u>Paul Provon</u> <small>Print Name</small>		<u>Paul Provon</u> <small>Signature</small>	<u>3/13/2018</u> <small>Date</small>	Reviewed By:	Sr. Geologist	Signature	Date	<u>Sarah Springer</u> <small>Print Name</small>		<u>Sarah Springer</u> <small>Signature</small>	<u>04/06/2018</u> <small>Date</small>
Reported By:	Geologist	Signature	Date																	
<u>Paul Provon</u> <small>Print Name</small>		<u>Paul Provon</u> <small>Signature</small>	<u>3/13/2018</u> <small>Date</small>																	
Reviewed By:	Sr. Geologist	Signature	Date																	
<u>Sarah Springer</u> <small>Print Name</small>		<u>Sarah Springer</u> <small>Signature</small>	<u>04/06/2018</u> <small>Date</small>																	
OR Doc Type:		For Office Use Only																		
WMU Code(s):																				

BOREHOLE LOG				Page <u>1</u> of <u>1</u>	
Well ID: <u>C9860</u>		Well Name: <u>N/A</u>		Date: <u>3-13-18</u>	
Project: <u>Install 28 Characterization (Shallow) BHs in Zoo-DV-100</u>			Location: <u>216-T-26</u>		
Reference Measure Point: <u>Grand Surface</u>					
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other	
0			0-12.0': gravelly Sand (gs) g: 15% s: 80% m: 5% Gravel: 2-40mm, v. fine to v. coarse pebbles; subang Sand: v. fine to coarse, ang	GeoProbe Drilling with 4 1/2" / 3 3/4" temporary casing from 0.0-14.1' Samples collected from 2.1-13.5' bgs using a 5' 3" OD Lexan Liner	
40sec	100% rec				
1 min	45sec				
100% rec	30sec				
100% rec	30sec				
90% rec	30sec				
0% rec	5.5min				
30% rec					
12.5-13.5'				Gravel (G) 100% g Gravel: 2-85mm, v. fine pebbles to sm cobbles. ang - subang	
					Total Depth: Casing: 14.1' bgs BH: 13.5' bgs
not used PP 3/13/18					

Reported By: <u>Paul Prevow</u> <u>Geologist</u> <u>Paul Prevow</u> <u>3/13/2018</u>			
Print Name	Title	Signature	Date
Reviewed By: <u>Sarah Springer</u> <u>Sr. Geologist</u> <u>Sarah Springer</u> <u>04/06/2018</u>			
Print Name	Title	Signature	Date
For Office Use Only			
OR Doc Type:	WMU Code(s):		

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9945</u>		Well Name: <u>NIA</u>		Date: <u>3-13-18</u>
Project: <u>Install 28 Shallow Characterization BHS in 70-100</u>			Location: <u>216-T-26</u>	
Reference Measure Point: <u>Ground Surface</u>				
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0			0.0-10.3' Direct push with no sediment recovery.	Geoprobe drilling with 4 1/2" 3" 1/4" temporary casing from 0.0-15.5' Samples collected from 10.3-15.0' bgs using a 5' 3" OD Lexan liner.
5				
10	2 min Sol. 5.5 min		10.3-11.6: Gravel (G) 100% G Gravel: 2 - 75mm v. fine pebbles to small cobbles. Ang - sub ang.	observations were limited due to drilling method
15	100%		11.6-15.0: Sandy Gravel (sG) G = 70%. S = 30%. Gravel: 2-75mm v. fine pebbles to small cobbles. suba Sand: v fine to v. coarse - angular	
			Not used PA 3/13/2018	
<p>Reported By: <u>Paul Pevon</u> Geologist 3/13/2018</p> <p style="text-align: center;">Print Name Title Signature Date</p>				
<p>Reviewed By: <u>Sarah Springer</u> Sr. Geologist 04/06/2018</p> <p style="text-align: center;">Print Name Title Signature Date</p>				
For Office Use Only				
OR Doc Type:			WMU Code(s):	

