OU1-631 AR

DRAFT CLOSEOUT REPORT OPERABLE UNIT 1 GROUNDWATER REMEDIATION FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA



Prepared for:

U.S. Army Corps of Engineers Sacramento District 1325 J Street Sacramento, CA 95814-2922

Contract No. W912DY-10-D-0023 Task Order CM10

Prepared by:

HydroGeoLogic, Inc. 14142 Denver West Parkway Suite 225 Lakewood, CO 80401-3189

September 2017

DRAFT CLOSEOUT REPORT OPERABLE UNIT 1 GROUNDWATER REMEDIATION FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

PROJECT:

Delivery Order for Operable Unit 1, Former Fort Ord, California (Delivery Order CM08)

CLIENT:

CONTRACT NUMBER: W912DY-10-D-0023

PROJECT MANAGER: Roy Evans, P.E.

PREPARATION DATE:

September 2017

U.S. Army Corps of Engineers

Roy Evans, P.E. HydroGeoLogic, Inc. Project Manager Date

Laura McNamara, P.E., PMP HydroGeoLogic, Inc. Senior Technical Reviewer Date

REGULATORY SUMMARY ES-1			
1.0	INTRODUCTION		
2.0	SUMMARY OF SITE CONDITIONS 2-1 2.1 SITE LOCATION AND DESCRIPTION 2-1 2.1.1 Land Use 2-1 2.1.2 Hydrogeologic Setting 2.2		
	2.1.2 Hydrogeologic Setting 2.2 NPL LISTING 2-2		
	2.3 REMOVAL ACTIONS		
	2.4 REMEDY SUMMARY / HISTORY		
	2.4.1 Original GWE15		
	2.4.3 Off-Site System		
	2.5 INSTITUTIONAL CONTROLS 2-7		
	2.6 FINAL INSPECTION ACTIVITIES		
3.0	MONITORING RESULTS		
	3.1 SOURCE ACTION SOIL REMOVAL CONFIRMATION		
	3.2 GROUNDWATER MONITORING DEMONSTRATING		
	REMEDIATION PROGRESS		
4.0	ATTAINMENT DEMONSTRATION FOR GROUNDWATER CLEANUP4-1		
	4.1 ATTAINMENT MONITORING SUMMARY - VOCS		
	4.2 ATTAINMENT MONITORING SUMMARY – PFOA/PFOS		
	4.2.1 Comparison to Preliminary Health Advisory		
	4.2.2 Comparison to May 2016 PFOA/PFOS Health Advisory		
5.0	SUMMARY OF OPERATION AND MAINTENANCE REQUIRED		
	5.1 GROUNDWATER MONITORING		
	5.2 INSTITUTIONAL CONTROLS		
6.0	DEMONSTRATION OF CLEANUP ACTIVITY QA/QC		
	6.1 CONSTRUCTION QA/QC		
	6.2 OPERATIONS AND MAINTENANCE QA/QC		
	6.3 SAMPLING AND ANALYIS PROTOCOLS		
7.0	FIVE-YEAR REVIEW7-1		
	7.1 SUMMARY OF PREVIOUS AND CURRENT FIVE-YEAR REVIEWS		
	7.2 FUTURE FIVE-YEAR REVIEWS		
8.0	SITE COMPLETION CRITERIA		
9.0	REFERENCES		

- Table 2.1Well Location Map Index
- Table 2.2Well Function
- Table 4.1OU-1 Attainment Monitoring Summary of Analytical Results for TCE
- Table 4.2OU-1 Attainment Monitoring Summary of Analytical Results for PFOA and PFOS

LIST OF FIGURES

Figure 1.1 Former Fort Ord Location Map Figure 2.1 Maximum Extent of Trichloroethene (TCE) in OU-1 Groundwater Figure 2.2 **OU-1** Remediation Area Figure 2.3 Former Fort Ord OU-1 Remediation System Figure 2.4 OU-1 Groundwater Remediation Well Locations Former Fort Ord, CA Figure 2.5 Special Groundwater Protection Zones, June 2016 Figure 3.1 TCE Concentration in September Groundwater Monitoring 2006-2014 Figure 3.2 OU-1 FONR TCE Concentrations Over Time for Attainment Monitoring Well Network, Former Fort Ord, CA Figure 4.1 Attainment Monitoring Summary TCE Concentrations in OU-1 A-Aquifer Figure 4.2 Attainment Monitoring Summary PFOA and PFOS Concentrations in OU-1 A-Aquifer

LIST OF APPENDICES

- Appendix A Attainment Monitoring Evaluation and Summary for EPA Designated Emerging Contaminants In Operable Unit 1
- Appendix B Well Destruction and NWTS Decommissioning Completion Report

µg/L	micrograms per liter
ACL	Aquifer Cleanup Level
BCT	BRAC Cleanup Team
bgs	below ground surface
BRAC	Base Realignment and Closure (Fort Ord Office)
Cal/EPA	California Environmental Protection Agency
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
COC	chemical of concern
DCE	dicholorethene
DTSC	Department of Toxic Substances Control
EPA	U.S. Environmental Protection Agency
ESD	Explanation of Significant Differences
FAAF	Fritzsche Army Air Field
FDA	Fire Drill Area
FONR	Fort Ord Natural Reserve
GAC	granular activated carbon
GRO	gasoline range organics
GST	Groundwater Statistics Tool
GWETS	groundwater extraction and treatment system
GWSTS	groundwater and soil treatment system
HA	health advisory
HCPP	Hydraulic Control Pilot Project
HGL	HydroGeoLogic, Inc.
HMP	Habitat Management Plan
J	value is estimated
LTM	long-term monitoring
mg/kg	milligrams per kilogram
ng/L	nanograms per liter
NPL	National Priority List
NWTS	Northwest Treatment System
OU	Operable Unit
PFOA	perfluorooctanoic acid

LIST OF ACRONYMS AND ABBREVIATIONS (continued)

PFOS PFOT PHA PLC	perfluorooctane sulfonate total PFOA and PFOS concentration Preliminary Health Advisory programmable logic control
QA QAPP QC	quality assurance Quality Assurance Project Plan quality control
RACR	Remedial Action Completion Report
ROD	Record of Decision
RWQCB	Regional Water Quality Control Board
SVA	Salinas Valley Aquiclude
TCE	trichloroethene
TPH	total petroleum hydrocarbons
U.S. Army	Department of the Army
USACE	U.S. Army Corps of Engineers, Sacramento District
UCL	upper confidence limit
UCNRS	University of California Natural Reserve System
UCSC	University of California at Santa Cruz
VOC	volatile organic compound

REGULATORY SUMMARY

The groundwater long-term monitoring (LTM) results showed and the attainment monitoring results confirmed that the aquifer cleanup levels (ACLs) specified in the Operable Unit 1 (OU-1) Record of Decision (ROD) for the chemicals of concern (COC) have been met. The emerging contaminants perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) were not addressed in the ROD but were included in the groundwater attainment monitoring program. PFOA and PFOS sample results were considered with the COC sample results in evaluating the case for OU-1 site closure. The detected PFOA and PFOS concentrations in two wells were greater than the U.S. Environmental Protection Agency (EPA) Health Advisory (HA) limits published in May 2016. These HA values were published five months after the attainment monitoring effort was completed. All PFOA and PFOS detections in OU-1 groundwater were much less than the Preliminary HA values in effect at the time the attainment monitoring was performed. The California Department of Toxic Substances Control (DTSC), Regional Water Quality Control Board (RWQCB), and EPA concluded that OU-1 groundwater monitoring and remediation are complete and that OU-1 can be closed. This closure report summarizes the site history, remediation and monitoring activities, and decommissioning of the remediation system.

DRAFT CLOSEOUT REPORT OPERABLE UNIT 1 GROUNDWATER REMEDIATION FRITZSCHE ARMY AIRFIELD FIRE DRILL AREA FORMER FORT ORD, CALIFORNIA

1.0 INTRODUCTION

HydroGeoLogic, Inc. (HGL) prepared this closeout report on behalf of the U.S. Army Corps of Engineers, Sacramento District (USACE) to document completion of soil and groundwater remediation at Operable Unit (OU)-1, Former Fort Ord, California. Training activities conducted at the former Fire Drill Area (FDA) at Fritzsche Army Airfield resulted in contaminants being released to the environment in the OU-1 area (Figure 1.1).

Contaminated soils were removed from the FDA source area in 1987. Cleanup objectives were specified in the OU-1 Record of Decision (ROD) (U.S. Army, 1995). The ROD established Aquifer Cleanup Levels (ACLs) for 10 chemicals of concern (COCs) in OU-1 groundwater. The 10 OU-1 COCs and the corresponding ACL (shown in parentheses after the chemical name) are:

- 1,1-Dichloroethane (5.0 micrograms per liter [µg/L])
- 1,2-Dichloroethane $(0.5 \,\mu g/L)$
- 1,1-Dichloroethene (DCE; $6.0 \,\mu g/L$)
- Total 1,2-DCE (6.0 µg/L)
- 1,1,1-Trichloroethane (200 µg/L)
- Benzene $(1.0 \,\mu\text{g/L})$
- Chloroform $(2.0 \,\mu g/L)$
- Methyl ethyl ketone $(1,900 \,\mu g/L)$
- Tetrachloroethene $(5.0 \,\mu g/L)$
- Trichloroethene (TCE; $5.0 \mu g/L$)

Groundwater remediation using pump and treat systems and groundwater monitoring was conducted from 1988 through 2014 as part of the OU-1 cleanup and groundwater long-term monitoring (LTM) effort. The LTM results showed that the ACLs specified in the ROD were met at all wells in September 2014 and the remediation system was converted to standby operation in October 2014. Attainment monitoring to confirm that the ROD requirements had been met and would be maintained in the future was performed during 2015.

Perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) have been used nationwide as part of film-forming foam applied to extinguish fires and have been identified by the U.S. Environmental Protection Agency (EPA) as emerging contaminants. Because of their potential use in fire training activities at OU-1, PFOA and PFOS were included in the attainment monitoring sampling program. These compounds were not considered during development of the ROD or included in the ACLs specified in the ROD. Neither Federal nor California drinking water standards for these chemicals have been established; therefore the Preliminary Health Advisory (PHA) values for PFOA and PFOS concentrations in groundwater established by EPA prior to the start of the attainment monitoring effort (EPA, 2014) were used as screening criteria in evaluating the sampling results.

PFOA and PFOS were detected in groundwater at two locations during attainment monitoring. All PFOA and PFOS detections in OU-1 groundwater were much less than the PHA values in effect at the time the attainment monitoring was performed. However, the detected concentrations in two wells were greater than the EPA Health Advisory (HA) limits published in May 2016 (five months after the attainment monitoring effort was completed).

Although the HA values are non-enforceable and presented as advisory information, these more conservative values were considered in evaluating the case for OU-1 closure. The California Department of Toxic Substances Control (DTSC), Regional Water Quality Control Board (RWQCB), and EPA concluded that the cleanup objectives specified in the OU-1 ROD (U.S. Army, 1995) have been met and will continue to be met in the future. They also concurred with the Army recommendation to proceed with site closure activities. This closeout report summarizes the information developed and the actions taken throughout the OU-1 investigation and remediation process.

2.0 SUMMARY OF SITE CONDITIONS

2.1 SITE LOCATION AND DESCRIPTION

Former Fort Ord is located adjacent to Monterey Bay in Monterey County, CA (Figure 1.1). The Fritzsche Army Air Field (FAAF) FDA, located in the northernmost portion of the former Fort Ord (Figure 1.1), is the source area for OU-1 groundwater contaminants. The FDA was identified as the contaminant source area for the soil and groundwater cleanup designated as OU-1. The FDA was established in 1962 as a training area for the Fort Ord Fire Department. The FDA consisted of an unlined burn pit, a drum loading area, a storage tank, and underground piping that connected the storage tank to a discharge nozzle (U.S. Army, 1995). During training exercises, fuel was piped into the burn pit, ignited, and then extinguished. Training activities at the FDA ceased in 1985.

At its maximum extent, the OU-1 groundwater contamination plume (defined as the footprint of the area in which any COC concentration exceeded its associated ACL) extended beyond the former Fort Ord boundary and onto the Armstrong Ranch property as shown on Figure 2.1. The contaminant source area and the resulting OU-1 plume within the former Fort Ord boundary are located within a habitat reserve managed by the University of California at Santa Cruz (UCSC). This habitat reserve is part of the University of California Natural Reserve System (UCNRS) and is referred to as the Fort Ord Natural Reserve (FONR) (Figure 2.2).

2.1.1 Land Use

The dominant habitats within the OU-1 portion of the FONR are coast live oak woodland, coastal scrub, maritime chaparral, and annual grassland. The maritime chaparral is considered a rare habitat by the California Department of Fish and Game and is largely dependent on Former Fort Ord land for survival. Several federally protected rare, threatened, or endangered species are known or suspected to be present within the FONR and were identified in the Installation-Wide Multispecies Habitat Management Plan (HMP) (USACE, 1997). These species include the federally endangered and state threatened sand gilia, the federally threatened Monterey spineflower, and the federally and state threatened California tiger salamander. Several other plant and animal HMP species are or may also be present in the FONR, including the following:

- Coast wallflower (Erysimum ammophilum)
- Eastwood's ericameria (Ericameria fasciculata)
- Monterey ceanothus (Ceanothus cuneatus var. rigidus)
- Sandmat manzanita (Arctostaphylos pumila)
- Toro manzanita (Arctostaphylos montereyensis)
- Yadon's piperia (Piperia yadonii)
- California black legless lizard (Anniella pulchra nigra)
- Monterey ornate shrew (Sorex ornatus salarius)

The Armstrong Ranch property overlying the former OU-1 contaminant plume was used for cattle grazing or as idle pasture until the Off-Post monitoring and extraction wells were decommissioned and destroyed in October 2016 (HGL, 2016b).

2.1.2 Hydrogeologic Setting

The Former Fort Ord straddles two distinct groundwater basins: the southwestern edge of the Salinas Basin and the eastern portion of the smaller Seaside Basin. The Salinas Basin underlies the OU-1 area (Lawrence Berkeley National Laboratory/Lawrence Livermore National Laboratory, 2001). At the Former Fort Ord, the Salinas Basin is composed of relatively flat-lying to gently dipping, poorly consolidated sediments. Aquifers within the Salinas Basin at the Former Fort Ord, from top to bottom, are as follows:

- The unconfined A-Aquifer
- The confined Upper 180-foot Aquifer
- The confined and unconfined Lower 180-foot Aquifer
- The confined 400-foot and 900-foot Aquifers

These aquifer names reflect local historical water levels and are not directly correlated to present water levels at the Former Fort Ord. Contaminants at OU-1 were detected only in the A-Aquifer. Since at least 2003, the TCE plume footprint encompassed the maximum extent of the other nine COCs. Consequently, TCE concentrations are used to define the boundaries of OU-1 groundwater contamination.

Aquifer materials in the saturated zone of the A-Aquifer consist predominantly of permeable, slightly silty, fine- to medium-grained sands with some coarse-grained sands. Typically, this aquifer depth ranges from approximately 80 feet to 125 feet below ground surface (bgs) in the OU-1 area. The depth to water ranges from approximately 60 feet to 110 feet bgs. The A-Aquifer is underlain by a sequence of impermeable silts and clays that compose the Salinas Valley Aquiclude (SVA). The SVA is up to 100 feet thick beneath Former Fort Ord. In the OU-1 area, the SVA appears to be an effective barrier that prevents downward migration of contaminants from the A-Aquifer into the underlying Upper 180-foot Aquifer.

Additional information concerning the geology, climate, hydrology, and hydrogeology in OU-1 is presented in the Final 100% Engineering Design Report, Volume 1 of 3 (HGL, 2006a).

2.2 NPL LISTING

Environmental investigations began at Fort Ord in 1984 at FAAF under California Central Coast RWQCB cleanup/abatement orders 84-92, 86-86, and 86-135 (U.S. Army, 2010). Additional investigations at the Fort Ord Landfills began in 1986 and the preliminary site characterization was completed in 1988. In 1990, Fort Ord was placed on the EPA's National Priority List (NPL), primarily because of volatile organic compounds (VOCs) found in groundwater beneath the Fort Ord Landfills. Subsequent environmental investigations and remedial actions at the former Fort Ord have been conducted under the Federal Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA). The CERCLA regulation is more commonly referenced as Superfund. A Federal Facility Agreement was signed in 1990 by the U.S. Department of the Army (U.S. Army) as lead agency, the EPA, the DTSC and the RWQCB. DTSC and RWQCB are part of the California Environmental Protection Agency (Cal/EPA).

The OU-1 remediation effort is overseen by the Army, EPA, DTSC, and RWQCB. These entities signed the Federal Facilities Agreement to perform the Fort Ord environmental cleanup and are referred to as the Fort Ord Base Realignment and Closure (BRAC) Cleanup Team (BCT).

The OU-1 ROD was signed by the EPA in September 1995, the DTSC and the RWQCB in March 1996, and the U.S. Army in May 1996 (U.S. Army, 1995). Groundwater samples collected late in 2004 and in 2006 indicated that the OU-1 plume was larger than that estimated in the ROD. The sample results also indicated that the plume had migrated beyond the capture zone of the groundwater extraction and treatment system (GWETS) and across the boundary between the former Fort Ord and Armstrong Ranch. Consequently, an Explanation of Significant Differences (ESD) was prepared and was signed by the U.S. Army, EPA, and the Cal/EPA in June 2010 (U.S. Army, 2010). The ESD addressed three items:

- The change in the physical area of the remediation response.
- Significant changes in remediation cost from the estimates in the OU-1 ROD due to the expanded remedial area.
- After the OU-1 ROD was signed, institutional controls regarding contaminated groundwater at the former Fort Ord were developed and implemented.

The ESD described the expansion of the extraction and treatment remedy and noted that institutional controls are in place. The two additional extraction and treatment systems that were constructed and operated are described in Section 2.4. The institutional controls (groundwater protection zones shown on Figure 2.5) prevent access or use of the groundwater within the OU-1 area for any purpose until the ACLs are met. The boundaries of the groundwater protection zones are updated as determined by the BCT.

2.3 **REMOVAL ACTIONS**

In 1986, approximately 4,000 cubic yards of total petroleum hydrocarbon- (TPH) contaminated soil were excavated from the FDA and temporarily stockpiled. The maximum depth of the excavation was 31 feet bgs and lateral excavation continued until soil samples collected from the excavation side walls were less than 200 milligrams per kilogram (mg/kg). The completed excavation was backfilled to the original ground surface with clean soil. The excavated soil removed from the FDA was stockpiled and placed in an aboveground biotreatment area.

Biotreatment of the contaminated soil progressed incrementally in l-foot layers of soil and was completed by August 1991. Nutrients were added to treated groundwater from the GWETS and the treated water was then sprayed on the soil in the biotreatment area to optimize growth of microbes that consume hydrocarbons. As each contaminated soil layer was remediated, it was removed and transported to a soil borrow area for use as fill in construction projects at Fort Ord.

The ROD states that the contaminated soil at the FDA has been remediated and no further soil remediation action was selected (U.S. Army, 1995).

2.4 REMEDY SUMMARY / HISTORY

The ROD names extraction and treatment as the selected remedy for groundwater at OU-1. In total, four separate extraction and/or treatment systems were constructed and operated to achieve the OU-1 groundwater remediation goal. These separate systems are shown on Figure 2.3 and were operated as follows:

- Original GWETS / 1988 2006. This system included two extraction wells connected to a treatment plant using carbon adsorption to remove COCs.
- Northwest Treatment System (NWTS) / 2006 2014. This system included four extraction wells connected to a treatment plant using carbon adsorption to remove COCs.
- FONR System / 2007 2014. This system included four extraction wells connected to the NWTS treatment plant.
- Off-Site GWETS / 2008 2009. This system included two extraction wells connected to a treatment plant using carbon adsorption to remove COCs.

Treatment facilities using granular activated carbon (GAC) to remove the COCs from groundwater were constructed at the original GWETS, the NWTS, and the Off-Site GWETS. Groundwater from the FONR system extraction wells was conveyed to and treated at the NWTS facility. The individual remediation systems are described in the following sections.

Figure 2.4 shows the locations of the monitoring and extraction wells constructed as part of the overall remediation effort. The grid pattern overlain on the background maps enable easier location of the wells discussed within this document. To help locate any well, Table 2.1 provides a cross reference to this and other map grids shown in some figures. Well names throughout the document are followed by the column letter and row number in which the well can be found on the figure grid. Well MW-OU1-26-A (F3), for example, would be found in Column F, Row 3 of the grid on Figure 2.4.

Note that typical well identification formats—"MW-" prefix for monitoring wells, "EW-" prefix for extraction wells, and "IW-" prefix for injection wells—do not correspond to well function in all cases.

The current use of each well is shown in Table 2.2. The boundaries of the contaminated groundwater zone in OU-1 were refined as the remedial design progressed after the wells were permitted and constructed. The initial stage of remedy implementation provided additional plume definition and estimated potential pumping rates at several monitoring wells. The evaluation of design alternatives showed that the most effective OU-1 remedy required that some wells be used for different purposes than originally intended. Consequently, some wells that were intended and named as monitoring wells when constructed became extraction wells during remedy implementation; those wells were MW-OU1-46-AD (D2), MW-OU1-85-A (D2), and MW-OU1-87-A (E3). Conversely, well EW-OU1-72-A (D3) is used only for monitoring groundwater quality. Several wells were named as potential injection well sites, but only two such wells were incorporated into the remedy for this purpose; those wells were IW-OU1-73-A (D3) and IW-OU1-74-A (C3). The remaining "IW-" prefix wells are used only for monitoring groundwater quality.

The only exception to this statement is well IW-OU1-10-A (F3), which was converted from a monitoring well to an extraction well in October 2010.

2.4.1 Original GWETS

The original GWETS began operating in 1988 and was located in the immediate vicinity of the contaminant source area. The GWETS extracted groundwater through extraction wells EW-OU1-17-A (F5) and EW-OU1-18-A (G5) (HGL, 2006a). The system treated VOCs using GAC vessels connected in series. The treated groundwater was discharged through a spray irrigation system located in the former FDA to recharge the underlying groundwater.

All monitoring wells within the original GWETS capture zone met the aquifer cleanup targets in 2005 and the original GWETS was shut down on 22 February 2006 to conduct a rebound evaluation. The regulatory agencies concurred with the Army that significant rebound did not occur and the original GWETS should remain shut down. A detailed discussion of the rebound evaluation study and evaluation of the data collected therein are presented in the Final Rebound Evaluation Report (HGL, 2011a). The original GWETS and associated equipment were decommissioned and removed from the site in 2014 (HGL, 2014).

2.4.2 NWTS and FONR Systems

The expanded remediation system designed to capture and treat the remainder of the OU-1 VOC plume within the former Fort Ord boundary became fully operational in October 2007 (Figure 2.3). The expanded system was constructed in two phases. The first component was installed as a pilot program (the Hydraulic Control Pilot Project [HCPP]) consisting of a groundwater treatment system using GAC and four extraction wells installed along the northwest boundary of the FONR.

The primary objective of the HCPP was to prevent plume migration across the former Fort Ord property boundary. The four HCPP extraction wells are EW-OU1-60-A (B2), EW-OU1-62-A (C2), EW-OU1-63-A (B2), and EW-OU1-66-A (B2). The HCPP began operating on 01 July 2006. After approximately nine months of successful operation, the "pilot project" label was dropped and the HCPP facilities were subsequently referred to as the NWTS. During the operation of the pilot phase, the treated groundwater was discharged through an infiltration trench to recharge the groundwater immediately east of the NWTS (Figure 2.4).

The second phase of the full remediation system was constructed in the summer of 2007 and became fully operational on 12 October 2007. The primary objective of this component of the remedy was to accelerate plume capture by placing extraction wells along the main path of plume migration. This component is referred to as the FONR System and consists of four additional extraction wells located along the main axis of plume migration in the central portion of the FONR. The additional extraction wells are MW-OU1-46-AD (D2), MW-OU1-85-A (D2), MW-OU1-87-A (E3), and EW-OU1-71-A (E3). After October 2007, treated groundwater from the NWTS was recharged to the A-Aquifer through one or more of the following options:

- Infiltration trenches constructed during the pilot project phase and located immediately to the east of the NWTS treatment facility
- New infiltration trenches constructed in the grassland area adjacent to the central portion of the OU-1 plume during the second phase

• One of two injection wells (IW-OU1-73-A [D3] or IW-OU1-74-A [C3]) constructed within the FONR habitat

In 2010, HGL converted monitoring well IW-OU1-10-A to an extraction well to accelerate the overall groundwater cleanup. The design parameters for this expansion are described in the Remediation System Expansion Design Technical Memorandum (HGL, 2010).

Significant progress was achieved during the 2007 to 2011 review period in terms of reducing the footprint of the TCE plume by over 60 percent and reducing the maximum detected TCE concentration by 67 percent (to 17 μ g/L). In September 2011, the remaining TCE plume was composed of two discrete segments covering approximately 8 acres in total. The smaller segment was located along the northwest OU-1 boundary, in the immediate vicinity of MWOU1-61-A, with a footprint of approximately 0.5 acre. The 7.5 acres remaining in the second segment were at least 1,700 feet from the northwest boundary. The Army recommended that the remedy continue operating and be evaluated to optimize the overall effectiveness of natural attenuation with respect to the following:

- Time required to achieve the ACLs
- Impact on greenhouse gas emissions resulting from the current pump and treat system
- FONR habitat impact
- Groundwater mass balance
- Total cost to meet the ACLs

Optimization evaluations were conducted and recommendations were made to reduce pumping and modify the groundwater LTM program resulting in fewer wells to be sampled and conducting sampling semiannually. The recommended changes would reduce electric use and greenhouse gas emissions, reduce the potential impacts to the protected FONR habitat, extend the life of the carbon adsorption system, and reduce the estimated cost to reach the OU-1 cleanup goals. The recommendations were approved by the regulatory agencies and implemented in 2012 (HGL, 2012c).

Sample results from the groundwater LTM program in September 2014 showed that groundwater met the ACLs at all sampled wells in September 2014. The NWTS and FONR systems were taken offline in October 2014 as a prerequisite for initiating attainment monitoring. The NWTS remained offline but operable after October 2014, except for brief periods to test repairs of damage caused by an electric utility meter short circuit and a lightning strike. The NWTS was decommissioned and all remaining OU-1 wells were destroyed as part of site closure (see Section 5 and Appendix B).

2.4.3 Off-Site System

In August 2008, construction of the Off-Site GWETS was completed and operation was initiated. This Off-Site System was constructed in the Armstrong Ranch near the downgradient edge of the OU-1 TCE Plume. It consisted of groundwater extraction from the A-Aquifer by two extraction wells, aboveground treatment with GAC, and infiltration of the treated water (Figure 2.3). Treated water was discharged to an infiltration basin on the Marina Coast Water District property near the Off-Site GWETS. The Off-Site System operated full-time until February 2009, when analytical

data indicated remedial action objectives were achieved. A series of rebound tests starting in February 2009 indicated that COC concentrations in the off-site area remained below ACLs (Shaw, 2010). The Off-Site System treatment plant and the treated water discharge pipeline were decommissioned and removed in 2014 (HGL, 2014). The OU-1 monitoring wells, extraction wells, and associated pipeline on Armstrong Ranch were destroyed in 2016 (HGL, 2016b).

2.5 INSTITUTIONAL CONTROLS

OU-1 groundwater contamination is limited to the A-Aquifer. Although this aquifer is not used for drinking water purposes, the OU-1 area is located within the Special Groundwater Protection Zones established by Monterey County. These special protection zones, which include all the OU-1 area, are designated as the Prohibition Zone and the Consultation Zone and are illustrated on Figure 2.5.

The boundaries of the groundwater protection zones shown on Figure 2.5 are updated as determined by the Fort Ord BCT. The BCT consists of representatives of the U. S. Army, EPA, California DTSC, and the California RWQCB, Central Coast Region. Construction of any proposed well in the OU-1 area falls within the boundaries shown on Figure 2.5 and must be approved by the Monterey County Health Office in consultation with the BCT (Monterey County, 2016).

2.6 FINAL INSPECTION ACTIVITIES

Final inspections performed by the BCT consisted of the following activities:

- Review, comment, and acceptance of the Final Well Destruction Report for OU-1 (HGL, 2012b). This report described the decommissioning and removal of 55 wells within OU-1, including grout quantities and well destruction completion reports submitted to Monterey County. The destroyed wells were located within the original GWETS capture zone and elsewhere within OU-1 where the groundwater ACLs specified in the ROD had been achieved.
- Review, comment, and acceptance of the Final Well Destruction and Former OU-1 Treatment Plant Decommissioning Completion Report (HGL, 2014). This report described the decommissioning and removal of the original GWETS, the off-site GWETS, and the destruction of the extraction wells associated with the original GWETS. This report also presented information, including grout quantities and well destruction completion reports submitted to Monterey County. The destroyed wells were located in areas where the groundwater ACLs specified in the ROD had been achieved.
- Review, comment, and acceptance of the Final Remedial Action Completion Report (RACR) (HGL, 2016a). This report presented the results of the attainment monitoring program that was performed in accordance with the Exit Strategy Technical Memorandum (HGL, 2015a) approved by the BCT.
- Review, comment, and acceptance of the Final Armstrong Ranch Well Destruction and Pipeline Decommissioning Completion Report (HGL, 2016b). This report described the decommissioning and removal of the extraction wells and pipeline associated with the off-site GWETS, and the destruction of the monitoring wells located on the Armstrong Ranch

property. This report also presented information, including grout quantities and well destruction completion reports submitted to Monterey County. The destroyed wells were located in areas where the groundwater ACLs specified in the ROD had been achieved.

- Review, comment, and acceptance of the Technical Memorandum: Final Attainment Monitoring Evaluation and Summary for EPA Designated Emerging Contaminants in Operable Unit 1 Groundwater (U.S. Army, 2016). This memorandum described the results of the attainment monitoring for PFOA and PFOS in comparison to the corresponding HA values published by EPA in May 2016.
- Review, comment and acceptance of the Final OU-1 Well Destruction and NWTS Plant Decommissioning Completion Report (Appendix B). This report describes the decommissioning of the NWTS and removal of all OU-1 extraction wells and monitoring wells that remained when the regulatory agencies concurred that remediation and monitoring were complete and OU-1 could be closed. This work was completed in July 2017.
- Review, comment, and acceptance of this OU-1 Closeout Report.

3.0 MONITORING RESULTS

Groundwater monitoring was conducted from 1985 through 2015. The number of wells included in the groundwater LTM network varied over time, as did the sampling frequency. As the aquifer cleanup progressed, the frequency of LTM sample collection went from quarterly to semiannually. The sampling frequency at individual wells varied from quarterly to annually. The remediation phase of the LTM program ended in September 2014 when groundwater sampling showed that the cleanup objectives for the COCs identified in the ROD had been achieved at all monitoring locations. These sampling results are described in Section 3.2. Groundwater sampling for attainment monitoring was performed in 2015 and is described in Section 4.

3.1 SOURCE ACTION SOIL REMOVAL CONFIRMATION

A groundwater and soil treatment system (GWSTS) was constructed at the former fire drill training source area and operation began in August 1988. Details of the construction of the GWSTS are presented in the Construction Report (HLA, 1989a) and summarized as follows:

- Approximately 4,000 cubic yards of TPH-contaminated soil was excavated and temporarily stockpiled. The maximum depth of the excavation was 31 feet bgs.
- The excavated, stockpiled soil removed from the FDA was placed in an aboveground biotreatment area. Biotreatment of the contaminated soil progressed incrementally in l-foot layers of soil, or lifts, and was completed by August 1991. As each lift was remediated, it was removed and transported to the FAAF soil borrow area for use as fill in construction projects at Fort Ord.
- Soil sampling during and after the excavation activities demonstrated that TPH was not detected in soil samples collected from the excavation side walls above 200 mg/kg. Two samples were analyzed specifically for gasoline range organics (GRO) during the excavation because of odors noticed by the field team. In the two samples, TPH-GRO was only detected in one, at a concentration of 190 parts per million.
- The excavation was backfilled to the original ground surface with clean soil.

In 1993, additional soil samples were collected as part of a remediation (cleanup) confirmation study (HLA, 1994). The confirmation sampling results indicated that low concentrations of several organic chemicals remained in soil at the site, but cleanup goals for soil were achieved. These remaining chemicals included: 1,3-dichlorobenzene; methylene chloride; toluene; xylenes; chlorinated dioxins and furans; and TPH as diesel and gasoline. Lead was also detected in soil samples just above natural background concentrations in several samples, but below the cleanup goals (HLA, 1994; Appendix A).

3.2 GROUNDWATER MONITORING DEMONSTRATING REMEDIATION PROGRESS

Groundwater monitoring wells at OU-1 were sampled as part of the groundwater LTM program from 1986 through 2015. The sampling frequency varied from quarterly to semiannually during that period. Extraction wells and treatment system inflow and discharge have also been sampled as part of the performance monitoring associated with the groundwater treatment systems (Figure

2.3). All sampling results were presented at least semiannually in reports presented to the public and BCT. These sampling reports are available in the Fort Ord Administrative Record located at:

4463 Gigling Road, Ord Military Community Seaside, California 93955 Email: <u>adminrecord@fortordcleanup.com</u>

All groundwater sampling reports and other documents referenced in this Closeout Report can also be accessed online at <u>http://fortordcleanup.com/documents/search/</u>.

Except for TCE, remediation efforts successfully reduced all COC concentrations below their corresponding ACLs in 2008. Since 2004 or earlier, the footprint of the TCE concentration greater than the ACL encompassed all other COCs that exceeded their respective ACLs. Consequently, the TCE contamination boundary has been used to define cleanup progress.

The 2006 groundwater sampling events revealed TCE exceedances (at or above 5 μ g/L) at nine well locations (Figure 3.1). Continual operation of the pump and treat remediation systems (Figure 2.3) steadily reduced the footprint of the TCE contamination boundary; however, the TCE concentration in some wells in the southern portion of the site and at one well on the northwest boundary of the former Fort Ord consistently exceeded the ACL from 2006 to 2013. By 2013, TCE exceeded the ACL only at monitoring wells MW-OU1-61-A (B2) in the northern portion and MW-OU1-88-A (E3) in the southern portion of the site. The September 2014 groundwater sampling results showed that the TCE concentration at all LTM wells met the ACL targets specified in the ROD. Follow-up samples from monitoring wells MW-OU1-61-A (B2) and MW-OU1-88-A (E3) in December 2014 confirmed the September results. Figure 3.1 shows the consistent shrinkage in the TCE contamination boundary from 2006 to 2014. Figure 3.2 illustrates the decline in TCE concentration observed at the wells located along the main axis of plume migration.

4.0 ATTAINMENT DEMONSTRATION FOR GROUNDWATER CLEANUP

Following the December 2014 sampling event, the BCT developed and approved an exit strategy and Attainment Monitoring program to confirm that OU-1 groundwater remediation is complete and the OU-1 site can be closed (HGL, 2015a). The sampling results from the Attainment Monitoring Program were evaluated to verify that the ROD cleanup goals were met and will continue to be met after termination of remedial activities.

The evaluation of OU-1 groundwater monitoring data collected from 2006 through 2014 and the 2015 attainment monitoring sampling indicates that all COC concentrations are below the ACLs identified in the ROD. Analytical data and statistical analysis of contaminant concentrations confirm that COCs will continue to meet the OU-1 ROD ACLs in the future (HGL, 2016a).

4.1 ATTAINMENT MONITORING SUMMARY - VOCS

All COCs at wells in the Attainment Monitoring well network, with the exception of TCE, have been less than the corresponding ACL since 2008. TCE concentrations in all Attainment Monitoring wells were less than the corresponding ACL for at least six consecutive sampling events, including the four attainment monitoring events. The dates for remediation period events during which TCE concentrations were less than the ACL vary by well and are presented in Table 4.1.

The EPA Groundwater Statistics Tool (GST) (EPA, 2015) was used to evaluate the TCE sample results from the attainment monitoring wells. The dataset at each well included all samples since the TCE ACL was reached at each well, except for well PZ-OU1-10-A1. At PZ-OU1-10-A1, the September 2012 and September 2013 TCE concentrations of 0.4 J μ g/L and 0.2 J μ g/L (the J qualifier indicates the value is estimated) were omitted from the GST input data to avoid potentially biasing the evaluation results to the low side. The results from these two dates were much less than the range of TCE concentration observed in the five subsequent samples collected between September 2014 and December 2015 (1.6 μ g/L to 3.3 μ g/L). The lower concentrations reported during September 2012 and 2013 may be a result of vertical mixing caused by changes in pumping at nearby extraction well IW-OU1-10-A.

The dataset evaluation for all wells in the attainment monitoring program showed that the 95 percent upper confidence limit (UCL) band value after the fourth attainment event was less than the ACL of 5.0 μ g/L. The maximum 95 percent UCL band value after the fourth event was 4.2 μ g/L at well MW-OU1-61-A (B2). More information regarding VOC results, trends, and statistical evaluation is presented in the Final RACR/Technical Memorandum (HGL, 2016a). The TCE results used in GST calculations are provided in Table 4.1 and the Attainment Monitoring Results (May 2015 to December 2015) are shown on Figure 4.1.

4.2 ATTAINMENT MONITORING SUMMARY – PFOA/PFOS

4.2.1 Comparison to Preliminary Health Advisory

PFOA was detected in all wells and PFOS was detected at two wells during the first attainment monitoring sampling event (May 2015). Consequently, sampling for PFOA and PFOS was included during all four attainment monitoring events. Sampling for PFOA and PFOS was discontinued at well PZ-OU1-10A after the first event because of concerns about the potential for suspended sediment in the HydrasleeveTM collection device to impact sample results. The EPA, DTSC, and RWQCB concurred with the decision to discontinue sampling at this location. Total depth measurements at this well combined with visible aquifer material in the bottom of the HydrasleeveTM sampler indicated that the well casing and/or screen has been damaged and HydrasleeveTM samplers do not exclude suspended sediments. COC sampling for VOCs continued because the passive diffusion bags used to collect VOC samples exclude suspended sediments from the sample; this method has not been approved for PFOA or PFOS sample collection. The analytical results from the Attainment Monitoring program are presented in Table 4.2 and shown on Figure 4.2.

A field duplicate, trip blank, field blank, and equipment blank were collected during all sampling events. PFOA and PFOS were not detected in any trip, equipment, or field blank. The results for the blank samples clearly indicate that the sampling procedures did not affect the analytical results.

Although drinking water standards for PFOA and PFOS have not been established, EPA developed PHA standards in 2009 for concentrations in groundwater (EPA, 2014). The PHAs for groundwater for PFOA and PFOS are 400 nanograms per liter (ng/L) and 200 ng/L, respectively (EPA, 2014). Although these compounds were not identified in the OU-1 ROD, the regulatory agencies stated that the attainment monitoring sampling program must include these potential contaminants in order for the agencies to evaluate the case for OU-1 closure. The PHA values were used as a benchmark in evaluating PFOA and PFOS sampling results.

PFOS was detected in only two of the eight attainment network monitoring wells and was detected during each of the four sampling periods. The PFOS concentrations in all events were less than the corresponding PHA value for this analyte in all cases. The maximum concentration was detected in well MW-OU1-88-A (E3) at 72 ng/L; this is the same well that contained the highest PFOA concentration. The PFOS concentration ranged from 72 ng/L to 33 ng/L at MW-OU1-88-A (E3) with the minimum value observed in the fourth sampling round (December 2015).

PFOS was also detected in well MW-OU1-26-A (F3) with a maximum concentration of 15 ng/L. The PFOS concentration was essentially unchanged and varied only from 7 ng/L to 15 ng/L.

The extraction holding time was exceeded by four days for all samples in the first Attainment Monitoring Event. Consequently, the "J-" qualifier was assigned to all results to indicate the possibility that the analytical results may be biased low. The successive PFOS concentrations were either nearly identical or slightly decreasing within a minimal range. Based on the consistency between sampling events, it is unlikely that the initial results were biased low due to sample holding time exceedances. At both wells where PFOS was detected, the maximum concentration was far less than the 200 ng/L PHA screening value.

PFOA was detected in all samples collected during the Attainment Monitoring Program. The maximum concentration was observed at MW-OU1-88-A (E3) at 270 ng/L. PFOA ranged from 180 ng/L to 270 ng/L with close agreement between the duplicate samples. As with PFOS, the overall results suggest it is unlikely that the initial results were biased low. At the other wells in the attainment monitoring network (excluding PZ-OU1-10-A1 [F3], which was sampled only once), there was virtually no variation between measurements. The maximum range was 10 ng/L at MW-OU1-26-A (F3) and the maximum concentration was 44 ng/L at that same well. All PFOA concentrations were much less than the 400 ng/L PHA screening value.

Based on these results, the regulatory agencies concurred (see Appendix A, Attachment 1) in March 2016 with the Army's conclusion that remediation was complete and OU-1 should proceed to site closure. A Closure Plan was developed and included as Appendix D of the 2016 OU-1 Annual Groundwater Monitoring Report (HGL, 2016c).

4.2.2 Comparison to May 2016 PFOA/PFOS Health Advisory

In May 2016, the EPA published HA values for PFOA and PFOS (EPA, 2016); these values superseded the previous PHA values. The 2016 HA eliminated separate values for each compound and established 70 ng/L as the advisory limit for the sum of PFOA and PFOS concentrations in a sample. As illustrated in Table 4.2 and discussed below, PFOA and PFOS concentrations exceeded the HA values at two wells.

The maximum total PFOA and PFOS concentration in all sampling events was found at well MW-OU1-88-A (E3). A duplicate sample was collected from this well during attainment sampling events 2 through 4. Using the maximum value of the parent and duplicate sample as the sampling result for each event, the total PFOA and PFOS concentration (PFOT) was nearly identical in sampling events 1 and 2 (334 ng/L and 332 ng/L, respectively) and likewise, although decreasing by approximately 25 percent, in events 3 and 4 (244 ng/L and 243 ng/L, respectively). All results were greater than the revised advisory value of 70 ng/L.

As noted in the previous section, well PZ-OU1-10-A1 (F3) was sampled only during the first attainment event (in May 2015) because the sample showed considerable suspended sediment. PFOS was not detected in the sample; thus, the PFOT value was equal to the PFOA value of 120 ng/L and exceeded the revised advisory limit of 70 ng/L.

The Army submitted a Technical Memorandum to the regulatory agencies in August 2016 that discussed these results and sited characteristics in relation to the 2016 HA values (U.S. Army, 2016); this submittal is included for reference as Appendix A. The Army recommended that OU-1 be closed without further remediation or sampling.

After reviewing the OU-1 attainment monitoring results, the regulatory agencies concurred (Appendix A, Attachment 1) that all response actions have been successfully completed and that the cleanup objectives specified in the OU-1 ROD (U.S. Army, 1995) have been met and will continue to be met in the future. This closeout report summarizes the information developed and the actions taken throughout the OU-1 investigation and remediation process.

5.0 SUMMARY OF OPERATION AND MAINTENANCE REQUIRED

Remediation has been completed and all requirements of the ROD have been met. All groundwater monitoring and extraction wells were destroyed in accordance with State of California and Monterey County requirements. The NWTS facility was decommissioned and the infrastructure disposed or recycled with the following exceptions:

- The buried water transmission pipelines connecting the NWTS and FONR extraction wells to the NWTS and connecting the NWTS to the infiltration trenches and injection wells in the FONR (Figure 2.3) were capped and left in place. Removal of these pipelines would potentially impact sensitive habitat within the FONR and the UCSC management staff preferred that the pipelines be left in place.
- The buried water transmission pipelines connecting the original extraction wells to the GWETS in the former source area (Figure 2.3) were also capped and left in place based on the same rationale described in the previous bullet point.
- The electric utility connection, lighting, fencing, and secondary containment basin at the NWTS were left in place to provide a storage and staging facility to support future field research activities to be conducted by UCSC.