BOREHOLE LOG			Page <u>1</u> of <u>1</u>										
Well ID: <u>C9849</u>		Well Name: <u>NIA</u>	Date: <u>1/18/18</u>										
Project: <u>Install 28 Shallow Characterization BH's in Zoo-DV-100</u>		Location: <u>216-S-9</u>											
		Reference Measure Point: <u>Ground Surface</u>											
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other										
			Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other										
0		○	0-6.6': Sandy Gravel (sG) g=35%, s=60%, m=5% (Gravel: 2-70mm, v. fine pebbles to small cobbles, ang-sub ang. Sand: fine to v. coarse grained, ang. Moist										
5	100% 2 min	○											
	100% 1 min	○	6.6-12.8': gravelly Sand (gS) g=20%, s=20% (Gravel: 2mm-40mm, v. fine to v. coarse pebbles sub.ang. Sand: fine to v. coarse, ang. Moist										
	100% 20 sec	○											
10	100% 20 sec	○											
	5% 30 sec	○	12.8-15.2': 0% recovery - no sediment to describe.										
15	0%	○											
			Total Depth 4 1/2" casing: 15.5' Borehole: 15.0'										
<table style="width:100%; border: none;"> <tr> <td style="width: 30%;">Reported By:</td> <td style="width: 30%;"><u>Tracy Mallgren</u> <small>Print Name</small></td> <td style="width: 20%;"><u>Geologist</u> <small>Title</small></td> <td style="width: 20%;"> <small>Signature</small></td> <td style="width: 10%;"><u>1/18/18</u> <small>Date</small></td> </tr> <tr> <td>Reviewed By:</td> <td><u>Sarah Springer</u> <small>Print Name</small></td> <td><u>Sr. Geologist</u> <small>Title</small></td> <td> <small>Signature</small></td> <td><u>03-13-18</u> <small>Date</small></td> </tr> </table>				Reported By:	<u>Tracy Mallgren</u> <small>Print Name</small>	<u>Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>1/18/18</u> <small>Date</small>	Reviewed By:	<u>Sarah Springer</u> <small>Print Name</small>	<u>Sr. Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>
Reported By:	<u>Tracy Mallgren</u> <small>Print Name</small>	<u>Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>1/18/18</u> <small>Date</small>									
Reviewed By:	<u>Sarah Springer</u> <small>Print Name</small>	<u>Sr. Geologist</u> <small>Title</small>	 <small>Signature</small>	<u>03-13-18</u> <small>Date</small>									
OR Doc Type:		For Office Use Only											
		WMU Code(s):											

BOREHOLE LOG				Page <u>1</u> of <u>1</u>
Well ID: <u>C9851</u>		Well Name: <u>NIA</u>		Date: <u>1/22/18</u>
Project: <u>Install 28 Shallow Characterization BH's in 200-DU-100</u>			Location: <u>216-S-9</u>	
Reference Measure Point: <u>Ground Surface</u>				
Depth (ft)	Sample	Graphic Log	Sample Description: Sediment Classification, Grain Size Distribution, Color, Moisture Content, Sorting, Angularity, Mineralogy, Particle Size, Reaction to HCl, Other	Comments: Depth of Casing, Drilling Method, Sampling Method, Sampler Size, Water Level, Other
0		○	0-6.5: Sandy Gravel (sG) g=50% s=45% m=5% Gravel: 2mm-35mm v. fine to v. coarse pebbles, sub angular. Sand: fine to v. coarse grained, ang. Moist.	Geoprobe drilling using 4 1/2" / 3 3/4" Temporary Casing from 0.0-15.4' bgs Samples collected from 1.9-15.1' bgs using 5' 300 Lexan Liners.
	55 sec.	○		
	100% 1 min	○	@ 4.0' s=76% g=35% m=5	
5		○	6.5-15.1: gravelly Sand (gS) s=75 g=20 m=5 Gravel: 2mm-35mm v. fine to v. coarse pebbles, sub ang. Sand: v. fine to v. coarse, ang. Moist.	
	100%	○		
	100%	○		
10		○		
	100% 1 min	○		
	100%	○		
15		○		Total Depth 4 1/2" casing: 15.4' Borehole: 15.1'
	100%	○		

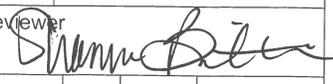
Reported By:	Geologist	Signature	Date
<u>Tracy Malgren</u> <small>Print Name</small>			<u>1/22/18</u>
Reviewed By:	Sr. Geologist	Signature	Date
<u>Sarah Springer</u> <small>Print Name</small>			<u>03-13-18</u>