Consequently, no further operation or maintenance of the former remediation system is needed or required. The Well Destruction and NWTS Decommissioning Completion Report describing these activities is included as Appendix B in this Closeout Report.

5.1 GROUNDWATER MONITORING

The regulatory agencies concurred that remediation is complete and no further groundwater monitoring is required (Appendix A, Attachment 1). All groundwater monitoring wells were destroyed (Appendix B) following approval of the Well Destruction and NWTS Decommissioning Work Plan (HGL, 2017).

5.2 INSTITUTIONAL CONTROLS

All property within the OU-1 boundary is located within the Special Groundwater Protection Zones (Figure 2.5) established by Monterey County (described in Section 2.5). Construction of any new well within the former OU-1 area must be approved by the Monterey County Health Office in consultation with the BCT (Monterey County, 2016). It is anticipated that these controls will remain in place until the groundwater cleanup goals established for other ongoing OUs are met—in particular, for the Carbon Tetrachloride OU that is underway immediately south of OU-1. The boundaries of the Special Groundwater Protection Zones may be modified only with approval from Monterey County and the BCT.

In addition, most of the OU-1 area lies within the FONR (Figure 2.2). The FONR property is owned by the University of California and managed by the UCSC as part of the UCNRS. The FONR is a protected habitat devoted to biological and environmental research; development is prohibited.

6.0 DEMONSTRATION OF CLEANUP ACTIVITY QA/QC

The EPA, DTSC, and RWQCB have provided program review and oversight throughout the investigation, design, construction, and operational activities of the OU-1 effort. Reports and documents representing major milestones in the investigation and cleanup process were designated as Primary Documents and longer review time (compared to Secondary Documents) was allotted to facilitate thorough quality assurance (QA)/quality control (QC). The minimum 60-day review period for Primary Documents was extended upon request in some cases. Reports were submitted as draft, draft final, and final to ensure that all public and agency review comments and any QA/QC concerns were satisfactorily resolved. Key elements of the QA/QC effort are discussed in the following sections.

6.1 CONSTRUCTION QA/QC

Construction QC was implemented during the construction of the groundwater remediation system to ensure that the remedy would function as designed. Aquifer pumping tests were performed as part of the remedial design effort to ensure that plume control and capture would be consistent with the requirements of the OU-1 ROD. Leak detection was incorporated into the Off-Site treatment system and all water transmission pipelines for the GWETS, NWTS, and FONR systems were located within the capture zone of the associated extraction wells. Startup testing was performed as each treatment system was brought online to ensure proper operation. Construction reports were submitted upon completion and subsequent modification of each treatment system to document the as-built condition. USACE staff provided field QA/QC during the well destruction and treatment plant removals in 2014, 2016, and 2017.

A detailed description of the HCPP/FONR OU-1 groundwater remediation system components is provided in the following documents:

- Construction Report Ground-Water and Soil Treatment System (HLA, 1989a)
- Design Modifications Ground-Water Treatment System (HLA, 1989b)
- Final 100% Engineering Design Report, Volumes 1-3 (HGL, 2006a, 2006b, 2006c)
- Final HCPP Construction Report (HGL, 2007)
- Final FONR System Design Technical Memorandum (HGL, 2011b)
- Final FONR System Construction Report (HGL, 2009)
- Final IW-OU1-10-A System Expansion Construction Report (HGL, 2012a)
- Draft Final Operable Unit 1 Off-Site Groundwater Extraction Pilot Study Work Plan, Former Fort Ord, California. Revision 0 (Shaw, 2008)
- Report of Off-Site Groundwater Extraction Pilot Study and Quarterly Monitoring Operable Unit 1 July to September 2008 (Shaw, 2009)

6.2 OPERATIONS AND MAINTENANCE QA/QC

The four groundwater treatment systems operated independently (except that the FONR system extraction wells were connected to the NWTS treatment plant) as noted in Section 2.4 and shown on Figure 2.3. The periods of operation overlapped to some degree:

- Original GWETS from 1988 to 2006.
- NWTS from 2006 to 2014.
- FONR System from 2007 to 2014.
- Off-Site GWETS from 2008 to 2009.

All treatment systems were unmanned, automatic operation, and were inspected at regular intervals. The inspection schedules varied from at least weekly to monthly, depending upon cleanup progress and pumping volumes. The inspections included routine maintenance of pumps, controls, and equipment to ensure proper operation and repairs or replacement of system components as needed. Pumping and treatment rates and other operational parameters were gauged, recorded, and compared to expected rates to confirm performance was in accordance with design expectations.

The NWTS and Off-Site GWETS included automated monitoring, programmable logic controls (PLC), and alarm callouts to alert Operations and Maintenance personnel of unexpected conditions (such as low or high pressure, and low or high water volumes in holding tanks, for example). The PLC could automatically shut down system operation in response to pre-programmed conditions such as leaks or system water pressure outside a prescribed range.

The system performance data was compared to groundwater sampling results to identify opportunities to optimize system performance by adjusting pumping rates and/or eliminating pumping at individual wells. Groundwater modeling was used to evaluate alternative pumping strategies and optimization impacts. The NWTS total pumping rate declined over time as the groundwater cleanup targets were met within the capture zones of individual wells (Figure 3.1).

Effluent discharge requirements were set by RWQCB Order Number 85-20. Effluent sampling for the COCs identified in the ROD was performed at regular intervals to monitor compliance and the sampling frequency was adjusted with regulatory concurrence as the cleanup progressed, influent contaminant loading decreased, and discharge quality stabilized. The GAC treatment vessels at each system were connected in series and mid-point concentrations were monitored to identify potential or actual contaminant breakthrough. When breakthrough was identified, the treatment process order was reversed and the GAC in the breakthrough vessel was replaced. This approach minimized the potential for discharging treated water that did not meet the requirements of RWQCB Order 85-20.

6.3 SAMPLING AND ANALYIS PROTOCOLS

The sampling and monitoring activities followed the procedures, specifications, and requirements described in the Final Sampling and Analysis Plan, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California (HGL, 2004a) and the Final Quality Assurance Management Plan (HGL, 2004b). The Final Quality Assurance Management Plan was revised in

2015 in accordance with guidance for the Uniform Federal Policy Quality Assurance Project Plan (QAPP). The QAPP revisions in 2015 (HGL, 2015b) provided guidance for PFOA and PFOS sample collection and analysis and incorporated the requirements of the Attainment Monitoring Program.

Groundwater LTM analytical results have been validated since May 1992 or July 1993 (varies among the first 19 wells installed and their sampling frequency) to ensure compliance with the requirements of the QAPP. Since 2004, groundwater data was validated at a frequency of 100 percent for validation to Level III (EPA Stage 2) and a minimum of ten percent of the samples were validated to meet Level IV (EPA Stage 4) requirement. Data validation results are included with the groundwater monitoring reports submitted for regulatory review. The data validation effort ensured that all results used in evaluating OU-1 site closure were of sufficient quality for use in meeting the project objectives.

7.0 FIVE-YEAR REVIEW

Five-year review reports are required by CERCLA §121 and the National Contingency Plan. The five-year review process consists of evaluating relevant documents including Operation and Maintenance records, groundwater evaluation records, groundwater VOC concentration monitoring data, and remediation system performance data. The data collected over each five-year term is evaluated for continual effectiveness as the chosen remedial action and overall protection of human health and the environment. The findings are evaluated to assess the capability of the remedy to reduce contamination and determine whether additional remedial action is necessary.

The initial five-year review report was submitted in 2002 (U.S. Army, 2002) with subsequent reviews submitted in 2007, 2012, and 2017 (U.S. Army, 2007; 2012; 2017). The preliminary draft of the fourth five-year review has been submitted for Army review. The following sections provide a brief overview of the most recent five-year review (concluded in 2012) and the anticipated key conclusions of the 2017 five-year review effort that is underway.

7.1 SUMMARY OF PREVIOUS AND CURRENT FIVE-YEAR REVIEWS

No issues were identified in the third five-year review (U.S. Army, 2012) that affected the protectiveness of the remedy at OU-1 or that would require follow-up action. The current remedy achieved the groundwater cleanup objectives during the period covered by this five-year review.

The current five-year review report (U.S. Army, 2017) noted that the maximum TCE concentration within the OU-1 monitoring well network first met the ROD cleanup target in the September 2014 sampling effort and this achievement was confirmed in samples collected in December 2014 and during attainment monitoring from May 2015 through December 2015. The report also concluded that there are no issues affecting the protectiveness of the remedy at OU-1. Consequently, the final recommendation regarding OU-1 is to initiate the Closure Plan as described in the Final 2016 Annual Groundwater Monitoring Report (HGL, 2016c) and the regulatory agencies concurred with that recommendation. All remaining infrastructure associated with the OU-1 remediation was destroyed or decommissioned as of August 2017.

7.2 FUTURE FIVE-YEAR REVIEWS

As of February 2017, the BCT concurred that OU-1 can be closed without additional groundwater monitoring or remediation. This site will be eliminated from future Five-Year Reviews. However, in response to EPA concerns about PFOA and PFOS, the Army has proposed the following:

"Given that the Army is planning to screen for the presence of PFOA and PFOS at OU 2 and conduct a site-wide PFOA/PFOS review (which includes OU 1) in 2018, the Army instead proposes to include a new section to discuss the emerging contaminant nature of PFOA/PFOS in the 5th Five Year Review. This section will include discussion regarding PFOA/PFOS issues at OU 1 and the results of the site-wide review of historical activities with the potential to cause PFOA/PFOS contamination in the soil and groundwater. Since PFOA/PFOS issues will be discussed under the new section, the Army recommends the elimination of OU 1 from future Five Year Reviews after acceptance of the final Close-out Report."

8.0 SITE COMPLETION CRITERIA

The remedy at OU-1 is protective of human health and the environment as the remedial action objectives stipulated in the 1995 ROD and 2010 ESD have been achieved. The Closure Plan presented in the 2016 OU-1 Annual Groundwater Report (HGL, 2016c; Appendix D) will be implemented to complete the site closeout activities. Primary components of the plan are as follows:

- 1. Prepare a Work Plan to remove the facilities and wells used in the remediation effort
- 2. Destroy wells used in OU-1 remediation effort, specifically:
 - a) All OU-1 monitoring, extraction, and injection wells
 - b) Associated pipelines and power conduits
- 3. Decommission and remove NWTS treatment plant
 - a) Remove treatment equipment and off-post pipelines (Table D.2)
 - b) Leave the Pacific Gas & Electric power transformer and meter, fence and containment basin in place
- 4. Perform site restoration if needed
- 5. Prepare reports to satisfy regulatory documentation of site closure:
 - a) Draft and final reports describing the work activities performed in accordance with the Closure Plan
 - b) OU-1 Closeout Report

All OU-1 groundwater monitoring wells, extraction wells, and associated pipelines located on the Armstrong Ranch (included in Items 1 and 2 of the Closure Plan summary above) were destroyed in October 2016 (HGL, 2016b; 2016d). No further field activities will occur on Armstrong Ranch.

The Final Work Plan described in Item 1 was submitted in July 2017 (HGL, 2017). All remaining OU-1 wells were destroyed (Item 2 and Item 4) and the NWTS was decommissioned (Item 3) in July 2017. This Closeout Report addresses Item 5.

Rare plant surveys at the OU-1 well sites within the FONR will be performed annually through 2020 in accordance with the 2015 Biological Opinion (U.S. Fish and Wildlife Service, 2015). The results of the 2017 Rare Plant Survey will be submitted separately. No restoration activities (Item 4) beyond those already completed as part of well destruction and treatment plant decommissioning have been identified at present. The final determination regarding site restoration will be made after completion of the OU-1 biological monitoring program in 2020 and evaluation of those results.
9.0 **REFERENCES**

- HydroGeoLogic, Inc. (HGL), 2004a. Final Sampling and Analysis Plan, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. July. Administrative Record Series Number OU1-501*.
- HGL, 2004b. Final Quality Assurance Management Plan, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. July. Administrative Record Series Number OU1-505*.
- HGL, 2006a. Final 100% Engineering Design Report, Volume 1 of 3, Geology and Conceptual Site Model, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. August. Administrative Record Series Number OU1-538*.
- HGL, 2006b. Final 100% Engineering Design Report Volume 2 of 3, Groundwater Modeling and Design Analysis, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. June. Administrative Record Series Number OU1-535*.
- HGL, 2006c. Final 100% Engineering Design Report Volume 3 of 3, Engineering Calculations Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. October. Administrative Record Series Number OU1-537*.
- HGL, 2007. Final Hydraulic Control Pilot Project Construction Report, Operable Unit One, Former Fort Ord, California. January. Administrative Record Series Number OU1-541*.
- HGL, 2009. Final FONR System Construction Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. August. Administrative Record Series Number OU1-561*.
- HGL, 2010. Final Fort Ord Natural Reserve (FONR) Remediation System Expansion Design Technical Memorandum. October. Administrative Record Series Number OU1-583*.
- HGL, 2011a. Final Rebound Evaluation Report Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. September. Administrative Record Series Number OU1-559*.
- HGL, 2011b. Draft 2011 Fort Ord Natural Reserve (FONR) Remediation System Expansion Design Technical Memorandum Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. February. Administrative Record Series Number OU1-609*.
- HGL, 2012a. Final IW-OU1-10-A System Expansion Construction Report Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. March. Administrative Record Series OU1-592*.

- HGL, 2012b. Final Well Destruction Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. September. Administrative Record Series Number OU1-593*.
- HGL, 2012c. Memorandum for Record: Record of Decision Remedy Optimization for Operable Unit 1, Former Fort Ord, California. March. Administrative Record Series Number OU1-594*.
- HGL, 2014. Final Well Destruction and Former OU-1 Treatment Plant Decommissioning Completion Report, Former Fort Ord, California. September. Administrative Record Series Number OU1-611*.
- HGL, 2015a. Final Technical Memorandum Operable Unit 1 Exit Strategy Former Ford Ord, California. April. Administrative Record Series Number OU1-614*.
- HGL, 2015b. Final Uniform Federal Policy Quality Assurance Project Plan, Groundwater Monitoring and Operations and Maintenance of Treatment System at OU-1, Former Fort Ord, California. Revision 1. April. Administrative Record Series Number OU1-606*.
- HGL, 2016a. Final Remedial Action Completion Report / Technical Memorandum Operable Unit 1 Attainment Monitoring Results Sampling Events #1 Through #4 Former Fort Ord, California. March. Administrative Record Series Number OU1-623*.
- HGL, 2016b. Final Armstrong Ranch OU-1 Well Destruction and Pipeline Decommissioning Completion Report, Former Fort Ord, California. *Date to be determined*. Administrative Record Series Number OU1-627C*. *The preliminary draft report is currently being prepared* – *this will be updated in the future*
- HGL, 2016c. Final 2016 Annual Groundwater Monitoring Report, Operable Unit 1 Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. August. Administrative Record Series Number OU1-624*.
- HGL, 2016d. Final Armstrong Ranch OU-1 Well Destruction and Pipeline Decommissioning Work Plan, Former Fort Ord, California. October. Administrative Record Series Number OU1-627*.
- HGL, 2017. Final OU-1 Fort Ord Natural Reserve Well Destruction and Northwest Treatment System Decommissioning Work Plan, Former Fort Ord, California. October. Administrative Record Series Number OU1-629*.
- HLA, 1989a. Construction Report, Ground-water and Soil Treatment System, Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. Report prepared for Department of the Army, Corps of Engineers, Sacramento District. May. Administrative Record Series Number OU1-114*.

- HLA, 1989b. Design Modification, Fritzsche Army Airfield Ground-Water Treatment System, Fort Ord, California. Report prepared for Department of the Army, Corps of Engineers, Sacramento District. October. Administrative Record Series Number OU1-136*.
- HLA, 1994. OU 1 Remediation Confirmation Study, Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. Report prepared for the Department of the Army, Corps of Engineers, Sacramento District. May. Administrative Record Series Number OU1-248*.
- Lawrence Berkeley National Laboratory/Lawrence Livermore National Laboratory, 2001. Phase II Fort Ord Landfill Demonstration Task 7 – Three-dimensional Groundwater Flow Mapping, Aquifer Response and Treatment System Monitoring at Site OU-1. November. Administrative Record Series Number BW-2576*.
- Monterey County, CA Code of Ordinances, 2016. Chapter 15.08.140 Special Groundwater Protection. <u>https://www.municode.com/library/ca/monterey_county/codes/code_of_ordinances.</u>
- Shaw, 2008. Draft Final Operable Unit 1 Off-Site Groundwater Extraction Pilot Study Work Plan, Former Fort Ord, California. Revision 0. April. Administrative Record Series Number OU1-557*.
- Shaw, 2009. Report of Off-Site Groundwater Extraction Pilot Study and Quarterly Monitoring Operable Unit 1 July to September 2008 Former Fort Ord, California. January. Administrative Record Series Number OU1-565*.
- Shaw, 2010. Report of Off-Site Groundwater Extraction Pilot Study and Quarterly Monitoring, Operable Unit 1, July to September 2008, Former Fort Ord, California, Revision 0. January. Administrative Record Series Number OU1-565.
- Department of the Army (U.S. Army), 1995. Record of Decision, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. July. Administrative Record Series Number OU1-362*.
- U.S. Army, 2002. Draft Final Five-Year Review Report, First Five-Year Review Report for Fort Ord Superfund Site, Monterey, California. May (reissued in August). Administrative Record Series Number BW-2167*.
- U.S. Army, 2007. Final Second Five-Year Review Report, Fort Ord Superfund Site, Monterey, California. September. Administrative Record Series Number BW-2437*.
- U.S. Army, 2010. Explanation of Significant Difference No. 1, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. August. Administrative Record Series Number OU1-581*.
- U.S. Army, 2012. Final Third Five-Year Review Report, Fort Ord Superfund Site, Monterey, California. September. Administrative Record Series Number BW-2632*.

- U.S. Army, 2016. Letter correspondence; William Collins (BRAC Environmental Coordinator) to Maeve Clancy (EPA). Attainment Monitoring Evaluation and Summary for EPA Designated Emerging Contaminants in Operable Unit 1 Groundwater, Fritzsche Army Airfield, Former Fort Ord, California. August. Administrative Record Series Number OU1-626*.
- U.S. Army, 2017. Draft 4th Five-Year Review Report, Fort Ord Superfund Site, Monterey, California. March. Administrative Record Series Number not yet assigned # will be added in final version of this Closeout Report*.
- U.S. Army Corps of Engineers (USACE), 1997. Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California. April. Administrative Record Series Number BW-1787*.

U.S. Environmental Protection Agency (EPA), 2014. Emerging Contaminants – Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA). EPA 505-F-14-001. March. https://nepis.epa.gov/Exe/ZyNET.exe/P100LTG6.txt?ZyActionD=ZyDocument&Client=EPA&I ndex=2011%20Thru%202015&Docs=&Query=&Time=&EndTime=&SearchMethod=1&TocRe strict=n&Toc=&TocEntry=&QField=&QFieldYear=&QFieldMonth=&QFieldDay=&UseQField =&IntQFieldOp=0&ExtQFieldOp=0&XmlQuery=&File=D%3A%5CZYFILES%5CINDEX%20 DATA%5C11THRU15%5CTXT%5C00000014%5CP100LTG6.txt&User=ANONYMOUS&Pa ssword=anonymous&SortMethod=h%7C-&MaximumDocuments=1&FuzzyDegree=0&ImageQuality=r75g8/r75g8/x150y150g16/i425&D isplay=hpfr&DefSeekPage=x&SearchBack=ZyActionL&Back=ZyActionS&BackDesc=Results %20page&MaximumPages=1&ZvEntry=1

- EPA, 2015. Groundwater Statistics Tool http://www2.epa.gov/sites/production/files/2015-11/gw_stats_tool_08112014.final_.xlsm
- EPA, 2016. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). EPA 822-R-16-005. May. <u>https://www.epa.gov/ground-water-and-drinking-water/drinking-water-health-advisories-pfoa-and-pfos</u>
- U.S. Fish and Wildlife Service, 2015. Programmatic Biological Opinion for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California (8-8-09-F-74). May 28. Administrative Record Series Number BW-2747*.

* When using the Fort Ord Data Integration System, to see a complete listing of all documents, grouped by a specific report, use an asterisk (*) as a wildcard search in the "Record Number" field on that particular number series. For example:

- Searching for: BW-1283* will show every item related to the main document of BW-1283.
- Searching for: BW-1283B* will only show the items that came after "B" (BW-1283-C, BW-1283-D, etc.)

• Searching for: ESCA* will show all document numbers with prefix 'ESCA.

The asterisk is also a useful feature for finding comment letters related to a report.

TABLES

Well or Piezometer Name	Map Cell	Cell Quadrant	Well or Piezometer Name	Map Cell	Cell Quadrant	Well or Piezometer Name	Map Cell	Cell Quadrant	Hydropunch Boring Name	Map Cell	Cell Quadrant
EW-OU1-17-A*	F5	NW	MW-OU1-19-A*	F5	NW	MW-OU1-68-A	C2	NW	FAA-HP-1	H5	NE
EW-OU1-18-A*	G5	SW	MW-OU1-20-A*	G4	SW	MW-OU1-69-A2	B1	NW	HP-OU1-15	E3	NE
EW-OU1-47-A	C2	NW	MW-OU1-21-A*	G4	NE	MW-OU1-70-A	B2	NW	HP-OU1-16	F2	SW
EW-OU1-49-A	E3	NE	MW-OU1-22-A*	F3	SE	MW-OU1-75-A	B1	SW	HP-OU1-17	G3	NW
EW-OU1-52-A	F4	NE	MW-OU1-23-A*	F4	SE	MW-OU1-76-A	B1	SE	HP-OU1-18	H2	SE
EW-OU1-53-A	F4	NE	MW-OU1-24-AR*	E4	NW	MW-OU1-77-A	A1	SE	HP-OU1-22	Н5	NE
EW-OU1-54-A	G4	SE	MW-OU1-25-A*	F4	SW	MW-OU1-78-A	A1	SE	HP-OU1-23	D2	NW
EW-OU1-55-A	F5	NE	MW-OU1-26-A*	F3	SE	MW-OU1-79-A	A1	SW	HP-OU1-24	E2	NW
EW-OU1-60-A	B2	NW	MW-OU1-27-A*	E3	NW	MW-OU1-80-A	A1	NW	HP-OU1-25	C3	SE
EW-OU1-62-A	C2	NW	MW-OU1-28-A*	F2	SW	MW-OU1-82-A	C2	NW	HP-OU1-26	D4	NW
EW-OU1-63-A	B2	NW	MW-OU1-29-A*	E2	SW	MW-OU1-83-A	C2	NE	HP-OU1-27	E3	NW
EW-OU1-66-A	B2	NE	MW-OU1-30-A*	G3	NW	MW-OU1-84-A	C2	SE	HP-OU1-28	E5	SE
EW-OU1-71-A	E3	NW	MW-OU1-31-A*	G2	SE	MW-OU1-85-A	D2	SE			
EW-OU1-72-A	D3	NE	MW-OU1-32-A*	G4	SW	MW-OU1-86-A	E3	NW			
IW-OU1-01-A	F4	SE	MW-OU1-33-A*	G4	SW	MW-OU1-87-A	E3	NE			
IW-OU1-02-A	F3	SW	MW-OU1-34-A*	E2	SW	MW-OU1-88-A	E3	NE			
IW-OU1-05-A	F5	SW	MW-OU1-36-A*	F6	NE	MW-OU1-ERD-01-A*	E2	SW			
IW-OU1-10-A	F3	SW	MW-OU1-37-A*	G5	SW	MW-OU1-ERD-02-A*	E2	SW	-		
IW-OU1-13-A	D2	NE	MW-OU1-38-A*	G5	SW	MW-OU1-ERD-03-A*	E2	SW			
IW-OU1-24-A	G4	SW	MW-OU1-39-A*	G5	NW	MW-OU1-ERD-04-A*	E2	SW	-		
IW-OU1-25-A	F5	NE	MW-OU1-40-A*	G4	SW	MW-OU1-ERD-05-A*	E2	SW			
IW-OU1-73-A	D3	NE	MW-OU1-41-A*	C1	SW	MW-OU1-ERD-06-A*	E2	SE			
IW-OU1-74-A	C3	NE	MW-OU1-42-A*	D1	NW	MW-OU1-ERD-07-A*	D2	SE			
IW-OU1-ERD-01-A*	E2	SW	MW-OU1-43-A*	D2	NW	MW-OU1-ERD-08-A*	D2	SE			
IW-OU1-ERD-02-A*	E2	SW	MW-OU1-44-A*	E5	SE	MW-OU1-01-180*	G6	NW			
IW-OU1-ERD-03-A*	E2	SW	MW-OU1-45-A*	C1	SW	MW-OU1-02-180*	F6	SE			
IW-OU1-ERD-04-A*	E2	SW	MW-OU1-46-A*	D2	SW	MW-OU1-03-180*	Н5	SW	*	Wells installe	d by others
MW-B-10-A*	B2	NW	MW-OU1-46-AD	D2	SW	MW-BW-10-A*	G6	NW	C5 -	Map cell iden	tification numb
MW-OU1-01-A*	G6	NW	MW-OU1-50-A	B2	NE	PZ-OU1-02-A1	F3	SW		Letter indicat	es column on w
MW-OU1-02-A*	G6	NE	MW-OU1-51-A	C3	NE	PZ-OU1-10-A1	F3	SW		Number indic	cates row on we
MW-OU1-03-A*	G5	SW	MW-OU1-56-A	B2	NW	PZ-OU1-13-A*	F5	NW	NE -	Northeast qua	adrant of map c
MW-OU1-04-A*	F5	NE	MW-OU1-57-A	B2	NW	PZ-OU1-14-A*	F5	NW	NW -	Northwest qu	adrant of map o
MW-OU1-05-A*	F5	SW	MW-OU1-58-A	B2	NE	PZ-OU1-15-A*	G5	SW	SE -	Southwest qu	adrant of map o
MW-OU1-06-A*	F6	NE	MW-OU1-59-A	C2	SW	PZ-OU1-16-A*	G5	SW	SW -	Southeast qua	adrant of map c
MW-OU1-07-A*	F5	SE	MW-OU1-61-A	B2	NW	PZ-OU1-35-A*	E2	SW			
MW-OU1-08-A*	G5	NW	MW-OU1-64-A1	B2	NW	PZ-OU1-46-AD2	D2	SE			
MW-OU1-09-A*	F4	SW	MW-OU1-64-A2	B2	NW	PZ-OU1-49-A1	E3	NE			
MW-OU1-10-A*	F5	NW	MW-OU1-65-A	B2	NW				-		
MW-OU1-11-SVA*	G5	NW	MW-OU1-67-A	B2	NE						

Table 2.1 Well Location Map Index

- ber
- well location index map
- vell location map
- cell
- cell
- cell
- ell

Table 2.2
Well Function

Existing	Northing	Facting Location	Well Function(s)				
Monitoring Well	Location	Lasting Location					
Identification	Coordinate	Coordinate					
Remaining Wells on NW Boundary Road (5 Total)							
MW-OU1-67-A	2,145,146.910	5,746,128.750	Monitoring well				
MW-OU1-57-A	2,145,064.165	5,745,918.771	Monitoring well				
MW-OU1-58-A	2,145,135.397	5,746,101.889	Monitoring well				
MW-OU1-61-A	2,145,093.660	5,746,002.560	Monitoring well				
MW-OU1-68-A	2,145,206.490	5,746,264.480	Monitoring well				
	Marina M	lunicipal Airport We	ell (1 Total)				
MW-B-02-A	2,146,530.206	5,749,507.454	Monitoring well				
	Ex	ctraction Wells (9 To	otal)				
EW-OU1-60-A	2,145,082.110	5,745,974.440	Extraction well				
EW-OU1-62-A	2,145,176.620	5,746,197.950	Extraction well				
EW-OU1-63-A	2,145,039.090	5,745,859.970	Extraction well				
EW-OU1-66-A	2,145,111.140	5,746,043.900	Extraction well				
MW-OU1-46-AD	2,144,778.116	5,746,791.994	Monitoring; converted to Extraction in 2006.				
EW-OU1-71-A	2,144,372.988	5,747,400.254	Extraction well				
IW-OU1-10-A	2,143,956.400	5,748,004.350	Monitoring; converted to Extraction in 2010.				
MW-OU1-85-A	2,144,635.096	5,747,164.990	Extraction well				
MW-OU1-87-A	2,144,314.009	5,747,774.400	Extraction well				
	Remaining FO	ONR and Grassland	Wells (20 Total)				
EW-OU1-53-A	2,143,778.418	5,748,369.881	Monitoring well				
EW-OU1-52-A	2,143,941.682	5,748,310.174	Monitoring well				
PZ-OU1-10-A1	2,143,978.280	5,747,981.540	Monitoring well				
IW-OU1-02-A	2,144,117.040	5,748,079.410	Monitoring well				
MW-OU1-26-A	2,144,141.800	5,747,960.000	Monitoring well				
MW-OU1-88-A	2,144,246.831	5,747,761.098	Monitoring well				
EW-OU1-49-A	2,144,355.179	5,747,796.775	Monitoring well				
PZ-OU1-49-A1	2,144,353.560	5,747,766.780	Monitoring well				
MW-OU1-86-A	2,144,285.082	5,747,414.248	Monitoring well				
MW-OU1-27-A	2,144,578.100	5,747,460.400	Monitoring well				
EW-OU1-72-A	2,144,576.724	5,747,243.822	Monitoring well				
MW-OU1-84-A	2,144,683.376	5,746,730.867	Monitoring well				
MW-OU1-83-A	2,144,908.009	5,746,717.940	Monitoring well				
MW-OU1-82-A	2,144,952.025	5,746,360.764	Monitoring well				
MW-OU1-50-A	2,144,999.072	5,746,101.724	Monitoring well				
PZ-OU1-02-A1	2,144,099.970	5,748,088.780	Monitoring well				
MW-OU1-46-A	2,144,773.124	5,746,795.274	Monitoring well				
MW-OU1-59-A	2,144,852.762	5,746,195.379	Monitoring well				
IW-OU1-73-A	2,144,508.890	5,746,782.737	Injection Well				
IW-OU1-74-A	2,144,573.499	5,746,674.984	Injection Well				

Notes:

FONR = Fort Ord Natural Reserve

Ana	alyte	TCE (µg/L)			
Aquifer Cleanup Lev	el or Screening Value	5 µg/L			
		Sample Date	Result		
Well Identification	Sample Event	Groundwater	Concentration		
	Remediation	9/21/2011	4.9 A		
	Period	9/2/2014	1.9 A		
		5/7/2015	1.6 A		
EW-001-55-A	Attainment Monitoring	7/17/2015	1.8 A		
	Attainment Monitoring	10/2/2015	1.3 A		
		12/11/2015	1.4 A		
		9/27/2012	4.2 A		
	Remediation	9/19/2013	4.9 A		
	Period	9/2/2014	2.9 A		
EW-OU1-52-A		5/7/2015	3.8 A		
	Attainment Manitaning	7/17/2015	3.7 A		
	Attainment Monitoring	10/2/2015	3.0 A		
		12/11/2015	2.9 A		
		9/15/2012 ¹	0.4 J/A		
	Remediation	9/18/2013 ¹	0.2 J/J		
	Period	9/2/2014	2.4 A		
PZ-OU1-10-A1		5/7/2015	3.3 A		
		7/17/2015	2.5 A		
	Attainment Monitoring	10/2/2015	2.0 A		
		12/11/2015	1.6 A		
		3/4/2010	4.1 A		
	Remediation	9/22/2010	3.5 J/A		
	Period	3/9/2011	4.0 A		
		9/21/2011	3.8 A		
IW-001-02-A		5/7/2015	1.8 A		
	Attainment Manitaning	7/17/2015	1.8 A		
	Attainment Monitoring	10/2/2015	1.8 A		
		12/11/2015	1.9 A		
		1/8/2013	4.5 A		
	Densetted	2/19/2013	4.6 A		
	Remediation	9/18/2013	3.9 A		
	renou	3/27/2014	2.5 A		
MW-OU1-26-A		9/2/2014	2.7 A		
		5/7/2015	2.5 A		
	Attoinmont Maritaria	7/17/2015	2.5 A		
	Auanment Monitoring	10/2/2015	2.3 A		
		12/11/2015	2.2 A		

Table 4.1OU-1 Attainment Monitoring Summary of Analytical Results for TCE

Ana	alyte	TCE (µg/L)			
Aquifer Cleanup Lev	el or Screening Value	5 µg/L			
Well Identification	Sample Event	Sample Date	Result		
wen identification	Sample Event	Groundwater Concentration			
		3/27/2014	4.6 A		
	Remediation	6/27/2014	4.5 A		
	Period	9/2/2014	4.7 A		
		12/22/2014	4.1 A		
MW-001-88-A		5/7/2015	4.0 A		
	Attainment Monitoring	7/17/2015	3.2 J/J-		
	Attainment Monitoring	10/2/2015	3.9 A		
		12/11/2015	3.9 A		
		10/1/2008	2.7 A		
		3/10/2009	1.1 A		
		9/15/2009	0.71 A		
		3/24/2010	0.61 A		
		9/21/2010	0.79 A		
	Period	3/8/2011	0.64 A		
	1 chida	9/22/2011	0.29 J/A		
PZ-OU1-49-A1		3/15/2012	0.27 J/A		
		9/27/2012	0.21 J/A		
		9/18/2013	0.77 A		
		9/2/2014	1.2 A		
		5/7/2015	1.8 A		
	Attainment Monitoring	7/17/2015	2.0 A		
	Attainment Monitoring	10/2/2015	2.2 A		
		12/11/2015	1.9 A		
	Remediation	9/2/2014	4.7 A		
	Period	12/22/2014	4.6 A		
MW OUT 61 A		5/7/2015	4.4 A		
WIW-001-01-A	Attainment Monitoring	7/17/2015	4.4 A		
	Anamment Monitoring	10/2/2015	3.7 A		
		12/11/2015	3.5 A		

 Table 4.1

 OU-1 Attainment Monitoring Summary of Analytical Results for TCE

Notes:

¹ Result omitted from Environmental Protection Agency Groundwater Statistics Tool calculations in order to avoid a potentially low bias. These results were probably impacted by pumping cycle at nearby extraction well.

 $\mu g/L = micrograms per liter$

A = The result has undergone routine data validation

J = Estimated concentration

J- = Data are qualified as estimated, with a low bias likely to occur. The associated value is the detected level. False negatives are unlekely to have been reported.

- NS = Not Sampled
- OU-1 = Operable Unit 1

TCE = trichloroethene

Table 4.2	
OU-1 Attainment Monitoring Summary of Analytical Results for PFOA and PFOS	

Analyte	PFOA				PFOS				Total PFOA and PFOS			
Preliminary Health Advisory January 2009 - May 2016	400 ng/L				200 ng/L				Not Applicable			
Health Advisory 16 May 2016	Not Applicable						70 ng/L					
Sample Event #	1	2	3	4	1	2	3	4	1	2	3	4
Sample Date(s)	5/11/2015	7/20/2015	10/5/2015	12/14/2015	5/11/2015	7/20/2015	10/5/2015	12/14/2015	5/11/2015	7/20/2015 & 7/24/2015	10/5/2015	12/14/2015
Well Identification	Groundwater Conc				oncentration	centration in ng/L						
EW-OU1-53-A	14 J-	13.0	9	13	UJ-	U	U	U	14 J-	13.0	9	13
EW-OU1-52-A	3 J-	4.0	4	5	UJ-	U	U	U	3 J-	4.0	4	5
PZ-OU1-10-A1**	120 J-	120 J- Not sampled		UJ-	Not sampled		120 J-	120 J- Not sampled				
IW-OU1-02-A	9 J-	10.0	7	9	UJ-	U	U	U	9 J-	10.0	7	9
MW-OU1-26-A	34 J-	44.0	42	39	7 J	12.0	15	12	41 J-	56.0	57	51
MW OILL 89 A	270 I	230.0	180	210	64 I	62.0	37	33	334 J-	292.0	217	243
WIW-UU1-88-A	270 J -	260.0	200	200	04 J-	72.0	44	36		332.0	244	236
PZ-OU1-49-A1	7 J-	8.0	9	11	UJ-	U	U	U	7 J-	8.0	9	11
MW OUI 61 A	3 J-	3.0	2 J	2	UJ-	U	U	U	3 J-	3.0	2 1	2
WIW-UU1-01-A	4 J-	3.0			UJ-				4 J-	3.0	2 J	2

Notes:

** PZ-OU1-10-A1 was deleted from the sampling network for PFOA and PFOS after Event #1 because suspended aquifer material from a damaged screen was present in the sample.

italics = Field duplicate

ng/L = nanograms per liter PFOA = perfluorooctanoic acid PFOS = perfluorooctane sulfonate TCE = trichloroethene OU-1 = Operable Unit 1 U = Not detected

 $J_{-} =$ Potential low bias in reported result

Red font indicates value exceeds May 2016 Health Advisory

FIGURES





HGL-OU-1 Closeout Report Former Fort Ord, CA











07	HGL—OU	J-1 Closeout Report Former Fort Ord, CA
×	T Septemb	Figure 3.1 CE Concentration in er Groundwater Monitoring 2006-2014
J.		Legend
T	Φ	Monitoring Well
) /	¢	Extraction Well
	¢	Injection Well
~		Piezometer
1	MW-OU1-88-A	Location with TCE Concentration at or Above MCL (5 μ g/L)
	<u> </u>	TCE Contour (µg/L) Based on September Data for Given Year (dashed where inferred)
	MW-OU1-88-A (4 ft 6.4)	-Well ID -September TCE Result (µg/L) -Sample Elevation (feet above mean sea level)
		10 μ g/L to 20 μ g/L TCE
		20 µg/L or Greater µg/L TCE
		Trail/Unimproved Road
	× × × ×	Fence
4	Notes: Green we Italicized	General Direction of Groundwater Flow Il label font indicates extraction or injection well.
	MCL=M Record ND=Non NA=Dep OU=Ope J=Estima TCE=Tri µg/L=Mi *=Indica +=Indica	aximum Contaminant Level (specified in OU-1 l of Decision) detect th is not applicable - sample is from pumping well rable Unit ted value chlorethene crograms per liter tes wells not used for contouring tes disconnected extraction well. No longer operable.
£	\\gst-srv-01\HGLGIS\\ (3-01)TCE_2006-2014 4/25/2017 CNL Source: HGL	Ft_Ord_MSIW\CloseoutReport\OU1\ 4.mxd
	ĬĸĦ	



Source: HGL

1 💼 1

Wells Along Main Axis of Contaminant Migration (South to North):





APPENDIX A

ATTAINMENT MONITORING EVALUATION AND SUMMARY FOR EPA DESIGNATED Emerging Contaminants in Operable Unit 1



TECHNICAL MEMORANDUM

Attainment Monitoring Evaluation and Summary for EPA Designated Emerging Contaminants in Operable Unit 1 Groundwater, Fritzsche Army Airfield, Former Fort Ord, California

1.0 INTRODUCTION

After reaching the groundwater cleanup targets established in the Record of Decision (ROD), the Army, the U.S. Environmental Protection Agency (EPA), the California Department of Toxic Substances Control (DTSC), and the California Regional Water Quality Control Board (RWQCB) approved an Exit Strategy and Attainment Monitoring program to confirm that Operable Unit (OU)-1 groundwater remediation is complete and the OU-1 site can be closed (HGL, 2015a).

During discussions with the regulatory agencies to develop the Exit Strategy, the agencies expressed concern that perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) may have been used during fire training activities at the OU-1 source area. These compounds have been used as part of film-forming foam applied to extinguish fires, and have been identified by the EPA as emerging contaminants. Federal and California drinking water standards for these chemicals have not been established but in January 2009 EPA's Office of Water established Preliminary Health Advisory (PHA) values for concentrations in groundwater (EPA, 2014). Although these compounds were not identified in the OU-1 ROD, the regulatory agencies stated that the attainment monitoring sampling program must include these potential contaminants to evaluate the case for OU-1 closure.

This Technical Memorandum presents the results from PFOA and PFOS sampling during the attainment monitoring period, describes the distribution of these compounds within OU-1 groundwater and factors affecting site closeout, and recommends that the OU-1 site proceed to closure without further sampling or remediation for PFOA and PFOS.

1.1 DECISION CRITERIA

The Exit Strategy specified that sample results for PFOA and PFOS be considered as described below:

During the initial sampling event, if either compound is detected in any well at a concentration greater than the method detection limit (MDL) but less than the PHA, then PFOA and PFOS sampling will be extended through four sampling periods during attainment monitoring.

If neither compound is detected above the MDL in any sample, then a second (confirmation) set of samples and analysis for PFOA and PFOS will be performed in the next scheduled sampling event.

If the confirmation samples also show that all PFOA and PFOS concentrations are less than the MDL, then collection and analysis for PFOA and PFOS will be terminated. If either compound is detected in any well at a concentration greater than the MDL but less than the PHA in the

confirmation sampling, then PFOA and PFOS sampling will be extended through a total of four sampling periods.

If either compound is detected in any well at a concentration greater than the corresponding PHA during any sampling event, then the OU-1 groundwater extraction and treatment system will resume operation. In that event, the implementation of this Exit Strategy will be suspended and discussions will be held with the regulatory agencies to define the subsequent OU-1 groundwater monitoring network and sampling frequency. The subsequent sample results will be evaluated to develop an acceptable path forward to complete the OU-1 remediation effort and attain site closure.

If the PFOA and PFOS concentrations in all samples are less than their corresponding PHA value, then site closure activities will be based on the results of the attainment monitoring for the contaminants of concern (COCs) specified in the ROD. If the PFOA or PFOS concentration in any sample exceeds the corresponding PHA, then the pump and treat system will resume operation and the attainment monitoring results will be evaluated to develop an acceptable path forward to complete the OU-1 remediation effort and attain site closure.

1.2 ATTAINMENT MONITORING ANALYTICAL RESULTS

Attainment monitoring sampling results were described in detail in the Final Remedial Action Completion Report (HGL, 2016). Table 1.1 and Figure 1.1 show the analytical results for PFOA and PFOS during the attainment monitoring period.

PFOA was detected in all wells and in all sampling events. The maximum concentration was observed at MW-OU1-88-A (E3) at 270 nanograms per liter (ng/L). PFOA ranged from 180 ng/L to 270 ng/L with close agreement between the duplicate samples (see Table 1.1). At the other wells in the attainment monitoring network (excluding PZ-OU1-10-A1 [F3], which was sampled only once), there was virtually no variation between measurements. The greatest range between the minimum and maximum values was 10 ng/L at MW-OU1-26-A (F3). The second highest PFOA concentration observed at any well was 44 ng/L, also at MW-OU1-26-A (F3). All PFOA concentrations were much less than the 400 ng/L PHA screening value established in 2009 and incorporated in the Exit Strategy decision criteria.

PFOS was detected in only two of the eight attainment network monitoring wells and was detected during each of the four sampling periods. The maximum concentration was detected in well MW-OU1-88-A (E3) at 72 ng/L; this is the same well that contained the highest PFOA concentration. The PFOS concentration ranged from 36 ng/L to 72 ng/L at MW-OU1-88-A (E3) with the minimum value observed in the fourth sampling round. PFOS was also detected in well MW-OU1-26-A (F3) with a maximum concentration of 15 ng/L. The PFOS concentration was essentially unchanged and varied only from 7 ng/L to 15 ng/L during the attainment monitoring effort. All PFOS concentrations were much less than the 200 ng/L PHA screening value established in 2009 and incorporated into the Exit Strategy decision criteria.

1.3 SAMPLING RESULTS RELATIVE TO THE MAY 2016 PHA REVISION FOR PFOA / PFOS

In May 2016, the EPA published revised PHA values for PFOA and PFOS (EPA, 2016b). The revision eliminated separate values for each compound and established 70 ng/L as the advisory limit for the sum of PFOA and PFOS concentrations in a given sample. As illustrated in Table 1.1 and discussed below, PFOA and PFOS concentrations exceeded the revised standard at two well locations.

The maximum total PFOA and PFOS concentration in all sampling events was found at well MW-OU1-88-A (E3). A duplicate sample was collected from this well during sampling events 2 through 4. If the maximum of the parent and duplicate sample is used as the sampling result for each event, the total PFOA and PFOS concentration (PFOT) was virtually identical in sampling events 1 and 2 (334 ng/L and 332 ng/L, respectively) and likewise essentially the same—although decreasing by approximately 25 percent—in events 3 and 4 (244 ng/L and 243 ng/L, respectively). All results were greater than the revised advisory value of 70 ng/L.

Well PZ-OU1-10-A1 (F3) was sampled only during the first attainment event (in May 2015) because the sample showed considerable suspended sediment. Comparison of total depth after construction to the total depth at the time of sampling indicated approximately 8.5 feet of accumulated sediment in the well. PFOS was not detected in the sample and PFOA was much less than the PHA value at the time of sampling (120 ng/L versus 400 ng/L). Consequently, the regulatory agencies concurred during the June 2015 Base Realignment and Closure Cleanup Team meeting that PFOA and PFOS sampling would be suspended at that well (HGL, 2015b). The PFOT value of 120 ng/L exceeded the revised advisory limit of 70 ng/L.

2.0 OU-1 CLOSEOUT CONSIDERATIONS

2.1 ROD REQUIREMENTS AND EXIT STRATEGY

PFOA and PFOS were not included in the ROD (U.S. Army, 1995) and these compounds were sampled only during the attainment monitoring period as specified in the approved Exit Strategy. The groundwater long-term monitoring (LTM) and attainment monitoring results demonstrated that the cleanup requirements specified in the ROD have been met. The PFOA and PFOS sampling results met the Exit Strategy criteria for site closure approved by the regulators based on the PHA values in effect before the May 2016 revision. After reviewing the attainment monitoring results, the regulatory agencies concurred that cleanup was complete and agreed that the Army could begin site closeout activities (DTSC, 2016; EPA, 2016a; RWQCB, 2016).

2.2 REGULATORY STANDARD VERSUS PHA

The role of the PHA is described in the publication that presented the revised values (EPA, 2016b):

"The U.S. Environmental Protection Agency (EPA) developed the nonregulatory Health Advisory (HA) Program in 1978 to provide information for public health officials or other interested groups on pollutants associated with short-term contamination incidents or spills that can affect drinking water quality, but are not regulated under the Safe Drinking Water Act (SDWA)...HAs serve as

informal technical guidance to assist federal, state, and local officials, and managers of public or community water systems in protecting public health when emergency spills or other contamination situations occur...The HA value is not a legally enforceable federal standard and is subject to change as new information becomes available."

PFOA and PFOS health risks are being evaluated by numerous entities in the United States, Europe, and elsewhere. Few regulatory entities have established regulatory standards but many have developed guidance values. Table 2.1 presents selected published values, including the EPA revision of May 2016, for various states and countries. The values presented in Table 2.1 illustrate the current range of promulgated and guidance levels and Table 2.1 is not intended as an exhaustive summary. California has not established any promulgated standards or guidance values for PFOA and PFOS concentrations in groundwater or drinking water, although the former PHA values were approved as site-specific closure criteria for OU-1 (HGL, 2015a).

2.3 PFOA / PFOS SOURCE AREA AND MIGRATION

The groundwater LTM program for OU-1 was conducted from 1987 through 2014. The volatile organic compound (VOC) contaminant concentrations obtained during that period demonstrated that the attainment well locations are on the main path of the VOC plume migration. Like trichloroethene (TCE), PFOA and PFOS are highly mobile in groundwater and would be expected to follow the same groundwater flow path (shown in Figure 2.1).

Fire training activities conducted at the former Fire Drill Area (FDA; Figure 1.1) are believed to be the source of PFOA and PFOS in OU-1 groundwater. Contaminated soils were removed from the FDA in 1987 and replaced with clean backfill (U.S. Army, 1995). Groundwater cleanup for those contaminants identified in the ROD was completed in the source area and vicinity in 2007 (HGL, 2011). The extraction and monitoring wells associated with the source area cleanup were destroyed in 2011 with regulatory concurrence (HGL, 2012).

As shown on Figure 1.1, the nearest existing wells that are downgradient from the former source area are wells EW-OU1-53-A (F4) and EW-OU1-52-A (F4). The PFOT concentrations varied by less than 4 ng/L during the attainment monitoring period with maximum values of 14 J- ng/L and 5 ng/L, respectively (Table 1.1). The PFOT concentrations at these wells support the conclusion that the source area is no longer contributing PFOA and PFOS at concentrations that would exceed the revised PHA values.

Likewise, the downgradient PFOT concentration at the former Fort Ord boundary, represented by well MW-O1-61-A (B2), decreased from 4 J- ng/L to 2 ng/L during the attainment monitoring period. Well PZ-OU1-49-A1 (E3) is also along the main path of the TCE plume migration and showed a maximum PFOT concentration of 11 ng/L during the attainment monitoring.

Assuming similar migration paths and concentration trends as observed for TCE and shown on Figure 2.2 and Figure 2.3, the area where PFOT exceeds the revised PHA value would be in the central part of the Fort Ord Natural Reserve (FONR); the attainment monitoring results for PFOT are consistent with this observation. Well MW-OU1-61-A (B2) is located at the former Fort Ord boundary and is downgradient from this area. The sample results from MW-OU1-61-A (B2)

showed a maximum PFOT concentration of 4 ng/L and demonstrate that the high PFOT concentration is not migrating off site.

2.4 HUMAN HEALTH PROTECTIVENESS

OU-1 groundwater contamination is limited to the A-Aquifer. This aquifer is not used for drinking water purposes. In addition, the OU-1 area is located within the Special Groundwater Protection Zones, either the Prohibition Zone or the Consultation Zone, as illustrated on Figure 2.4. Installation of wells and use of the A-Aquifer for drinking water is prohibited by Monterey County ordinance.

The Salinas Valley Aquiclude (SVA) underlies the A-Aquifer beneath former Fort Ord and continues in a downgradient direction more than 5,000 feet beyond the farthest historic extent of the OU-1 plume (Ahtna, 2016; Figure 5). The low permeability and thickness of the SVA prevents significant vertical migration of groundwater within the former OU-1 plume area from the A-Aquifer into the underlying Upper 180 Foot Aquifer. Consequently, there is no exposure pathway to human receptors for groundwater from the OU-1 area where the PFOT concentration exceeds the revised PHA.

The OU-1 area is also located within the FONR. The FONR is managed by the UCSC and access is prohibited / controlled by perimeter fencing and locked gates. As part of the California Natural Reserve System, development is prohibited within the FONR. The University of California, Santa Cruz (UCSC) uses the FONR as a "nature laboratory" for the study of rare plant species and associated habitat. Well installation is allowed only as part of the OU-1 remediation effort.

Based on the hydrologic and institutional factors described above, there is no exposure pathway for high PFOT concentration groundwater to reach human receptors and OU-1 closure will remain protective of human health.

3.0 CLOSEOUT RECOMMENDATION

The Army recommends that the OU-1 site proceed to closure without further sampling or remediation for PFOA and PFOS. This recommendation is based on the following considerations:

- The PFOT concentrations in the attainment network wells indicate that the potential source area no longer contributes these compounds to OU-1 groundwater in significant concentration.
- The maximum PFOT concentration at the former Fort Ord boundary is 4 J- ng/L in all samples and well below the revised PHA value of 70 ng/L. These results indicate that high PFOT concentration is not migrating off site.
- There is no exposure pathway for use of OU-1 groundwater where PFOT exceeds the revised PHA that would impact human health; thus the remedial action is protective of human health.
- OU-1 closeout was previously approved by the regulatory agencies (correspondence provided in Attachment 1) based on the attainment monitoring results presented in the Remedial Action Completion Report (HGL, 2016).

• The PHA concentration is an advisory value rather than a regulatory limit and may be considered in the overall context of site conditions rather than as numerical criteria.

4.0 **BIBLIOGRAPHY**

- Ahtna, 2016. Draft Operable Unit Carbon Tetrachloride Plume Fourth Quarter 2014 through Third Quarter 2015 Groundwater Monitoring Report, Former Fort Ord, California. February. Administrative Record Series Number OUCTP-0071*.
- DTSC (California Department of Toxic Substances Control), 2016. Letter to William Collins, BRAC Environmental Coordinator "*Review of Final Technical Memorandum Operable* Unit 1, Attainment Monitoring Results, Sampling Events #1 Through #4, Former Fort Ord, California, March 16, 2016" from Dr. Min Wu, Project Manager. April 4, 2016.
- EPA, 2014. Emerging Contaminants Perfluorooctane Sulfonate (PFOS) and Perfluorooctanoic Acid (PFOA). EPA 505-F-14-001. March. http://www2.epa.gov/fedfac/emerging-contaminants-perfluorooctane-sulfonate-pfos-and-perfluorooctanoic-acid-pfoa.
- EPA, 2016a. Letter to William Collins, BRAC Environmental Coordinator "*Remedial Action Completion: Operable Unit 1, Former Fort Ord, California*" from Angeles Herrera, Assistant Director, Superfund Division. March 28, 2016.
- EPA, 2016b. Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA). EPA 822-R-16-005. May. https://www.epa.gov/ground-water-and-drinking-water/drinking-waterhealth-advisories-pfoa-and-pfos.
- HGL, 2011. Final Rebound Evaluation Report Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. September. Administrative Record Series Number OU1-559*.
- HGL, 2012. Final Well Destruction Report, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Former Fort Ord, California. March. Administrative Record Series Number OU1-593*.
- HGL, 2015a. Final Technical Memorandum Operable Unit 1 Exit Strategy Former Ford Ord, California. April. Administrative Record Series Number OU1-614*.
- HGL, 2015b. Final Technical Memorandum Operable Unit 1 Perfluorinated Chemicals Sampling Event #1 (May 2015) Fritzsche Army Airfield Fire Drill Area Former Ford Ord, California. October. Administrative Record Series Number OU1-620*.
- HGL, 2016. Final Remedial Action Completion Report / Technical Memorandum Operable Unit 1 Attainment Monitoring Results Sampling Events #1 Through #4 Former Fort Ord, California. March. Administrative Record Series Number OU1-623*.

- RWQCB (Regional Water Quality Control Board) 2016. Email correspondence to R. Evans, HGL Project Manager "Revisions to OU-1 Draft Attainment Technical Memorandum" from G. Himebaugh, Engineering Geologist. March 10, 2016.
- U.S. Army, 1995. Record of Decision, Operable Unit 1, Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. July. Administrative Record Series Number OU1-362*.

The following tables, figures, and Attachment referenced above are included:

TABLES

Table 1.1	OU-1 Attainment Monitoring Summary of Analytical Results for PFOA
	and PFOS
Table 2.1	Selected PFOA and PFOS Promulgated and Guidance Concentrations
	Established by Others

FIGURES

Figure 1.1	Attainment Monitoring Summary PFOA and PFOS Concentrations in OU-1
	A-Aquifer
Figure 2.1	OU-1 FONR A-Aquifer Groundwater Elevation Map May 2015 and
	December 2015
Figure 2.2	OU-1 FONR TCE Concentrations Over Time for Attainment Monitoring
-	Well Network
Figure 2.3	TCE Concentration in September Groundwater Monitoring 2006-2014
Figure 2.4	Special Groundwater Protection Zones June 2016
e	

ATTACHMENT

Attachment 1 Regulatory Closeout Approval Documentation Based on Attainment Monitoring Results
TABLES

 Table 1.1

 OU-1 Attainment Monitoring Summary of Analytical Results for PFOA and PFOS

Analyte	PFOA				PFOS				Total PFOA and PFOS			
Preliminary Health Advisory January 2009 - May 2016	400 ng/L			200 ng/L				Not Applicable				
Revised Preliminary Health Advisory 16 May 2016	Not Applicable 70 ng/L					g/L						
Sample Event #	1	2	3	4	1	2	3	4	1	2	3	4
Sample Date(s)	5/11/2015	7/20/2015	10/5/2015	12/14/2015	5/11/2015	7/20/2015	10/5/2015	12/14/2015	5/11/2015	7/20/2015 & 7/24/2015	10/5/2015	12/14/2015
Well Identification	Groundwater Concentration in ng/L											
EW-OU1-53-A	14 J-	13.0	9	13	UJ-	U	U	U	14 J-	13.0	9	13
EW-OU1-52-A	3 J-	4.0	4	5	UJ-	U	U	U	3 J-	4.0	4	5
PZ-OU1-10-A1**	120 J- Not sampled			UJ-	Not sampled			120 J-		Not sampled		
IW-OU1-02-A	9 J-	10.0	7	9	UJ-	U	U	U	9 J-	10.0	7	9
MW-OU1-26-A	34 J-	44.0	42	39	7 J	12.0	15	12	41 J-	56.0	57	51
MW OUL 89 A	270 J-	230.0	180	210	64 J-	62.0	37	33	- 334 J-	292.0	217	243
MW-001-88-A		260.0	200	200		72.0	44	36		332.0	244	236
PZ-OU1-49-A1	7 J-	8.0	9	11	UJ-	U	U	U	7 J-	8.0	9	11
MW-OU1-61-A	3 J- 4 J-	3.0	2 J	2	UJ- UJ-	U	U	U	3 J- 4 J-	3.0	2 J	2

Notes:

italics = Field duplicate ng/L = nanograms per liter PFOA = perfluorooctanoic acid PFOS = perfluorooctane sulfonate TCE = trichloroethene OU1 = Operable Unit 1 U = Not detected J- = Potential low bias in reported result Red font indicates value exceeds PHA

** PZ-OU1-10-A1 was deleted from the sampling network for PFOA and PFOS after Event #1 because suspended aquifer material from a damaged screen was present in the sample.

Table 2.1
Selected PFOA and PFOS Promulgated and Guidance Concentrations Established by Others

	Lin	nit (nanograms/	liter)				
State or Country	PFOA PFOS Tota &		Total PFOA & PFOS	Year Established	Remarks	Reference	
Vermont	20	30	-	2016	Drinking water criteria	9	
New Jersey	40	-	-	2007	Preliminary health-based guideline for drinking water	1	
Delaware	70	70	-	2016	Values "are not to be construed as site specific cleanup levels"	11	
New Hampshire	70	70	70	2016	Ambient Groundwater Quality Standards	10	
USEPA PHA	70	70	70	2016	Public Health Advisory value	2	
Michigan	89	11	-	2016	Proposed values	4	
Maine	100	-	-	2014	Maximum Exposure Guideline (MEG) in drinking water; MEG value for short term exposure is 400 ng/L	1	
Texas	290	560	-	2016	Promulgated value for groundwater cleanup	4 and 14	
Denmark	300	100	-	2015	Proposed values	3	
Germany	300	300	100	2006	300 ng/L is strict, health-based level. 100 ng/L is precautionary guidance value	3	
Minnesota	300	300	-	2008	Chronic non-cancer Health Risk limit for drinking water	1 and 5	
United Kingdom Tier 1	300	300	-	2009	Minimum action is requirement to consult health professionals and	8	
Alaska	400	160	-	2016	Proposed values	4	
California	400	200	-	2015	Site-specific screening level specified in approved OU-1 Exit Strategy	12	
Illinois	400	200	-	2013		4	
West Virginia	500	-	-		Requirement to provide alternative drinking source if exceeded; considering change to 400 ng/L	5	
North Carolina	2,000	-	-	2006	North Carolina Science Advisory Board recommended in 2012 reducing Interim Maximum Allowable Concentration in groundwater to 1,000 ng/L	6 and 7	
United Kingdom Tier 2	5,000	1,000	-	2009	Minimum action is requirement to reduce concentration to less than limit as soon as practicable	8	
Oregon	24,000	300,000	-	2009	Trigger level requiring measurement or development of pollutant reduction plan; not a water quality standard	4 and 13	
United Kingdom Tier 3	45,000	9000	-	2009	Minimum action is requirement to reduce exposure from drinking water within 7 days	nking 8	
Netherlands	-	530	-	2011	Maximum tolerable concentration in drinking water	3	
Sweden	-	-	90	2014	Sum of seven PFAS substances	3	

Table 2.1

Selected PFOA and PFOS Promulgated and Guidance Concentrations Established by Others

Notes:

Bold font is promulgated value PFOA = perfluorooctanoic acid ng/L = nanograms per liter PFOS = perfluorooctane sulfonate OU-1 = Operable Unit 1

1 - Maximum Exposure Guideline for Perfluorooctanoic Acid in Drinking Water; Division of Environmental Health, Maine Department of Health and Human Services. March, 2014

- 2 US EPA, Office of Water, EPA 822-R-16-005, Drinking Water Health Advisory for Perfluorooctanoic Acid (PFOA), May 2016
- 3 Danish Ministry of the Environment, Perfluoroalkylated substances: PFOA, PFOS, and PFOSA. Evaluation of health hazards and proposal of a health based quality criterion for drinking water, soil and ground water. Environmental Project #1665, 2015
- 4 USACE Omaha Presentation by OTIE & Amec Foster Wheeler, 2016
- 5 State WRCB [CA], Groundwater Information and Fact Sheet Perfluorooctanoic Acid (PFOA) & Related Compounds . May, 2016
- 6 North Carolina Interim Maximum Allowable Concentrations in groundwater <u>https://deq.nc.gov/document/nc-stds-groundwater-imac-2013</u>
- 7 North Carolina Department of Environment and Natural Resources Memorandum NCASB Recommendation for the Revision of the IMAC for PFOA, August 10, 2012
- 8 United Kingdom Drinking Water Inspectorate Guidance on the Water Supply (Water Quality) Regulations 2000¹ specific to PFOS (perfluorooctane sulfonate) and PFOA (perfluorooctanoic acid) concentrations in drinking water. October 2009
- 9 Vermont Environmental Conservation Drinking Water and Groundwater Protection Division Guidance. Interim Groundwater Quality Standards. April, 2016.
- 10 New Hampshire Department of Environmental Health. Ambient Groundwater Quality Standard for Perfluorooctanoic Acid (PFOA) and Perfluorooctane Sulfonate (PFOS) http://des.nh.gov/media/pr/2016/20160531-pfoa-standard.htm
- 11 Delaware Department of Natural Resources and Environmental Control. Screening Level Table. July 2016
- 12 HGL, 2015a. Final Technical Memorandum OU-1 Exit Strategy Former Ford Ord, California. April. Administrative Record Series Number OU1-614*.
- 13 Oregon Department of Environmental Quality Rule 340-045-0100
- 14 Texas Commission on Environmental Quality Texas Risk Reduction Program Protective Concentration Levels Tier 1 values

FIGURES



	HGL—0	DU-1 PFC HA Technical Memorandum Former Fort Ord, CA					
1	Figure 1.1 Attainment Monitoring Summary PFOA and PFOS Concentrations in OU-1 A-Aquifer Former Fort Ord, CA						
		Legend					
	¢	Monitoring Well					
2*	¢	Extraction Well					
, ti		Injection Well					
	•	Piezometer or 2-Inch Well					
*	MW-OU1-70-A	Well Identification					
3		Trail/Unimproved Road					
	× × × ×	Fence					
		Treated Water Infiltration Trench					
		Former Fire Drill Area					
4		Building					
		NWTS Facility					
/	Notes: Well labels in Wells not sam *=Duplicate S	green font indicate extraction or injection well. pled are not part of Attainment Monitoring Network. Sample					
	⁺ =Indicates di ft amsl=feet a	sconnected extraction well. No longer operable. bove mean sea level					
5.	FONR=Fort Ord Natural Reserve J-=Sample result estimated value potentially biased low J=Sample result estimated value						
	ND=Nondetec NS=Not Samp ng/L=nanogra	et bled ms per liter					
	NWTS=North PFOA=Perflu	west Treatment System orooctanoic Acid					
	UJ-=Not deter	cted; Sample result biased low					
* 6	\\gst-srv-01\HGLGIS\F (1-01)PFOA_PFOS_C 8/22/2016_CNL	t_Ord_MSIW\OU1_PFC_HA_Tech_Memo\ oncens_Mon_Summary_Prelim.mxd					
	Source: HGL						
		High HydroGeologic, Inc					



HGL—OU-1 PFC HA Technical Memorandum Former Fort Ord, CA Figure 2.1 **OU-1 FONR A-Aquifer Groundwater Elevation Map** 1 May 2015 and December 2015 **Former Fort Ord, CA** Legend **OU-1** Existing Wells ⊕ Extraction Well 0 2 Injection Well 0 Piezometer or 2-Inch Well ▲ Well Identification MW-OU1-27-A Groundwater Elevation (May 2015) 41.55 42.15 Groundwater Elevation (December 2015) Groundwater Elevation Contour -38-(December 2015) (dashed where inferred) (ft amsl) 3 Groundwater Elevation Contour (May 2015) -38-(dashed where inferred) (ft amsl) General Direction of Groundwater Flow (December 2015) General Direction of Groundwater Flow (May 2015) Trail/Unimproved Road Treated Water Infiltration Trench 4 Fence Former Fire Drill Area Building **NWTS** Facility Notes: Locations where no groundwater elevation is reported were not measured. ≏5 Well labels in green font indicate extraction or injection well. MW-OU1-61-A: Well completed in channel fill interval only. MW-OU1-67-A: Well completed in channel fill interval only. PZ-OU1-49-A1: Well is located 30 feet from EW-OU1-49-A and aquifer is approximately 11 feet deeper at PZ-OU1-49-A1. ft amsl=feet above mean sea level *=Indicates wells not used for contouring ⁺=Indicates disconnected extraction well. No longer operable. FONR=Fort Ord Natural Reserve NWTS=Northwest Treatment System \\gst-srv-01\HGLGIS\Ft_Ord_MSIW\OU1_PFC_HA_Tech_Memo\ (2-01)GWE_May_Dec_2015.mxd 8/23/2016_CNL 6 Source: HGL Ĩ. HG







HGL—OU-1 PFC HA Technical Memorandum Former Fort Ord, CA

Figure 2.4 Special Groundwater Protection Zones June 2016

Legend

Assessor's Parcel

Prohibition Zone

Consultation Zone

Notes:

Prohibition Zone: Well construction is restricted due to the presence of organic contaminants at concentrations exceeding state and federal guidelines and to prevent interference with ongoing remedial activities. Consultation Zone: Well construction is restricted due to the proximity to organic contamination and associated remedial activities.

\\gst-srv-01\HGLGIS\Ft_Ord_MSIW\OU1_PFC_HA_Tech_Memo\ (2-04)GW_Protection.mxd 8/22/2016_CNL Source: HGL, Monterey County Assessor's Office, USACE ArcGIS Online Light Gray Canvas Basemap





ATTACHMENT 1

REGULATORY CLOSEOUT APPROVAL DOCUMENTATION BASED ON ATTAINMENT MONITORING RESULTS

Department of Toxic Substances Control

Matthew Rodriguez Secretary for **Environmental Protection**

Barbara A. Lee, Director 8800 Cal Center Drive Sacramento, California 95826-3200

April 4, 2016

Mr. Bill Collins **BRAC Environmental Coordinator** Fort Ord Base Realignment and Closure Office Post Office Box 5008 Monterey, California 93944-5008

REVIEW OF FINAL TECHNICAL MEMORANDUM OPERABLE UNIT 1. ATTAINMENT MONITORING RESULTS, SAMPLING EVENTS #1 THROUGH #4, FORMER FORT ORD, CALIFORNIA, MARCH 16, 2016

Dear Mr. Collins:

The Department of Toxic Substances Control (DTSC) Geological Services Unit (GSU) has reviewed the Final Technical Memorandum Operable Unit 1 (OU-1), Attainment Monitoring Results, Sampling Events #1 through #4, Former Fort Ord, California (Tech Memo) dated March 16, 2016. The Tech Memo was prepared by HydroGeoLogic, Inc. for the U.S. Army Corps of Engineers, Sacramento District.

DTSC concurs with the data provided in the Tech Memo, the conclusion that OU-1 groundwater remediation efforts are complete and an OU-1 site closure report should be prepared for regulatory review.

DTSC appreciates the opportunity to review the subject document. If you have any questions, please contact me by email at Min.Wu@dtsc.ca.gov, or at (916) 255-3621.

Sincerely,

min Hurang Wu

Min H. Wu, Ph.D. **Project Manager** Military Sites and Corrective Action Unit Brownfields and Environmental Restoration Program

CC: See next page.





Edmund G. Brown Jr. Governor

Mr. Bill Collins April 4, 2015 Page 2 of 3

cc: (Via email)

Ms. Judy Huang U.S. Environmental Protection Agency, Region 9 75 Hawthorne Street Mail Code: SFD-8-3 San Francisco, California 94105 Huang.judy@epa.gov

Mr. Martin Hausladen U.S. Environmental Protection Agency, Region 9 75 Hawthorne Street Mail Code: SFD-8-3 San Francisco, California 94105 Hausladen.martin@epa.gov

Ms. Lindsay Alexander Fort Ord BRAC Office Administrative Record P.O. Box 5008 Monterey, California 93944-5008 adminrecord@fortordcleanup.com

Ms. Teresa Rodgers USACE-SPK-ED-ED 1325 "J" Street, 12th Floor, #119 Sacramento, California 95814 Teresa.M.Rodgers@usace.army.mil

Mr. Grant Himebaugh Regional Water Quality Control Board Central Coast Region 895 Aerovista Place, Suite 101 San Luis Obispo, California 93401 Grant.Himebaugh@waterboards.ca.gov

Mr. Noel Shrum, Chief Military Sites and Corrective Action Unit Brownfields and Environmental Restoration Program Department of Toxic Substances Control 8800 Cal Center Drive Sacramento, California 95826 Noel.Shrum@dtsc.ca.gov Mr. Bill Collins April 4, 2015 Page 3 of 3

cc: Mr. Stephen C. Sterling, P.G., P.G.P., C.E.G., C.H.G Senior Engineering Geologist Geological Services Unit Brownfields and Environmental Restoration Program

Department of Toxic Substances Control 8800 Cal Center Drive Sacramento, California 95826 Stephen.Sterling@dtsc.ca.gov



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY REGION IX 75 Hawthorne Street San Francisco, CA 94105

February 21, 2017

Mr. William Collins Department of the Army Fort Ord Base Realignment and Closure (BRAC) Office BRAC Environmental Coordinator P.O. Box 5008 Monterey, California 93944-5008

Re: Technical Memorandum, Attainment Monitoring Evaluation and Summary for EPA Designated Emerging Contaminants in Operable Unit 1 Groundwater, Fritzsche Army Airfield, Former Fort Ord, California, August 25, 2016

Dear Bill,

EPA has reviewed the *Technical Memorandum*, Attainment Monitoring Evaluation and Summary for EPA Designated Emerging Contaminants in Operable Unit 1 Groundwater, Fritzsche Army Airfield, Former Fort Ord, California, dated August 25, 2016. This document was prepared at the request of EPA, the California EPA Department of Toxic Substances Control (DTSC), and the Central Coast Regional Water Quality Control Board (RWQCB) in response to concerns regarding potential perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) contamination at Operable Unit 1 (OU-1) despite the completion of remediation of other contaminants of concern.

During our review, we considered EPA's 2016 health advisory (HA) value of 70 ng/L for the sum of PFOA and PFOS concentrations, monitoring data and closeout information presented in this memo, comment letters from DTSC (September 20, 2016) and the RWQCB (August 20, 2016 and September 8, 2016), and a map prepared by the Army Corps of Engineers in February 2017 showing all nearby private groundwater wells. We have also consulted with the EPA Federal Facilities Restoration and Reuse Office as required by EPA policy.

Based on the information currently available, EPA concurs with the recommendation for site closure without additional sampling or remediation of PFOA and PFOS at this time, for the following reasons:

. PFOA and PFOS Source No Longer Present

- The source of contamination at OU-1 was a fire drill training pit. Training activities were discontinued in 1985. In 1987 approximately 4,000 cubic yards of contaminated soil were removed, down to a maximum depth of 31 feet below ground surface, and replaced with clean backfill. The removal action was implemented to address benzene, chloroform, 1,1-
- dichloroethane, 1,2-dichloroethane, 1,1-dichloroethene, total 1,2-dichloroethene, methyl ethyl ketone, 1,1,1-trichloroethane, and trichloroethene. Releases of these chemicals, the PFOA, and the PFOS happened during fire drill training exercises. Given the recent PFOA and PFOS concentrations in the monitoring wells near the fire drill pit training area, it is unlikely that the source area is currently contributing these compounds to groundwater in the A-aquifer.

- <u>Concentrations Above the 2016 HA Are Not Migrating Off Site</u> Monitored values at the former Fort Ord boundary are at, or near, the detection limit of 2 ng/L for PFOA. PFOS was not detected during any of the sampling events. Levels exceeding, or potentially exceeding, the 2016 HA are located approximately 1600-2200 feet from the boundary of the former Fort Ord.
- No Exposure Pathway

OU-1 historic groundwater contamination was limited to the A-aquifer which is not used for drinking water purposes. A Monterey County ordinance prohibits the installation of wells and use of the A-aquifer for drinking due to a number of factors, including low yield rates. Four historic private wells are in the vicinity of OU-1. Three are closed. The remaining well is approximately 2600 feet from the historic plume extent and in the cross gradient direction. It is only used for irrigation purposes.

The Salinas Valley Aquiclude (SVA) underlies the A-aquifer and continues in a downgradient direction more than 5,000 feet beyond the farthest historic extent of the OU-1 plume. The SVA prevents significant vertical migration of groundwater between the A-aquifer and underlying upper 180-foot aquifer.

Additionally, OU-1 is located within the Fort Ord Natural Reserve (FONR). Development is prohibited and well installation is allowed only as part of the OU-1 remediation effort. Access is controlled by the University of California Santa Cruz which uses the FONR as a nature laboratory for the study of rare plant species and associated habitat.

This concurrence applies only to Fort Ord OU-1 and does not represent EPA policy on the closeout of Superfund site operable units with PFOA and PFOS levels exceeding the 2016 HA. I appreciate the accommodations you have made to extend the due date of EPA comments on this technical memo. If you have any questions, please do not hesitate to call me at (415) 947-4105 or e-mail me at clancy.maeve@epa.gov.

Sincerely,

aeve Clanc

Maeve Clancy Remedial Project Manager

cc: (via email) Grant Himebaugh, Central Coast RWQCB Alex Kan, Department of the Army, USACE Noel Shrum, Cal EPA DTSC Min Wu, Cal/EPA DTSC





Central Coast Regional Water Quality Control Board

February 26, 2016

Mr. Bill Collins Base Environmental Coordinator U.S. Department of the Army Base Realignment and Closure Fort Ord Field Office P. O. Box 5004 Monterey, CA 93944-5004 william.k.collins@us.army.mil Sent via U.S. Mail and Electronic Mail

Dear Mr. Collins:

FORMER FORT ORD: DRAFT TECHNICAL MEMORANDUM OPERABLE UNIT 1 ATTAINMENT MONITORING RESULTS ACCEPTANCE

Central Coast Regional Water Quality Control Board (Water Board) staff has reviewed the subject technical memorandum (report), prepared by the Army and its contractor, and received on February 1, 2016. In the report, the Army transmits the latest groundwater monitoring well data demonstrating consistent attainment of site closure goals. The Water Board accepts the report, as written.

Demonstration of aquifer cleanup levels or goals for trichloroethylene, perfluorooctanoic acid (PFOA) and perfluorooctane sulfonate (PFOS) is a major milestone on the way to site closure. We appreciate the considerable effort expended by all parties to arrive at this point in the site cleanup process.

If you have any questions or comments regarding this letter, please call **Grant Himebaugh at** (805) 542-4636 (grant.himebaugh@waterboards.ca.gov), or Sheila Soderberg at (805) 549-3592.

Sincerely,

for Lisa Horowitz McCann Interim Executive Officer

CC:

DR. JEAN-PIERRE WOLFF, CHAIR | LISA HOROWITZ MCCANN, INTERIM EXECUTIVE OFFICER



Ms. Teresa M. Rodgers, USACE, Teresa.M.Rodgers@usace.army.mil

Mr. Roy Evans, HGL, Inc., revans@hgl.com

Mr. Judy Huang, USEPA, huang.judy@epa.gov

Mr. Min Wu, DTSC, Min.Wu@dtsc.ca.gov

Mr. Ed Walker, DTSC, Ed.Walker@dtsc.ca.gov

Mr. Steven Sterling, DTSC, <u>Stephen.Sterling@dtsc.ca.gov</u>

Mr. Grant Himebaugh, Water Board, grant.himebaugh@waterboards.ca.gov

Ms. Sheila Soderberg, Water Board, Sheila.soderberg@waterboards.ca.gov

Water Board - GeoTracker File, Jessica.Duffy@waterboards.ca.gov

R:\RB3\Shared\DoD\Facilities\Fort Ord\Ford Correspondance\OU1\TM Site Attain Mon Approval.doc GeoTracker ID DOD100220500

APPENDIX B

OU-1 Well Destruction and NWTS Decommissioning Completion

APPENDIX B

OU-1 SITE CLOSURE REPORT FORMER FORT ORD, CALIFORNIA PRELIMINARY DRAFT OU-1 WELL DESTRUCTION AND NORTHWEST TREATMENT PLANT DECOMMISSIONING COMPLETION REPORT

PROJECT:

Delivery Order for Operable Unit 1, Former Fort Ord, California (Delivery Order CM11)

CLIENT: U.S. Army Corps of Engineers

CONTRACT NUMBER: W912DY-10-D-0023

PROJECT MANAGER: Roy Evans, P.E.

PREPARATION DATE: September 2017

Roy Evans, P.E. HydroGeoLogic, Inc. Project Manager

Date

Laura McNamara, P.E. HydroGeoLogic, Inc. Senior Technical Reviewer Date

1.0	INTRODUCTION
2.0	WELL DESTRUCTION ACTIVITIES2-1
	2.1 PREPARATION AND SITE MANAGEMENT2-1
	2.1.1 Coordination
	2.1.2 Notifications
	2.1.3 Traffic Control Plan
	2.1.4 Right of Entry2-2
	2.1.5 Biological Clearance and Protection2-2
	2.1.6 Security
	2.2 WELL DESTRUCTION METHODS
	2.2.1 Grout Seal
	2.3 ENVIRONMENTAL MONITORING
	2.4 WELLS DESTROYED
	2.5 RESTORATION2-6
3.0	NWTS DECOMMISSIONING
	3.1 PIPELINES AND INJECTION VAULT
	3.2 DEBRIS DISPOSAL
4.0	CONCLUSIONS
5.0	REFERENCES

i

- Table B2.1Destroyed Well Characteristics
- Table B2.2
 Calculated Grout Volume versus Actual Grout Volume
- Table B3.1Demolition Items and Disposal Summary

LIST OF FIGURES

Figure B1.1	Former Fort Ord Location Map
Figure B1.2	OU-1 Work Area and Access Route Former Fort Ord, CA
Figure B2.1	OU-1 Destroyed Well Locations Former Fort Ord, CA
Figure B2.2	OU-1 Pipeline Locations Former Fort Ord, CA

LIST OF PHOTOGRAPHS

Photograph 1 – Setting up to pressure grout	2-4
Photograph 2 – Removing bollards and surface completion.	2-4
Photograph 3 – Pulling injection pipe at IW-OU1-73-A	2-6
Photograph 4 – Removing holding tank at NWTS.	3-1
Photograph 5 – Water holding tanks being loaded on truck for disposal.	3-2
Photograph 6 – FONR infiltration trench vault lid	3-3
Photograph 7 – Regraded area at former FONR System infiltration trench vault	3-3
Photograph 8 – NWTS after demobilization	4-1

LIST OF ATTACHMENTS

- Attachment B-2 Biological Monitoring During Well Destruction
- Attachment B-3 Field Documentation
- Attachment B-4 Destruction Activities Photographs
- Attachment B-5 Demolition Debris Disposal Documentation

ACRONYMS, ABBREVIATIONS AND SYMBOLS

%	percent
BCT bgs BRAC	BRAC Cleanup Team below ground surface Base Realignment and Closure
CTS	California tiger salamander
DD&A DTSC DWR	Denise Duffy & Associates, Inc. Department of Toxic Substances Control Department of Water Resources
EM EPA	Environmental Monitor U.S. Environmental Protection Agency
FONR	Fort Ord Natural Reserve
HGL	HydroGeoLogic, Inc.
MCHD MS	Monterey County Health Department Monterey spineflower
NWTS	Northwest Treatment System
OU	operable unit
SG	sand gilia
UCSC USACE USFWS	University of California Santa Cruz U.S. Army Corps of Engineers U.S. Fish and Wildlife Service
YP	Yadon's piperia

APPENDIX B

OU-1 SITE CLOSURE REPORT FORMER FORT ORD, CALIFORNIA PRELIMINARY DRAFT OU-1 WELL DESTRUCTION AND NORTHWEST TREATMENT PLANT DECOMMISSIONING COMPLETION REPORT

1.0 INTRODUCTION

This report describes the methods and procedures used in destroying the remaining Operable Unit (OU)-1 groundwater monitoring, injection, and extraction wells and decommissioning of the associated Northwest Treatment System (NWTS) at the former Fort Ord, California (Figure B1.1 and Figure B1.2). HydroGeoLogic, Inc. (HGL) prepared this report for the U.S. Army Corps of Engineers (USACE), Sacramento District, under the Small Business Worldwide Environmental Remediation Services Contract No. W912DY-10-D-0023, task order number CM11. The term "decommissioning" includes the demolition, removal, and proper disposal of the above-ground treatment system facilities and associated components.

The regulatory agencies concurred in February 2017 (Appendix A of main text) that OU-1 groundwater remediation is complete and no further monitoring or groundwater treatment is needed. The wells that were destroyed are no longer needed for collecting groundwater chemical data or water level data. In addition, these wells represented an ongoing maintenance responsibility for the USACE and a potential liability if they were vandalized. Consequently, all remaining OU-1 wells were destroyed. Field operations were not started until the following had occurred:

- The Base Realignment and Closure (BRAC) Cleanup Team (BCT) approved the OU-1 Fort Ord Natural Reserve Well Destruction and Northwest Treatment System Decommissioning Work Plan (HGL, 2017a); this document is referred to hereafter as the Work Plan. The BCT consists of the following regulatory agencies: U.S. Environmental Protection Agency (EPA), California Department of Toxic Substances Control (DTSC), and the Regional Water Quality Control Board.
- HGL received the approved well destruction permits from Monterey County Health Department (MCHD).
- Utility clearance was completed.
- Property owners were notified concerning work activities and schedule.

The well destruction activities fulfilled the State of California and Monterey County requirements for proper abandonment of inactive wells. The MCHD was notified before field activities began and received updates as work progressed. No complications were encountered in the field and there were no deviations from the Work Plan, except that the electric power cables at two extraction wells sites were capped above ground at the request of the University of California Santa Cruz (UCSC); the UCSC is the property owner.

The equipment staging area was located within the Fort Ord Natural Reserve (FONR) adjacent to the NWTS. The FONR is owned and managed by the UCSC. Best management biological protection measures were implemented to protect sensitive habitat, as described in Section 2.1.5.

HGL provided on-site construction management throughout the project. The principal subcontractors and their roles are:

- Cascade Drilling: Grouting, excavating, demolition; C-57 License Number: 938110.
- Denise Duffy & Associates, Inc. (DD&A): On-call for habitat and biological survey / monitoring / protection services if needed.
2.0 WELL DESTRUCTION ACTIVITIES

Thirty-five wells were destroyed during this effort. Well destruction activities began on 11 July 2017 and were completed on 18 July 2017. Well characteristics (location coordinates, depth, diameter, etc.) are presented in Table B2.1 and locations are shown on Figure B2.1. The corresponding Monterey County Well Permits and State of California Destruction Forms are presented in Attachment B-1. All wells constructed as part of the OU-1 groundwater investigation and remediation program have now been destroyed.

Destruction activities included: (1) decommissioning wells in accordance with federal, state, and local requirements including, but not limited to, those of the MCHD; (2) removing the well casing to a depth of approximately 1 foot below ground surface (bgs) at wells located within the FONR habitat and to a depth of 5 feet bgs at wells located within grassland habitat; (3) removing and disposing of all surface pads and bollards (if applicable) from around the wells; and (4) sealing all wells with pressure grout.

The following subsections describe the procedures followed and field activities conducted during the well destruction effort.

2.1 PREPARATION AND SITE MANAGEMENT

Personnel entering the construction zone were required to comply with applicable Occupational Safety and Health Administration requirements and the Final Site Safety and Health Plan, (HGL, 2017a, Attachment C). Level D personal protective equipment was worn. Compliance included, but was not limited to, the use of hard hats where appropriate, steel-toed boots, high visibility vests, safety glasses, and hearing protection.

Before setting up associated well destruction equipment, HGL field personnel inspected the equipment for potential hazards to verify that the equipment was in safe operating condition. Tailgate safety meetings were held every morning before daily operations began to address potential safety concerns. On-site HGL and subcontractor personnel signed the health and safety plan acknowledging their discussion of environmental awareness, safe work practices, potential hazards, and site history.

An equipment and material staging area was established in the area adjacent to the NWTS on the north side of the dirt of road that parallels the northwest boundary of the former Fort Ord. This area was used for staging equipment and material in previous OU-1 construction projects.

A variety of management practices were adopted to minimize impacts to the FONR area. Key elements of the management effort included the following:

- Field staff received a training session before they began work to acquaint them with the issues and procedures necessary to protect the FONR during construction activities.
- An Environmental Monitor (EM) approved by the Army BRAC Office was on site or available by telephone during field activities. The EM trained workers to recognize critical habitat and protected species, inspected proposed construction sites before activity began, and remained on call to respond to any unexpected issues or field questions.
- Close coordination was maintained, as applicable, with the Army BRAC Office and USACE staff throughout the construction activity.

• Site access was controlled to prevent unauthorized visitors.

2.1.1 Coordination

MCHD issued the initial well destruction permits on 13 October 2016. The approved well destruction permits are included in Attachment B-1. HGL coordinated with local municipalities and private property owners throughout field activities.

2.1.2 Notifications

Notifications were made in advance to the following:

- Fort Ord BRAC Office
- Marina Airport Management personnel
- UCSC management personnel

2.1.3 Traffic Control Plan

Thirty-four of the 35 wells destroyed and the NWTS are located within the FONR. The FONR is fenced along its entire perimeter and access is through locked gates. The 35th well was located along the access road to the FONR. Figure B1.2 shows the location of the work area. The gates were kept locked and HGL and subcontractor vehicles and equipment at each work site were positioned to allow other traffic to pass. Traffic was rare and limited to UCSC staff working at other parts of the FONR and visitors from the Army, regulatory agencies, or BRAC Office.

2.1.4 Right of Entry

Upon the transfer of property to UCSC, the USACE retained the rights to perform remediation activities within the FONR. No right of entry was required for this activity, however, UCSC was notified before work began.

2.1.5 Biological Clearance and Protection

Several federally and state protected species are known or suspected to be present within the FONR. These include the federally endangered and state threatened sand gilia (SG), the federally threatened Monterey spineflower (MS), the federally endangered Yadon's piperia (YP), and the federally threatened California tiger salamander (CTS).

Project activities were conducted in a manner consistent with the current biological opinions and guidance regarding conservation measures (USFWS, 2015). Compliance with these measures reduces or avoids impacts to species of concern on the project site. The following is the guidance that was followed during project activities:

- The 28 March 2015 Programmatic Biological Opinion for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California (8-8-09-F-74). (USFWS, 2015)
- Guidance and direction from University of California FONR staff
- Installation-Wide Multispecies Habitat Management Plan (U.S. Army, 1997)

• *OU-1 Fort Ord Natural Reserve Well Destruction Work Plan, including the Environmental Protection Plan presented in Appendix D (HGL, 2017a)*

To minimize the potential for impacts to sensitive species, each well destruction site was included in a baseline survey during the peak blooming season conducted in April 2017 (for SG and YP) and in May 2017 (for MS). The baseline surveys were performed by qualified field personnel from DD&A under subcontract to HGL. The results of the baseline survey are presented separately (HGL, 2017b).