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Appendix C

Civil Survey

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SURVEY DATA REPORT				Page 1 of 39			
Project No.		Title		Request No.			
		200E/200W DV-1 Boreholes Final Surveys		183-075			
Job No.		Prepared By		Date		Reviewer	
CACN: 303971-JPRC		N.P. Fastabend		4/11/18			
DESCRIPTION OF WORK				DISTRIBUTION	SDR	PLOT	DWG
Obtain final coordinates and elevations of brass cap markers for completed DV-1 Boreholes C9558 thru C9560, C9839 thru C9866 and C9939 thru C9945 located in 200E and 200W Area. Horizontal Coordinate System: WCS83S/91 (Meters) Vertical Datum: NAVD88 (Meters)				Survey File	OR		
				J.D. Mehrer	1		
				K.M. Whitley	1		
				J.B. Geiger	1		
				A.J. Green	1		
SURVEY RESULTS AND COMMENTS							
See Attached Well Survey Data Report Sheets							
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OR Doc Type:			WMU Code(S):				

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/11/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9839 located at the 216-B-5 Waste Site in 200E Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200E		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9839	C9839	573778.92	136730.22	209.61	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement: 					

WELL SURVEY DATA REPORT

Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9558 located at the 216-B-5 Waste Site in 200E Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200E			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9558	C9558	573778.58	136730.87	209.64	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT

Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9840 located at the 216-B-9 Waste Site in 200E Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200E			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9840	C9840	573855.66	136831.24	207.97	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/11/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9559 located at the 216-B-9 Waste Site in 200E Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200E		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9559	C9559	573854.93	136830.05	208.09	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9841 located at the 216-B-9 Waste Site in 200E Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200E			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9841	C9841	573860.48	136862.90	207.34	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9842 located at the 216-B-9 Waste Site in 200E Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200E			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9842	C9842	573863.58	136837.56	207.68	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9843 located at the 216-B-35 Waste Site in 200E Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200E			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9843	C9843	573448.46	137277.11	203.83	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT

Project:	Prepared By: Neil P. Fastabend
	Company: CHPRC

Date Requested: 04/09/18	Requestor: James D. Mehrer (CHPRC)
------------------------------------	--

Date of Survey: 04/11/18	Surveyor / Company: Neil P. Fastabend / CHPRC
------------------------------------	---

Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9844 located at the 216-B-36 Waste Site in 200E Area.	Horizontal Datum: NAD83 (91)
	Vertical Datum: NAVD88
	Units: Meters
	Hanford Area Designation: 200E

Coordinate System: Washington State Plane Coordinates (South Zone)

Horizontal Control Monuments:
Washington State Reference Network

Vertical Control Monuments:
Washington State Reference Network

Well ID	Well Name	Easting	Northing	Elevation	
C9844	C9844	573403.74	137292.16	203.84	Brass Cap Survey Marker in Concrete

Notes:
Surveyed location on top center of Brass Cap in Concrete.
Equipment Used: Trimble R8 RTK GPS

Surveyor Statement:

WELL SURVEY DATA REPORT

Project:	Prepared By: Neil P. Fastabend
	Company: CHPRC

Date Requested: 04/09/18	Requestor: James D. Mehrer (CHPRC)
------------------------------------	--

Date of Survey: 04/11/18	Surveyor / Company: Neil P. Fastabend / CHPRC
------------------------------------	---

Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9845 located at the 216-B-39 Waste Site in 200E Area.	Horizontal Datum: NAD83 (91)
	Vertical Datum: NAVD88
	Units: Meters
	Hanford Area Designation: 200E

Coordinate System: Washington State Plane Coordinates (South Zone)

Horizontal Control Monuments:
Washington State Reference Network

Vertical Control Monuments:
Washington State Reference Network

Well ID	Well Name	Easting	Northing	Elevation	
C9845	C9845	573458.27	137373.92	200.96	Brass Cap Survey Marker in Concrete

Notes:
Surveyed location on top center of Brass Cap in Concrete.
Equipment Used: Trimble R8 RTK GPS

Surveyor Statement:

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/11/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9560 located at the 216-B-39 Waste Site in 200E Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200E		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9560	C9560	573458.57	137373.50	200.99	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9846 located at the 216-B-40 Waste Site in 200E Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200E			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9846	C9846	573431.43	137403.15	200.14	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9847 located at the 216-B-41 Waste Site in 200E Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200E			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9847	C9847	573449.70	137429.20	199.34	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9855 located at the 216-T-5 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9855	C9855	566672.45	136722.33	206.79	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT

Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9856 located at the 216-T-5 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9856	C9856	566674.46	136727.39	206.82	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9857 located at the 216-T-14 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9857	C9857	566947.30	136856.60	212.61	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9940 located at the 216-T-14 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9940	C9940	566946.64	136856.62	212.62	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9858 located at the 216-T-15 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9858	C9858	566973.24	136849.93	213.15	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9941 located at the 216-T-15 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9941	C9941	566972.49	136849.87	213.14	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/10/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9859 located at the 216-T-16 Waste Site in 200W Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200W		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9859	C9859	567007.57	136805.03	213.50	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9942 located at the 216-T-16 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9942	C9942	567008.27	136805.06	213.53	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9860 located at the 216-T-17 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9860	C9860	567021.98	136843.01	213.65	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT

Project:	Prepared By: Neil P. Fastabend
	Company: CHPRC

Date Requested: 04/09/18	Requestor: James D. Mehrer (CHPRC)
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Date of Survey: 04/11/18	Surveyor / Company: Neil P. Fastabend / CHPRC
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Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9861 located at the 216-T-18 Waste Site in 200W Area.	Horizontal Datum: NAD83 (91)
	Vertical Datum: NAVD88
	Units: Meters
	Hanford Area Designation: 200W

Coordinate System: Washington State Plane Coordinates (South Zone)

Horizontal Control Monuments:
Washington State Reference Network

Vertical Control Monuments:
Washington State Reference Network

Well ID	Well Name	Easting	Northing	Elevation	
C9861	C9861	566944.22	136463.38	205.30	Brass Cap Survey Marker in Concrete

Notes:
Surveyed location on top center of Brass Cap in Concrete.
Equipment Used: Trimble R8 RTK GPS

Surveyor Statement:

WELL SURVEY DATA REPORT

Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9862 located at the 216-T-18 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9862	C9862	566946.91	136454.98	205.12	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/11/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9863 located at the 216-T-18 Waste Site in 200W Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200W		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9863	C9863	566958.51	136455.71	205.25	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9864 located at the 216-T-26 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9864	C9864	566929.09	136405.16	205.73	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9943 located at the 216-T-26 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9943	C9943	566929.87	136405.24	205.76	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/11/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9865 located at the 216-T-26 Waste Site in 200W Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200W		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9865	C9865	566926.71	136396.61	205.73	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/11/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9944 located at the 216-T-26 Waste Site in 200W Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200W		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9944	C9944	566926.69	136395.95	205.72	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9866 located at the 216-T-26 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9866	C9866	566930.04	136390.97	205.74	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/11/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9945 located at the 216-T-26 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9945	C9945	566930.88	136390.88	205.76	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT

Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9848 located at the 216-S-9 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9848	C9848	567156.35	134508.49	208.05	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9849 located at the 216-S-9 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9849	C9849	567167.58	134484.55	209.41	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9939 located at the 216-S-9 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9939	C9939	567167.55	134484.98	209.42	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement: 					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9850 located at the 216-S-9 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9850	C9850	567180.74	134451.37	209.47	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9851 located at the 216-S-9 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9851	C9851	567184.31	134474.54	209.33	Brass Cap Survey Marker in Concrete
Notes: Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement: 					

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/10/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9852 located at the 216-S-9 Waste Site in 200W Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200W		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9852	C9852	567194.84	134456.53	208.29	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete. Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:			Prepared By: Neil P. Fastabend		
			Company: CHPRC		
Date Requested: 04/09/18			Requestor: James D. Mehrer (CHPRC)		
Date of Survey: 04/10/18			Surveyor / Company: Neil P. Fastabend / CHPRC		
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9853 located at the 216-S-21 Waste Site in 200W Area.			Horizontal Datum: NAD83 (91)		
			Vertical Datum: NAVD88		
			Units: Meters		
			Hanford Area Designation: 200W		
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9853	C9853	566615.78	134405.42	203.03	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					

WELL SURVEY DATA REPORT					
Project:		Prepared By: Neil P. Fastabend			
		Company: CHPRC			
Date Requested: 04/09/18		Requestor: James D. Mehrer (CHPRC)			
Date of Survey: 04/10/18		Surveyor / Company: Neil P. Fastabend / CHPRC			
Description of Work: Obtained final survey coordinates and elevation of Brass Cap Marker for DV-1 Borehole C9854 located at the 216-S-21 Waste Site in 200W Area.		Horizontal Datum: NAD83 (91)			
		Vertical Datum: NAVD88			
		Units: Meters			
		Hanford Area Designation: 200W			
Coordinate System: Washington State Plane Coordinates (South Zone)					
Horizontal Control Monuments: Washington State Reference Network					
Vertical Control Monuments: Washington State Reference Network					
Well ID	Well Name	Easting	Northing	Elevation	
C9854	C9854	566607.84	134413.15	202.69	Brass Cap Survey Marker in Concrete
Notes:					
Surveyed location on top center of Brass Cap in Concrete.					
Equipment Used: Trimble R8 RTK GPS					
Surveyor Statement:					