HGL, DD&A, and UCSC personnel conducted an on-site briefing for all staff involved in well destruction activities before fieldwork began at sites within the FONR. DD&A staff provided site-specific guidance to the field crews at well sites located in any area of potentially sensitive habitat. The following best management biological protection measures were implemented:

- HGL and the DD&A biologist conducted an on-site briefing for all staff involved in well destruction or pipeline removal activities before fieldwork began. This briefing ensured that all field crew members understood the security measures and protocols enforced to minimize impact to the natural resources. Staging areas and access routes were clearly delineated and shown to field personnel. Field staff were given information to identify protected species (such as the federally threatened California tiger salamander, for example) that might be encountered during work activities. No encounters with any protected animal species occurred during field activities.
- The DD&A biologist was approved by U.S. Fish and Wildlife Service (USFWS) to handle CTS and relocate as specified in the Biological Opinion (USFWS, 2015). The DD&A biologist is also familiar with the Fort Ord plant and wildlife identified in the Habitat Management Plan (U.S. Army, 1997) and was on call during all work activities.
- Heavy equipment was washed before entering the FONR to minimize the potential for carrying non-native plant species into the FONR.
- The general environmentally proactive work practices and general mitigation measures to minimize environmental impacts presented in the Work Plan (HGL, 2017a) were followed.
- A Habitat Checklist (Work Plan [HGL, 2017a]) was completed before work began.

2.1.6 Security

Site access was controlled with locked gates controlling access to the FONR. Entrance into the work area around individual well sites was controlled and monitored by project personnel. Only project personnel, subcontractor personnel, and authorized visitors with proper identification and health and safety training credentials visited the work site.

2.2 WELL DESTRUCTION METHODS

Before field activities began, well destruction permits were obtained from the MCHD. All approved well destruction permits are included for reference in Attachment B-1. The well destruction procedures were performed in accordance with California's Department of Water Resources (DWR) Bulletin 74-81 (California DWR, 2009) and Monterey County Code of Ordinances (Monterey County, 2014).

The well destruction sequence proceeded as follows:

- The wells were sounded and their depths were checked prior to destruction to identify any obstructions that could have interfered with filling and sealing the casing and/or well screen. No obstructions were encountered.
- The entire well was pressure-filled with a mixture of five percent (%) bentonite, 95% cement using a tremie pipe to reduce the potential for bridging. Details regarding grout placement are discussed in Section 2.2.1. The photograph below shows the drilling rig used to place the grout.



Photograph 1 – Setting up to pressure grout. Equipment shown: CME 75 drill rig.

- The sealing material was placed under pressure using the tremie method starting from the bottom of the well and proceeding continuously upward until the casing was completely filled. The volume of sealing material placed was monitored as the sealing operation proceeded and was compared to the calculated volume of the well casing and screen intervals. The sealing material volumes are presented in Table B2.2; field documentation is provided in Attachment B-3.
- The surface completion of each well was removed, including any well boxes, well pads, and bollards. At well locations within potentially sensitive habitat, approximately the top six inches of the surface soil was set aside for use during restoration.



Photograph 2 – Removing bollards and surface completion. Equipment shown: John Deere 310L Backhoe.

- After setting and/or curing times for the sealing material were met, (as described in California DWR Water Well Standards Section 9, Subsection D) the well destruction crew excavated around the casing to remove the uppermost 5 feet of the well casing at wells MW-B-02-A and MW-OU1-27-A. All other well locations were within potentially sensitive habitat and only the top foot (approximately) of well casing was excavated. A cement plug was then poured over the top of the cut off casing.
- The casing excavation was then backfilled with native material and regraded to match the surrounding topography.
- All debris (well casing, excess seal material, and trash) and surface components from the destroyed well (bollards, well pad, protective casing, and well boxes) were transported to the staging area pending proper disposal.

2.2.1 Grout Seal

Pressure grouting began on 11 July 2017 using a 5% bentonite neat cement grout. This sealing material is consistent with the approved impervious sealing materials described in Section 9, Subsection D, of the DWR Water Well Standards (California DWR, 2009). The wells were filled with a sufficient volume of cement grout to completely fill the well casing and force grout through the well screens into the gravel pack and surrounding lithology. The wells were filled from the bottom up using a tremie pipe to prevent dilution of the grout, avoid bridging, and ensure proper grout placement. No significant settling was observed in any of the 35 wells. There was no leftover water from grouting activities.

2.3 ENVIRONMENTAL MONITORING

The destruction activities on Armstrong Ranch were planned to be consistent with the biological opinions and guidance described in Section 2.1.5. The worker environmental training program also included general and site-specific environmental minimization measures that, if implemented properly, significantly lessen adverse effects to the local environment.

DD&A was contracted as an unbiased third party to assist HGL in developing procedures and policies to comply with the above guidance. DD&A provided an EM to conduct the worker environmental training program during the site mobilization effort before field activities began. The role of the EM was to assist field personnel in following environmental mitigation guidelines and to ensure that any protected species encountered were not harmed by project activity. The EM was available by telephone for consultation as needed during the project activities.

• The EM prepared a summary report describing the actions taken and observations made during the well destruction effort. This report is included in Attachment B-2. The environmental monitoring effort focused on well sites within potentially significant habitat. The NWTS and wells MW-OU1-27-A and MW-B-02-A were located in grassland areas and were not addressed by the EM.

2.4 WELLS DESTROYED

A total of 35 wells were destroyed between 11 July 2017 and 18 July 2017 as listed in Table B2.1. Well destruction activities were performed using a back hoe, drill rig, water tank, mixing tank/high pressure pump, and hand tools as needed. A summary of information for each destroyed well can be found in Table B2.1 and Table B2.2. Figure B2.1 shows the locations of the destroyed wells. Well destruction completion reports were submitted to the MCHD and DWR for each well that was destroyed; these reports are included in Attachment B-1. All well destruction activities were supervised by HGL personnel.

Pumps, piping, power, and controls were removed from the extraction wells before grouting began. Likewise, piping and controls were removed from the two injection wells before they were sealed.



Photograph 3 – Pulling injection pipe at IW-OU1-73-A. Equipment shown: CME 75 drill rig.

Additional photographs showing typical well destruction activities are presented in Attachment B-4.

2.5 **RESTORATION**

Upon completion of the destruction activities, surface restoration was performed to return the well locations to their pre-disturbed conditions. Site restoration efforts consisted of backfilling the casing excavation area with native soil and re-grading the immediate area to conform to the surrounding ground surface. At well locations within potentially sensitive habitat (all wells except MW-OU1-27-A and MW-B-02-A), the previously segregated and stored top six inches of the surface soil were used to make up the restored surface. Photographs showing restoration results are included in Attachment B-2 and Attachment B-4. All debris and surface components from the destroyed wells were transported to the rolloff bins in the staging areas for disposal.

3.0 NWTS DECOMMISSIONING

Decommissioning the NWTS included removing the entire physical plant, associated piping, fixtures, system components, transfer pumps, carbon treatment tanks, influent and treated water holding tanks, and debris. Selected components left in place for future reuse by UCSC were the Pacific Gas and Electric transformer, electrical meter, outdoor lighting, power outlet, fence, and concrete pad. The removal effort was accomplished between 12 July and 14 July 2017. Modifications were completed on 02 August 2017 to the power cables within the NWTS to maintain future operability for lighting and one power outlet.

All power was disconnected and lockout/tagout protocols implemented before decommissioning began. Power was restored intermittently to test the electrical modifications. HGL notified PG&E to discontinue electric service on 03 August 2017. UCSC may elect to restore power in the future.

The activated carbon contained in the carbon tanks was removed from the tanks and transported for recycling. Residual water in the carbon tanks, piping, and water tanks was drained and pumped into the infiltration trench at the NWTS. Residual water is water that remained in the NWTS components after the NWTS was shut down. All residual water is derived from the extraction wells. Sample results show that extraction well discharge did not contain contamination above site cleanup levels for at least 18 months and at least 6 consecutive samples before the well was shut down (HGL, 2016; Appendix B). Consequently, the residual water does not pose a threat to human or ecological health. The piping, pumps, valves, and gauges were disconnected using hand tools and placed in the rolloff bin for disposal. The carbon and water tanks were unbolted from the concrete pad and lifting straps were attached to hooks permanently affixed to the top of each tank. A telescopic forklift was used to lift each tank out of the containment basin and load all tanks for transport to the recycling facility.



Photograph 4 – Removing holding tank at NWTS. Equipment shown: SkyTrak 10054 telescopic forklift.



Photograph 5 – Water holding tanks being loaded on truck for disposal.

3.1 PIPELINES AND INJECTION VAULT

The existing water transmission pipelines were left in place to minimize disturbance to the FONR habitat. The pipelines are shown on Figure B2.2 (blue indicates untreated groundwater conveyed to the NWTS and orange indicates treated water pumped to the injection wells and infiltration trenches).

The pipelines were cut at each well site and at the NWTS and sealed by hand with approximately one linear foot of grout. The electric conduit at each extraction well was also cut and sealed except at two locations as described in Section 3.3. Any water remaining in the pipeline was derived from the extraction wells. The extraction well sample results show that water in the extraction well discharge does not contain contamination above site cleanup levels (HGL, 2016; Appendix B). Consequently, this remaining water does not pose a threat to human or ecological health and was allowed to drain into the ground before endpoints were sealed as per the Work Plan (HGL, 2017a). Soil removed during pipeline sealing activities was used to fill in and regrade the excavated area. The excavated area was completely closed at the end of each workday. No trenching took place during this field effort and the excavations during pipeline capping did not exceed 3 feet in depth.

The vault at the head of the FONR System Infiltration Trenches (Figure B2.2) was also excavated using a backhoe. The concrete was transported to a rolloff bin for disposal as construction debris and the vault lid was recycled.



Photograph 6 – FONR infiltration trench vault lid.

Soil removed during the vault excavation and from the area around the vault was used as backfill. The grassland area surrounding the injection vault is primarily loose sand. The sand was easily regraded to fill in the relatively shallow void left from the injection vault. No imported backfill was used. Photograph 7 shows the regraded area after site demobilization.



Photograph 7 – Regraded area at former FONR System infiltration trench vault.

3.2 DEBRIS DISPOSAL

Debris was collected in rolloff dumpsters in the staging area and held for disposal as nonhazardous material. The dumpsters were transported to Monterey Peninsula Landfill in Marina, California. Disposal documentation is included in Attachment B-5. A summary of materials and infrastructure removed is presented on Table B3.1.

4.0 CONCLUSIONS

Thirty-five wells were destroyed and the NWTS was decommissioned. All well destruction activities fulfilled the State of California and Monterey County requirements for proper abandonment of inactive wells.

All work was performed in accordance with the approved Work Plan (HGL, 2017a) with two exceptions as noted below:

- At UCSC's request, the electric power conduit was not cut at two extraction well locations (MW-OU1-87-A and IW-OU1-10-A). The electric conduit was kept in place when the well boxes and controls were removed; the conduit projected above ground approximately 36 inches. The wires within the conduit were cut and the conduit was capped to provide an opportunity for UCSC to restore power at those locations in the future
- The Work Plan assumed that the two poly water tanks would be cut into pieces and/or crushed with a backhoe to facilitate transport to the rolloff bin for disposal. Instead, the tanks were lifted intact and transported to a recycling facility to process into smaller sizes at that location.

UCSC accepted the final condition of the NWTS and the individual work areas as satisfactory. The NWTS is shown below after decommissioning was complete.



Photograph 8 – NWTS after demobilization.

All field activities were conducted in a manner consistent with the various biological opinions and guidance regarding mitigation measures.

5.0 REFERENCES

- California Department of Water Resources (DWR), 2009. Water Well Standards at URL http://www.water.ca.gov/groundwater/well_info_and_other/well_standards.cfm
- HGL, 2016. Final 2016 Annual Groundwater Monitoring Report, Operable Unit 1 Fritzsche Army Airfield Fire Drill Area, Fort Ord, California. August. Administrative Record Series Number OU1-624*.
- HydroGeoLogic, Inc. (HGL), 2017a. Final OU-1 Fort Ord Natural Reserve Well Destruction and Northwest Treatment System Decommissioning Work Plan Former Fort Ord, California. July. Administrative Record Series Number OU1-629*.
- HGL, 2017b. Draft 2017 Impact Assessment and FONR Baseline and Rare Plant Survey Results Operable Unit 1 Former Fort Ord, California. In progress. Administrative Record Series Number OU1-628*.
- Monterey County, 2014. Monterey County Code of Ordinances, Title 15- Public Services, Chapter 15- Water Wells at URL: https://library.municode.com/index.aspx?clientID=16111&stateid=9&statename=California
- U.S. Army, 1997. Installation-Wide Multispecies Habitat Management Plan for Former Fort Ord, California. April. Administrative Record Series Number BW-1787*.
- U.S. Fish and Wildlife Service (USFWS), 2015. Programmatic Biological Opinion for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California (8-8-09-F-74). May 28. Administrative Record Series Number BW-2747*.

* When using the Fort Ord Data Integration System, to see a complete listing of all documents, grouped by a specific report, use an asterisk (*) as a wildcard search in the "Record Number" field on that particular number series. For example:

- Searching for: BW-1283* will show every item related to the main document of BW-1283.
- Searching for: BW-1283B* will only show the items that came after "B" (BW-1283-C, BW-1283-D, etc.)
- Searching for: ESCA* will show all document numbers with prefix 'ESCA.

The asterisk is also a useful feature for finding comment letters related to a report.

TABLES

Table B2.1 **Destroyed Well Characteristics**

	Northing Logotion	Easting Location		Casing	Total Well	Top of	Bottom of	Screen	
Well Identification	Northing Location	Easting Location	Well Type	Diameter	Depth	Screen	Screen	Length	Remarks
	Coordinate	Coordinate		inches	ft bgs	ft bgs	ft bgs	feet]
			Monitoring W	ells on NW Bo	undary Road (5 Total)			
MW-OU1-67-A	2,145,146.910	5,746,128.750	Monitoring well	4.0	102.3	92.0	102	10	
MW-OU1-57-A	2,145,064.165	5,745,918.771	Monitoring well	6.0	95.5	61.0	91.0	30	Northwest hour down road
MW-OU1-58-A	2,145,135.397	5,746,101.889	Monitoring well	6.0	102.8	67.0	96.5	30	location adjacent to grassland
MW-OU1-61-A	2,145,093.660	5,746,002.560	Monitoring well	4.0	96.5	91.2	96.2	5	location aujacent to grassiand
MW-OU1-68-A	2,145,206.490	5,746,264.480	Monitoring well	4.0	103.8	58.5	103.5	45	
		Nort	s Route (1 Tot	al)					
MW-B-02-A	2,146,530.206	5,749,507.454	Monitoring well	6.0	80.0	55.0	75.0	20	Grassland well
			E	xtraction Well	s (9 Total)				
EW-OU1-60-A	2,145,082.110	5,745,974.440	Extraction well	6.0	95.7	55.2	95.2	40	
EW-OU1-62-A	2,145,176.620	5,746,197.950	Extraction well	6.0	100.9	60.4	100.4	40	Northwest boundary road
EW-OU1-63-A	2,145,039.090	5,745,859.970	Extraction well	6.0	91.5	51.0	91.0	40	location adjacent to grassland
EW-OU1-66-A	2,145,111.140	5,746,043.900	Extraction well	6.0	101.6	56.1	101.1	45	
MW-OU1-46-AD	2,144,778.116	5,746,791.994	Extraction well	4.0	125.4	104.3	124.3	20	FONR well
EW-OU1-71-A	2,144,372.988	5,747,400.254	Extraction well	6.0	116.0	66.0	116.0	50	FONR well
IW-OU1-10-A	2,143,956.400	5,748,004.350	Extraction well	6.0	133.5	94.0	134.0	40	FONR well
MW-OU1-85-A	2,144,635.096	5,747,164.990	Extraction well	6.0	122.0	72.1	122.1	50	FONR well
MW-OU1-87-A	2,144,314.009	5,747,774.400	Extraction well	6.0	119.0	71.0	121.0	50	FONR well
			Remaining F	ONR and Gras	sland Wells (20) Total)			
EW-OU1-53-A	2,143,778.418	5,748,369.881	Monitoring well	6.0	131.1	104.5	134.5	30	FONR well
EW-OU1-52-A	2,143,941.682	5,748,310.174	Monitoring well	6.0	124.5	84.5	114.5	30	FONR well
PZ-OU1-10-A1	2,143,978.280	5,747,981.540	Monitoring well	2.0	116.5	81.5	116.5	35	FONR well
IW-OU1-02-A	2,144,117.040	5,748,079.410	Monitoring well	6.0	133.5	88.0	128.0	40	FONR well
MW-OU1-26-A	2,144,141.800	5,747,960.000	Monitoring well	5.0	102.0	82.0	102.0	20	FONR well
MW-OU1-88-A	2,144,246.831	5,747,761.098	Monitoring well	4.0	122.0	72.0	122.0	50	FONR well
EW-OU1-49-A	2,144,355.179	5,747,796.775	Monitoring well	6.0	109.6	78.5	108.5	30	FONR well
PZ-OU1-49-A1	2,144,353.560	5,747,766.780	Monitoring well	2.0	122.3	91.5	121.5	30	FONR well
MW-OU1-86-A	2,144,285.082	5,747,414.248	Monitoring well	6.0	126.0	76.0	126.0	50	FONR well
MW-OU1-27-A	2,144,578.100	5,747,460.400	Monitoring well	5.0	89.8	55.0	85.0	30	Grassland well
EW-OU1-72-A	2,144,576.724	5,747,243.822	Monitoring well	6.0	108.5	61.0	111.0	50	FONR well
MW-OU1-84-A	2,144,683.376	5,746,730.867	Monitoring well	4.0	127.0	80.5	130.5	50	FONR well
MW-OU1-83-A	2,144,908.009	5,746,717.940	Monitoring well	4.0	123.0	73.0	123.0	50	FONR well
MW-OU1-82-A	2,144,952.025	5,746,360.764	Monitoring well	4.0	123.0	73.0	123.0	50	FONR well
MW-OU1-50-A	2,144,999.072	5,746,101.724	Monitoring well	4.0	111.2	80.0	110.0	30	FONR well
PZ-OU1-02-A1	2,144,099.970	5,748,088.780	Monitoring well	6.0	137.0	90.0	130.0	40	FONR well
MW-OU1-46-A	2,144,773.124	5,746,795.274	Monitoring well	5.0	105.0	75.0	105.0	30	FONR well
MW-OU1-59-A	2,144,852.762	5,746,195.379	Monitoring well	6.0	103.7	76.0	106.0	30	FONR well
IW-OU1-73-A	2,144,508.890	5,746,782.737	Injection Well	6.0	126.0	76.5	126.5	50	FONR well
IW-OU1-74-A	2,144,573.499	5,746,674.984	Injection Well	6.0	119.5	70.0	120.0	50	FONR well

Notes:

FONR = Fort Ord Natural Reserve

ft bgs = feet below ground surface

Table B2.2 Calcula	ated Grout Volume	e versus Actual G	rout Volume
--------------------	-------------------	-------------------	-------------

Well Identification	Date Demolition Complete	Well Diam. (in)	Known Total Depth (ft below TOC)	Measured Total Depth (ft below TOC)	Calculated Casing Volume (Gal)	Date Sealing Material Placed	Volume of Sealing Material Placed (Gal)	Volume of Sealing Material Divided by Casing Volume as %	Volume of Sealing Material Exceeds Volume of Well Casing and Screen?				
Monitoring Wells on the NW Boundary Road													
MW-OU1-67-A	07/12/2017	4	102.3	102	66.8	7/11/2017	105	157%	YES				
MW-OU1-57-A	07/13/2017	6	95.5	91.0	140.3	7/12/2017	205	146%	YES				
MW-OU1-58-A	07/12/2017	6	102.8	96.5	151.0	7/11/2017	245	162%	YES				
MW-OU1-61-A	07/12/2017	4	96.5	96.2	63.0	7/11/2017	100	159%	YES				
MW-OU1-68-A	07/12/2017	4	103.8	103.5	67.8	7/11/2017	135	199%	YES				
		-	Northwest .	Part of Marina	a Airport Prop	erty on Access H	Route						
MW-B-02-A	07/18/2017	6	80.0	75.00	117.5	7/17/2017	190.0	162%	YES				
				Ext	raction Wells		•	•					
EW-OU1-60-A	07/12/2017	6	95.7	95.2	140.6	7/11/2017	225	160%	YES				
EW-OU1-62-A	07/13/2017	6	100.9	100.4	148.2	7/12/2017	230	155%	YES				
EW-OU1-63-A	07/13/2017	6	91.5	91.0	134.4	7/12/2017	220	164%	YES				
EW-OU1-66-A	07/12/2017	6	101.6	101.1	149.2	7/11/2017	230	154%	YES				
MW-OU1-46-AD	07/14/2017	4	125.4	124.3	81.9	7/13/2017	150	183%	YES				
EW-OU1-71-A	07/16/2017	6	116.0	116.0	170.4	7/15/2017	275	161%	YES				
IW-OU1-10-A	07/17/2017	6	133.5	134.0	196.1	7/16/2017	250	127%	YES				
MW-OU1-85-A	07/15/2017	6	122.0	122.1	179.2	7/14/2017	250	140%	YES				
MW-OU1-87-A	07/16/2017	6	119.0	121.0	174.8	7/15/2017	475	272%	YES				
		-		Remaining FO	NR and Grass	land Wells	-						
EW-OU1-53-A	07/18/2017	6	131.1	134.5	192.6	7/17/2017	250	130%	YES				
EW-OU1-52-A	07/18/2017	6	124.5	114.5	182.9	7/17/2017	275	150%	YES				
PZ-OU1-10-A1	07/17/2017	2	116.5	116.5	19.0	7/16/2017	65	342%	YES				
IW-OU1-02-A	07/18/2017	6	133.5	128.0	196.1	7/17/2017	225	115%	YES				
MW-OU1-26-A	07/17/2017	5	102.0	102.0	104.0	7/16/2017	170	163%	YES				
MW-OU1-88-A	07/17/2017	4	122.0	122.0	79.6	7/16/2017	250	314%	YES				
EW-OU1-49-A	07/16/2017	6	109.6	108.5	161.0	7/15/2017	225	140%	YES				
PZ-OU1-49-A1	07/16/2017	2	122.3	121.5	20.0	7/15/2017	50	251%	YES				
MW-OU1-86-A	07/16/2017	6	126.0	126.0	185.1	7/15/2017	350	189%	YES				
MW-OU1-27-A	07/15/2017	5	89.8	85.0	91.6	7/14/2017	225	246%	YES				
EW-OU1-72-A	07/15/2017	6	108.5	111.0	159.4	7/14/2017	250	157%	YES				

Well Identification	Date Demolition Complete	Well Diam. (in)	Known Total Depth (ft below TOC)	Measured Total Depth (ft below TOC)	Calculated Casing Volume (Gal)	Date Sealing Material Placed	Volume of Sealing Material Placed (Gal)	Volume of Sealing Material Divided by Casing Volume as %	Volume of Sealing Material Exceeds Volume of Well Casing and Screen?
MW-OU1-84-A	07/14/2017	4	127.0	130.5	82.9	7/13/2017	320	386%	YES
MW-OU1-83-A	07/14/2017	4	123.0	123.0	80.3	7/13/2017	150	187%	YES
MW-OU1-82-A	07/15/2017	4	123.0	123.0	80.3	7/14/2017	125	156%	YES
MW-OU1-50-A	07/15/2017	4	111.2	110.0	72.6	7/14/2017	125	172%	YES
PZ-OU1-02-A1	07/18/2017	6	137.0	130.0	201.2	7/17/2017	275	137%	YES
MW-OU1-46-A	07/14/2017	5	105.0	105.0	107.1	7/13/2017	365	341%	YES
MW-OU1-59-A	07/15/2017	6	103.7	106.0	152.3	7/14/2017	225	148%	YES
IW-OU1-73-A	07/14/2017	6	126.0	126.5	185.1	7/13/2017	325	176%	YES
IW-OU1-74-A	07/14/2017	6	119.5	120.0	175.5	7/13/2017	250	142%	YES

Table B2.2 Calculated Grout Volume versus Actual Grout Volume

Notes:

Diam - diameter ft - feet Gal - gallon in - inch EW - extraction well MW - monitoring well

Table B3.1 Demolition Items and Disposal Summary

Item	Units	Quantity	Remarks	Disposal Method	Disposal Site	
Well materials: bollards, housings, concrete (well pads), PVC piping and metal conduit	20 cubic yard roll off dumpster	1	Removed by subcontractor (Cascade Drilling)	landfill	Monterey Peninsula Landfill	
HDPE influent and treated water holding tanks	each	2				
Steel treatment vessels	each	4	Transported by A&S Metals Recycling & Demolition	recycled	A&S Metals Recycling Facility (Castroville, CA)	
(A) Injection vault lid and (B) bag filter housings	each	(A) 1 (B) 3				
Piping, fittings, hoses, brackets, concrete, miscellaneous destruction debris from treatment plant	30 cubic yard roll off dumpster	1	Transported by Greenwaste, Inc.	landfill	Monterey Peninsula Landfill	
Electrical wiring, transformer, variable frequency drives, gauges, conduits	pounds	e-waste: ~50 ; debris: ~100	Removed by subcontractor (Telemetrix)	landfill	Monterey Peninsula Landfill	

Notes:

HDPE = high density polyethylene PVC = polyvinyl chloride

FIGURES





HGL—OU-1 Site Closure Report App B Well Destruction Former Fort Ord, CA

Figure B1.2 OU-1 Work Area and Access Route Former Fort Ord, CA

Legend

- Monitoring Well
 - Access Route to OU-1
 - Well Destruction Project Area
- NWTS Facility
- Note: NWTS=Northwest Treatment System

\\gst-srv-01\HGLGIS\Ft_Ord_MSIW\OU-1_Site_Closure_App_B_Well_Destruction\ (B1-2)Work_Area_Access.mxd 8/8/2017_CNL Source: HGL ArcGIS Online Imagery







HGL—OU-1 Site Closure Report App B Well Destruction Former Fort Ord, CA

Figure B2.1 OU-1 Destroyed Well Locations Former Fort Ord, CA

Legend

- Monitoring Well
- ✤ Extraction Well
- ✤ Injection Well
- ▲ Piezometer or 2-Inch Well
 - Access Route to OU-1
- × × × × Fence
- – Trail/Unimproved Road
 - Treated Water Infiltration Trench



Well Destruction Project Area



Former Fire Drill Area



NWTS Facility

Notes:

FONR=Fort Ord Natural Reserve NWTS=Northwest Treatment System Well labels in green font indicate extraction or injection well. All pumping suspended.

* Disconnected extraction well. No longer operable.

\\gst-srv-01\HGLGIS\Ft_Ord_MSIW\OU-1_Site_Closure_App_B_Well_Destruction\ (B2-1)Destroyed_Well.mxd 8/8/2017 CNL Source: HGL ArcGIS Online Imagery







HGL—OU-1 Site Closure Report App B Well Destruction Former Fort Ord, CA

Figure B2.2 OU-1 Pipeline Locations Former Fort Ord, CA

Legend

- Monitoring Well
- Extraction Well
- ♦ Injection Well
- ▲ Piezometer or 2-Inch Well
- Trail/Unimproved Road
- Fence
 - Treated Water Infiltration Trench
 - **Extraction** Pipeline
 - Treated Water Pipeline



Former Fire Drill Area



NWTS Facility

Notes:

FONR=Fort Ord Natural Reserve NWTS=Northwest Treatment System Well labels in green font indicate extraction or injection well. All pumping suspended.

* Disconnected extraction well. No longer operable.





ATTACHMENT B-1

MONTEREY COUNTY WELL DESTRUCTION PERMITS AND COMPLETION CERTIFICATES

free Adobe Reader may be us	ed to view and complete	this form. However, software mu	ist be purchased to c	omplete	s, save, and reu	ise a saved	form		
Driginal with DWR	•	State of Calil	iomia	Ē		WR Use C	nly – Do N	lot Fill In	
		Well Completie	on Report						
of		Refer to Instruction	Pamphiet		S	tate Well N	umber/Site	Number	
er's Well Number MW -	OUL-VITA	No. e034850)6			N		W	
VVork Began <u>1 - M-1 /</u>	Uale	work Ended <u>1-19-17</u>	10		Latitud	e		Longitude	
Permit Agency mini-124	U -Id A Pormit D	auth 16-20-17		- '		APN	/TRS/Othe	ur la	
	Geologie Log] Woll Owner						
Orientation	O Horizontal	OAnole Specify	- Edu	J. the	11.			and an and	
ing Method DY / SUCL	Grant	Drilling Fluid	- Nameter 1 ar			ACC	<u>» (</u> 0M	UNS JENV. 100-21	
pth from Surface	J Des	cription	Mailing Addre	SS <u>r.v</u>	1601 -	008	. / 4	- 920144	
Feet to Feet	Describe material	, grain size, color, etc	City relation			51			
) 94.5 WE	11 Destruct	on pressure		1.1.1.1.1	Wel	Locatio	n –		
	17 4 WL110-91	6.5 primary	Address 10	mer	tort av	<u>d.</u>	n	anticera	
50	alt, Delle	FILL MEAT COMENT	City Clark			C	ounty 🥂	interes -	
			Latitude	ea.	Min. Sec.	N Longi	tude	Min. Sec.	
			Datum	C	ec. Lat.		_ Dec. L	.ong	
7.			APN Book_		Page	÷	_ Parce		
		econt a Victor and the	Township		Range		Sectio	n	
			L	ocatio	on Sketch	a factor		Activity	
			(Sketch must be	a drawn b	y hand after form	is printed.)	O Ne	ew Well	
) Deepen	
	1						Ŏ	Other	
							De De	STOY scribe procedures and materials	
							<u></u>	der 'GEOLOGIC LOG'	
			1					ater Supply	
			41					Domestic Public	
			- Sest			- 		rrigation 🔲 Industrial	
						-		athodic Protection	
							O De	ewatering	
			-11					eat Exchange	
								onitorina	
							O R	emediation	
							O SI	parging	
			1.00	5	South		OTe	est Well	
			illustrate or describe rivers, etc. and attact Please be accurate.	distance of a map. U and comp	l well from roads, buil ise additional paper il lete.	dings, fences, necessary.		apor Extraction ther	
			Water Leve	land	Yield of Co	mpleted	Well		
			Depth to first	water lic			(Fee	er delow surface)	
			Water Level		(F	feet) Da	te Measu	ired	
otal Depth of Boring	96.5	Feet	Estimated Yi	eld * _	(0	GPM) Te	st Type _		
tal Depth of Completed W	/ell	Feet	Test Length		()	Hours) To	term vici	iown(Feet)	
	Ca	einne		-opres		Ann	ular Ma	terial	
Depth from Borehole		erial Wali Outside	Screen Sla	t Size	Depth from	n	MINE STIC		
Surface Dlameter eet to Feet (inches)	, and the second	Thickness Diamete (Inches) (Inches)	r Type if	Any ches)_	Surface Feet to Fe	et	FM	Description	
					0, 121	<u>5 (e</u>	ment		
						_	. –		
			1 1						
Attachme	Ints		Cert	ificati	on Stateme	ont			
Geologic Log		I, the undersigned, certify t	hat this report is c	omplet	e and accura	te to the b	est of my	knowledge and belief	
Well Construction Di	agram	Person Firm or Corp							
Geophysical Log(s)	Analyses	120 S. 23RD STREET		RIC			CA Stale	94804 Zin	
Other Stra. M	LO	Signed	Name	4-0	1rrovs7-	31-17	938110	0	
ch additional information, if it exist	.T.	C-57 Licensed Wate	r Well Contractor		Date	Signed	C-57 Li	cense Number	

DWR 188 REV, 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSPCUTIVELY NUMBERED FORM

File Origina Page Owner's W Date Work Local Perm Permit Nun	inal with DWR State of Well Compl Well Number MW - 041 - 57 - A No. e034 Drk Began 7 - 11 - 1 Date Work Ended 7 - 19 - ermit Agency Monteren County Health Dept- Number 5761, MW - 041 - 57 - A Permit Date 5-30 - 17							Jeamphiet DWR Use Only – Do Not Fill In 24					ot Fill In Number Longitude	
Orlan	tation	Vertics	Geolog	ic Log		Spaciby		. P.			Well C	wner	1	Hull tonyalis at
Drilling Mo	ethod D/ ()	Sur	C. House		Drilling Fi	uid		Mailing A	ddress	6 BC	17.50	108	111 12	EPV. COURTINATO
Depth tr	to Feet		Descri	Uesci be material, g	rain stze,	color, etc		City M	INTer	w		Stat	e <u>CA</u>	Zip 93944
<u> </u>	<u> 45.</u>	5 12	ALL DE	95.5 '	<u>x100</u>	· · · · ·	SUR	Addrose	Como	1 fa	Well Lo	cation		
		Z	cast 1	Backt	ul ,	reat		City	VINC	x in		Cou	nty 🕢	onteres
)	cene	nt				Latitude		Min. S	N	Longitu	de	g. Min. Sec.
								Datum_		Dec. Lat.			Dec. L	ong
								APN Boo	k	_ Page			Parcel	
_								Township	Locati	_ Range	ch		Secuo	Activity
								(Sketch m	ust be drawn	by hand after North	er form is pri	nted.)	O Ne O Mo	w Well dification/Repair
	+	_ _						1.1					0	Other
													De De	STOY scribe procedures and materials
								1.0					F	Planned Uses
	-							1.1					O Wa	ater Supply
								est				ast		omestic Public
								Š				ü	O Ca	thodic Protection
													O De	watering
<u> </u>		-+			÷.,								O He	ection
	-			-		100		1					O M	pnitoring
														mediation
	_				11.					0			O Te	st Well
<u> </u>				-				litustrate or de	scribe distance o	SOUTH f well from ros	nda, buildinga,	fences.	O Va	por Extraction
				1.1		-		rivers, etc. and ettach a map. Use additional paper if necessary. O Other						her
								Water L	evel and	Yield o	f Comp	leted V	Vell	
				1.11	-			Depth to	Static				_ (Fee	(below surface)
Total De		dina		35.5	_	Feet		Water Lo	evel		(Feet)) Date	Measu Type	red
Total Da	pitt of Co	malatad		1	1.00	Feet		Test Ler	igth		(Uour	s) Total	Drawd	own(Feet)
Total De	spin or co	mpleteu	44CH					*May no	t be repres	entative	of a well'	s long te	rm yiel	d.
Depth	from 1	Borehole		Casi	ngs	Wall	Outside	Screen	Slot Size	Dept	h from	Annul	ar Mat	erial
Surf	ace I	Diameter	Туре	Mater	a	Thickness /loches)	Diameter (Inches)	Туре	if Any (Inches)	Sur	face to Feet	Fi	11	Description
		(mones)								3	955	Cem	ent	
													_	
 		-		ļ										
						1								
		-												
	1	Attachr	nents		1 #5 ~ ~ ~	ndomin	an tif . it.	at this second	Certificati	ion Stat	tement	the bro	t of mo	koowladge and hallef
	Seologic L Well Cons	.og truction	Diagram		Name	CASCAD	E DRILLI	tity that this report is complete and accurate to the best of my knowledge and belief RILLING						
	Geophysic	al Log(s)		120 \$	Person F S. 23RD S	TREET	EET RICHMOND CA 94804						
	Soil/Water	Chemic	al Analyses		Signed	$\mathcal{O}^{\cdot \cdot}$	Address	City State Zip Zip						
Attach add	itional informa	tion, if it e	dsts.			C-57 Lice	ensed Water V	Vell Contractor	(\mathbf{T}	Date Sig	ned (C-57 Lic	ense Number

ile Original with DWR Page of Date Work Began Orientation Orientation Drilling Method Depth from Surface Feet 0' 102.91	MW-011-58-A MW-011-58-A Unterey Munty W.1W.SS: A Permit Da Geologic Log entical O Horizontal Corract UI Desc Describe material WLU DESTURT GYOUT 0-102.8' Datk Fill M DEST	State of Califor Well Completion Refer to Instruction Pa No. e0348525 Work Ended <u>7-161-17</u> teatth Dapt. No. e0348525 Work Ended <u>7-161-17</u> teatth Dapt. No. e0348525 Work Ended <u>7-161-17</u> teatth Dapt. No. e0348525 No. e034855 No.	nia Report Imphiet Nameurlord S Mailing Address City Morto Address Torr City Marris Latitude Dea	DWR Use Only - Do Not Fill In State Well Number/Site Number Latitude Longitude Latitude Longitude H H H H H H H H Latitude Longitude H H H H H H H APN/TRS/Other Well Owner Well Owner Ca C AFfre - William Colling (CM), COOYd in add PU BOX 5008 State CA Zip 13944 Well Location Well Location Well Location Well Location Min. Sec. N LongitudeW				
			APN Book	Page Parcel				
			Tawashia	Papea Section				
				Kange Section				
			(Sketch must be dra	wm by hand after form is printed.) O New Well North O Modification/Repair O Deepen O Other Destroy Describe procedures and materials under "GEOLOGIC LOG" Planned Uses Vater Supply Domestic Public Irrigation Industrial O Cathodic Protection Dewatering Heat Exchange Injection O Injection Monitoring O Remediation Sparging Test Well Vapor Extraction O Uter				
			Please be accurate and complete.					
Total Depth of Boring Total Depth of Compl	<u>102,8</u>	Feet Feet	Depth to first wat Depth to Static Water Level Estimated Yield Test Length *May not be repu	ter (Feet below surface) (Feet) Date Measured * (GPM) Test Type (Hours) Total Drawdown (Feet) resentative of a well's long term yield.				
	Cas	ings		Annular Material				
Depth from Bore Surface Dlan Feet to Feet (Inc	hole Type Mate	rial Wall Outside Thickness Diameter (Inches) (Inches)	Screen Slot Sla Type if Any (Inches	ze Depth from y Surface Fill Description s) Feet to Feet 0' 1028 Cement				
Atta	tion Diagram og(s) emical Analyses 2 ~ ~ ~ ~	I, the undersigned, certify that Name <u>CASCADE DRILLI</u> Person, Firm or Corpore 120 S. 23RD STREET Address Signed C-57 Licensed Water W	Certification Statement that this report is complete and accurate to the best of my knowledge and belief LING					

DWR 168 REV 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

File Original with DWR Page	State of California Well Completion Report Refer to Instruction Pamphlet No. e0348503 Work Ended 7-19-17 LAITH ULDUARTMENT e 5/20/17 OAngle Specify Dilling Fluid OAngle Specify Name Fort Or Mailing Address City Minter City Minter City Marine Latitude Datum Datum	DWR Use Only - Do Not Fill In State Well Number/Site Number State Well Number/Site Number State Well Number/Site Number Under Latitude Latitude Latitude Latitude Latitude Latitude Longitude APN/TRS/Other Well Owner C Prac. If Fice-William Collins / FAV/2000 PD. Box 500 8 Yell Location Mell Location Mell Location Min. Sec. N Longitude Dea. Min. Sec. V Dec. Lat. Dec. Long.
	APN Book	Page Parcel
	Township	Range Section
Image: Casi Image: Casi	Loc: (Sketch must be dramed by the second	ACTIVITY North North O New Well Modification/Repair O Deepen O Other Destroy Domestic Public Irrigation Industrial C Cathodic Protection Dewatering Heat Exchange Injection South noce of well forn roads, buildings, fences app: Use additional paper if necessary complete (Feet) Date Meas
Depth from Borehole Type Mater	rial Wall Outside Screen Slot Siz Thickness Diameter Type If Any	ize Depth from y Surface Fill Description
Feet to Feet (inches)	(inches) (inches) (inches)	s) Feet to Feet
Attachments	Certific	cation Statement
Geologic Log Well Construction Diagram Geophysical Log(s) Soil/Water Chemical Analyses Other Strice mo.p. Attach additional information, if it exists.	1, the undersigned, certify that this report is complexity of the compl	Plete and accurate to the best of my knowledge and belief CHMOND CA 94804 City 7-31-/7 938110 Date Signed C-57 License Number

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

File Original with DWR Page of Dwner's Well Number Date Work Began _ <u>1-N-()</u> Local Permit Agency <u>MUNTUTUM (AUNT)</u> Permit Number <u>5134, WW-6U1-1084</u> Permi	State of Califor Well Completio Refer to Instruction Pa No. e0348507 No. e0348507	Image: Domain of the second					
Geologic Lo	g		Well Ow	ner			
Orientation Vertical O Horizontal Drilling Method Df LSSUAL A 10 ML Depth from Surface J	OAngle Specify Drilling Fluid Description	Name Firturd B Mailing Address	PO. DOX 500	B State (A zin 93944			
X 102 4 WILL Describe mat	enal, grain size, color, etc	City Harter	18/011 1 000				
and the demonstration	A-In2 QI	Adding From	Well Loca				
transie	+ . Or all fill	City MAKIN	a.	County Mantelau			
winest in	ant and a second	Latitude	N Lo				
		Deq	Min. Sec.	Deg. Min. Sec.			
		Datum	Dec. Lat	Dec. Long			
		APN Book	Page	Parcel			
		Township	Range	Section			
		Loca	tion Sketch	Activity			
		(Sketch must be draw	m by hand after form is printer North	O New Well Modification/Repair O Deepen O Other Destroy Destroy			
				under "GÉOLOGIC LOG"			
				Planned Uses			
				O Water Supply			
		st					
] Š					
				O Heat Exchange			
		1		O Injection			
		1		O Monitoring			
				O Remediation			
				O Sparging			
			South				
-		Illustrate or describe distance rivers, etc. and attach a mag	e of well from roads, buildings, fenc p. Use additional paper if necessary				
		Please be accurate and co	impleta.				
		Water Level an	a Yield of Complet	ted Well			
		Depth to first wat	er	(Feet below surface)			
		Water Level	(Feet)	Date Measured			
Total Depth of Boring	Feet	Estimated Yield *	(GPM)	Test Type			
Total Depth of Completed Well	Feet	Test Length	(Hours)	Total Drawdown (Feet)			
		May not be repr	esentative of a well's lo	ong term yield.			
	Casings		A	nnular Material			
Depth from Borehole Type Surface Dlameter Type Feet to Feet (Inches)	Material Wall Outside Thickness Dlameter (Inches) (Inches)	Screen Slot Siz Type if Any (Inches	Depth from Surface	Fill Description			
			0 403.8 (ement			
╏───┤───┤───┤───┤───							
Attachments	I the understand earlify the	Certifica	auon Statement	a bast of my knowledge and ballof			
	Name <u>CASCADE</u> DRILL	ING		ie vest of my knowledge and belief			
Geophysical Loo(s)	Person, Firm or Corpor	ation		CA 94804			
Soil/Water Chemical Analyses	Address		City	State Zip			
POther SITE MAD		r/ \a.a.	<u>reys</u> 7-3/-1	7 938110			
Attach additional information, if it exists.	C-57 Licensed Water V	Vall Contractor	/ Date Signe	d C-57 License Number			

DWR 188 REV 1/2006

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUTIVELY NUMBERED FORM

ile Origina lage wner's W Date Work ocal Pern Permit Nur	Il with DV Il with DV Began hit Agenc nber 572	of of er) - [1 -] y y 5, <u>mw</u> -	- B-02H 	Date V OLAT Permit Data ic Log	Well Vork Ended Heatth e 5-30	State Corr Refer to No. e 7-10 De	e of Califor pletio Instruction Pl e0348526 2 -17 pt.	mia n Repor	t		DWR	Use Oni Well Num N APN/T	y Do N hber/Site	2t Fill In Number Longitude r
Orien Drilling M	tation ethod	Vertica	1 O Horiz	contal 6 th	OAngle Drilling Fluid	Specify		Name Of Mailing Ac	Idress	6. BC	e-will	14m [1	2~115	tww.coordinate
Depth fi Feet	to Fee	ace t	Descr	Desci be material, g	ription Irain size, col	or, etc		City M	soler	14	1.20	Stat	e CA	
6	80	W	ell Des	Fructio	n: Pr	LSSIA	(e)			1	Well Lo	cation		
		- <u>S</u>	sut A.	80 tri	mmil - rema	× 41	art	Address-	Brmer	· 60,+	ord	Cou		onteren
			(¹¹		_			Latitude			N	Longitu	de	
		_						Datum	Deg.	Min. S Dec. Lat.	ec.		Dec. L	a. Min. Sec. ong
								APN Bool	<	Page	_		Parcel	
								Township		Range			Sectio	n
									Locatio	on Sket	ch			Activity
	_							(Skelch m	ust be drawn I	by hand afte North	r form is pri	nted.)	O Ne O Mo O	w Well dification/Repair Deepen Other
												5	De De De un	Stroy scribe procedures and materials ser "GEOLOGIC LOG"
														Planned Uses
							- 1	est				BSt		iter Supply Jomestic Public rrigation Industrial
						7		5						thodic Protection watering
													O Inj O Mo	ection
													ORe OSp	mediation parging
				2		- 92	-	iBustrate or der rivers, etc. and	icribe distance o attach a map. L	South f well from roa Joe additional	ds, buildings, paper il neces	fences, isary.		por Extraction
				100				Please be accurate and complete.						
			-				-	Depth to	first water Static			leted	(Fee	t below surface)
					1	-		Water Le	vel		(Feet) Date	Measu	red
Total D	epth of B	oring		<u>20 – </u>		Feet		Estimate	d Yield * _		(GPN	I) Test	Туре _	
Total D	epth of C	ompleted	Well		<u></u>	Feet		Test Len *May not	gth be repres	entative	(Hou: of a well'	rs) Tota <u>s long t</u>	l Drawd erm yiel	own(Feet) d.
				Cas	ings							Annu	lar Mat	terial
Depth Sur Feet	from lace o Feet	Borehole Diameter (Inches)	Туре	Mater	rial Th (I	Wall ickness inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth Sur Feet	a from face lo Feet	F	11	Description
			-							Q,	60'	lan	ent	
											11			
				ļ							ļ			
<u> </u>														
		-								<u> </u>		l		
		A AAr - L -		1			1		41/1			1		
	Geologia	Attachi	nents		I, the under	ersioned	. certify th	at this report	is comple	te and an	ement curate fr	the he	st of my	knowledge and belief
	Well Con	struction	Diagram		Name <u>C/</u>	ASCAD Person, F	E DRILL	ING						
	Geophys	ical Log(s	i) al Analveac		<u>.120 Ş. 2</u>	23RD 5	Address)		CA <u>State</u>	34804 Zin
	Other S	ite m	A D		Signed	2	<u>nl</u>	~ ~ ~			7-30	-17	938110)
Attach add	litional infor	nation, if it e	cists.			C-57 Lice	ensed Water V	Vell Contractor			Date Sig	ned	C-57 Lic	ense Number

IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECLEMELY NUMBERED FORM
File Original with DWR Page of Owner's Well Number Date Work Began Local Permit Agency M Permit Number 200-, E Orientation @V Drilling Method 0105 Depth from Surface	Geologic Log artical O Horizontal Carte Court of the Cologic Log artical O Horizontal Carte Court 10 ¹¹ Des	State of Califor Well Completion Refer to instruction Pe No. e0348508 Work Ended <u>1-19-17</u> Lifth Deot- te <u>\$-20-17</u> OAngle Specify Drilling Fluid	Nameserter Mailing Address	d Brac of ss fo 8 60	DWR State V atitude Well O Vell O So O		y – Do N ber/Site	Longitude	nato 1
Feet to Feet	Describe material,	grain size, color, etc			Wall La		e		
0 13.1	cruit lound	1-95 7'	Address	merfect	well Lo	cation			
	Trimmit Gia	t, Backful	City Mar	ince.		Соц	ntv P	Nonteren	
	uppeat come	at .	Latitude		N	Longitu	de	L w	1
			Deturn	Min. S	ec.		Deal	a, Min, Sec,	
			APN Book	Page			Parcel	.ung	
			Township	Range	,		Sectio		1
			Lo	ocation Sket	ch			Activity	i –
Total Depth of Boring Total Depth of Compl		Feet	Hustrate or describe di Plant and the second and the Plant be accurate an Water Level Depth to Stati Water Level Estimated Yie Test Length _ *May not be ri-	South South South Istance of well from roe a map. Use additional ad complete. and Yield o water	ds. buildings, fr paper if necess f Compli (Feet) (GPM) (Hours of a well's	eted V Date) Test s) Total	Nee N	w Well odification/Repair Deepen O Other estroy setroe procedures and materials der 'deDicloric Loor Planned Uses ater Supply Domestic Public rrigation Industrial athodic Protection ewatering eat Exchange ection onitoring emediation barging est Well apor Extraction ther t below surface) red(Feet) d.	
	Cas	ings				Annul	ar Mat	terial	1
Depth from Bore Surface Dian Feet to Feet (Inc	hole Type Mate heter Type Mate	vrial Wall Outside Thickness Diameter (inches) (inches)	Screen Slot Type If / (Inc	Size Deptr Any Sur hes) Feet (from face Feet	Fi	11 	Description	
	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1								1
								<u> </u>	-
					<u> </u>				1
								İ]
Atta	chments		Certi	fication Stat	ement				1
Geologic Log Well Construct Geophysical L Soil/Water Ch Other SL Attach additional information	tion Diagram .og(s) emical Analyses L Map if it exists.	I, the undersigned, certify that Name <u>CASCADE DRILLI</u> Person, Firm or Corpor <u>120 S. 23RD STREET</u> Address Signed <u>Address</u> C-57 Licensed Water V	At this report is condition	RICHMOND City	Z-3/-/ Date Sign	the bes	2A 9 tate 938110 2-57 Lic	knowledge and belief 94804 Zip Cense Number	-

File Origina	al with D	WR				Stat	te of Califo	mia	Г		DWR	Use Or	ily – Do N	ot Fill In
0	1.0				ell Con	npletio	etion Report						1 1 . 1 1	
Page	La 11 A A	of				Refer to Instruction Pamphiet State Well Number/Site Number							Number	
Owner's W	ell Numi		04(-0)	LT TO	-	NO.	e034852	ſ				N		W
Local Perm	beyan _	min	TORON 1	unt H	POR ENG	No mi	<u>9-1-1</u>			L ()	atitude .	, 1	1 1	
Permit Nun	nber521	n.EW.	041-102-A	Permit Dat	e 5-2	30-17			— L			APN/	TRS/Othe	r
		-1 -1	Geolog	lic Log			101100-00		88_VC=		Well (Wner		
Orien	tation	Vertica	al O Horiz	contal	OAnale	Specify		Non-P	hard De-			- TONY	دامريد	and the chinese
Drilling Me	ethod D/	essur	Variant	10"	Drilling Fl	uid		Namen		0 0 0	Y 51	na.	masia	NT. CO GINATO
Depth fr	om Sur	face	J	Desc	ription				aaress r	100 100	~ 30	00	./4	- 93444-
Feet	to Fee	ci lat /	Descr	ibe material, j	grain size,	color, etc			SIL FILL			Sta		
a	100,		un unst	TUCI OF	YP	12854			1.	- 0	Well Lo	ocatio	n	
		-91	att 0-1	00.7	ויאד	ALLIE	Jack-	Address-	torme	101	7 0	ra	-	100+0.00
			Jour	, Dae	X AL	r ma	un		<u>arini</u>	N		Co	unty _/	runnerey
-	-		LMONT					Latitude		Min S	N	Longit	ude	W Min Sec
	-							Datum		Dec. Lat.			Dec. L	.ong
	-							APN Boo	ik	Page			Parce	
	-							Townshir		Range			Sectio	n
<u> </u>									Locat	ion Sket	ch			Activity
	-							(Sketch m	iust be drawn	by hand after	er form is pr	inted.)	O Ne	w Well
								1		North			Ô Mo	dification/Repair
								1						Deepen Other
		<u> </u>						11					• De	stroy
<u> </u>	+							11					De	scribe procedures and materials der "GEOLOGIC LOG"
<u> </u>	-													Planned Uses
							-	11.					O W	ater Supply
						-								Domestic Public
		<u> </u>						- Se				1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		rrigation 🔲 Industrial
<u> </u>							-	11					O Ca	thodic Protection
													O De	watering
	-				-	-	-							eat Exchange
				_	-	-	-	11					Юм	onitoring
	-												Ö Re	emediation
						-		11					O Sp	barging
							-	11		South			ΟΤε	est Well
	_			_			-	likustrate or de	scribe distance	of well from roa	eds, buildings,	fences	O Va	apor Extraction
	+			-	100	-	_	livers, etc. and Please be act	d attach a map curate and com	Use additional plete.	paper if nece	ssary.		ther
				100		-		Water L	evel and	Yield o	f Comp	leted	Well	
			-		-	-	_	Depth to	first wate	r			(Fee	t below surface)
								Depth to	Static		(Feel) Det	a Messu	red
Total De	nth of P	oring		100.0	1	Feet		Fstimate	ever ad Yield *		(GPN)	iy Udi ∕i) To≊	s medau t Tyne	····
				1001				Test Ler	ngth _		(U), II	rs) Tot	al Drawd	own (Feet)
Total De	epth of C	ompleted	vvell			Feet		May no	t be repre	sentative	of a well	's long	erm yiel	d
				Casi	ings	N 00-	110					Annu	lar Mat	terial
Depth	from	Borehole	Туре	Mater	rial	Wall	Outside	Screen	Slot Size	Dept	h from		-144	B 1 11
Feet to	ace Feet	(Inches)				(Inches)	Ulameter (Inches)	Гуре	If Any (Inches)	Sur Feet	to Feet	1	-111	Description
			_							01	100.9	Lan	rent	
														l
		ļ		ļ		ļ			ļ	╢───	ļ			
				1		<u> </u>	L		}					<u> </u>
		Attachr	nents					(Certificat	tion Stat	tement			
	Geologic	Log			I, the u	ndersigned	t, certify th	at this report	t is comple	ete and ad	ccurate to	o the be	est of my	knowledge and belief
	Vell Con	struction	Diagram		wame .	Person, I	Firm or Corpo	ration						
	SollAnter	ical Log(s	i) Jal Analyson		<u>120 s</u>	5. 23RD S	STREET	ET RICHMOND CA 94804						
	onevvate Other				Signed	0		\mathcal{V}	adar	UII)	7-31	-17	938110)
Attach addi	tional infor	nation, if it e	kists.			C-57 Lic	ensed Waler	Vell Contractor			Date Si	gned	C-57 Lic	ense Number
DWR 168 F	REV 1/200	8			IF ADDIT	IONAL SPACE	E IS NEEDED	USE NEXT CO	NSECUTIVE		RED FORM			

File Original with DWR Page	State of California Well Completion Re Refer to Instruction Pamphiet No. e0348509 Work Ended 7-19-17 Alth Dept. te \$-30-17	port	DWR Use	Only – Da Not Fill In Number/Site Number I I Longitude I I I I
Geologic Log			Well Own	er
Orientation Vertical O Horizontal	OAngle Specify Nam	Educe Bray	Willing - Willi	an colliastENV. loording to
Drilling Method DIISSURE arout 10"	Drilling Fluid	Address DO	POX 5009	
Depth from Surface J Des	cription	Mantaria		State (A 710 93944
Feet to Feet Describe material,	grain size, color, etc			
0 MIS Well Lismictle	A TUSSUIL		Well Local	tion
Grout Grivell	Addr	ess tormer	TONT ONCH	
Trimmel. grow	T, Oacketul City	Marina	,	County Contere
neat cement	Latito	.de	N Lor	ngitude w
	Datu	m Deg Mi	n. sec. clat	Dec Long
		Book	Bage	Dec. Long
			Page	Faiter
	(Skr	LOCATION tich must be drawn hv	hand after form is printed	
		No	rth	Modification/Repair
][O Deepen
				O Other
				Describe procedures and materials
				under "GEOLOGIC LOG"
				Planned Uses
				O Water Supply
	at i			
	Š			
				O Heat Exchange
				O Injection
				O Monitoring
				O Remediation
				O Sparging
		Se	with	O Test Weil
	Ilbustrai	a or describe distance of w	ell from roads, buildings, fences	O Vapor Extraction
	rivers. Please	etc. and attach a map. Use be accurate and complete	additional paper if necessary.	O Other
	Wat	er Level and Y	ield of Complete	d Well
	Den	th to first water		(Feet below surface)
	Dep	th to Static		
	Wat	er Level	(Feet) [Date Measured
Total Depth of Boring	Feet Esti	mated Yield *	(GPM)]	Test Type
Total Depth of Completed Well	Feet Tes	u Lengin	(Hours) tative of a wotile to:	or term vield
		y not be represer	ILGUVE OF A WEILS IO	
Cas	lings Wall Outside Same	Clot Fire	Ar Donth from	inular Material
Surface Diameter Type Mate	rial Thickness Diameter Typ	e If Any	Surface	Fill Description
Feet to Feet (Inches)	(Inches) (Inches)	(inches)	Feet to Feet	
			U 41.5 (ement-
			<u> </u>	
		∦		
			- D án An	
Attachments		Certificatio	n Statement	hast of my knowledge and helief
	Name CASCADE DRILLING	shorr is combinete		s dest of my knowledge and belief
	Person, Firm or Corporation	000		CA 04904
Soil/Water Chemical Analyses	Address		City	State Zip
Drother Site majo	Signed	avarray	7-31-1	938110
Attach additional information, if it exists	C-57 Licensed Water Well Contr	actor	Date Signed	C-57 License Number
DWR 188 REV 1/2008	IF ADDITIONAL SPACE IS NEEDED, USE NE	T CONSECUTIVELY	NUMBERED FORM	

File Original with DWR Page	1 W-OUI-Ide-A MARCELI CALINILY WARCELI CALINILY WARCELI CALINILY WARCELI CALINILY Geologic Log ertical O Horizontal MELI O Horizontal Describe material, WELI DESTRUCT O GROUT O-101-D GROUT O-101-D GROUT O-101-D GROUT O-101-D GROUT O-101-D	State of Califor Well Completion Refer to instruction Pa No. e0348528 Work Ended <u>- G- T</u> Heath Ort Heath Ort To be specify Dilling Fluid prinsize, color, etc Comple Specify Dilling Fluid Color, etc Comple Specify Dilling Fluid	Image: Construction of the second					
			APN Book	_ Dec. Lat	Parcel			
				Range	Section			
			1.00	ation Sketch	Activity			
Total Depth of Boring Total Depth of Comp		Feet Feet Feet	Ibustrate or describe data ***********************************	South	O New Well O Modification/Repair O Deepen O Other Destroy O Cathodic Drotection O Dewatering O Heat Exchange O Injection O Monitoring O Remediation O Sparging O Test Well O Vapor Extraction O Other			
Depth from Boo Surface Dia	ehole Type Mate	rial Wall Outside Thickness Diameter	Screen Slot S Type if Ar	ize Depth from 1y Surface I	Fill Description			
Feet to Feet (In	ches)	(Inches) (Inches)	(Inche	Feet to Feet				
	5							
	1							
┠								
Att Geologic Log Well Constru Geophysical Soil/Water C Z Other S L Attach additional informatio	acnments ction Diagram Log(s) nemical Analyses 	I, the undersigned, certify that Name <u>CASCADE DRILLI</u> Person, Firm or Corport <u>120 S. 23RD STREET</u> Address Signed <u>Address</u> C-57 Licensed Water V	Certific It this report is com NG alion F /ell Qontractor	RICHMOND City Date Signed	CA 94804 State Zip 938110 C-57 License Number			

DWR 188 REV; 1/2006

File Original wi Page(Owner's Well N Date Work Beg Local Permit A Permit Number Orientatio	th DWR of Number gan <u>1</u> - gency (1) 5240-10 on @ Ve	MW- ante- 11-17 anterey con w. aut. the Ac Geologi entical O Horiza	Date W Date W Date W Dermit Date ic Log		State Refer to No. e ed 7-14 Specify	e of Califor Ipletion Instruction Pa 0348510 034-17 1-17	nia Repor <i>mphiet</i>			DWR State	Use Onl Well Num N APN/T	y - Do N	bt Fill In Number Longitude Longitude Longitude
Drilling Metho	COLLESS	Chrast.	4 ^U	Drilling Flu	lid		Mailing A	ddress 🖺	Bar	500	08		
Feet to	Feet	Descri	be material, g	rain size, (color, etc	_	City 20	Ater	1		Stat		_Zip <u>73944</u>
0. 14	0.4	WEIVEST	uction	1-47	SSUA	e	Address	forme	c fa		Orc		
-		trimmie	Arous	+ 6	ackf	11	City M	arina	2		Cou	unty M	ontercy
		neat c	emen-	<u> </u>	_		Latitude	Deg.	Min. Se	N	Longitu	de	a Min. Sec.
							APN Boo	k	Page			Parcel	
							Township Range					Sectio	n
							(Sketch m	Locatio	on Sketo by hand after North	rform is pr	inted.)	Ó Ne	Activity w Well dification/Repair
Total Depth	of Boring		5.4		Feet		Illustrate or de fivers, etc. an Please be ac Water L Depth to Depth to Uvater Le Test Ler *May no	escribe distance o d attach a map. (currets and comp evel and b first water b Static evel ad Yield * ngth b be repres	South fivel from roas lize additional j Yield of Yield of	s. buildings apper If nece Comp (Feet (GPN (Hou (Hou (Hou	tences, seary ileted to i) Date i) Test rs) Tota 's long t	O Mc O O O O O O O O O O O O O O O O O O O	dification/Repair Deepen Otherstroy stroy stroy Planned Uses ater Supply Domestic Public migation Industrial thodic Protection evatering eat Exchange ection onitoring emediation barging est Well apor Extraction ther t below surface) red(Feet) d.
Depth from	m Bore	ahole Tura	Casi	ngs	Wall	Outside	Screen	Slot Size	Depth	from	Annu	lar Ma	terial
Surface Feet to Fe	Diar eet (Inc	neter (ype hes)	Mater	idi	Thickness (inches)	Diameter (Inches)	Туре	If Any (Inches)	Sur Feet t	ace Feet	F	IH	Description
									_0,	125.4	Lem	ent.	
							<u> </u>						
		1									_		
												-	
	Att	achments						Certificati	on Stat	ement	0.01		
Geo	logic Log			I, the ur		i, certify th	at this repor	t is comple	te and ac	curate to	o the be	st of my	knowledge and belief
	I Construct	tion Diagram		120 9	Person I		Corporation ET RICHMOND CA 94804						
Soil	Water Ch	emical Analyses		Signed		Address	State Zip State Zip 938110						
Attach additiona	er	, if it exists.	nsed Water Well Contractor Date Signed C-57 License Number										

DWR 188 REV.: 1/2008

File Origina Page Owner's W Date Work Local Perm Permit Nur Permit Nur Dritting M Depth fin Feet	al with DWR 1 of /ell Number _ Began mber 5291 _ mber 5291 _		-OUI 1-2 tarey u71.A Geolog O Horiz Great Descri	Date W Count Permit Date ic Log ontal Descr be material, g	VVe Jork Endi 	State Refer to No. e ed Specify uid	e of Califor pletio Instruction Pa 0348529	Name Ser	t tord Bread		DWR State	Well Nun N APN/T Dwner Lan (a) 8 Stat	y - Do Nn hber/Site RS/Other	ot Fill In Number Unopitude W Longitude ENV. COOrdinator Zip 93944
		WL D- Bo	N Destri IIV' tr.	ution annie y re	fiess Brain	inter G. it cemen	cont A	Address 7 City M Latitude Datum_ APN Bool	Dea [Min. S Dec. Lat.	Well Lo 	Cou Longitu	inty de Dec. Li Parcel	anterent a. Min. Sec. W ong.
			· · · · · · · · · · · · · · · · · · ·					Township (Sketch m	Locatie	Range	ch Ir form is pr	inted.)	Section	n Activity w Well
								Illustrate or der there, etc. and Please be acc Water L. Depth to	eoribe distance o attach a map. I urate and comp evel and first water	South fwel form ros Jee additional left. Yield o	rda, buildinga, paper if nece f Comp	Inces ssary	Mo O	dification/Repair Deepen Other
Total Do	epth of Boring)		16		Feet		Depth to Water Le Estimate	Static evel d Yield * _		(Feel (GPN	i) Date () Test	Measu Type	red
Total D	epth of Comp	leted 1	//ell	Casi	ngs	_ Feet		*May not	be repres	entative	of a well	's long to Annu	erm yiek lar Mat	d
Depth Sur Feet t	n from Bor face Dia to Feet (Inc	ehole meter ches)	Туре	Materi	al	Wali Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth Sur Feet	from face Feet	F	un -	Description
	Att Geologic Log Well Constru Geophysical Soil/Water Cl Other <u>51</u>	achm ction I Log(s) nemica	Diagram al Analyses		Certification Statement I, the undersigned, certify that this report is complete and accurate to the best of my knowledge and b Name CASCADE DRILLING Person, Firm or Corporation RICHMOND 120 S. 23RD STREET RICHMOND Address City Signed 7-31-17 938110 0 C-57 Licensed Water Weil Contractor Date Signed					knowledge and belief 94804 Zip cense Number				

ile Original Page Owner's We Date Work E Local Permit	with D I Numb Began _ t Agenc	of Der 1- y M	 - - 	<u>oui ~ 10</u> 1 - ery Co w-001-1	-A Date W Man (2)	W JorkyEnc	State ell Con Refer to No. (Ied. 7 - 1 I+h () S-3 ()	e of Califor pletion Instruction Pa 0348511 1-1-7 0-0-7	nia n Repoi mphiet	-t		DWR State	Use Onl	y - Do N hber/Site	ot Fill In Number Longitude
Citrine Frank				Geolog	ic Log	·						Mall	hunor	· · · ·	
Orient	ation	● Ve	rtical	O Horiz	zontal (Angle	Specify	i	No. P	hala	m.	went	wher		strat marks
Drilling Met	thod	Sin	a con	rout	lp ^u	Drilling F	luid		Name	tora Br	acorr a	ICE-W	WI KAN	<u>1 (Ollic</u> 2	STENV. Coramore
Depth fro	om Sur	face	0	1	Descr	iption			Mailing A	ddress T.	<u>U. 10</u>	022	007	2	02014
Feet t	o Fee	et		Descr	ibe material, g	rain size,	color, etc		City V	und Cr	m		Sta	te CA	Zip 3 44
0	1331	5'	WC	n Destr	uction	<u>: p</u>	lssure					Well Lo	ocatior	1	
	 		910	4tw	ell 0-1	33.5			Address	Former	- Fort	ord.			
			-4r	immi	- Glas	t, P	ackf	11	City <u>M</u>	arina			Cou	unty 🚺	onterey
			دى	neat	<u>ceme</u>	N.			Latitude			N	Longitu	ude	w
	ļ			<u> </u>					Deturn	Deq.	Min. S	Sec.		De	a. Min. Sec.
						·····			Datum_	L	ec. Lat.			Dec. L	ong
	l					7. A. F			APN BOO	К	_ Page			Parcel	
	ļ					·····			Township)	_ Range			. Sectio	n
	<u> </u>					71 y la y la y la y			(Skatch -	Locatio	on Skel	tch	inted)		Activity
	<u> </u>					•					North		ancu.)		w vvell dification/Repair
	<u> </u>			_											Deepen
	<u> </u>														Other
			L				······							De De	Sti OY scribe procedures and materials
	<u> </u>													und	der "GEOLOGIC LOG"
															rianned Uses
															ater Supply
			 						est				ast		
			ļ						Š				Ű		thodic Protection
														O De	ewatering
														ОНе	eat Exchange
														Ö Inj	ection
														Ом	onitoring
														O Re	emediation
														O Sp	barging
											South				est vveli
			1						Illustrate or de	scribe distance o 1 attach a map. 1	f well from ro	ads, buildings, I paper if nece	fences, ssarv.		her
									Please be ac	curate and comp	lete.				
									Water L	evel and	Yield c	of Comp	leted	Well	indiada di dia mandri andri dia di mangri di anana di ana ana di ana
									Depth to	first water				(Fee	t below surface)
									Water Lo	evel		(Fee	t) Date	e Measu	red
Total Dep	oth of B	oring			133.5		Feet		Estimate	d Yield *		(GPN	/) Test	t Type	
Total De	oth of C	omol	hote				 Foot		Test Ler	ngth		(Hou	rs) Tota	al Drawd	own(Feet)
		Suba							*May no	t be repres	entative	of a well	's long t	erm yiel	d.
			18 T 14		Casi	ngs		가 가장 하지?					Annu	lar Ma	terial
Depth 1 Surfa	from	Bore	hole	Туре	Mater	ial	Wall	Outside Diameter	Screen	Slot Size	Dept	h from	5	::11	Description
Feet to	Feet	(Incl	hes)				(Inches)	(Inches)	Type	(Inches)	Feet	to Feet			Description
		ļ			<u></u>		ļ				0'	133.5	um	unt	
Ⅰ →		 					- 	ļļ		ļ		1			
├ ───┼		 								Į,					
+	·	+									l		<u> </u>		I
┠		+									ļ				
		1					L	I			<u> </u>		<u> </u>		
		Atta	chm	ents		1	an a		(Certificat	ion Sta	tement			
	eologic	Log	tion P	iagrom		i, the u Name	CASCAF	i, certify the	at this repor NG	t is comple	te and a	ccurate t	o the be	est of my	knowledge and belief
	ven COľ Jeonhve	istruc sical I	uon D oa(e)	nagram		400	Person, I	Firm or Corpor	ation			 `		<u></u>	
	Soil/Wat	er.Ch	emics	l Analyses		120	<u>5. Z3RD 8</u>	Address	M		HMONE	<u>ر</u> ۷		CA State	7in
	Other S	ite	1	an		Signed	A	d	<u>(1)</u> a	arroy	•	2.31	-17	938110)
Attach addit	ional infor	mation,	if it exi	sts. r		L	C-57 Lic	ensed Water V	Vell Contractor	1		Date Si	gned	C-57 Li	cense Number
DWR 188 R	EV. 1/200)6				IF ADDI	IONAL SPAC	E IS NEEDED	USE VEXT CO	DNSECUTIVE	Y NUMBE	RED FORM	1		
												ni. National			
										-					

-lie Original with DWR		e t : 16 1						
		State of Cali	tornia	DWR	Use Only - Do Not F	ül In		
Page of	1	well Completi						
Owner's Well Number	W-01-85-A	No. e03485	Pampniet 30	State V	Nell Number/Site Num	mber		
Date Work Began	1-11 Date V	Vork Ended 7 - 19 -	้ำ			noitude		
ocal Permit Agency	HEREN CALARY L	tealth Dest-						
Permit Numbe 52913. MW	1.001.15 .A Permit Dat	e 5-30-17	8		APN/TRS/Other			
	Geologic Log			Well O	wner			
	cal O Horizontal (OAngle Specify	Non School On	to affine "welling	seall as small	condia. La		
Drilling Method DVISSU	(0, CYGAT 10"	Drilling Fluid	- Nametorio Q	In BOU CO	A GUILLAS TENV.	COURSINASI		
Depth from Surface	J Desc	ription	Mailing Address	TU LOX SU	00	07974		
Feet to Feet	Describe material, g	grain size, color, etc	City MONTLY		_ State CR 7	ip 73/77		
0' 122 V	VUI VIStruct	10n: fressure	4	Well Lo	cation	11 - LL		
<u> </u>	rout 0-122!	trimmel.	Address for m	er tor ore	d			
1	grant, Buck	Fillwineart	City Marin	a	County Mo	nterey_		
	Jement	<u> </u>	Latitude	N	Longitude	w		
			Deq.	Min. Sec.	Deg	Min. Sec.		
			Datum	Dec. Lat	Dec. Long)		
			APN Book	Page	Parcel _			
			Township	Range	Section			
			Loca	tion Sketch		Activity		
			(Sketch must be drav	which we have after form is prin	nted.) O New V	Vell		
			-1	ΝΟΠΠ		cation/Repair		
						epen her		
			-11		Destro	ру		
					Describe under *C	e procedures and materials SEOLOGIC LOG*		
			-11		Pla	nned Uses		
			-		O Water	Supply		
			- 11			nestic Public		
			est			ation Industrial		
			3		O Catho	dic Protection		
					O Dewa	terina		
					O Heat	Exchange		
					O Injecti	ion		
					O Monit	oring		
		10			O Reme	diation		
					O Sparg	jing		
			-11	South	O Test V	Vell		
			South O Vapor Extraction					
			rivers, etc. and attach a ma Please be accurate and c	 Use additional paper if necess simplete. 	O Other	·		
 			Water Level an	d Yield of Compl	eted Well			
			- Donth to first wat	er				
			Depth to first water (Feet below surface)					
			Depth to Static		(Feet be	elow surface)		
			Depth to Static Water Level	(Feet)	Date Measured	elow surface)		
Total Depth of Boring		Feet	Depth to first wat Depth to Static Water Level Estimated Yield	(Feet)	Date Measured	elow surface)		
Total Depth of Boring	172'	Feet	Depth to Static Depth to Static Water Level Estimated Yield Test Length	(Feet)	Date Measured Date Type) Test Type s) Total Drawdown	elow surface)		
Total Depth of Boring Total Depth of Complete	<u>_22'</u>	Feet	Depth to Static Depth to Static Water Level Estimated Yield Test Length *May not be repr	(Feet) (GPM) (GPM) esentative of a well's	Date Measured) Test Type s) Total Drawdown s long term yield.	elow surface) (Feel)		
Total Depth of Boring Total Depth of Complete	d WellCasi	Feet Feet	Depth to Static Water Level Estimated Yield T Test Length *May not be repr	(Feet) (GPM) (GPM) (Hours esentative of a well's	Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi	elow surface) (Feet) al		
Total Depth of Boring Total Depth of Complete	d Well Casi	Feet Feet Ings Wall Outside	Bepth to Static Depth to Static Water Level Estimated Yield Test Length *May not be repr	(Feet) (GPM) esentative of a well's	(Feet be Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi	n(Feet)		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Dlamete Feet to Feet (Inches	d WellCasi	Feet Feet Ings Vail Outside Thickness Diamete (Inches) (Inches	Bepin to instruent Depth to Static Water Level Estimated Yield Test Length *May not be repr Screen Slot Siz Type If Any (Inchest	(Feet) (GPM) (Hours esentative of a well's Depth from Surface Feet to Feet	(Feet be Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi Fill	elow surface) n(Feet) ial Description		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Diamete Feet to Feet (Inches	d WellCasi	Feet Feet Ings Hal Wall Outside Thickness Diamete (Inches) (Inches	Bepin to instruent Depin to instruent Depin to Static Water Level Estimated Yield Test Length *May not be repr Screen Slot Sla f Any (Inches	(Feet) (GPM) (Hours esentative of a well's Depth from Surface Feet to Feet () 172	(Feet be Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi Fill	elow surface) n(Feet) ial Description		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Dlamete Feet to Feet (Inches	d WellCasi er Type Mater a)	Feet Feet ings Hal Wall Outside (Inches) (Inches	Bepin to instruent Depin to instruent Depin to Static Water Level Estimated Yield Test Length *May not be repr Screen Slot Sla fr Type If Any (Inchest	(Feet) (GPM) (GPM) (Hours esentative of a well's Depth from Surface Feet to Feet () 172	(Feet be Date Measured Test Type s) Total Drawdown s long term yield. Annular Materi Fill CLMLA	elow surface) n(Feet) ial Description		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Dlamete Feet to Feet (Inches	d WellCasi er Type Mater b)	Feet Feet Ings Hal Wall Outside (Inches) (Inches)	Bepin to instruent Depin to instruent Depin to Static Water Level Estimated Yield Test Length *May not be repr Screen Slot Siz (inches	(Feet) (GPM) (GPM) (Hours esentative of a well's Surface Feet to Feet Depth from Surface	(Feet be Date Measured) Test Type s) Total Drawdows s long term yield. Annular Materi Fill	elow surface) n(Feet) ial Description		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Dlamete Feet to Feet (Inches	LZ2'	Feet Feet Feet Ings Hal Wall Outside (Inches) (Inches)	Bepin to instruent Depth to Static Water Level Estimated Yield '' Test Length 'May not be repr Screen Slot Siz (Inches	(Feet) (GPM) (GPM) (Hours esentative of a well's Surface Feet to Feet (172)	(Feet be Date Measured) Test Type s) Total Drawdows s long term yield. Annular Materi Fill	elow surface) n(Feet) ial Description		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Diamete Feet to Feet (Inches	LZ2'	Feet Feet Ings Wall Outside Thickness Diamete (Inches) Inches	Bepin to instruent Depth to Static Water Level Estimated Yield Test Length 'May not be repr Screen Slot Siz (inches	(Feet) (GPM) (GPM) (Hours esentative of a well's Depth from Surface Feet to Feet O 172	(Feet be Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi Fill	elow surface) n(Feet) ial Description		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Diamete Feet to Feet (Inches	LZ2'	Feet Feet Feet Ings Wail Outside Thickness Diamete (Inches) Inches	Bepin to instruent Depth to Static Water Level Estimated Yield Test Length 'May not be repr Screen Slot Siz (Inches	(Feet) (GPM) (GPM) esentative of a well's Depth from Surface Feet to Feet D 122	(Feet be Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi Fill	elow surface)		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Diamete Feet to Feet (Inches	LZ2'	Feet Feet Ings Wall Outside Thickness Oiamete (Inches) Inches	Depth to Static Depth to Static Water Level Estimated Yield Test Length 'May not be repr Screen Slot Siz (Inches Certific	(Feet) (GPM) esentative of a well's Depth from Surface Feet to Feet () 1221	(Feet be Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi Fill CEMEN H	elow surface)		
Total Depth of Boring Total Depth of Complete	d Well Casi	Feet Feet Ings Wall Outside Thickness Diamete (Inches) Inches Inc	Depth to Static Depth to Static Water Level Estimated Yield ' Test Length *May not be repr Screen Slot Siz (inches) (inches) Certific that this report is comp	(Feet) (GPM, (Hours esentative of a well's Depth from Surface Feet to Feet Depth from Surface Feet to Feet Depth from Surface Feet to Feet	(Feet be Date Measured) Test Type s) Total Drawdown s long term yield. Annular Materi Fill CCMCA	elow surface) n(Feet) al Description owledge and belief		
Total Depth of Boring Total Depth of Complete	d Well Casi	Feet Feet Ings Wall Outside Thickness Diamete (Inches) Inches Inc	Depth to Static Depth to Static Water Level Estimated Yield ' Test Length 'May not be repr Screen Slot Size If Any (Inches) Certific that this report is comp LING	(Feet) (GPM, (Hours esentative of a well's Depth from Surface Feet to Feet, (122) (1	(Feet be Date Measured) Test Type	elow surface) n(Feet) ial Description owledge and belief		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Diamete Feet to Feet (Inches	Casileer Type Mater	Feet Feet Ings Wall Outside Thickness Diamete (Inches) (Inches) Inches I	Depth to Static Depth to Static Water Level Estimated Yield Test Length Test Length May not be repr Screen Slot Siz (Inches) (Inches) Certific that this report is comp LING poration	(Feet) (GPM, (Hoursesentative of a well's e Depth from Surface Feet to Feet, D' 122 122 122 122 122 122 122 122 122 122	(Feet be Date Measured) Test Type	elow surface) n(Feet) ial Description owledge and belief		
Total Depth of Boring Total Depth of Complete	Casile Type Mater	Feet Feet Ings It Wail Outside Thickness Diamete (Inches) Outside (Inches) Outside It It is the undersigned, certify Name CASCADE DRIL Person, Firm or Cor 120 S. 23RD STREET Address	Certific Certific	(Feet) (GPM (Hoursesentative of a well's surface Feet to Feet (122) (I22	(Feet be Date Measured) Test Type	elow surface) n(Feet) al Description owledge and belief 304 Zip		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Diamete Feet to Feet (Inches Attach	Casile Type Mater	Feet Feet Ings It Wail Outside Thickness Diamete (Inches) Outside It (Inches) Outside	Depth to Static Depth to Static Water Level Estimated Yield Test Length 'May not be repr Screen Slot Siz (inches Certific that this report is comp LING poration RI	(Feet) (GPM (Hoursesentative of a well's e Depth from Surface Feet to Feet D' 122 122 ation Statement blete and accurate to CHMOND City 7-31-	(Feet be Date Measured) Test Type	elow surface) n(Feet) ial Description owledge and belief i04 Zip		
Total Depth of Boring Total Depth of Complete Depth from Borehol Surface Dlamete Feet to Feet (Inches Geologic Log Well Construction Geophysical Log Soil/Water Chem Z Other Street	LZ2 Casile Type Mater Type Mater Mater Diagram ((s) Nical Analyses Casile Mater Mat	Feet Feet Ings It Wall Outside Thickness Diametes (Inches) (Inches) It is undersigned, certify Name CASCADE DRIL Person, Firm or Con 120 S. 23RD STREET Address Signed C-57 Licenser Wall	Depth to Static Depth to Static Depth to Static Water Level Estimated Yield Test Length *May not be repr Screen Slot Siz If Any (Inches If Any (Inches Certific that this report is comp LING poration Ri sr Well Contractor	(Feet) (GPM (Hours esentative of a well's Depth from Surface Feet to Feet (CHMOND City City Date Sig	(Feet be Date Measured) Test Type	elow surface) n(Feel) al Description owledge and belief l04 Zip se Number		

File Original with DWR Page of Dwner's Well Number	State Well Com Refer to No. e Date Work Ended <u>1</u> COUNTY Health Dept. 1. A Permit Date <u>5-30 - 17</u> eologic Log DHorizontal OAngle Specify DHorizontal Date <u>Description</u> Description Description Size, color, etc VSHULTOO PLASSING	Name Ortord Mailing Addres	DWR Use On State Well Nul Image: State Well Nul	IV - Do Not Fill In mber/Site Number Longitude IRS/Other MINS/ENV. Coordinate Ite CA zip 93944
grout grout	Well 0-119 trimme Buckefill peat cem	Address for City Mari Latitude Datum APN Book Township	Mer. Fortord. Col N Longitu N Longitu Dec. Lat. Page Range	unty <u>Monterey</u> Jude <u>w</u> Dec. Longw Parcel Section
		Isobrate or describe di fivera, etc. and stach i Plesse be accurate di Vater Level Depth to first i Depth to Stati Water Level Estimated Yie Test i conth	South South South South South South South Stance of well bom roads, buildings, fences, smap. Use additional paper if necessary, ad complete. (Feet) Data (GPM) Tes (Hours) Tota	Activity New Well Modification/Repair Deepen Other Destroy Destro
Total Depth of Completed Well	Feet	*May not be n	epresentative of a well's long t	term yield.
Depth from Borehole Ty Surface Diameter Ty Feet to Feet (Inches)	pe Material Wall (inches)	Outside Screen Slot Diameter Type If (Inches) (Inc	Size Depth from Any Surface F Feet to Feet	ill Description
Attachments		Certi	fication Statement	
Geologic Log Well Construction Diagra Geophysical Log(s) Soil/Water Chemical Ana Other Site may Attach additional information, if it exists.	I, the undersigned Name <u>CASCAD</u> Person, i <u>120 S. 23RD S</u> Signed <u>C-57 Lice</u>	I, certify that this report is co DE DRILLING Firm or Corporation STREET Address Address Address Address Address Address	RICHMOND City Date Signed	est of my knowledge and belief CA 94804 State Zip 938110 C-57 License Number

DWR 188 REV. 1/2006

Image Address in the last in the la	State of California Well Completion Report Refer to Instruction Pamphlet No. e0348531 Work Ended <u>7-19-17</u> Heatth Deet. te <u>5-30-77</u> OAngle Specify Drilling Fluid State of California No. e0348531 Nork Ended <u>7-19-17</u> Narne Ectuck Mailing Address City Machte Latitude	DWR Use Only - Do Not Fill in DWR Use Only - Do Not Fill in State Well Number/Site Number State Well Number/Site Number Latitude Longitude Latitude Longitude Latitude Longitude Latitude Longitude Location Mell Location Mar. Location Mar. Location Mar. N Longitude W
	Deq	. Mir. Sec. Dec. Min. Sec. Dec. Lat Dec. Long
	APN Book	Page Parcel
	Township	Range Section
Image: Second	(Sketch must be d (Sketch must be d) (Sketch must be d) </td <td>rawn by hand after form is printed.) O New Well North Modification/Repair O Deepen O Other Destroy Destroy Other Industrial C Cathodic Protection Dewatering Heat Exchange Injection O Monitoring Remediation Sparging Test Well Vapor Extraction Osparging Test Well Vapor Extraction Other Other and Yield of Completed Well (Feet) rater (Feet) Date Measured</td>	rawn by hand after form is printed.) O New Well North Modification/Repair O Deepen O Other Destroy Destroy Other Industrial C Cathodic Protection Dewatering Heat Exchange Injection O Monitoring Remediation Sparging Test Well Vapor Extraction Osparging Test Well Vapor Extraction Other Other and Yield of Completed Well (Feet) rater (Feet) Date Measured
Cas	ings	Annular Material
Depth from Borehole Type Mate Surface Diameter Type Mate Feet to Feet (Inches)	rial Wall Outside Screen Slot 5 Thickness Dlameter Type if A (Inches) (Inches) (Inches)	Bize Depth from ny Surface Surface Fill Description Feet Feet
Attachments Geologic Log Well Construction Diagram Geophysical Log(s) Soil/Water Chemical Analyses Other <u>gitte mag</u> Attach additional information. If it exists.	Certified, certify that this report is con Name CASCADE DRILLING Person, Firm or Corporation 120 S. 23RD STREET Address Signed C-57 Licensed Water Well Contractor	Ication Statement mplete and accurate to the best of my knowledge and belief RICHMOND CA 94804 City 7-31-17 938110 Date Signed C-57 License Number

ile Original Page Owner's Wel Date Work B Local Permit Permit Numb	with DW II Numbe legan Agency ber 5/94		-011-5: 17 erey co	Date V	Work End	State Ell Con Refer to No. (ed	e of Califor pletio Instruction Pa e0348513 <u>9-17</u> <u>9+</u>	mia n Repoi Imphiet	t		DWR State	Use Only Well Num N APN/TI	y – Do No hber/Site I	t Fill In
			Géologi	ic Log							Well C	wner		
Orienta	ation 🕻	Vertical	O Horiza	ontal 🚬 🤇	OAngle	Specify		Nameto	00 80	ac offi	LL-W	Higm	collin	SEW. mordinal
Drilling Meth	hod VI	SULC	Grout	6"	Drilling Fl	uid		Mailing A	ddress	0800	1500	28		
Depth fro	m Surfa	ce	Descrift	Desc	ription	anles als		City M	more	И —	-	Stat	, CA	7in 93944
Feet 10	10 Peet	5 14.7.8		be material, j	grain size,		c.A.			;	107-10-1			
0	MAS	2 VAL	These			1250L	10/				Well LC	cauon		
		- 677	NT WL	10-r	145			Address	ormer	-10/7	_010			La CALL
	1	- 1	rimmie	Crow.		nar	M I	City 1/1		1	_	Cou	inty 140	unterey
		<u> ne</u>	UT LLW	Unt			_	Latitude			N	Longitu	de	Wa San
		_						Datum	Ueq.	Min. S Neclat	ec.		Dec 1 c	. Min. 305.
	=							ADNI Dee	1	Dene	_		Dec. Lo	
								APN BOD	к	_ Page			Farcer	
								Township)	_ Range			Section)
								(Chatab -	Locati	on Sket	ch Informie en	interi \	<u> </u>	Activity
								(and tail is		North			O Nev	v vveil lification/Repair
													0	Deepen
1													0	Other
													Des Des	SIFOY proceduries and materials
													unde	* "GÉOLOGIC LOG"
							-						P	lanned Uses
								100					O Wa	ter Supply
							. 3	10				St.		
								l \$				Ë		
-						100							O Cat	hodic Protection
							10							watering at Exchange
								1						action
-	<u> </u>			- 1		1.1	-	11					O Mo	nitoring
				-	_	-	-						O Rei	mediation
						-							O Spa	prigra
					_	_		11		South		- 1	O Tes	st Well
				_	_			illustrate of de	scribe distance d	f well from roa	da buildinca	feoces.	O Va	por Extraction
	<u> </u>				100			rivers, etc. an Please be ac	stach a map. I	Jee additional	paper if nece	sary.	O Oth	ner
	1		·					Water	hne leve	Vield o	fCom	leted V	Vell	
	L							Depth to	first water				/Foot	helow surface)
	1						_	Depth to	Static				_ (* cet	ourow ouroout
					-	- Second		Water Lo	evel		(Feet) Date	Measur	ed
Total Dep	th of Bor	ring		24.5		Feet		Estimate	d Yield *		(GPN	i) Test	Туре	
Total Den	oth of Co	moleted 1	Well	1.1		Feet		Test Ler	igth		(Hou	rs) Tota	Drawdo	wn(Feet)
								May no	t be repres	entative	ot a well	s long te	erm yield	
				Cas	ings							Annu	lar Mate	erial
Depth fr	rom E	Borehole	Туре	Mater	rial	Wall	Outside Diameter	Screen Type	Slot Size	Depti Sur	n from face	Fi	11	Description
Feet lo	Feet	(Inches)				(Inches)	(Inches)	.164	(Inches)	Feet	to Feet			
										<u>1</u> 2`	# 245	Cam	ent!	
						L			ļ		L			
						ļ			ļ	I	<u> </u>			
									ļ	₩		ļ		
									ļ	∦	ļ			
		_				Į	l		_]	L		
	-	Attachm	ients					(Certificat	ion Stat	ement			
G	eologic L	.og			I, the u	ndersigner	t, certify th	at this repor	t is comple	te and ac	curate to	the be	st of my	knowledge and belief
Dw	eli Cons	truction [)iagram		Name	Parson		ation						
	eophysic	al Log(s)	1		120 5	S. 23RD 9	STREET		RIC	HMONE)		<u>CA 9</u>	4804
	oil/Water	Chemic	al Anaiyses		Signed	A	Address	\sim		City	7-21-	, -7	51818 038110	Zip
	AL				and the state of the last	1 51 7	- 12 11		1 2 2 2 W W W L		K .31		000110	
Attach additio	ther <u>21</u>	tion, if it exi	sts			C-57 Lic	ensed Water	Vell Contractor		[4	Date Si	ned	C-57 Lice	ense Number

File Origin	nal with DWF	2				Stat	e of Califor	nia.		,		Lice Only D	Not Fill In		
ongi	1	1			Well Completion Rep				n Report						
Page	_ _ of				***	Refer to	Instruction Pa	amphiet	` !		State 1	A/all Number/S	Site Number		
Owner's V	Nell Number	<u> 12 -</u>	ou1-49	-A1		No. e	e0348516	5							
Date Wor	k Began <u>1</u>	-11-1	1	Date V	Vork End	ed	9-17			La	atitude		Longitude		
Local Per	mit Agency	mont	eren cor	entry f	tatt	2 Qu	pt		[i					
Permit Nu	umber <u>S3</u> 0	2-1	<u> 1-102-20</u> 1-	Permituate	1 <u>5-</u>	-30-1	7					APN/TRS/O	ther		
			Geologi	c Loa	1			-			Well O	wner			
Orie	ntation 🐌	Vertica	O Horizo	ontal (CAngle	Specify		E.I	hard Bra		- te dill		a law in 1		
Drilling I	Method	4100	cront	211	Drilling Fl	uid		Name	1010-010	C OITIC		ing C	IS IENV- COORDA		
Depth	from Surfac	e		Desc	ription		:	Mailing Ad	Idress <u>P</u>	0.00	<u>IXS</u>	008	1 0001		
Feet	to Feet		Descrit	pe material, g	rain size,	color, etc		City	ntere	21		State	<u>A Zip 9394</u>		
O'	122.3	ÌW	EII DES	struc	tion	: Prus	SUL				Well Lo	cation			
		91	altwi	10.	122.2	. trin	Am. P	Address -	Firme	1 - Fa	ct a	rd			
		1	valt r	7/10/48	<u></u>	11 rel	NF 1	City AA	11.00	<u></u>	· · · ·	County	Unteren		
			1000 00	1	<u> v</u>		<u> </u>	City <u>70</u>	417160						
				¥				Latitude	Dea.	Min. S	N ec.	Longitude _	Deg. Min. Sec.		
								Datum		Dec. Lat.		Dec	. Lona.		
								APN Book	· · · · · · · · · · · · · · · · · · ·	Dage		Dor			
								Tournahin	` <u></u>	_ lage		i ui			
								TOWNSHIP					SuUII		
ļ								(Sketch m	LOCATIO	on Sket	c n form is priv	nted)	Activity		
L								(0.0001110		North	. isin is pil		New Well Modification/Renair		
													O Deepen		
													O Other		
								11					Describe procedures and materia		
													under "GEOLOGIC LOG"		
								11					Planned Uses		
												0	Water Supply		
													Domestic Dublic		
								Vest				្រូន [Irrigation Indus		
	·						···	>				- I O	Cathodic Protection		
							·······	41				0	Dewatering		
							· · · · · · · · · · · · · · · · · · ·					0	Heat Exchange		
												0	Injection		
												0	Monitoring		
												0	Remediation		
								1				0	Sparging		
										South		N N N	Test Well		
		_						Illustrate or des	cribe distance o	f well from roa	ds, buildings,	fences,	Vapor Extraction		
								rivers, etc. and Please be accu	attach a map. L urate and comp	Jse additional liete.	paper if neces	isary. O	Other		
								Water Le	evel and	Yield o	f Comp	leted Well			
								Depth to t	first water			(F	eet below surface)		
								Depth to	Static			, (·			
								_ Water Le	vel		(Feet) Date Mea	asured		
Total [Depth of Bori	ng	12	2.3		Feet		Estimated	d Yield *		(GPN	 Test Type 	e		
Total [Depth of Cor	npleted	Well			Feet		Test Leng	gth	a	(Hour	s) Total Dra	wdown (Fee		
	•	<u> </u>						*May not	be repres	entative	of a well'	s long term	vield.		
				Casi	ngs						n e gelie	Annular M	Material		
Dep	th from B	orehole	Туре	Mater	ial	Wall	Outside	Screen	Slot Size	Depth	from		Description		
Feet	to Feet (Inches)				(Inches)	(Inches)	Type	(Inches)	Feet	tace to Feet	FIII	Description		
										0	122.3	CLIMEN	1		
]								
											1				
											1				
	Δ	ttachn	nents	1			Х.,		ortificat	on Stat	amant	• • • • • • • • • • • • • • • • • •			
	Geologic				L the u	ndersigner	1. certify th	at this report	is comple	te and ac	curate tr	the best of	my knowledge and b		
	Well Const	-9 ruction I	Diagram		Name	CASCAL	DE DRILL	ING							
1 7	Geophysic	al Log(s)		120.0	Person,		or Corporation							
	Soil/Water	Chemic	, al Analvses			<u>. 23RU 3</u>	Addr <u>es</u> s /	\sim			<u>,</u>	CAState	<u>94004</u> Zip		
	Other <u></u>	te	nar		Signe	<u></u>	<u>e</u> r	1/0	actor		7-31	-17 938	110		
Attach a	dditional informa	ion, if it ex	asts.			C-57 Lic	ensed Water \	Well Contractor			Date Sig	gned C-57	License Number		
DWR 188	8 REV 1/2006					IONAL SPAC	E IS NEEDED	USE NEXT COL	NSECUTIVE	Y NUMBER					

File Origin	al with DWR			St	ate of Califo	mia			DWR	Use Only	- Do No	t Fill In
-	1			Well Co	mpletio	n Repo	t 🛅					
Page	of .			Refer	to Instruction P	amphiet	- I	<u>I</u>	State	Well Numl	ber/Site I	Number
Owner's V	Vell Nui T	N-011-01	L-A	_ No.	e0348514	ł.		1	1 1	N		
Date Worl	K Began	-11-17	Date V	Vork Ended	19-17	J		L	atitude			Longitude
Local Peri	nit Agency	writeren c	mentry H	eath see	pt.						S/Other	└┉└━╾┟━─┟━╼┦
Permit Nu	mber 2/10,1	W-041-02-+	Permit Date	= 5-30-1	<u> </u>					20.0010	S/Other	
		Geolog	gic Log						Well C	Jwner	-0.1	[[[[]]]][[]]][[]]][[]]][[]]][[]]][[]]
Orie	ntation OV	ertical O Hori	zontal	DAngle Speci	fy	Nametor	tord Bra	L AFIC	L-Will	iam cal	hack	ENV. 100rdina
Drilling N	lethod	1 Chart	E 19"	Drilling Fluid		Mailing A	ddress P). BG	rsa	58	/ /	
Depth	from Surface	J	Desci des motorist a	ription		City U	ontor	N		State	14	710 93944
Feel	1776	INAL Deck	noe materias, g		C A			·	MAX-11-1			
	1,20,2	A CONTRACT	meron.	22 E				- 0	VVeli Li	\		
		HYOU WI		53.5 44	immil	Address	rormax		t or	d .	1.4	001000. I
	_	TLOVA	park	till wire	07	City <u>LA</u>	and	~		Cour	ity <u>PV</u>	OTHERE
		Ceme	at	(Latitude			N	Longitud	le	
						Datum	Lied.	Min. ⊃)oo.lot	HBC.		Dec Lo	I. MIN. 205.
							. ľ			······	Dec. Lu	ng
1						APN 800	к	_ Page	_		Parcel	
						Township		Range			Section	·
							Locati	on Sket	ch			Activity
		1				(Sketch m		by nano arre North	ar torm is pr	mied.)	O Nev	v Well
									-			Deepen
-						1					, ŏ	Other
		1				11					Des	troy
						11				L L	Lieso	r "GEOLOGIC LOG"
<u> </u>					-					10	P	lanned Uses
	_										O Wa	ter Supply
												omestic Public
	_				10.00	Lesi L				asi	🔲 កែ	rigation 🔲 Industrial
-						11 >					O Cat	hodic Protection
<u> </u>					1.00	41 -					O Dev	watering
11				-		41					O Hea	at Exchange
				7 - Mar 1							O Inje	ction
10				10 Mar.	1.00						O Mo	nitoring
1											O Rei	mediation
			-		- E						O Spa	arging
1					- L.			South			Oles	
		1	10.00			litustrate or de	scribe distance o	f well from ros	ida, buildinga,	ferices,		por Extraction
	_					Please be ac	urate and comp	lete.	baber ninece	1540 Y.	0.0	
<u> </u>			-			Water L	evel and	Yield o	fĊomp	leted W	ell 🛛	
├ ──						Depth to	first water			_	(Feet	below surface)
						Depth to	Static					
	_		100 0			- Water Lo	evel		(Feel	i) Date I	Measur	ed
Total D	epth of Boring		130.5	Feet		Estimate	d Yield *		(GPN	/) Test⊺	iype	
Total C	epth of Compl	eted Well		Feet		Test Ler	igth		(Hou	rs) i otal	Drawdo	IWR(Feet)
							t be repres	entative	or a well	s long tel	im yield	
P. May 1			Casi	ngs						Annula	ar Mate	erial
Dept Su	h from Bore face Diar	neter Type	Mater	ial Wall Thicknes	Outside a Diameter	Screen Type	Slot Size	Depti Sur	1 from face	Fill		Description
Feet	to Feet (Inc	hes)		(inches) (Inches)		(Inches)	Feet	to Feet			
								0	1335	Cam	rat	•
		1.00									[
		-										
							1			_		
	Atta	chments				(Certificati	on Stat	ement			
	Geologic Log			I, the undersign	ed, certify th	at this report	is comple	te and ac	curate to	the best	of my l	knowledge and belief
	Well Construc	tion Diagram		Name <u>CASČA</u>	DE DRILL	ING						_
	Geophysical I	_og(s)		120 S. 23RD	STREET	ration	RICI	HMOND)	С	A 9	4804
	Soil/Water Ch	emical Analyses			Address	~		City		St	ate	Zip
	Other Street	map		Signed	<u>c</u>	<u>oj a</u>	Acces	0	7-31	-1/9	38110	
Attach ad	ditional information	, if it exists.		C-57 L	icensed Water	Well Contractor		۱ <u> </u>	Date Si	gned C	-57 Lice	ense Number

DWR 168 REV, 1/2006

File Original with DWR Page of Owner's Well Number Date Work Began Local Permit Agency Permit Number 2269 Orientation Drilling Method 2655 Depth from Surfac Feet to Feet of 162	MW-OWI- -11-17 Monterey (MW-DUI-24-A Geolog Vertical O Horiz UCLI OE Oreat Oreat	Date W Date W Permit Date ic Log contal S Descr ibe material, g	Ve fork End Heal 5-3 Dangle Drilling Fik Tiption rain size, HIOT	Stat Refer to No. 0 ed 1- th 0 specify uid color, etc 2, 0 - 17	e of Califo npletio instruction Pie 0348533 N9-11 pt. SAre SAre	Name Mailing A City M	tord Grad ddress Pa former former	Li Li D. BO 2. BO 2. BO	Well (Well (Well (Well (Well (Well (Well (Well (Well Nur Nur APN/T	IN - Do N mber/Site RS/Othe te CA	ot Fill In Number Longitude T T T T T T T T T T T T T
						Latitude Datum APN Boo Townshij	Deq. C C C C	Min. S Dec. Lat. Page Range	ec. N	Longitu	Dec. L Dec. L Parcel	n
						Illustrate or do rivera, etc. es Montes art.	evol and	South tweetam ros se additional isto	ds, buildings, paper if nece	inted.)		w Well dification/Repair Deepen Other stroy stroy stroy over the procedures and materials recorder est and materials recorder est and materials recorder est and materials recorder est and materials ater Supply Domestic Public rrigation Industrial thodic Protection watering est Exchange ection pointoring emediation parging est Well apor Extraction ther
Total Depth of Borir Total Depth of Com	g	102	ž	Feet		Depth to Depth to Water Le Estimate Test Ler	o first water o Static evel ed Yield * ngth of be repres	entative	(Feel (GPN (Hou	t) Date /) Test rs) Tota 's long t	(Fee e Measu t Type t Drawd erm viet	t below surface) red own(Feet)
Depth from Bo Surface Di Feet to Feet (I	rehole Type ameter Type inches)	Casi Materi	ngs ial	Wali Thickness (inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth Sur Feet t	from face	Annu	lar Mat	Description
							Certificati	O on Stat	ement		ent	
Geologic Lo Well Constr Geophysica Soil/Water C Ø Other S 11 Attach additional informatik DWR 188 REV. 1/2008	g Log(s) Chemical Analyses		I, the ur Name <u>120 S</u> Signed	ASCAD Person, F 23RD S C-57 Lice	d, certify the DE DRILL Firm or Corport STREET Address ensed Water V E IS NEEDED	Vell Contractor		te and ac	Date Si	o the be	st of my CA <u>(</u> State 93811(C-57 Lic	knowledge and belief 04804 Zip) cense Number

File Origina Page Owner's We Date Work Local Perm Permit Num Orient Drilling Me Depth fr Feet	I with Di I ell Numt Began _ it Agence ber 5300 tation ethod 011 om Sur			- 0121- (1.4 (1) (1.8 - A Geolo O Hor (0 2) (0 2	BB-A Date Durty Permit D gic Log izontal izontal izontal izontal izontal izontal izontal izontal izontal	Work Ent Health ate <u>S</u> . OAngle Drilling F scription	Stat Pell Con Refer to No. ded <u>1-1</u> Specify Fluid	te of Califor npletio o Instruction Pe e0348515 19-17	nia n Repor	t tord or ddress f	ec iff 0.00	DWR State	Well Num N APN/T Owner		et Fill In Number Longitude 1	nato,
<u>0'</u>	122		NL gr	IL De out w	strue	-122	: Prese trim neat	sure mie (mt	Address	Forme	r fo	Well La	cation	inty A	Iontered	
			9	·····					Latitude		Min. S Dec. Lat.	iec. N	Longitu	de Dec. L	ma. Min. Sec. W .ong	
	1								APN Boo	k	Page	_		Parce		1
		—†							Township		Range			Sectio	n	
	+	-+								Locati	on Sket	ch			Activity	[
	epth of B				122		Feet		(Sketch m State Passe be acc Water L Depth to Depth to Water Le Estimate	acribe distance of a state a map curate and comp every and comp first water Static evel d Yield *	South	rds, buildings paper if nece f Comp (Fee: (GPN	rinted.) To the second		Activity Well Other Deepen Other Other Planned Uses ater Supply Domestic Public rrigation Industrial athodic Protection ewatering eat Exchange iection onitoring emediation barging est Well apor Extraction ther t below surface) red	
		Ĭ			1.000				Test Len			(Hou	rs) Tota	I Drawd	lown (Feet)	1
i otal De	pin of C	omple	ted V	/ell			- Feel		*May no	t be repres	entative	of a well	's long t	erm yiel	d.	
	16	100210			Ca	sings							Annu	lar Ma	terial]
Depth Surfa Feet_to	from ace Feet	Borel Diam (Inch	nole eter es)	Туре	Ma	terial	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size If Any (Inches)	Depti Sur Feet	face to Feet	Fi Com	iii in	Description	
		-		5.35]
														_		-
			\rightarrow								╟───					-
							+									1
		Atta	che	onte	-			1	(Certificati	ion Stat	ement				ี 1
	Seologic Well Cor Seophys Soil/Wat Other S	Log struct sical Lo er Che	ion D og(s) emica	agram Analyses		I, the u Name <u>120</u> Signed	CASCAL Person, S. 23RD S C-57 Lic	d, certify th DE DRILL Firm or Corpor STREET Address Address censed Water (at this report ING ration			Date Si	o the be	st of my CA State 938110 C-57 Lit	v knowledge and belief 94804 Zip O cense Number	-
DWR 168 F	REV 1/200	6				IF ADDI	TIONAL SPAC	E IS NEEDED	USE NEXT CO	NECUTIVE	LY NUMBER	RED FORM	1			

DWR 168 REV 1/2008

File Original with DWR Page of Owner's Well Number Ex Date Work Began Local Permit Agency MO Permit Numbe 301,EW Orientation Verti Dritling Method MESSUR	Describe material of	State Well Com Refer to No. e Vork Ended Vork Ended He.c.th. 5-30-17 DAngle Specify Dritting Fluid tiption rean size color etc	e of Califor pletio instruction Pa 0348534 G-17 V.cot	nia n Report Imphilet Name Mailing Add City Mon	iress <u>P.C.</u>	La La 	DWR State	Use On Well Nut N APN/T Dwner APN/T Dwner	ly - Do Ni mber/Site	ot Fill In Number Longitude
0' 109.0 V	NUL Destruction	on: Pressu	re	Address	1mes	4.1	Nell Lo	catio	1	
	u[neat cemer	t		City Latitude	Dec. D	Min. Se ec. Lat	N	Co Longiti	unty ude Dec. L	a. Min. Sec. W
				Township		Range_			Sectio	n
					Locatio	n Sketo	h			Activity
Total Depth of Boring Total Depth of Complete		Feet		(Sketch must	t be drawn b N N N N N N N N N N N N N N N N N N N	South well tom road e additional p see. Yield of	s, buildings, sper if nacer Comp (Feet (GPN (Hour if a well	tences, isary. Ieted 1) Date 1) Tes rs) Tota s long 1	Nee Mo O	w Well dification/Repair Deepen Other stroy stroy stroy Planned Uses ater Supply Domestic Public migation Industrial athodic Protection evatering eat Exchange ection onitoring emediation barging est Well apor Extraction her t below surface) red(Feet) d.
Depth from Boreho	Die Type Mater	ngs Wall	Outside	Screen S	Slot Size	Depth	from	Annu	ilar Mat	terial
Surface Diamet	s)	(inches)	Dlameter (Inches)	Туре	If Any (Inches)	Feet to	ace Feet	Ŧ	-MI	Description
						0.	109.6	CLA	nent_	·
Attacl	hments In Diagram g(s) nical Analyses	I, the undersigned Name <u>CASCAD</u> Person, I <u>120 S. 23RD S</u>	I, certify this DE DRILLI Firm or Corpor STREET Address	Ce at this report is ING ation	s complete <u>RIC</u>	e and acc	curate to	the be	est of my CA	knowledge and belief 94804 Zip
Attach additional information, if it	t exists	Signed C-57 Lice	ensed Water V	Vell Contractor			Date Sig	ned	938110 C-57 Lic) cense Number

DWR 188 REV 1/2006

File Origina Page Owner's W Date Work Local Perm Permit Nur Orien Drilling M	al with DV (ell Number Began nit Agency nber ethod () ()	VR of <u>1</u> er <u>172</u> (<u>1711</u>) (<u>1710</u>) (<u></u>	- <u>601</u> - 49 - 17 - 19 - 19 - 19 - 49 - 49 - 49 - 49 - 49 - 49 - 49 - 4	Date V Date V Permit Date ic Log ontal 21	Vork Enc Vork Enc Palti Dangle Drilling Fi	Stat ell Con Refer to No. (ded)- (- 30-) Specify luid	e of Califor npletio Instruction Pre- e0348516 9 - 1 - 7 gt -	nia n Repoi Imphilet Nameter Mailing A	rt	 	DWR State	Use Only Well Num APN/TI APN/TI	- Do N ber/Site	et Fill In Number Longitude I I I W Longitude I I I I Fill W
Depth fi	to Feel	ace	V Descri	Desc be material. d	nption Inain size	color, etc		City 1	onter	21		Stat	A	
0	177	3 11	HEIL DE	st-2uc	FION	· Pris	SUL			1	Well Lr	cation		
	- Calat	a la	(altow)	JI 0.	122.2	+110	Am. 6	Address	Firme	1-	1+0	rd		
		1	iralt 1	Juell	ш.	JAE	at	City M	acing	1		Cou	$_{\rm ntv}\mathcal{M}$	onteren
	-		James	it	1	-t	9.2	Latitude	Deq.	Min. Se	N	Longitu	de	Min. Sec.
	1							Datum_	C	Dec. Lat.			Dec. L	.ong
			· · · ·					APN Boo	k	Page			Parce	
								Township		Range			Sectio	n
									Locatio	on Sket	ch			Activity
								(Sketch m	iust be drawn I	by hand afte North	r form is pri	inted.)		w Well odification/Repair Deepen
													De De De Un	Istroy scree procedures and materials der "SEOLOGIC LOG"
<u> </u>							-						OW	ater Supply
-	-													Domestic Public
						-	_	Sest				East		rrigation 🔲 Industrial
-		+						-					O Ca	thodic Protection
<u> </u>	-					-							O De	ewatering
					-			11						ection
	+			_		1.1		11					ОM	pnitoring
						-		11					O Re	emediation
	+												O Sp	parging
					_					South			O Te	est Well
								Illustrate or de	scribe distance o d attach a map. L	f well from roa Jee additional (ds. buildings. Saper if neces	fences,		ipor Extraction
100						-	C	Please be ac	curate and comp	lete.				
								Water L	evel and	Yield of	Comp	leted V		the terrs and the
								Depth to	static				_ (Fee	t delow sufface)
								Water Lo	evel		_ (Feet) Date	Measu	red
Total De	epth of Bo	ring	/	23	_	Feet		Estimate	ed Yield *		(GPN	f) Test	Туре _	
Total De	epth of Co	mpleted	I Well			Feet		Test Ler	ngth		(Hou	rs) Total	Drawd	own(Feet)
								I May no	c pe repres	entative (or a well	s long te	rm yiel	Q.
Danth	from	Borehet	D	Casi	ngs	Wall	Outeida	Seroon	Slot Size	Danih	from	Annul	ar Ma	terial
Surl	ace o Feet	Diamete (Inches)	г Туре	Mater	lal	Thickness (Inches)	Diameter (inches)	Туре	if Any (inches)	Feet t	ace Feet	FI		Description
										0	12.3	cam	east.	
								· · · · · · · · ·						
		-												
														1
				i—		1	1							
		Attach	ments						Certificati	on Stat	ement			
	Geologic	Log			I, the u	ndersigned	t, certify the	at this repor	t is complet	te and ac	curate to	the bes	t of my	knowledge and belief
	Well Cons	struction	Diagram		Name	CASCAD	DE DRILL	iNG						
	Geophysi	cal Log(s)		120 :	S. 23RD S	STREET			HMOND		<u> </u>	A 1	94804
	Soll/Wate	r Gnemi			Signed	0-	- Col	×11	. Aren		7-21	-11 s		_{متک}
Attach add	itional inform	ation, if it e	exists.			C-57 Lic	ensed Water V	Vell Contractor			Date Sig	ned (C-57 Lic	cense Number
D14/D 400	DEV 10000				10 10017	DOMAL SDAC		LICE NEVTOC	MERCUTINE	VMMOCO	ED CODU			

File Origin: Page Owner's W Date Work Local Perm Permit Nu	Al with DW /ell Number Began nit Agency mber 5.30	/R of I - 11 - 1 	- OUL - B D oterey Geolog	Date V Courst Permit Date		Stat ell Con Refer to No. o ed 7-1 o-17	e of Califo npletio Instruction Pre 0348535 9-17 Dep	mia n Repor	t		DWR State	Use On Well Nur N APN/T	iy – Do Ni nber/Site	ot Fill In Number IW Longitude
Orier Drilling M Depth f	ethod	Vertica	1 O Horiz	Desci	DAngle Drilling Flu	Specify, uid		Name Or Mailing A	ddress P	0.60	F will	08	lins/E	W. coordinator
Feet O	to Feet	· Wa	Descri	ibe material, g	rain size.	color, etc LSSUY	r	City 22	1	4	Well Lo	Sta	te <u>(1</u> 5	Zip 151-1-1
			yrout	, w[v	ieat	- Cor	nent		arin	a		Co		okteren w
			•					Datum	Deg.	Min. Se Dec. Lat.	0 C.	Congite	Dec. L	a. Min. Sec. ong
-								APN Boo	k	_ Page		-	Parcel	
							132	Township		Range	_		Sectio	n
_								(Sketch m	Locatio Lust be drawn I	on Skete by hand afte North	ch r form is pr	inted.)	O Ne O Mo	Activity w Well odification/Repair Deepen
												10		Otherstroy serbe procedures and materials serbe clock LOG* Planned Uses ater Supply Domestic Public printing Public
								A6	5	South		Ea	O Ca O De O He O Inj O Ma O Re O Sp O Te	athodic Protection evatering eat Exchange ection ponitoring emediation parging est Well poor Extraction
								illustrate or de rivers, etc. enc	scribe distance o J ettach a map _e 1	f well from roa Jee additional (da, buildinga, paper if neces	lences, ssary	O O	her
						_		Water	evel and	Yield of	f Comp	leted 1	n Nell	
			-					Depth to Depth to Water Le	first water Static		(Feet) Date	(Fee	t below surface) red
Total D Total D	epth of Bo epth of Co	ring mpleted	Well	1210		Feet		Estimate Test Ler *May no	ed Yield *	entative	(GPN (Hou of a well	 Test Tota s long t 	i Type Il Drawd erm yiel	own(Feet) d.
				Casi	ngs	101-11	Outside	Comer	Pl-A Pl-A	Death	. European	Annu	lar Mat	terial
Sur Feet	face So Feet	Diameter (Inches)	Туре	Mater	ial	Thickness (Inches)	Diameter (Inches)	Screen Type	If Any (Inches)	Suri Feet	face Feet	F	m	Description
—	├────┤		1.1								u La	fred		
<u> </u>		1.1												
		2-												
				l		<u> </u>			<u> </u>					
	Geologic I Well Cons	Attachr Log itruction	n ents Diagram		I, the ur Name		d, certify th	at this report	Certificati t is comple	ion Stat te and ac	ement curate to	o the be	st of my	knowledge and belief
	Geophysi	cal Log(s)		120 5	5. 23RD 5	STREET			HMOND)		CA S	94804
	Soil/Wate	r Chemic	al Analyses		Sianed	p_	Address		Arres	City	7-31-	-17	State 938110	Zip)
Attach add	یلیہ ouner	ation, if it e	dists.			C-57 Lic	ensed Water	Well Contractor			Date Si	gned	C-57 Lic	ense Number
01100 400	DEV/ 1/2008					ONIAL COAC		NEE NEVT CO	NEECUTIVE	V AULISADED				

File Origina Page Dwner's W Date Work Local Perm Permit Nur Permit Nur Orier Drilling M Depth f Feet	al with DWR of Well Number Began mber 5304. Intation tethod from Surfact to Feet 891, 8	MW- MW- /ertica 6(- Jul - 1 Cley (a) Oull - 27-A Geologi O Horizo Construction Descrit LN Dest	Date V Date V Permit Date ic Log ontal I Desci be material, g	Vork End Cork End Cor	State ell Con Refer to No. c 1ed 7-1 021 30 -17 Specify luid color, etc (05546)	e of Califor pletion Instruction Pa 0348517 9 - [7] 01.	Name Mailing A City	tord Br ddress P.	1 1 1 1 0. BO	DWR State 1 atitude Well C Sc. with K. 50 Well Lc	Use On Well Nur APN/ APN/ Wmer Luco Sta	Iy - Do Ni mber/Site	ot Fill In Number Longitude 1 Longitude 1 Softwy, (codinor) Zip 93944
		9f 3	rinamie Inect c	11 0 - graat ement	89.8 B	LIKEN	<u> </u>	Address City M Latitude Datum_ APN Boo	Dea. [Min. S Dec. Lat. Page	ec. N	Co	unty ude Dec. L Parcel	a Min Sec. W
		1						Township		Range	_	_	Sectio	n
1		1							Locati	on Sket	ch			Activity
Total D	epth of Borir			A. 8		Feet		Billistrate or dr Billistrate or dr Please be ac Water L Depth to Vater L Estimate Test Ler	Has be distance of distance of distance of distance of distance of distance of distance of distance of distance of	South fives from ros fives additional lete. Yield o	ide buildings, paper li recet f Comp (Feet (GPM (Hour	tances saary. leted 1) Data 1) Tes rs) Tota	Nee Mo O	w viell dification/Repair Deepen Other
Total D	epth of Com	pleted	Well			Feet		May no	t be repres	entative	of a well'	s lona i	term viel	d.
	_			Cael	nge			a Linay ing				Ann	ilar Mat	erial
Depti Sur Feet	h from Bo face Di lo Feet (li	rehole ameter aches)	Туре	Mater	ial	Wall Thickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depti Sur Feet	h from face to Feet	F	-111	Description
<u> </u>										L -	01.0	cer.	-ent	
H	<u>├ · </u>			· · · · ·										
	<u>├──</u>	-												
		1		-					1		1			
	At Geologic Lo Well Constri Geophysica Soil/Water	Diagram) al Analyses	I, certify the DE DRILL Firm or Corpor STREET Address	at this repor ING ration	Certificati t is comple 	Ion Stat te and ac HMOND City	tement courate to	the be	est of my CA 938110	knowledge and belief 94804 Zip				
Attach add	ditional information	on, if it ex	ists.			C-57 Lic	ensed Water V	Vell Contractor	(`	\sim	Date Sig	ned	C-57 Lic	ense Number
OWR 188	REV. 1/2008				F ADDIT	TIONAL SPACE	E IS NEEDED	USE NEXT CO	DNSECUTIVE	Y NUMBER	RED FORM			

File Origin Page Owner's M Date Work Local Permit Nu	vell Numb Began _ nit Agenc mber 53		1-17 nterey v.oul.72.1	72:A Date V COUNTS Permit Date	Wel	Stat 1 Con Refer to No. (1 7 1 7	e of Califor npletio Instruction Pe 0348536 19-1 Dep;	nia n Repor	rt [DWR State	Use Onl Well Nun N APN/T	y – Do Ni hber/Site	ot Fill In Number 1 W Longitude
Orier Drilling N		Vertic	Geolog al O Horiz	ic Log ontal (ימו	OAngle Drilling Fluid	Specify		Name	tord By	A BA	Well C		ilas/I	Env. coordinate
Depth f	rom Surf	ace	David	Desci	ription	les etc			ontife	<u></u>		Stat		7in 93944
DL	108.	ร้าง	LN NIS	tviet		PILS	5410,				Well Lo	cation		
		3	Vout, f	CI MM	e ove	the	£	Address	torm	ir fo	ct a	rd.	inter A	Instand
	+		20m G/L	400	5			Latitude			N	Longitu	de	w
11				1				Deter	Deg	Min. S	ec.		De	a. Min. Sec.
	_							ARN Boo		Page			Dec. L	ong
	_							Townshir	N	Range			Sectio	
								1 Otter Adapt	Locatie	on Sket	ch			Activity
								(Sketch m	rust be drawn l	by hand after North	er form is pr	inted.)		w Well dification/Repair Deepen Other Stroy stroy stroy procedures and materials
								1. S				\sim	unc F	Planned Uses
						-		st				Ist		omestic Public
								Ň				ű	O Ca	thodic Protection
							_						O De	watering
					_	-	_	1 1					OHe	at Exchange
_		_		-	-	-	-							ection
<u> </u>						-	-						O Re	emediation
													O Sp	arging
									;	South				st Well
								illustrate or de rivers, etc. and Please be act	scribe distance o d attach a map_ L curate and comp	f well from roe Jee additional Jete.	ds, buildings, paper II nece	lences, saary.	O ot	her
H				-		-	_	Water L	evel and	Yield o	f Comp	leted V	Vell	
<u> </u>						07		Depth to Depth to	first water Static	_			_ (Fee	t below surface)
				705		E		Water Le	evel		(Feet) Date	Measu	red
Total D	epin of Bi	pring		103.2	1.00	- Feet		Test Ler	a fiela		(GPN)(Hou	n) rest rs) Tota	i ype i Drawd	own (Feet)
Total D	epth of Co	ompleted			_	Feet		*May no	t be repres	entative	of a well	s long to	erm yiel	d_:
				Casi	ngs					-1 X		Annu	lar Mat	erial
Depti Sur Feet	n from face lo Feet	Borehole Diameter (Inches)	в Туре	Mater	ial Ti	Wall hickness (Inches)	Outside Diameter (Inches)	Screen Type	Slot Size If Any (Inches)	Depti Sur Feet	face face	F	in	Description
										0'	108.5	CLA	rent	
				l										
\vdash									<u>}-</u>					
—								_						
		-												
		Attach	ments					(Certificati	on Stat	ement			
	Geologic	Log	D 1		I, the und	ersigned	t, certify the	at this report	t is comple	te and ac	curate to	the be	st of my	knowledge and belief
	vvell Con Geophysi	struction	i Diagram (s)		120 0	Person		ation	BICI				24	34804
	Soil/Wate	r Chemi	cal Analyses		120 3.		Address			City		¹	late	Zip
	Other	Site	map		Signed -	C.57110	ensed Water 1	VelliContractor			1=51 Data 54		938110) Jense Number
Attach add	adonal infom	Herborn, it it €	5715(3						L	_	Date OI	jineu '	J-JI LIL	

DWR 188 REV 1/2006

File Origina Page Dwner's Wo Date Work Local Perm Permit Num	ell Numbe Began it Agency nbe 530 je	AR of 1 mw Mar Mar	-1-7 -1-7 -1-7 -1-7 -1-7 -1-7 -1-7 -1-7	A. A Date W Permit Date		Stat ell Con Refer to No. (ed 7- 4th 7. 30-1	e of Califor pletio Instruction Pa e0348519 19-17 2017	mia n Repor	rt	1 1 1 1	DWR State	Use Only Well Num	- Do Ni ber/Site	ot Fill In Number W W W T T T
Orient Drilling Me Depth fr	tation ethod <u>P()</u> om Súrfa	Vertica SSLACE	O Horiz	Descr	DAngle Drilling Fle	Specify uid		Nametar Mailing A	ddress	Boy	-Willia L 500	en colh	ns/t	W. Coordinter
Feet 0 ¹	to Feet	WI - Sr	UI Dect	127 +	rain size, : Pr	color, etc	rout	Address	Forme	T E	Well La	d.		
								Latitude	Ceq.	Min Si Dec. Lat.	ec. N	Longitud	be Dec. L	A Min. Sec. W
								APN Boo	k	Page			Parcel	
								Township		Range		- n	Sectio	n
								(Skeich m	Locatio	on Skete by hand after North	ch r form is pri	inted.)		Activity w Well dification/Repair Deepen Other strice procedures and materials serice procedures and materials serice procedures and materials
								West				East		Planned Uses ater Supply Domestic Public rrigation Industrial athodic Protection evalering eat Exchange ection poiloring
	-						ĺ	illustrate or de rivers, etc. and Pisase be acc	rscribe distance o d attach a map. (curate and comp	South f well from roa lise additional (Nets.	ds, buildings, paper If neces	fences, Isary.		emediation barging est Well apor Extraction ther
	-							Water L	evel and	Yield of	f Comp	leted W	/eli	
	enth of Bo		-	12.7'	-	Feet		Depth to Depth to Water Lo Estimate	first water Static evel		(Feet) Date	_ (Fee Measu Type	t below surface)
Total De	epth of Co	mpleteri	Well		1.0	Feet		Test Ler	igth		(Hou	rs) Total	Drawd	own (Feet)
	.p 01 00	mpiereu		A				May no	t be repres	entative (of a well	s long te	rm yiel	d.
Depth Surf Feet to	from ace Feet	Borehole Diameter (Inches)	Туре	Casi Mater	ngs iai	Wall Thickness (Inches)	Outside Diameter (inches)	Screen Type	Slot Size if Any (inches)	Depth Sur Feet t	from face to Feet	Fil		Description
										Ø	127'	Cen	ent	
		1												
							1		=			1		
	Geologic I Well Cons Geophysic	Attachn Log struction I cal Log(s	n ents Diagram)		I, the ur Name	ndersigned CASCAD Person, I 5. 23RD \$	1, certify th DE DRILL Firm or Corpo STREET	at this report ING ration	t is comple	ion Stat te and ac HMOND	curate to	the bes	t of my	knowledge and belief 94804
Attach addi	Soil/Water Other S , c	r Chemic TC n ation, if it ex	al Analyses		Signed	C-57 Lic	Address ensed Water V	Well Contractor	a. array	City	7-31 Date Sig	-17 9 gned 0	1316 13811(2-57 Lic	Zip) cense Number

DWR 188 REV 1/2006

File Origina Page Owner's W Date Work Local Perm Permit Nur	Al with D All Numl Began Dit Agent Mber 53		NW I-r ont W-D	- 0.1 -) erly U1.83.A Geolog	83 - A Date V Permit Date		State Refer to No. (ied] - 1 30 - 17	e of Califor pletio Instruction Pa e 0348537 9 -17	nia n Repol			DWR State	Well Nur N APN/T	y – Do Ni Inber/Site	ot Fill In Number Longitude	
Drilling M Depth fi	ethod Pr	face		C Honz	Desc	Drilling Fi	uid		Mailing A	ddress P	D. DO	<u>x 50</u>	108 08		710 9394-	1610 4
<u>Feet</u>	10 10		110	Uescr	ibe material, g	rain size,		SUCA.				Wall 1				
			3	aet ckfi move	trim top	nea 21	L Sra t Cur	nent	Address City 22 Latitude	Dea.	Min. S.	BC. N	Concentration Concentration	unty <u>M</u> Ide <u>De</u> Dec. L	a Min. Sec	
									APN Boo)k	Page		_	Parcel]
									Townshi	P	Range	_		Sectio	n	
_										Locatio	n Sket	ch			Activity	
Total De	epth of E	loring	ted V		2.3 '		Feet Feet		(Sketch m Sketch m Bustrate or d there, etc. an Please be Water L Depth to Depth to Depth to Uvater L Estimato Test Let "May no	Locatto L	South South well from rea the additional left	da, buildinga, paper if nece f Comp (Feel (GPM	Inted.)	O Ne O Mo O O O De De C Wa O De O Va O Ca O De O He O Inj O Mo O Re O Te O Va O O O Mo O Te O Va O O O Mo O De Ca O DE O DE CA O DE CA O DE O DE CA O DE O DE O DE O DE O DE O DE O DE O DE	w Well dification/Repair Deepen Other stroy stroy stroy stroy the focedures and mathematic post coold Loce Planned Uses ater Supply Domestic Pub- migation Indu thodic Protection watering eat Exchange ection ponitoring energialion parging est Well apor Extraction her t below surface) red (Fer d.	et)
					Cae	200							Annu	lar Mat	erial	
Depth Sur Feet	from face o Feet	Borel Diam (Inch	eter es)	Туре	Mater	rial	Wall Thickness (inches)	Outside Diameter (Inches)	Screen Type	Slot Size if Any (Inches)	Depth Sur Fect t	from face	F	illi	Descriptio	n
			-+							┼──┤	6	123	am	10 P		
 			-+	-												
—	l									<u> </u>						
H		-	+		1											
				-									1			
		A 44-	a hare	ante	1					Cartificati	on Stat	omont				
	Geologic Well Cor	Log Struct	ion D	iagram		I, the u Name		d, certify th	at this repor	t is complet	te and ac	curate t	o the be	st of my	knowledge and l	belief
	Geophys	sical Lo	og(s)	_		120 :	S. 23RD 5	STREET	6401	RICI	HMOND)			94804	
	Soil/Wat	er Che	mica	I Analyses		Signed	C-57 Lic	Address ensed Water V	Vell 20ntractor		City	7 - 3	- <u>-</u>	State 938110 C-57 Lie	Zip) cense Number	
DWR 188	REV 1/200	ngation, i VS	. 11 8/05	1 <u>9</u> .					LISE NEXT C	DNSECUTIVE		ED FORM		5 51 EN	and the second	

File Original with DWR Page of Dwner's Well Number WW - OUI - 82 - A Date Work Began Date Local Permit Ager <u>Monteccy</u> Colored Permit Number 29.	State of Califor Well Completion Refer to Instruction Pa No. e0348520 Work Ended 7-19-17 Health Dept.	nia n Report mphiet		DWR State	Vel Numbe	Do Not Fill r/Site Numt Long I I I /Other	In
Geologic Log			_	Well C	Owner	(n)	
Orientation Overtical Overtical	OAngle Specify	NameDelord	10L ATT	R. WI	liam tal	uns/Ex	N.Coordinated
Drilling Method DrillSune Cast 7 4	Orilling Fluid	Mailing Address	P.O. BO	X. 50	OB		
Depth from Surface J Des	cription	City Monter	01		State	C# Zin	93944
N 123' WELL TRATILITION	Processe Grant	C.S.		Well 1	ocation		
0-172' + 44 001	A sale	Address fire	na- D	40	10	-	
Rackfill w/n	eat coments	City 110(11	10		County	Mar	torout
		Latitude		N	Longitude		- Iw
		Deg	Min	iec.		Deg	Min. Sec.
		Datum	_ Dec. Lat.		D	ec. Long.	
		APN Book	Page		P	arcei	
		Township	Kange	-			
		(Sketch must be dra	ation Sket wn by hand afte	:СП ar form is pr	ninted.)	New We	
			North	_		Modifica	ation/Repair
						O Deej	pen i
					- Ĉ	Destroy	
						Under "GEO	DLOGIC LOG
						Plan	ned Uses
) Water S	Supply
		at a start			t.		
	Salar I	Ň			ı, and a second se		o Protection
						Dewate	rina
						D Heat E	change
						D Injection	n
		200					ing
						C Remedi	iation
-		1999 C				D Test W	ell I
-		M	South	de builtetteren		O Vapor E	Extraction
		rivers, etc. and attach a ma Please he accurate and d	ap, Use additional	paper if nece	issary.	Other_	
		Water Level a	nd Yield o	f Com	pleted We	II III	
		Depth to first wa	ler			(Feet belo	ow surface)
		Depth to Static		/=	N D-4- 11	a a a sure of	
Total Depth of Bering	East	Estimated Vield	•	(Fee)	() Date M	easured _	
	ree.	Test Length		(Hou	rs) Total D	rawdown	(Feet)
Total Depth of Completed Well	Feet	May not be rep	resentative	of a well	's long term	n yield.	
Ca	sings	van _ III - III - III			Annular	Materia	
Depth from Borehole Type Mat	erial Wall Outside	Screen Slot Sl	ze Depti	h from	Fill		Description
Feet to Feet (Inches)	(inches)_(inches)	(inches	s) Feet	to Feet	1 10		
	¥		<u> </u>	123'	Cener	1-t	
┣━──┼──┼───┼───┼							
					1		
Attachments		Certific	ation Stat	tement		1000	
	I, the undersigned, certify that	at this report is com	plete and a	ccurate t	o the best o	of my know	wledge and belief
Well Construction Diagram	Name CASCADE DRÍLLI	NG					
Geophysical Log(s)	120 S. 23RD STREET	<u>R</u>)	<u></u> <u>CA</u>	9480	4
Soil/Water Chemical Analyses	Signed Address	6 Tan	City	7-21	State -17 93	8110	Ľ۳
Attach additional information, if it exists	C-57 Licensed Water V	Vell Contractor		Date Si	gned C-5	7 License	Number
DWR 188 REV 1/2006	IF ADDITIONAL SPACE IS NEEDED.	USE NEX CONSECUT	VELY NUMBE	RED FORM	1		

ile Original with DWR age of wner's Well Number late Work Began ocal Permit Agency rermit Number 5309	MW-0UI-50-A -U-I7 Date V MONTEREY COUNT MW-0U D-APermit Dat Geologic Log Vertical O Horizontal	State of Califor Well Completion Refer to Instruction Pa No. e0348538 Work Ended <u>1 - 19 - 17</u> V Health Dept e 5-30 - 17	nia n Report mphiet	DWR Use Only - Do State Well Number/S Latitude Latitude APN/TRS/Ot Well Owner	Not Fill In
Drilling Method <u>Pres</u>	Bucegrant 4"	Drilling Fluid	Mailing Address	PO. 66 × 500 8	4 - 0294A
Feet to Feet O' MI2	Describe material. Well Destruction Grout trimmie Backfill with Demove top	grain size, color, etc : Pressure growt Deat coment 2'	City <u>Dign Tea</u> Address <u>Firm</u> City <u>Maria</u> Latitude <u>Dea</u>	Well Location Well Location Well Location Lv fort ard. County d Min. Sec. N Longitude _ Dec Lat Dec	Manterey Dea. Min. Sec. W
			APN Book	_ Dec. Lat Dec. Page Parc	cel
			Township	RangeSec	lion
			Bustrate or describe distance of the second	South	Activity New Well Modification/Repair O Deepen O Other Destroy Descrbe procedures and materials under CEQLOGIC LOO* Planned Uses Water Supply Domestic Public Inrigation Industrial Cathodic Protection Dewatering Heat Exchange Injection Monitoring Remediation Sparging Test Well Vapor Extraction Other Destroy Extraction Cathedia Surface)
			Water Level	(Feet) Date Mean	sured
Total Depth of Borin	pleted Well	Feet	Test Length	(GPM) Test Type (Hours) Total Drav resentative of a well's long term vi	wdown (Feet) ield.
	Cas	ings		Annular M	aterial
Surface Di Feet to Feet (I	rehole Type Mate ameter Type Mate nches)	rial Thickness Diameter (Inches) (Inches)	Screen Slot Si Type if An (Inche	Surface Fill Feet to Feet	Description
At Geologic Lo Well Constru Geophysica Soil/Water C Z Other 5 Attach edditional informati	tachments g uction Diagram I Log(s) Chemical Analyses Herrow Mag	I, the undersigned, certify the Name CASCADE DRILLI Person Firm or Corpor 120 S. 23RD STREET Address Signed C-57 Licensed Water V	Certific at this report is com ING ation R Well Contrac or	ation Statement plete and accurate to the best of r ICHMOND CA City 9381 Date Signed C-57	ny knowledge and belief 94804 Zip 10 License Number

File Original with DWR Page of Dwner's Well Number Date Work Began Local Permit Agency MONTEREL COUNT Permit Number 330 , 02-001 02-00 Permit	State of California Well Completion Repo Refer to Instruction Pemphilet No. e0348521 ate Work Ended <u>7-19-17</u> Health Dept. Date 5-30-17	t Latitude APN/TRS/Other						
Geologic Los		Well Owner						
Orientation Vertical O Horizontal	OAnale Specify	and processing william collias/ENV. coordination						
Drilling Method Dressure Arout 6	Drilling Fluid	Harry PA BAX 6008						
Depth from Surface J	Description	Marsh City Charles A The GRG 44						
Feet to Feet Describe mate	rial. grain size, color, etc							
o ist wert pestille	2100 PILSSUR	Well Location						
Grout we	Address	Dimertart ora.						
grait puc	City M	City Marina County Monetered						
ement	Latitude	N Longitude W						
	Datum	Declat Declara						
	APN Bog	Rane Parcel						
	Townshi	Pange Section						
		Leastion Skatch						
	(Sketch r	ust be drawn by hand after form is printed) O New Wall						
		North O Modification/Repair						
		O Deepen						
		Describe procedures and materials under SEE0 DOIC LOGT						
		Planned Lises						
		O Water Supply						
	es l	👸 🔲 Irrigation 🛄 Industrial						
	3	O Cathodic Protection						
1 <u>1</u>		O Dewatering						
		O Heat Exchange						
		O Injection O Monitoring						
	2 2 2 2							
		O Remediation						
		South O Vapor Extraction						
	Wustrate or d	scribe distance of well itom roads, buildings, fences, attach a men. Use additional paper if pecesaary						
	Plaase be at	surate and complete.						
	Water	evel and Yield of Completed Well						
	Depth to	first water (Feet below surface)						
	Depth to Water I	Static evel (Feet) Date Measured						
Total Depth of Boring	Feet	d Yield * (GPM) Test Type						
	Test Le	gth (Hours) Total Drawdown (Feet)						
Total Depth of Completed Well	*May no	be representative of a well's long term yield.						
	Casings	Annular Material						
Depth from Borehole Type	Wall Outside Screen	Slot Size Depth from						
Surface Diameter 'ype	(inches) (inches)	if Any Surface Fill Description						
		0 137' cement						
	0							
Attachments		Certification Statement						
Geologic Log	1, the undersigned, certify that this report	is complete and accurate to the best of my knowledge and belief						
Well Construction Diagram	Name CASCADE DRILLING							
Geophysical Log(s)	120 S. 23RD STREET	RICHMOND CA 94804						
Soil/Wat es	Signed Address	City State Zip						
Other SITA MAN	C.S7 Licensed Water Wall Contractor	Date Stand C 57 License Number						

File Origina Page Owner's W Date Work Local Perm Permit Nun Permit Nun Drilling Mo Depth fr	al with Di iell Numt Began hit Agence hit Ag	WR of of of net of of net of net net of net	Geolog Geolog OHIOHORIZ	Date V Date V Anty H Permit Date ic Log contal 5 11 Desc	Vork Enc Arrightion	Stat ell Con Refer to No. 1 ded 1- be 1 Specify luid	te of Califo npletio D Instruction P e0348655 19-11	mia amphiet Namedoc Mailing Av	torder		DWF State		Inly – Do N umber/Site	ot Fill In Number Longitude 1	
Feet	to Fee	st Allert	Descri	ibe material, g	rain size,	color, etc		City 4		<u>e</u> g		<u>S</u>	tate Cr	Zip JIPT	
9,	105	<u> </u> W	LIDEST	ruction	· 410	SSULL	Growt		0	- 0	Well L	ocatio	on		
			WUI -	165 . 1	11000	nys	rost	Address	form	v toc	1.000	γ		4	
Baskful uncat cement								City M	acia	a	_	c	ounty	101 torey	
			emove-	10 2	_			Latitude			N	Longi	tude	W	
	-		~					Datum	Dea,	Min. Dec. Lat	Sec.		Dec I	ia. Min. Sec.	
									le.	Dec. Lai			_ Dec. L	.ong	
								APN BOD	K	Page			Parce		
								Township)	Range)		_ Sectio	<u> </u>	
								(Skeich m	Loca	tion Ske	tch	(hetoi		Activity	
-								(Onota) III		North		anda.7		w vveli dification/Renair	
											Ζ,			Deepen Other	
-								11					De	scribe procedures and materials	
														Planned Lises	
<u> </u>								11					O W	ater Supply	
L						-	_	11							
 						_	_	vest						rrigation 🔲 Industrial	
	_						_	1 5				ŭ		athodic Protection	
								41					O Dewatering		
-				= = .		-					O Heat Exchange				
					· · · ·]					O Inj	O Injection	
						24	-						O M	onitoring	
1.0													O Remediation O Sparging O Test Well O Vapor Extraction O Other		
						_									
										South					
								Illustrate or de	scribe distand	of well from re	ada, buildinga I paper if nece	, lences,			
	1							Please be act	urate and co	mplete.					
								Water L	evel an	d Yield (of Comp	pleted	Well		
						1.1		Depth to	first wat	er			(Fee	t below surface)	
	+							Depth to	Static		/Fee	n Da	te Measu	red	
Total De	onth of B	oring	1	251		Feet		Estimate	d Yield *		(GPN	() Da () Te	st Type		
Total De	parore	onng.		<u>us</u>				Test Len	ath		(Hou	rs) To	tal Drawd	own (Feet)	
Total De	epth of C	ompleted	Weli	-		Feet		*May no	t be repr	esentative	of a well	's long	term yiel	d.	
				Casi	nas					1		Ann	ular Mai	terial	
Depth	from	Borehole	Tune		tal	Wall	Outside	Screen	Slot Siz	Dep	th from				
Surf	ace	Diameter (loobos)	iype	TTHELT	HOI	Thickness (Inches)	Diameter	Туре	if Any	Su	rface		FID	Description	
			_						(manos	01	105	00.0	بلمعه		
					•		52		†		1.02				
						1	-				1				
											1	1			
			100	1							Ţ				
		Attach	nents						Certific	tion Sta	tement				
	Geologia	Loa			I, the u	ndersigned	d, certify th	at this report	is comp	ete and a	ccurate t	o the b	est of my	knowledge and belief	
	Vell Con	struction	Diagram		Name	CASCAL	DE DRILL	ING							
	Geophys	ical Log(s)		1205	S. 23RD S	TREET	rauon	RI		D		CA 9	94804	
	SoilWate	er Chemic	al Analyses			Diel: At-	Address	City Zip							
	Other 🔔	ite-	na p		Signed			Well Contractor		\rightarrow	<u>7-37-</u>		938110	J Jacoba Mumber	
Attach addi	UONAL INFOR	mation, if it ex 6	asts. •				E IC NEEDE	LICE NEYT CO	NSECUTA	LI V AU MAD	Date Si	gnea	0-97 LI	SUSE INTILIDEL	
		-				JOHNE OFAU		SOL HEAT OU							

File Origina Page Owner's W Date Work Local Pern Permit Nur	el with D\ lell Numb Began _ hit Agenc nber 53 12	of ber	ant No.	711-17 17 17 17 17 17 17 17 17 17 17 17	59-A Date V OUAT	Work End	Stat ell Con Refer to No. Ind 30 - 1	e of Californ pletio Instruction Ple e0348522 -/9 -/ Dept.	mia n Repor amphiet)	t		DWR State	Use Oni I Well Nun N APN/T	y - Do N	ot Fill In Number Longitude	
				Geolog	ic Log		10-22-201	1000				Well C)wner			
Orien	tation	Ver	tical	O Horiz	ontal	OAngle	Specify		Name a	ard Bra	e office		en al	lias/1	ENV. coordinates	
Drilling M	ethod	ssu	2	Cast	0	Drilling Fl	uid		Mailing Ad	tdress P	0.001	x 50	08			
Depth f	om Sur	lace		1	Desc	ription			City M	ntor0	11		Stat	LA	7in 93944	
Feet		<u>n</u> 71	1. /.		be material.	grain size,		0.01								
<u> 0. </u>	103	14	WI	NI DEPI	Incan	19-	1100	WY L		-A	-	Well Lo	cation	<u>ا</u>		
	<u> </u>	!	94	Ut W	<u>un_0</u>	-102:	·	0	Address	torma	C +2 1	+ 01	a	_	to the second	
			JY	VIMMIN I	LAYN	171	Back	CFIN	City MOVINA County/MOVITECEN							
			2	reat	anne	nt.			Latitude			N	Longitu	ide	/_w	
										Deg	Min. S	ec.		De	iq, Min. Sec.	
									Datum		Dec. Lat.	-		Dec. L	.ong	
1							-		APN Bool	k	Page	_	_	Parce		
	1								Township		Range			Sectio	n	
		\rightarrow								Locatie	on Sket	ch			Activity	
_	-								(Sketch m	ust be drawn i	by hand afte	r form is pri	nted.)	O Ne	w Well	
										I	North	- <u>(</u>		O MC	dification/Repair	
		-+												0	Deepen	
	_														Other	
	<u> </u>													De	Stribe procedures and materials	
													200	un	der "GEOLOGIC LOG"	
1.0															Planned Uses	
														O Wa	ater Supply	
	_								Š				ä		rrigation L Industrial	
	-												1	O Ca	athodic Protection	
								-	11					O De	ewatering	
	_								11					O He	eat Exchange	
							_		11						ection	
					_				11					I Q M	onitoring	
															emediation	
									11						barging	
									1		South			O Test Well O Vapor Extraction		
200				1	1.11		100		illustrate or der	scribe distance o	f well from roa	ds, buildings,	lences,			
						-			Please be acc	urate and comp	siete.	baber is necei	ISIN'Y		iner	
	+						-	_	Water L	evel and	Yield of	f Comp	leted V	Vell		
-					-				Depth to	first water	_			(Fee	t below surface)	
						_			Depth to	Static					,	
<u> </u>					1.1.0.2				Water Le	evel	_	(Feet) Date	Measu	red	
Total De	epth of B	oring			103	_	Feet		Estimate	d Yield *		(GPN	1) Test	Туре_		
Total De	epth of C	omple	led V	Vell			Feet		Test Len	gth	=	(Hou	rs) Tola	I Drawd	own(Feet)	
_									May not	t be repres	entative	of a well'	s long t	arm yiel	d	
					Cas	ings							Annu	lar Mat	terial	
Depth	from	Boreh	ole	Туре	Mater	rial	Wall	Outside	Screen	Slot Size	Depth	from			Deserved	
Feet t	Feet	(Inche	BS)				(Inches)	(Inches)	(Aba	(Inches)	Feet t	o Feet			oescription	
			T								01	1077	Cin	w		
			-													
							i									
										(
				-		_	1				1					
		A 44.0 -	-	onto						ortifice Al	In Stat	ament		_		
	Coolers'-	Attac	TUL	51112		1 the re	ndersioner	L cortifu th	at this report	is complet	te and an		the ha	st of my	knowledge and ballef	
	Secilogic	LUG etrucki		iaaram		Name	CASCAE	DEDRILL	ING	a comple			ane be	a or my	anymedge and bellet	
1 8	Seonhue	ical Le	on D m(e)	ayıdırı		400 0	Person, I		ation	DIO				~^ /	04804	
	Soil/Mate	er Che	.g(3) mice	I Analyses		<u>120 S</u>	2. 23KU S	Address	<u> </u>	City State Zin						
ے اط	Other S	te	mA	L VI		Signed	100		1	anar		7-31	- 🗖 🗋	938110)	
Attach add	tional inform	nation, if	it exis	its		Ľ	C-57 Lic	ensed Water \	Vell Contractor		-	Date Sig	ned	C-57 Lic	ense Number	
		-														

DWR 188 REV 1/2006

File Original with DWR Page of Date Work Began T	State of California Well Completion Report Refer to Instruction Pamphiet No. e0348660 Nork Ended 1-19-17 Health Dept- e OAngle Specify Drilling Fluid mailing Address City Acontect No. e0348660 Nork Ended 1-19-17 Health Dept- e Drilling Fluid mailing Address City Acontect	DWR Use Only - Do Not Fill In State Well Number/Site Number State Well Number/Site Number Latitude Latitude Latitude Mell Owner Well Owner State Office Whose Coll of Epy/, Coords Octor PO. Coll 5008 Ce.y State Cla zip 939,44 Well Location
Grant trimm Backtill wir Demovi top	Address forme Verify Marie Zi Latitude Dec. Datum APN Book Township	L/ to'rt ord. Da. County Monderan Min. Sec. Dec. Lat. Dec. Long, Page Parcel Range Section
Total Depth of Boring	Itustrate of describe distance Itustrate distance	Activity awn by hand after form is printed.) North O New Well O Deepen O Other Destroy Destroy Destroy Deverbe procedures and materials under 'GEOLOGIC LOG' Planned Uses O Water Supply Domestic Problic Irrigation Industrial O Cathodic Protection Dewatering Heat Exchange Injection Monitoring Remediation O Sparging Test Well Vapor Extraction O Other Inte additional paper if necessary. or Wall for Completed Well Attraction (Feet) Date Measured
Cas Depth from Borehole Turne Mate	ings dat Well Outside Screen Slot Si	Annular Material Depth from
Surface Diameter Tro Mater	Thickness Diameter Type if An (Inches) (Inches) (Inches)	y Surface Fill Description s) Feet to Feet 0 ^t 12b Cement
Attachments	Certific	cation Statement
Construction Diagram Construc	Name CASCADE DRILLING Person, Firm or Corporation 120S. 23RD STREET Address Signed Rick Alcartage C-57 Licensed Water Well Contractor IF ADDITIONAL SPACE IS NEEDED, USE NEXT CONSECUT	City CA 94804 City J - 17 938110 Date Signed C-57 License Number

File Original with DWR Page of Date Work Began 1-1 Date Work Began 1-1 Docal Permit Agency W Permit Number 14 Orientation Vertil Drilling Method 10 Depth from Surface Feet O' 114.5'	W-011-74-A 1-17 Date W Intercy (ounty M 74- A Permit Date Geologic Log ical O Horizontal Describe material, g NOM NEATURE Yout 0 - 1195, Jourt Back	State of Califor Well Completion Refer to instruction Pa No. e0348523 Vork Ended <u>19-11</u> Heath Dept. <u>5-30-11</u> Dangle Specify Drilling Fluid Tiption rain size, color, etc. <u>britterstand</u>	nia Report mphiet Namaria de Mailing Address City Monter Address Form City Monter City Monter City Monter Datum	DWR Use On State Well Nur Latitude Latitude Well Owner Well Owner Well Owner Well Conter Well Location Well Location Well Location Min. Sec. Dec. Lat.	iy - Do Not Fill In mber/Site Number Longitude IRS/Other WINS/ENV. Courdinue te CA_zip 93944 Dea_Min_Sec. Dec. Long.		
			APN Book	Page	Parcel		
			Township	Range Range	Section		
			Loca (Sketch must be draw (Sketch must be draw)))))))))))))))))))	South	Activity New Well Modification/Repair O Deepen O Other Destroy Destroy Destroy Destroy Destroy Destroy Destroy Planned Uses Vater Supply Domestic Dublic Inrigation Industrial Cathodic Protection Dewatering Heat Exchange Injection Monitoring Remediation Sparging Test Well Vapor Extraction O ther Well (Feet below surface)		
			Water Level	(Feet) Date	e Measured		
Total Depth of Boring	119.5	Feet	Estimated Yield	GPM) Tesi (Hours) Tesi	I Type		
Total Depth of Complete	ed Well	Feet	*May not be rep	resentative of a well's long t	erm yield.		
	Casi	ngs		Annu	lar Material		
Depth from Boreho Surface Diamet Feet to Feet (Inche	ole Type Mater s)	ial Wall Outside Thickness Diameter (Inches) (Inches)	Screen Slot Siz Type if Any (Inches	Zee Depth from Surface F Feet I Feet I	ill Description		
					1. 7645		
	2 N.C						
	hments	I the understaned cortify the	Certific	ation Statement	st of my knowledge and helief		
Well Construction	n Diagram	Name CASCADE DRILLI	at this report is complete and accurate to the best of my knowledge and belief				
Geophysical Log	J(S)	Person, Firm or Corpora 120 S. 23RD STREET	ation RICHMOND CA 94804				
Soil/Water Chen	nical Analyses	Signed	17	City 7-21-17	State Zip		
Attach additional information, if it	t exists	C-57 Licensed Water W	/ell Contractor	Date Signed	C-57 License Number		

DWR 168 REV 1/2006

This page was intentionally left blank.

ATTACHMENT B-2

BIOLOGICAL MONITORING DURING WELL DESTRUCTION

This page was intentionally left blank.



Denise Duffy & Associates, Inc.

PLANNING AND ENVIRONMENTAL CONSULTING

MEMORANDUM

Date: Friday, August 11, 2017

- To: Roy Evans, HydroGeoLogic, Inc.
- From: Matthew Johnson, Senior Environmental Scientist, Denise Duffy and Associates, Inc.

RE: Summary Memorandum for the Operable Unit 1 Fort Ord Natural Reserve Environmental Monitoring in Support of 2017 Deconstruction Activities

Denise Duffy and Associates, Inc. (DD&A) was contracted to provide biological services within the Fort Ord Natural Reserve (FONR), in support of the decommissioning and destruction of 33 well sites within the FONR and the associated groundwater treatment facility. DD&A reviewed the baseline biological survey and other historic surveys to determine the quantity and specific location(s) of any threatened or endangered plants and animals within the planned well destruction and treatment plant decommissioning areas; this review was performed prior to the onset of any intrusive activities. DD&A used this information to identify potential impacts from the proposed activities, if any, at each well site that could result in failure to comply with the guidance presented in the Installation-Wide Multispecies Habitat Management Plan (HMP) for Former Fort Ord, California (USACE 1997) and the Programmatic Biological Opinion (PBO) for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California (USFWS, 2015 and USFWS, 2017).

Before well destruction began, DD&A identified and marked-off potential access routes and acceptable work area boundaries, as necessary, to maintain personnel and vehicles in designated work areas and limit access to protected areas. On the first day of well destruction, DD&A conducted a briefing to the well destruction field crew to inform them of the habitat protection requirements and procedures that must be followed, as well as other topics as needed to ensure the work is performed in accordance with the 2015/16 PBO, HMP, and site-specific guidance and direction from University of California, Santa Cruz (UCSC) staff. The briefing included descriptions of the species of concern that are known to be or potentially present within the work area and appropriate encounter protocols. The briefing included protocols to be followed for encounters with rare wildlife, such as California tiger salamander (*Ambystoma californiense*) and black legless lizard (*Anniella pulchra nigra*).

Following the briefing, the DD&A biologist remained onsite during a majority of the first day of the well destruction effort to observe work practices and provide guidance/direction as needed to ensure the work proceeded in compliance with the identified guidance documents. After the well destruction effort and before demobilization, DD&A inspected the well sites, the deconstructed groundwater treatment facility site, and access routes to identify any potential damage and/or absence of damage to rare plant populations or associated habitats. Finally, DD&A prepared this summary report presenting the actions taken and observations made during the well destruction effort.

The field activities, which included the destruction of multiple wells in the FONR groundwater remediation system, were initiated on July 11, 2017, and were completed on July 18, 2017. The following is a summary of specific monitoring events and communication by DD&A personnel during well destruction activities at FONR. The summary below documents communication and meetings with staff from UCSC FONR and HGL, as well as construction oversight by the DD&A environmental monitor. DD&A staff was present onsite, as needed and as summarized below. DD&A's environmental monitor took pictures documenting construction impact areas after the completion of the well destruction effort. A map for each photograph and a photographic record compiled by the DD&A environmental monitor is included in Attachment A. The map included in Attachment A also includes site locations that will be referred to throughout this text.

- DD&A environmental monitor conducted an initial site visit on July 11, 2017. During the initial site visit DD&A environmental monitor participated in the construction initiation meeting. This meeting included a worker education on special-status species and contact protocol for all construction personnel expected to be involved in FONR well destruction activities. Additionally, the DD&A environmental monitor surveyed the construction site with HGL, FONR staff, and construction personnel to outline any environmental issues that may arise as part of the planned effort. Prior to the initiation of well destruction, the DD&A environmental monitor surveyed all the wells scheduled for destruction and mapped rare plants. the DD&A environmental monitor also flagged access routes when it was necessary to avoid specific resources. the DD&A environmental monitor inspected each well with the drilling crew responsible for well destruction and instructed them on how to avoid the sensitive natural resources.
- The DD&A environmental monitor conducted a site visit on July 12, 2017. The DD&A environmental monitor conferenced with HGL staff to ensure environmental compliance and inspected the well destruction and vegetation removal activities. The DD&A environmental monitor inspected the construction site to ensure all practices discussed during the worker education training were applied onsite.
- The DD&A environmental monitor conducted a site visit on July 14, 2017. The DD&A environmental monitor discussed vegetation removal with HGL Field Supervisor. The DD&A environmental monitor observed a coast live oak tree limb along main access corridor. Discussed measures with HGL Field Supervisor and drilling crew and reiterated the need for caution with overhanging branches and the excavator arm when driving along access routes between well sites. HGL Field Supervisor informed the FONR Steward of the damage to the coast live oak. The FONR Steward indicated that he would return to the location and properly trim the limb so that no additional impacts would arise in the future. No additional mitigation was necessary. DD&A environmental monitor discussed work progress with HGL Field Supervisor.
- The DD&A environmental monitor conducted a site visit on July 17, 2017. Environmental monitor discussed work progress with HGL Field Supervisor and observed ongoing activities.
- The DD&A environmental monitor conducted a final site visit on July 18, 2017. During this site visit the DD&A environmental monitor visited and photographed the construction site. Photos of each deconstructed well site have been appended to this report (Attachment A).

Monitoring efforts were concluded on July 18, 2017. All well destruction activities were conducted with an emphasis on minimal impact and consistent with the HMP and PBOs. The 2017 field activities at OU-1 FONR followed all recommendations and requirements of the UCSC FONR staff that were discussed during the construction initiation meeting.

References

- U.S. Army Corps of Engineers [USACE], 1997. Installation-Wide Multispecies Habitat Management Plan (HMP) for Former Fort Ord, California. April. BW-1787.
- U.S. Fish and Wildlife Service [USFWS]. 2015. Programmatic Biological Opinion for Cleanup and Property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California (8-8-09-F-74) (2015 Biological Opinion). May 28. AR# BW-2747.
- 2017. Reinitiation of Formal Consultation for Cleanup and property Transfer Actions Conducted at the Former Fort Ord, Monterey County, California (Original Consultation #8-8-09-F-74, 81440-2009-F-0334). June 7. AR# BW-2747A.

Attachment A OU-1 Fort Ord Natural Reserve Site Photos


Date: 8/10/2017



Attachment A OU1 FONR 2017 Photo Map



Photo 1. FONR OU-1 Well Sites EW-OU1-66-A, MW-OU1-67-A, MW-OU1-58-A, EW-OU1-Photo 2. OU-1 FONR Well Sites EW-OU1-66-A, MW-OU1-67-A, MW-OU1-58-A, EW-OU1-62-A, and MW-OU1-68-A Prior to Destruction. (July 11, 2017)62-A, and MW-OU1-68-A After Destruction. (July 18, 2017)



Photo 3. OU-1 FONR Well Sites MW-OU1-61-A, EW-OU1-60-A, MW-OU1-57-A, and EW-OU1-63-A Prior to Destruction. (July 11, 2017)

Photo 4. OU-1 FONR Well Sites MW-OU1-61-A, EW-OU1-60-A, MW-OU1-57-A, and EW-OU1-63-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 5. OU-1 FONR Well Site MW-OU1-50-A Prior to Destruction. (July 11, 2017)

Photo 6. OU-1 FONR Well Site MW-OU1-50-A After Destruction. (July 18, 2017)



Photo 7. OU-1 FONR Well Site MW-OU1-59-A Prior to Destruction. (July 11, 2017)

Photo 8. OU-1 FONR Well Site MW-OU1-59-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 9. OU-1 FONR Well Site MW-OU1-82-A Prior to Destruction. (July 11, 2017)

Photo 10. OU-1 FONR Well Site MW-OU1-82-A After Destruction. (July 18, 2017)



Photo 11. OU-1 FONR Well Site MW-OU1-83-A Prior to Destruction. (July 11, 2017)

Photo 12. OU-1 FONR Well Site MW-OU1-83-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 13. OU-1 FONR Well Sites MW-OU1-46-A & MW-OU1-46-AD Prior to Destruction. (July 11, 2017)

Photo 14. OU-1 FONR Well Sites MW-OU1-46-A & MW-OU1-46-AD After Destruction. (July 18, 2017)



Photo 15. OU-1 FONR Well Site MW-OU1-84-A Prior to Destruction. (July 11, 2017)

Photo 16. OU-1 FONR Well Site MW-OU1-84-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 17. OU-1 FONR Well Site IW-OU1-74-A Prior to Destruction. (July 11, 2017)

Photo 18. OU-1 FONR Well Site IW-OU1-74-A After Destruction. (July 18, 2017)



Photo 19. OU-1 FONR Well Site IW-OU1-73-A Prior to Destruction. (July 11, 2017)

Photo 20. OU-1 FONR Well Site IW-OU1-73-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 21. OU-1 FONR Well Site MW-OU1-85-A Prior to Destruction. (July 11, 2017)

Photo 22. OU-1 FONR Well Site MW-OU1-85-A After Destruction. (July 18, 2017)



Photo 23. OU-1 FONR Well Site EW-OU1-72-A Prior to Destruction. (July 11, 2017)

Photo 24. OU-1 FONR Well Site EW-OU1-72-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 25. OU-1 FONR Well Site MW-OU1-27-A Prior to Destruction. (July 11, 2017)

Photo 26. OU-1 FONR Well Site MW-OU1-27-A After Destruction. (July 18, 2017)



Photo 27. OU-1 FONR Well Site EW-OU1-71-A Prior to Destruction. (July 11, 2017)

Photo 28. OU-1 FONR Well Site EW-OU1-71-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 29. OU-1 FONR Well Site MW-OU1-86-A Prior to Destruction. (July 11, 2017)

Photo 30. OU-1 FONR Well Site MW-OU1-86-A After Destruction. (July 18, 2017)



Photo 31. OU-1 FONR Well Sites PZ-OU1-49-A1 and EW-OU1-49-A Prior to Destruction. (July 11, 2017)

Photo 32. OU-1 FONR Well Sites PZ-OU1-49-A1 and EW-OU1-49-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 33. OU-1 FONR Well Site MW-OU1-87-A Prior to Destruction. (July 11, 2017)

Photo 34. OU-1 FONR Well Site MW-OU1-87-A After Destruction. (July 18, 2017)



Photo 35. OU-1 FONR Well Site MW-OU1-88-A Prior to Destruction. (July 11, 2017)

Photo 36. OU-1 FONR Well Site MW-OU1-88-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 37. OU-1 FONR Well Site MW-OU1-26-A Prior to Destruction. (July 11, 2017)

Photo 38. OU-1 FONR Well Site MW-OU1-26-A After Destruction. (July 18, 2017)



Photo 39. OU-1 FONR Well Sites PZ-OU1-10-A1 and IW-OU1-10-A Prior to Destruction. (July 11, 2017)

Photo 40. OU-1 FONR Well Sites PZ-OU1-10-A1 and IW-OU1-10-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 41. OU-1 FONR Well Sites IW-OU1-02-A and PZ-OU1-02-A1 Prior to Destruction. (July 11, 2017)

Photo 42. OU-1 FONR Well Sites IW-OU1-02-A and PZ-OU1-02-A1 After Destruction. (July 18, 2017)



Photo 43. OU-1 FONR Well Site EW-OU1-52-A Prior to Destruction. (July 11, 2017)

Photo 44. OU-1 FONR Well Site EW-OU1-52-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos



Photo 45. OU-1 FONR Well Site EW-OU1-53-A Prior to Destruction. (July 11, 2017)

Photo 46. OU-1 FONR Well Site EW-OU1-53-A After Destruction. (July 18, 2017)

OU-1 FONR 2017 Well Deconstruction Site Photos

This page was intentionally left blank.

ATTACHMENT B-3

FIELD DOCUMENTATION

This page was intentionally left blank.

Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

CQC Report Number` 01	Date or Time Period 07/11/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Su (703) 4	ite 400 478- <u>5</u> 1) 86
Weather Conditions:					
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	np High: 65 °F			
Quality Control Inspections Performed This Da	ate (Include inspections, results, o	deficiencies observed and corrective action	n.)		
Preparatory Phase Checklist: Initial Phase Checklist: Follow-up Phase Checklist:			Yes Yes Yes	No No No	
ampling and Testing					
lave data quality objectives been achieved? lotes: None			Yes Yes	No No	NA NA
lealth and Safety Vorker protection levels this date: Level D					
Vas any work activity conducted within a confined Vas any work activity conducted within an area det Vere approved decontamination procedures used	space? termined to be immediately on workers and equipmen	y dangerous to life and health? t as required?	Yes Yes Yes	<mark>No</mark> No No	NA
Safety Comments: (Include any infractions of approved	d safety plan and include instruc	tions from government personnel. Spec	ify correctiv	ve action t	taken.)

Work Activities Performed This Date

Pressure grouted wells listed below.

Removed protective housing and pulled pumps from: EW-OU1-60A and EW-OU1-66A.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17		
MW-OU1-58-A	7-11-17		
MW-OU1-61-A	7-11-17		
MW-OU1-68-A	7-11-17		
EW-OU1-60-A	7-11-17		
EW-OU1-66-A	7-11-17		
			-
			-
			-
Totals			

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent	1		HGL Vehicles	3	
CQCSM/HSO	1		Drillers trucks	3	
Assoc. Scientist			Trailers	1	
Sub-Contractors			Backhoe		
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller					
Drillers Helper					
Cal Safety-sub to National					
DDA					
Total Hours					

(None)			
Work Progress	Were there any contractor-caused delays or potential finding of fact?	Yes	No
	Were there any government caused delays or potential finding of fact?	Yes	No
	Were there any unforeseeable or weather-related delays? NO		

Comments/Unusual Conditions

Photographs

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager Kevin Wierengo Date 7/11/17

Site Superintendent _____ Date _____

Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

CQC Report Number` 02	Date or Time Period 07/12/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Su (703) /	ite 400 478-51) 186
Weather Conditions:					
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	p High: 65 °F			
Quality Control Inspections Performe	d This Date (Include inspections, results, o	leficiencies observed and corrective action	n.)		
Preparatory Phase Checklist:			Yes	No	<mark>0</mark>
Initial Phase Checklist:			Yes	No	<mark>0</mark>
			Yes	No	<mark>0</mark>
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted.	his day (Include corrective actior	taken and anticipated date o	f correct	ion).	
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing Has field-testing been performed this date	his day (Include corrective action	taken and anticipated date o	f correct	ion). No	NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing las field-testing been performed this date lave data quality objectives been achieved lotes: None	his day (Include corrective action	taken and anticipated date o	f correcti Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing Has field-testing been performed this date Have data quality objectives been achieved None Health and Safety	his day (Include corrective action	taken and anticipated date o	f correct Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing las field-testing been performed this date lave data quality objectives been achieved lotes: None Health and Safety Vorker protection levels this date: Level D	his day (Include corrective action ? ed? D	taken and anticipated date o	f correcti Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing Ias field-testing been performed this date Iave data quality objectives been achieved Iotes: None Health and Safety Vorker protection levels this date: Level I Vas any work activity conducted within a	his day (Include corrective action ? ed? D confined space?	taken and anticipated date o	f correcti Yes Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing tas field-testing been performed this date tave data quality objectives been achieved totes: None Health and Safety Vorker protection levels this date: Level I Vas any work activity conducted within a Vas any work activity conducted within ar	his day (Include corrective action ? ed? D confined space? n area determined to be immediately	taken and anticipated date o	f correct Yes Yes Yes Yes Yes	ion). No No <mark>No</mark>	NA NA

Work Activities Performed This Date

- 1) Pressure grouted wells and demolished surface competitions. Locations specified in the table below.
- 2) Removed protective housing and pulled pumps from: EW-OU1-62A and EW-OU1-63A.
- 3) Removed GAC from four GAC vessels. GAC was transported off site for regeneration.
- 4) Began removing piping and electrical components from the Northwest Treatment System.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17	7-12-17	7-12-17
MW-OU1-58-A	7-11-17	7-12-17	7-12-17
MW-OU1-61-A	7-11-17	7-12-17	7-12-17
MW-OU1-68-A	7-11-17	7-12-17	7-12-17
EW-OU1-60-A	7-11-17	7-12-17	7-12-17
EW-OU1-66-A	7-11-17	7-12-17	7-12-17
MW-OU1-57-A	7-12-17		
EW-OU1-62-A	7-12-17		
EW-OU1-63-A	7-12-17		
		-	-
		-	-
		-	-
Totals			

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent	1		HGL Vehicles	3	
CQCSM/HSO	1		Drillers trucks	3	
Project Manager	1		Trailers	1	
Out Out to a family			Deathan		
Sub-Contractors			Backhoe	2	
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller	1				
Drillers Helper	2				
Cal Safety-sub to National					
DDA	1				
Ultra Environmental	2				
Total Hours					

Instructions give	ren by the Government to the Contractor (Include names, reactions, and remarks.)		
(None)			
Work Progress	Were there any contractor-caused delays or potential finding of fact? Were there any government caused delays or potential finding of fact? Were there any unforeseeable or weather-related delays? NO	Yes Yes	No No

Comments/Unusual Conditions

Photographs



Photo 01 – Removing bollards and surface completion.



Photo 02 – Removing GAC from vessels.



Photo 03 – Seven super sacks of GAC removed from vessels.

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager Kevin Wierengo

Site Superintendent -

Date _____

Date _ 7/12/17

Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

CQC Report Number	Date or Time Period 07/13/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Su (703) -	ite 400 478-51	D 186
Weather Conditions:					
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	np High: 65 °F			
Quality Control Inspections Performe	ed This Date (Include inspections, results,	deficiencies observed and corrective action	n.)		
Preparatory Phase Checklist:			Yes	No	<mark>0</mark>
Initial Phase Checklist:			Yes	No	<mark>o</mark>
			Yes	No	<mark>0</mark>
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted.	his day (Include corrective action	n taken and anticipated date o	f correct	ion).	
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing Has field-testing been performed this date	his day (Include corrective action	n taken and anticipated date o	f correct Yes	ion). No	NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing las field-testing been performed this date lave data quality objectives been achieved lotes: None	his day (Include corrective action	n taken and anticipated date o	of correct Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing las field-testing been performed this date lave data quality objectives been achieved lotes: None Health and Safety	t his day (Include corrective action a? ed?	n taken and anticipated date o	f correct Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing las field-testing been performed this date lave data quality objectives been achieved lotes: None lealth and Safety Vorker protection levels this date: Level I	his day (Include corrective action ed? D	n taken and anticipated date o	f correct Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing las field-testing been performed this date lave data quality objectives been achieved lotes: None Health and Safety Vorker protection levels this date: Level I Vas any work activity conducted within a	his day (Include corrective action ?? ed? D confined space?	n taken and anticipated date o	f correct Yes Yes Yes	ion). No No	NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected to None noted. Sampling and Testing las field-testing been performed this date lave data quality objectives been achieved lotes: None Health and Safety Vorker protection levels this date: Level I Vas any work activity conducted within a Vas any work activity conducted within and Vas any work activity conducted within any conducted within any conducted within any conducted within any co	this day (Include corrective action e)? ed? D confined space? n area determined to be immediatel	n taken and anticipated date o	f correct Yes Yes Yes Yes Yes	ion). No No <mark>No</mark> No	NA NA

Work Activities Performed This Date

- 1) Pressure grouted wells and demolished surface competitions. Locations specified in the table below.
- 2) Removed protective housing and pulled pumps and/or piping from: MW-OU1-64AD, IW-OU1-73A and IW-OU1-74A.
- 3) Continued disassembling the Northwest Treatment System.
- 4) Removed injection vault in grassland area and backfilled hole with surrounding soil. Smoothed surface to blend with surrounding grade.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17	7-12-17	7-12-17
MW-OU1-58-A	7-11-17	7-12-17	7-12-17
MW-OU1-61-A	7-11-17	7-12-17	7-12-17
MW-OU1-68-A	7-11-17	7-12-17	7-12-17
EW-OU1-60-A	7-11-17	7-12-17	7-12-17
EW-OU1-66-A	7-11-17	7-12-17	7-12-17
MW-OU1-57-A	7-12-17	7-13-17	7-13-17
EW-OU1-62-A	7-12-17	7-13-17	7-13-17
EW-OU1-63-A	7-12-17	7-13-17	7-13-17
MW-OU1-83-A	7-13-17		
MW-OU1-46-AD	7-13-17		
MW-OU1-46-A	7-13-17		
MW-OU1-84-A	7-13-17		
IW-OU1-74-A	7-13-17		
IW-OU1-73-A	7-13-17		
Totals			

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent	1		HGL Vehicles	3	
CQCSM/HSO	1		Drillers trucks	3	
Project Manager	1		Trailers	1	
Sub-Contractors			Backhoe	2	
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller	1				
Drillers Helper	2				
Cal Safety-sub to National					
DDA					
Ultra Environmental	2				
Total Hours					

 Instructions given by the Government to the Contractor (Include names, reactions, and remarks.)

 (None)

 Work Progress
 Were there any contractor-caused delays or potential finding of fact?
 Yes
 No

 Were there any government caused delays or potential finding of fact?
 Yes
 No

 Were there any unforeseeable or weather-related delays? NO
 Yes
 No

Comments/Unusual Conditions

Photographs



Photo 01 – Removing protective housing at MW-OU1-46-AD.



Photo 02 – Disassembling NWTS.



Photo 03 – Pulling injection pipe at IW-OU1-73-A.



Photo 04 – Grassland Surface After Treated Water Infiltration Vault Removed

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager Kevin Wierengo

Date _ 7/13/17

Date __

Site Superintendent -

Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

04	Date or Time Period 07/14/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Sui (703) 4	ite 40(478-51) 86
Weather Conditions:					
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	p High: 65 °F			
Quality Control Inspections Performed	This Date (Include inspections, results, o	eficiencies observed and corrective action	n.)		
Preparatory Phase Checklist:			Yes	No	<mark>0</mark>
Initial Phase Checklist:			Yes	No	<mark>)</mark>
			Yes	No	`
Follow-up Phase Checklist: Deficiencies noted and/or corrected the None noted.	is day (Include corrective actior	taken and anticipated date of	f correcti	on).	•
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing las field-testing been performed this date?	is day (Include corrective actior	taken and anticipated date of	f correcti Yes	on). No	NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None	is day (Include corrective action	taken and anticipated date of	f correcti Yes Yes	on). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected thi None noted. Sampling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None Health and Safety Vorker protection levels this date: Level D	is day (Include corrective action	taken and anticipated date of	f correcti Yes Yes	on). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None lealth and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a co	is day (Include corrective action	taken and anticipated date of	f correcti Yes Yes	No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing tas field-testing been performed this date? tave data quality objectives been achieved totes: None Health and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a cor Vas any work activity conducted within and Vas any work activity conducted within and Vas any work activity conducted within and Deficiencies noted and/or corrected the Deficiencies noted and/or corrected the Deficiencies noted and/or corrected the None noted. Sampling and Testing tas field-testing been performed this date? Health and Safety Vorker protection levels this date: Level D	is day (Include corrective action	taken and anticipated date of	f correcti Yes Yes Yes Yes	No No No No	NA NA

Work Activities Performed This Date

- 1) Pressure grouted wells and demolished surface competitions. Locations specified in the table below.
- 2) Removed protective housing and pulled pumps and/or piping from: MW-OU1-85A.
- 3) Completed decommissioning the Northwest Treatment System, except for re-wiring to maintain lights and power. All tanks and equipment hauled off site for disposal.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17	7-12-17	7-12-17
MW-OU1-58-A	7-11-17	7-12-17	7-12-17
MW-OU1-61-A	7-11-17	7-12-17	7-12-17
MW-OU1-68-A	7-11-17	7-12-17	7-12-17
EW-OU1-60-A	7-11-17	7-12-17	7-12-17
EW-OU1-66-A	7-11-17	7-12-17	7-12-17
MW-OU1-57-A	7-12-17	7-13-17	7-13-17
EW-OU1-62-A	7-12-17	7-13-17	7-13-17
EW-OU1-63-A	7-12-17	7-13-17	7-13-17
MW-OU1-83-A	7-13-17	7-14-17	7-14-17
MW-OU1-46-AD	7-13-17	7-14-16	7-14-16
MW-OU1-46-A	7-13-17	7-14-16	7-14-16
MW-OU1-84-A	7-13-17	7-14-16	7-14-16
IW-OU1-74-A	7-13-17	7-14-16	7-14-16
IW-OU1-73-A	7-13-17	7-14-16	7-14-16
MW-OU1-27-A	7-14-16		
EW-OU1-72-A	7-14-16		
MW-OU1-82-A	7-14-16		
MW-OU1-50-A	7-14-16		
MW-OU1-59-A	7-14-16		
MW-OU1-85-A	7-14-16		
Totals			

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent	1		HGL Vehicles	3	
CQCSM/HSO	1		Drillers trucks	3	
Project Manager	1		Trailers	1	
Sub-Contractors			Backhoe	2	
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller	1				
Drillers Helper	3				
Cal Safety-sub to National					
DDA	1				
Ultra Environmental	2				
Total Hours					

Instructions given by the Government to the Contractor (Include names, reactions, and remarks.)				
(None)				
Work Progress	Were there any contractor-caused delays or potential finding of fact? Were there any government caused delays or potential finding of fact? Were there any unforeseeable or weather-related delays? NO	Yes Yes	<mark>No</mark> No	

Comments/Unusual Conditions

Photographs



Photo 01 – Removing holding tank at NWTS.



Photo 02 – Tanks loaded on truck for disposal.



Photo 03 – NWTS decommissioning complete.

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager Kevin Wierengo

Date _ 7/14/17

Date ____

Site Superintendent -

HGL
Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

05	Date or Time Period 07/15/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Su (703) /	ite 40(478-51) 186
Weather Conditions:		· · ·			
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	np High: 65 °F			
Quality Control Inspections Performed	This Date (Include inspections, results,	deficiencies observed and corrective action	n.)		
Preparatory Phase Checklist:			Yes	No	<mark>0</mark>
Initial Phase Checklist:			Yes	No	<mark>0</mark>
			Yes	No	<mark>)</mark>
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted.	s day (Include corrective action	n taken and anticipated date o	f correcti	ion).	
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing las field-testing been performed this date?	s day (Include corrective action	n taken and anticipated date o	f correcti Yes	ion). No	NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. ampling and Testing las field-testing been performed this date? lave data quality objectives been achieved? lotes: None	s day (Include corrective action	n taken and anticipated date o	f correcti Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing Has field-testing been performed this date? Have data quality objectives been achieved? None Health and Safety	s day (Include corrective action	n taken and anticipated date o	f correcti Yes Yes	ion). No No	NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing las field-testing been performed this date? lave data quality objectives been achieved? lotes: None lealth and Safety Vorker protection levels this date: Level D	s day (Include corrective action	n taken and anticipated date o	f correcti Yes Yes	ion). No No	NA NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Tampling and Testing las field-testing been performed this date? lave data quality objectives been achieved? lotes: None lealth and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a co	s day (Include corrective action	n taken and anticipated date o	f correcti Yes Yes Yes	ion). No No No	NA
Follow-up Phase Checklist: Deficiencies noted and/or corrected this None noted. Sampling and Testing las field-testing been performed this date? lave data quality objectives been achieved? lotes: None lealth and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a co Vas any work activity conducted within an a	s day (Include corrective action	n taken and anticipated date o	f correcti Yes Yes Yes Yes Yes	ion). No No <mark>No</mark> No	NA NA

Work Activities Performed This Date

- 1) Pressure grouted wells and demolished surface competitions. Locations specified in the table below.
- 2) Removed protective housing and pulled pumps and/or piping from: EW-OU1-71A and MW-OU1-87-A.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17	7-12-17	7-12-17
MW-OU1-58-A	7-11-17	7-12-17	7-12-17
MW-OU1-61-A	7-11-17	7-12-17	7-12-17
MW-OU1-68-A	7-11-17	7-12-17	7-12-17
EW-OU1-60-A	7-11-17	7-12-17	7-12-17
EW-OU1-66-A	7-11-17	7-12-17	7-12-17
MW-OU1-57-A	7-12-17	7-13-17	7-13-17
EW-OU1-62-A	7-12-17	7-13-17	7-13-17
EW-OU1-63-A	7-12-17	7-13-17	7-13-17
MW-OU1-83-A	7-13-17	7-14-17	7-14-17
MW-OU1-46-AD	7-13-17	7-14-17	7-14-17
MW-OU1-46-A	7-13-17	7-14-17	7-14-17
MW-OU1-84-A	7-13-17	7-14-17	7-14-17
IW-OU1-74-A	7-13-17	7-14-17	7-14-17
IW-OU1-73-A	7-13-17	7-14-17	7-14-17
MW-OU1-27-A	7-14-17	7-15-17	7-15-17
EW-OU1-72-A	7-14-17	7-15-17	7-15-17
MW-OU1-82-A	7-14-17	7-15-17	7-15-17
MW-OU1-50-A	7-14-17	7-15-17	7-15-17
MW-OU1-59-A	7-14-17	7-15-17	7-15-17
MW-OU1-85-A	7-14-17	7-15-17	7-15-17
EW-OU1-71-A	7-15-17		
MW-OU1-87-A	7-15-17		
EW-OU1-49-A	7-15-17		
PZ-OU1-49-A1	7-15-17		
MW-OU1-86-A	7-15-17		
Totals			

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent			HGL Vehicles	1	
CQCSM/HSO	1		Drillers trucks	3	
Project Manager			Trailers	1	
Sub-Contractors			Backhoe	2	
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller	1				
Drillers Helper	2				
Cal Safety-sub to National					
DDA					
Ultra Environmental					
Total Hours					

 Instructions given by the Government to the Contractor (Include names, reactions, and remarks.)

 (None)

 Work Progress
 Were there any contractor-caused delays or potential finding of fact?
 Yes
 No

 Were there any government caused delays or potential finding of fact?
 Yes
 No

 Were there any unforeseeable or weather-related delays? NO
 No

Comments/Unusual Conditions

Photographs



Photo 01 – Excavating to 5 ft bgs to remove casing at MW-OU1-27-A.



Photo 02 – Pressure grouting.



Photo 03 – Removing extraction pump.

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager Kevin Wierengo

Date _ 7/15/17

Date _

Site Superintendent -

HGL

Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

CQC Report Number` 06	Date or Time Period 07/16/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Su (703)	ite 400 478-51) 86
Weather Conditions:					
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	np High: 65 °F			
Quality Control Inspections Performed	This Date (Include inspections, results, o	deficiencies observed and corrective actio	n.)		
Preparatory Phase Checklist:			Yes	No	<mark>0</mark>
Initial Phase Checklist:			Yes	No	<mark>0</mark>
Follow-up Phase Checklist:			Yes	No	<mark>)</mark>
Deficiencies noted and/or corrected th None noted.	is day (Include corrective actior	a taken and anticipated date o	of correct	ion).	
Deficiencies noted and/or corrected th None noted. Sampling and Testing Has field-testing been performed this date?	is day (Include corrective action	a taken and anticipated date o	of correct	ion). No	NA
Deficiencies noted and/or corrected th None noted. Campling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None	is day (Include corrective action	a taken and anticipated date o	of correct Yes Yes	ion). No No	NA NA
Deficiencies noted and/or corrected th None noted. Sampling and Testing Has field-testing been performed this date? Have data quality objectives been achieved lotes: None	is day (Include corrective action	a taken and anticipated date o	of correct Yes Yes	ion). No No	NA NA
Deficiencies noted and/or corrected th None noted. Sampling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None lealth and Safety Vorker protection levels this date: Level D	is day (Include corrective action	a taken and anticipated date o	Yes Yes Yes	ion). No No	NA NA
Deficiencies noted and/or corrected the None noted. Campling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None lealth and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a co	is day (Include corrective action	a taken and anticipated date o	Yes Yes Yes Yes	ion). No No No	NA NA
Deficiencies noted and/or corrected the None noted. Sampling and Testing Has field-testing been performed this date? Have data quality objectives been achieved lotes: None Health and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a co Vas any work activity conducted within and	is day (Include corrective action	y dangerous to life and health?	Yes Yes Yes Yes Yes Yes	ion). No No <mark>No</mark> No	NA NA

Work Activities Performed This Date

- 1) Pressure grouted wells and demolished surface competitions. Locations specified in the table below.
- 2) Removed protective housing and pulled pumps and/or piping from: IW-OU1-10A.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17	7-12-17	7-12-17
MW-OU1-58-A	7-11-17	7-12-17	7-12-17
MW-OU1-61-A	7-11-17	7-12-17	7-12-17
MW-OU1-68-A	7-11-17	7-12-17	7-12-17
EW-OU1-60-A	7-11-17	7-12-17	7-12-17
EW-OU1-66-A	7-11-17	7-12-17	7-12-17
MW-OU1-57-A	7-12-17	7-13-17	7-13-17
EW-OU1-62-A	7-12-17	7-13-17	7-13-17
EW-OU1-63-A	7-12-17	7-13-17	7-13-17
MW-OU1-83-A	7-13-17	7-14-17	7-14-17
MW-OU1-46-AD	7-13-17	7-14-17	7-14-17
MW-OU1-46-A	7-13-17	7-14-17	7-14-17
MW-OU1-84-A	7-13-17	7-14-17	7-14-17
IW-OU1-74-A	7-13-17	7-14-17	7-14-17
IW-OU1-73-A	7-13-17	7-14-17	7-14-17
MW-OU1-27-A	7-14-17	7-15-17	7-15-17
EW-OU1-72-A	7-14-17	7-15-17	7-15-17
MW-OU1-82-A	7-14-17	7-15-17	7-15-17
MW-OU1-50-A	7-14-17	7-15-17	7-15-17
MW-OU1-59-A	7-14-17	7-15-17	7-15-17
MW-OU1-85-A	7-14-17	7-15-17	7-15-17
EW-OU1-71-A	7-15-17	7-16-17	7-16-17
MW-OU1-87-A	7-15-17	7-16-17	7-16-17
EW-OU1-49-A	7-15-17	7-16-17	7-16-17
PZ-OU1-49-A1	7-15-17	7-16-17	7-16-17
MW-OU1-86-A	7-15-17	7-16-17	7-16-17
IW-OU1-10-A	7-16-17		
PZ-OU1-10-A1	7-16-17		
MW-OU1-26-A	7-16-17		
MW-OU1-88-A	7-16-17		
Totals			

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent			HGL Vehicles	1	
CQCSM/HSO	1		Drillers trucks	3	
Project Manager			Trailers	1	
Sub-Contractors			Backhoe	2	
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller	1				
Drillers Helper	2				
Cal Safety-sub to National					
DDA					
Ultra Environmental					
Total Hours					

Instructions given by the Government to the Contractor (Include names, reactions, and remarks.)

(None)

 Work Progress
 Were there any contractor-caused delays or potential finding of fact?
 Yes
 No

 Were there any government caused delays or potential finding of fact?
 Yes
 No

 Were there any unforeseeable or weather-related delays? NO
 Yes
 No

Comments/Unusual Conditions

(None)

Photographs



Photo 01 – Setting up to pressure grout.



Photo 02 – Wellhead fitting used to connect to air compressor after a well has been filled with grout.



Photo 03 – Mixing grout.

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials

DAILY QUALITY CONTROL REPORT

ENVIRONMENTAL QUALITY CONTROL/QUALITY ASSURANCE REPORT and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager	Kevin Wierengo	Date _	7/16/17
Site Superintendent —		Date	
•		_	

Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

CQC Report Number` 07	Date or Time Period 07/17/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Su (703) /	ite 400 478-51) 86
Weather Conditions:					
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	np High: 65 °F			
Quality Control Inspections Performed	This Date (Include inspections, results,	deficiencies observed and corrective actio	n.)		
Preparatory Phase Checklist:			Yes	No	<mark>0</mark>
Initial Phase Checklist:			Yes	No	<mark>0</mark>
Follow-up Phase Checklist:			Yes	No	<mark>0</mark>
Deficiencies noted and/or corrected th None noted.	is day (Include corrective actior	taken and anticipated date o	of correcti	ion).	
Deficiencies noted and/or corrected th None noted. Sampling and Testing las field-testing been performed this date?	is day (Include corrective action	a taken and anticipated date o	of correcti	ion). No	NA
Deficiencies noted and/or corrected the None noted. Campling and Testing Has field-testing been performed this date? Have data quality objectives been achieved lotes: None	is day (Include corrective action	a taken and anticipated date o	of correcti Yes Yes	ion). No No	NA NA
Deficiencies noted and/or corrected th None noted. Sampling and Testing Has field-testing been performed this date? Have data quality objectives been achieved Notes: None	is day (Include corrective action	a taken and anticipated date o	of correcti Yes Yes	ion). No No	NA NA
Deficiencies noted and/or corrected the None noted. Campling and Testing las field-testing been performed this date? Have data quality objectives been achieved lotes: None Health and Safety Vorker protection levels this date: Level D	is day (Include corrective action	a taken and anticipated date o	of correcti Yes Yes	ion). No No	NA NA
Deficiencies noted and/or corrected the None noted. Sampling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None lealth and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a c	is day (Include corrective action	a taken and anticipated date o	Yes Yes Yes	ion). No No	NA
Deficiencies noted and/or corrected the None noted. ampling and Testing las field-testing been performed this date? lave data quality objectives been achieved lotes: None lealth and Safety Vorker protection levels this date: Level D Vas any work activity conducted within a co Vas any work activity conducted within an	is day (Include corrective action d? onfined space? area determined to be immediate!	y dangerous to life and health?	Yes Yes Yes Yes Yes	ion). No No No	NA

Work Activities Performed This Date

1) Pressure grouted wells and demolished surface competitions. Locations specified in the table below.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17	7-12-17	7-12-17
MW-OU1-58-A	7-11-17	7-12-17	7-12-17
MW-OU1-61-A	7-11-17	7-12-17	7-12-17
MW-OU1-68-A	7-11-17	7-12-17	7-12-17
EW-OU1-60-A	7-11-17	7-12-17	7-12-17
EW-OU1-66-A	7-11-17	7-12-17	7-12-17
MW-OU1-57-A	7-12-17	7-13-17	7-13-17
EW-OU1-62-A	7-12-17	7-13-17	7-13-17
EW-OU1-63-A	7-12-17	7-13-17	7-13-17
MW-OU1-83-A	7-13-17	7-14-17	7-14-17
MW-OU1-46-AD	7-13-17	7-14-17	7-14-17
MW-OU1-46-A	7-13-17	7-14-17	7-14-17
MW-OU1-84-A	7-13-17	7-14-17	7-14-17
IW-OU1-74-A	7-13-17	7-14-17	7-14-17
IW-OU1-73-A	7-13-17	7-14-17	7-14-17
MW-OU1-27-A	7-14-17	7-15-17	7-15-17
EW-OU1-72-A	7-14-17	7-15-17	7-15-17
MW-OU1-82-A	7-14-17	7-15-17	7-15-17
MW-OU1-50-A	7-14-17	7-15-17	7-15-17
MW-OU1-59-A	7-14-17	7-15-17	7-15-17
MW-OU1-85-A	7-14-17	7-15-17	7-15-17
EW-OU1-71-A	7-15-17	7-16-17	7-16-17
MW-OU1-87-A	7-15-17	7-16-17	7-16-17
EW-OU1-49-A	7-15-17	7-16-17	7-16-17
PZ-OU1-49-A1	7-15-17	7-16-17	7-16-17
MW-OU1-86-A	7-15-17	7-16-17	7-16-17
IW-OU1-10-A	7-16-17	7-17-17	7-17-17
PZ-OU1-10-A1	/-16-1/	/-1/-1/	/-1/-1/
MW-OU1-26-A	/-16-1/	/-1/-1/	/-1/-1/
MW-OU1-88-A	/-16-1/	/-1/-1/	/-1/-1/
MW-B-02-A	/-1/-1/		
EW-OU1-53-A	7-17-17		
EW-OU1-52-A	7-17-17		
IW-OU1-02-A	7-17-17		
PZ-OU1-02-A1	7-17-17		
Totals	35		

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent			HGL Vehicles	1	
CQCSM/HSO	1		Drillers trucks	3	
Project Manager			Trailers	1	
Sub-Contractors			Backhoe	1	
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller	1				
Drillers Helper	2				
Cal Safety-sub to National					
DDA	1				
Ultra Environmental					
Total Hours					

Instructions given by the Government to the Contractor (Include names, reactions, and remarks.)

(None)

 Work Progress
 Were there any contractor-caused delays or potential finding of fact?
 Yes
 No

 Were there any government caused delays or potential finding of fact?
 Yes
 No

 Were there any unforeseeable or weather-related delays? NO
 Yes
 No

Comments/Unusual Conditions

(None)

Photographs



Photo 01 – Pressure grouting EW-OU1-52-A.



Photo 02 – Setting up at MW-B-02-A.



Photo 03 - Grouting MW-B-02-A.

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager Kevin Wierengo

Date 7/17/17

Date

Site Superintendent -

Contract Number / Delivery Order Number W912DY-10-D-0023 CM 11

UPC/Project Title and Location of Work OU-1 WELL DESTRUCTION AND TREATMENT PLANT DECOMMISSIONING

08	Date or Time Period 07/18/2017	^{Contractor} HydroGeoLogic 11107 Sunset Hills Reston, VA 20190	Rd, Sui (703) 4	te 400 178-51) 86
Weather Conditions:		,	. /		
Temp Low: 50°F Wind Speed: 5-10 mph	Ten	np High: 65 °F			
Quality Control Inspections Performed Th	is Date (Include inspections, results, o	deficiencies observed and corrective action	n.)		
Preparatory Phase Checklist: Initial Phase Checklist: Follow-up Phase Checklist:			Yes Yes Yes	No No No	
Deficiencies noted and/or corrected this d None noted.	ay (Include corrective actior	taken and anticipated date o	f correcti	on).	
Deficiencies noted and/or corrected this d None noted.	ay (Include corrective actior	a taken and anticipated date o	f correcti	on).	
Deficiencies noted and/or corrected this d None noted. Sampling and Testing Has field-testing been performed this date? Have data quality objectives been achieved? Notes: None	ay (Include corrective actior	a taken and anticipated date o	f correcti Yes Yes	on). No No	NA NA
Deficiencies noted and/or corrected this d None noted. Sampling and Testing Has field-testing been performed this date? Have data quality objectives been achieved? Notes: None Health and Safety Norker protection levels this date: Level D	ay (Include corrective action	a taken and anticipated date o	f correcti Yes Yes	on). No No	NA NA

Safety Comments: (Include any infractions of approved safety plan and include instructions from government personnel. Specify corrective action taken.)

Work Activities Performed This Date

- 1) Demolished surface competitions. Locations specified in the table below.
- 2) Complete restoration activities at well locations.
- 3) Equipment and roll off bins picked up. All well destruction activities are complete.
- 4) Demob from site.

Well ID	Grouted	Surface Demolished	Complete
MW-OU1-67-A	7-11-17	7-12-17	7-12-17
MW-OU1-58-A	7-11-17	7-12-17	7-12-17
MW-OU1-61-A	7-11-17	7-12-17	7-12-17
MW-OU1-68-A	7-11-17	7-12-17	7-12-17
EW-OU1-60-A	7-11-17	7-12-17	7-12-17
EW-OU1-66-A	7-11-17	7-12-17	7-12-17
MW-OU1-57-A	7-12-17	7-13-17	7-13-17
EW-OU1-62-A	7-12-17	7-13-17	7-13-17
EW-OU1-63-A	7-12-17	7-13-17	7-13-17
MW-OU1-83-A	7-13-17	7-14-17	7-14-17
MW-OU1-46-AD	7-13-17	7-14-17	7-14-17
MW-OU1-46-A	7-13-17	7-14-17	7-14-17
MW-OU1-84-A	7-13-17	7-14-17	7-14-17
IW-OU1-74-A	7-13-17	7-14-17	7-14-17
IW-OU1-73-A	7-13-17	7-14-17	7-14-17
MW-OU1-27-A	7-14-17	7-15-17	7-15-17
EW-OU1-72-A	7-14-17	7-15-17	7-15-17
MW-OU1-82-A	7-14-17	7-15-17	7-15-17
MW-OU1-50-A	7-14-17	7-15-17	7-15-17
MW-OU1-59-A	7-14-17	7-15-17	7-15-17
MW-OU1-85-A	7-14-17	7-15-17	7-15-17
EW-OU1-71-A	7-15-17	7-16-17	7-16-17
MW-OU1-87-A	7-15-17	7-16-17	7-16-17
EW-OU1-49-A	7-15-17	7-16-17	7-16-17
PZ-OU1-49-A1	7-15-17	7-16-17	7-16-17
MW-OU1-86-A	/-15-1/	7-16-17	7-16-17
IW-OU1-10-A	/-16-1/	7-17-17	/-1/-1/
PZ-OUI-10-AI	7-16-17	7-17-17	/-1/-1/
MW-OUI-26-A	7-16-17	7-17-17	/-1/-1/
MW-OUI-88-A	7-16-17	7-17-17	7-17-17
MW-B-02-A	7-17-17	7-18-17	7-18-17
EW-OU1-53-A	/-1/-1/	(-18-1/	/-18-1/
EW-OU1-52-A	7-17-17	7-18-17	7-18-17
IW-OU1-02-A	7-17-17	7-18-17	7-18-17
PZ-OU1-02-A1	7-17-17	7-18-17	7-18-17
Totals	35		

Manpower and Equipment

Labor Classification	Number	Hours	Equipment Type	Number	Hours Used
HGL					
Site Superintendent			HGL Vehicles	1	
CQCSM/HSO	1		Drillers trucks	3	
Project Manager			Trailers	1	
Sub-Contractors			Backhoe	1	
Cascade			Cal Safety truck		
Site Foreman/SSHO			Total Hours		
Driller	1				
Drillers Helper	2				
Cal Safety-sub to National					
DDA	1				
Ultra Environmental					
Total Hours					

Instructions given by the Government to the Contractor (Include names, reactions, and remarks.)

(None)

 Work Progress
 Were there any contractor-caused delays or potential finding of fact?
 Yes
 No

 Were there any government caused delays or potential finding of fact?
 Yes
 No

 Were there any unforeseeable or weather-related delays? NO
 Yes
 No

Comments/Unusual Conditions

(None)

Photographs



Photo 01 – Roll off bin of construction debris picked up for disposal.



Photo 02 – Well destruction and restoration complete at EW-OU1-53-A.

Contractor's Verification: On behalf of the Contractor, I certify that this report is complete and correct, and all materials and equipment used and work performed during this reporting period are in compliance with the plans and contract requirements, to the best of my knowledge, except as may be noted above.

CQC System Manager	Kevin Wierengo	Date 7/18/17
_		
Site Superintendent —		Date

HGL - Armstron Ranch Well Destruction and Pipeline Decommissioning Completion Report - Former Fort Ord, CA

831-917-3242

Former Fort Ord OU-1	Calculated Grout	Volume versus	Actual Grout	Volume
----------------------	-------------------------	---------------	--------------	--------

Well Identification	Date Demolition Complete	Well Diam. (in)	Known Total Depth (ft below TOC)	Measured Total Depth (ft below TOC)	Calculated Casing Volume (Gal)	Date of Initial Sealing Material	Volume of Sealing Material Placed (Gal)	Date of Final Sealing Material	Volume of Sealing Material Placed (Gal)	Total Volume of Sealing Material Placed (Gal)	Volume of Sealing Material Exceeds Volume of Well Casing and Screen?
Remaining Wells on the NW Boundary											
MW-OU1-67-A		4	102.3	102	66.8	7-1-10	105				
MW-OU1-57-A		6	95.5	91.0	140.3	7-12-17	205				
MW-OU1-58-A		6	102.8	96.5	151.0	e 1245	245				
MW-OU1-61-A		4	96.5	96.2	63.0	7-11-17	.100				
MW-OU1-68-A		4	103.8	103.5	67.8	B-11-17	135				
					Marina A	irport Property	Well (1 Total)				
MW-B-02-A		6	80.0	75.00	117.5	7-17-17	190				
				76	Ex	traction Wells (9 Total)				
EW-OU1-60-A		6	95.7	95.2	140.6	7-11-17	225				
EW-OU1-62-A		6	100.9	100.4	148.2	7-12-17	230				
EW-OU1-63-A		6	91.5	91.0	134.4	7-12-17	220				
EW-OU1-66-A		6	101.6	101.1	149.2	0 1405	230				
MW-OU1-46-AD		4	125.4	124.3	81.9	7-13-17	150				11-1
EW-OU1-71-A		6	116.0	116.0	170.4	7-15-17	275				
IW-OU1-10-A		6	133.5	134.0	196.1	7-16-17	250				
MW-OU1-85-A		6	122.0	122.1	179.2	7-14-17	250				
MW-OUI-87-A		6	119.0	121.0	174.8	7-15-17	475				

Former Fort Ord OU-1 Calculated Grout Volume versus Actual Grout Volume

Well Identification	Date Demolition Complete	Well Diam. (in)	Known Total Depth (ft below TOC)	Measured Total Depth (ft below TOC)	Calculated Casing Volume (Gal)	Date of Initial Sealing Material	Volume of Sealing Material Placed (Gal)	Date of Final Sealing Material	Volume of Sealing Material Placed (Gal)	Total Volume of Sealing Material Placed (Gal)	Volume of Sealing Material Exceeds Volume of Well Casing and Screen?
Remaining FONR and Grassland Wells (20 Total)											
EW-OU1-53-A		6	131.1	134.5	192.6	7-17-17	250				
EW-OU1-52-A		6	124.5	114.5	182.9	7-17-17	275				
PZ-OU1-10-A1		2	116.5	116.5	19.0	7-16-17	65	. F			
IW-OU1-02-A		6	133.5	128.0	196.1	7-17-17	225				
MW-OU1-26-A		5	102.0	102.0	104.0	7-16-1.7	170				
MW-OU1-88-A		4	122.0	122.0	79.6	7-16-17	250				
EW-OU1-49-A		6	109.6	108.5	161.0	7-15-17	225				
PZ-OU1-49-A1		2	122.3	121.5	20.0	7-15-17	50				
MW-OU1-86-A		6	126.0-	126.0	185.1	7-15-17	350				
MW-OU1-27-A		5	89.8	85.0	91.6	7-14-17	225				
EW-OU1-72-A		6	108.5	111.0	159.4	7-14-17	250				
MW-OU1-84-A		4	127.0	130.5	82.9	7-13-17	320				
MW-OU1-83-A		4	123.0	123.0	80.3	7-13-17	150				
MW-OU1-82-A		4	123.0	123.0	· 80.3	7-14-17	125				
MW-OU1-50-A		4	111.2	110.0	72.6	7-14-17	125				
PZ-OU1-02-A1		6	137.0	130.0	201.2	7-17-17	275				
MW-OU1-46-A		5	105.0	105.0	107.1	7-13-17	365				
MW-OU1-59-A		6	103.7	106.0	152.3	2-14-17	225				
IW-OU1-73-A		6	126.0	126.5	185.1	7-13-17	325				
IW-OU1-74-A		6	119.5	120.0	175.5	7-13-17	250				

Notes:

Diam - diameter ft - feet Gal - gallon

OU - operable unit TOC - top of casing EW - extraction well MW - monitoring well

in - inch

Enter information during field event

Former Fort Ord OU-1 Calculated Grout Volume versus Actual Grout Volume												
Well Identification	Date Demolition Complete	Well Diam. (in)	Known Total Depth (ft below TOC)	Measured Total Depth (ft below TOC)	Calculated Casing Volume (Gal)	Date of Initial Sealing Material	Volume of Sealing Material Placed (Gal)	Date of Final Sealing Material	Volume of Sealing Material Placed (Gal)	Total Volume of Sealing Material Placed (Gal)	Volume of Sealing Material Exceeds Volume of Well Casing and Screen?	
				1	Remaining W	ells on the NW	Boundary					
MW-OU1-67-A	07/12/2017	4	102.3	102	66.8	7/11/2017	105	7/11/2017	N/A	105.0	YES	
MW-0U1-57-A	07/13/2017	6	95.5	91.0	140.3	7/12/2017	205	7/12/2017	N/A	205.0	YES	
MW-OU1-58-A	07/12/2017	6	102.8	96.5	151.0	7/11/2017	245	7/11/2017	N/A	245.0	YES	
MW-0U1-61-A	07/12/2017	4	96.5	96.2	63.0	7/11/2017	100	7/11/2017	N/A	100.0	YES	
MW-OU1-68-A	07/12/2017	4	103.8	103.5	67.8	7/11/2017	135	7/11/2017	N/A	135.0	YES	
			1	Ì	Marina Airpo	rt Property Wel	l (1 Total)					
MW-B-02-A	07/18/2017	6	80.0	75.00	117.5	7/17/2017	190.0	7/17/2017	N/A	190	YES	
					Extrac	tion Wells (9 To	tal)					
EW-0U1-60-A	07/12/2017	6	95.7	95.2	140.6	7/11/2017	225	7/11/2017	N/A	225.0	YES	
EW-OU1-62-A	07/13/2017	6	100.9	100.4	148.2	7/12/2017	230	7/12/2017	N/A	230.0	YES	
EW-0U1-63-A	07/13/2017	6	91.5	91.0	134.4	7/12/2017	220	7/12/2017	N/A	220.0	YES	
EW-001-66-A	07/12/2017	6	101.6	101.1	149.2	7/11/2017	230	7/11/2017	N/A	230.0	YES	
MW-001-46-AD	07/14/2017	4	125.4	124.3	81.9	7/13/2017	150	7/13/2017	N/A	150.0	YES	
EW-001-71-A	07/16/2017	6	116.0	116.0	1/0.4	7/15/2017	275	7/15/2017	N/A	275.0	YES	
IW-001-10-A	07/17/2017	6	133.5	134.0	196.1	7/16/2017	250	7/16/2017	N/A	250	YES	
	07/15/2017	0	122.0	122.1	174.8	7/14/2017	250	7/14/2017	N/A	250.0	I ES VES	
WW-001-87-A	07/10/2017	0	119.0	121.0 P oma	1/4.0	and Grassland	475 Walls (20 Total)	IN/A	475.0	I ES	
	07/18/2017	6	121.1	134.5	102.6	7/17/2017	250	7/17/2017	N/A	250	VES	
EW-001-53-A	07/18/2017	6	124.5	114.5	192.0	7/17/2017	250	7/17/2017	N/A N/A	230	VES	
P7-0U1-10-A1	07/17/2017	2	116.5	114.5	19.0	7/16/2017	65	7/16/2017	N/A	65	YES	
IW-0U1-02-A	07/18/2017	6	133.5	128.0	196.1	7/17/2017	225	7/17/2017	N/A	225	YES	
MW-0U1-26-A	07/17/2017	5	102.0	102.0	104.0	7/16/2017	170	7/16/2017	N/A	170	YES	
MW-0U1-88-A	07/17/2017	4	122.0	122.0	79.6	7/16/2017	250	7/16/2017	N/A	250	YES	
EW-OU1-49-A	07/16/2017	6	109.6	108.5	161.0	7/15/2017	225	7/15/2017	N/A	225	YES	
PZ-OU1-49-A1	07/16/2017	2	122.3	121.5	20.0	7/15/2017	50	7/15/2017	N/A	50	YES	
MW-0U1-86-A	07/16/2017	6	126.0	126.0	185.1	7/15/2017	350	7/15/2017	N/A	350	YES	
MW-OU1-27-A	07/15/2017	5	89.8	85.0	91.6	7/14/2017	225	07/14/2017	N/A	225	YES	
EW-0U1-72-A	07/15/2017	6	108.5	111.0	159.4	7/14/2017	250	07/14/2017	N/A	250	YES	
MW-0U1-84-A	07/14/2017	4	127.0	130.5	82.9	7/13/2017	320	7/13/2017	N/A	320	YES	
MW-0U1-83-A	07/14/2017	4	123.0	123.0	80.3	7/13/2017	150	7/13/2017	N/A	150	YES	
MW-0U1-82-A	07/15/2017	4	123.0	123.0	80.3	7/14/2017	125	07/14/2017	N/A	125	YES	
MW-0U1-50-A	07/15/2017	4	111.2	110.0	72.6	7/14/2017	125	07/14/2017	N/A	125	YES	
PZ-OU1-02-A1	07/18/2017	6	137.0	130.0	201.2	7/17/2017	275	7/17/2017	N/A	275	YES	
MW-0U1-46-A	07/14/2017	5	105.0	105.0	107.1	7/13/2017	365	7/13/2017	N/A	365	YES	
MW-0U1-59-A	07/15/2017	6	103.7	106.0	152.3	7/14/2017	225	7/14/2017	N/A	225	YES	
IW-0U1-73-A	07/14/2017	6	126.0	126.5	185.1	7/13/2017	325	7/13/2017	N/A	325	YES	
IW-0U1-74-A	07/14/2017	6	119.5	120.0	175.5	7/13/2017	250	7/13/2017	N/A	250	YES	

Notes:

Diam - diameter ft - feet Gal - gallon in - inch EW - extraction well MW - monitoring well OU - operable unit TOC - top of casing

Enter information during field event

ATTACHMENT B-4

DESTRUCTION ACTIVITIES PHOTOGRAPHS

This page was intentionally left blank.

NWTS DECOMMISSIONING ACTIVITIES

This page was intentionally left blank.



Removing carbon from NWTS treatment vessel

20170712_094451



Carbon from NWTS in bags staged for transport to regeneration facility



Removing treated water holding tank from NWTS containment basin



Transporting treated water holding tank from NWTS



Loading treated water holding tank for transport



Influent and treated water holding tanks being loaded for transport



First carbon vessel removed and staged for transport

20170714_104526



Remaining carbon vessels removed and staged for transport



Infiltration trench pipe sealed with concrete



NWTS containment basin after decommissioning



Loading roll-off bin at staging area for transport to disposal facility
TYPICAL WELL DESTRUCTION ACTIVITIES

This page was intentionally left blank.



Utility clearance on northwest boundary road



Setting tremie pipe before grouting



Well sealing in progress



Removing well housing and pipe on boundary well



Removing pump from extraction well



Pump removed from extraction well



Well sealing operation equipment setup



Mixing and pumping grout to seal well on northwest boundary 20170711_152623



Grout mixing setup



Removing bollards at well site on northwest boundary

20170712_090055



Removing JOBOX type well housing



Mixing and pumping grout to seal well in habitat area 20170714_132221



Removing well casing to 5 feet below ground

TYPICAL CONDITIONS AT WELL LOCATIONS AFTER PROJECT DEMOBILIZATION This page was intentionally left blank.



Site condition after completing destruction and demobilization at well MW-OU1-57-A 20170718_110656



Site condition after completing destruction and demobilization at well MW-OU1-82-A 20170718_111533



Site condition after completing destruction and demobilization at well EW-OU1-66-A 20170718_112251



Site condition after completing destruction and demobilization at well MW-OU1-83-A 20170718_122402



Site condition after completing destruction and demobilization at well EW-OU1-72-A 20170718_123235



Site condition after completing destruction and demobilization at well MW-OU1-87-A 20170718_125026



Site condition after completing destruction and demobilization at well EW-OU1-52-A 20170718_131124

ATTACHMENT B-5

DEMOLITION DEBRIS DISPOSAL DOCUMENTATION

This page was intentionally left blank.

		Email	ed 07-27-17
Destination Facility	Red Bluff	Profile Shipping Notes: (1) Red Bluff - RB and AC	Confirmation Number
Appointment Date / Time	7/27/2017	(2) Parker - RH, SH, NH, EX, AC (3) Exxon Mobil No.	
Parker Approval Signature		W20071AC Must be Shipped to Red Bluff	12122

SPENT CARBON SHIPM	ENT LOAD LIST	MUST HAVE	A CONFIRMATI	ON NUMBER	BEFORE TRU	JCK LEAVES	YOUR WAREHOUSE.
Generator Name Site City	Profile #	Expiration Date	Job Number	Container Weight	Container Type	Container Qty	Comments
SMI Holdings	W130240AC-1	3/7/2018	51794035	2,400	drums	6	Aqua
Mountain View, CA							
Oakland Bulk Plant	W170045AC	4/5/2019	51790445	5,100	bulk bag	3	Vapor
Oakland, CA	MITOCHOAC				buik bug		
Michaels Pipe Serv	W160137AC	8/29/2018		2,300	bulk bag	2	Aqua
Woodland, CA	W100137AC				Duik Day		
Fritzche Army	W(170078AC	6/29/2019	51776722	16,000	bulk bag	8	Aqua
Marina, CA	W1/00/8AC						
Harper Lease Plans Eureka, CA	W170030AC	2.17/2019		400	drums	1	Aqua
KB McCarthy	W170031AC	1AC 2/17/2019		400	drums	1	Aqua
Eureka, CA							_
AC1230C	- FRESH	10BB	LOT#27916-L	10.000	bulk bag		10K fresh carbon
OAK INVAMERIPRIDE							
Requested Date / Time				\square			
Requisition Approval Signature:			Quier	~ ^ل يعو	\backslash		
2/15/2006			7-2		\		
				,			



NON-HAZARDOUS MANIFEST

CONSIGNEE (TO):	SHIPPER (FROM):
OVOQUA WATER TECHNOLOGIES	 Fritzscha Armil Aufield AUIN
2523 Mutahar Street Parker, AZ 85344	² 3239 Imjin Rd Marina CA 93933
A 11711 Reading Road Red Bluff, CA 96080	
□ 5375 S. Boyle Ave. Los Angeles, CA 90058	

JOB #: 3 51776722

NO. SHIPPING UNITS	TYPE*	DESCRIPTION	WEIGHT
4 8	BA	Spent Carbon - Non-Hazardous Waste	6 11 mit
		Not DOT Regulated Material	16,000
		Circle One: AQUA VAPOR	
· · ·			
<u>.</u>	<u> </u>	Profile #, W170078AC Exp. 06/28/19	
CUSTOMER		DN: T.MAME: T.CHEV PRECISION SIGNATORE: 10 10 10	
TRANSPORT	ER:		
NAME OF CARRIE	ER #1:	nitic (Everya) DATE: 11 7-12-17 SIGNATORE:	Mag Gauge and galaxy and g
13 Ben	S Truc	K 14 7-27-17 15 Hoyd Manzes	
HECEIVED BY (FL	JEL NAME):	61000 DATE: SIGNATURE:	
\	\sim		

- 1.) Name of Generator
- 2.) Generator site address
- 3.) Given job number
- 4.) Number of units being picked up
- 5.) Type of unit being picked up
- 6.) Total weight
- 7.) Profile number, MANDATORY
- 8.) Date of service and/or pick up performed
- 9.) Name of person signing for Generator

- 10.) Signature of person in box 9
- 11.) Same as box 8
- 12.) Signature of driver for Transporter #1
- 13.) Name of carrier transporting to Plant
- 14.) Date the load was picked up to go to the Plant
- 15.) Driver's signature for Transporter #2
- 16.) Full name of Receiving person
- 17.) Date received to Plant
- 18.) Signature of Receiving person

NON-HAZARDOUS MANIFEST

WHITE: THE PLANT

YELLOW: TRANSPORTER #2

PINK: FILE

GOLD: GENERATOR



Evoqua Water Technologies - Red Bluff 11711 Reading Road Red Bluff, CA 96080 Telephone: (530) 527-2664 Facsimile: (530) 527-2109

July 27, 2017

,

This is to certify the following spent carbon received at Evoqua Water Technologies Carbon Reactivation facility was reactivated in accordance with applicable regulations:

Site Address:	Former Fort Ord NW Treatment System 3239 Imjin Road, Marina, CA
Profile Number:	W170078AC
Manifest Document Number:	23587
Date Of Receipt:	July 27, 2017
Container Quantity - Type:	8 - Bag
Reactivation Date:	07-27-2017

Under civil and criminal penalties of law for the making or submission of false or fraudulent statements or representations, I verify the information contained above is true, accurate and complete. As to the identified section(s) of this document for which I cannot personally verify truth and accuracy, I certify as the company official having supervisory responsibility for the persons who, acting under my direct instructions, made the verification this information is true, accurate and complete.

Evoqua Water Technologies

EPA ID No. CAR000058784 Sincerely,

Bret Meyer Plant Manager



 2523 Mutahar Street - Box 3308 Parker, AZ 85344
 AZD 982 441 263

 11711 Reading Road Red Bluff, CA 96080
 CAR 000 058 784

June 26, 2017

Consultant:

Roy Evans HydroGeoLogic, Inc. Phone: (720) 381-5591 Generator Mailing Address:

(831) 242-7933 US Army Presidio of Monterey DPW-Haz Waste Office Monterey, CA 93944-5005

FAX: (866) 757-3048

The following Spent Carbon Profile has been approved for acceptance at Evoqua Water Technologies LLC:

Generator:	US Army		
EPA ID:	CA7210020676		
Site Address:	Former Fort Ord NW Treatment System 3239 Imjin Road Marina, CA 93933-		
Waste Codes:	None	No Waste Codes Per Generator	
Corbon Type			
Carbon Type:	Aqueous		
PH Range:	Aqueous 4.1 to 10.5		
PH Range: FL Range:	Aqueous 4.1 to 10.5 1 to 15		
PH Range: FL Range: Profile Number:	Aqueous 4.1 to 10.5 1 to 15 W170078AC		

Please feel free to call the undersigned at (928) 669-5758 if you have any questions.

Sincerely,

Evoqua Water Technologies LLC has all the necessary permits and licenses for the waste that has been characterized and identified by this profile.

Roy Provins EHS Manager

Monte McCue Director of Plant Operations

Evans, Roy

Jason Jefferson <jjefferson@asmetals.com></jjefferson@asmetals.com>
Thursday, July 27, 2017 3:54 PM
Evans, Roy
Former Fort Ord Tank Removal

Roy,

The following materials were removed from the former Fort Ord ground water treatment facility adjacent to Marina Airport on July 14, 2017 (2) 5,000 gal poly storage tanks, and (4) steel filter tanks. These units were removed and hauled by A&S Metals Recycling & Demolition to the A&S Metals recycling facility located at 11340 Commercial Parkway in Castroville, Ca to be mechanically processed into smaller pieces. From there the material is able to be shipper to a number of smelters either foreign or domestic.

Regards,

Jason Jefferson Demolition Manager 11340 Commercial Parkway PO Box 955 Castroville, Ca. 95012 Office: (831) 633-3379 Cell: (831) 970-9834 jjefferson@asmetals.com



From: <u>kim@telemetrix.com</u> [mailto:kim@telemetrix.com] Sent: Monday, August 14, 2017 12:40 PM To: Evans, Roy <<u>revans@hgl.com</u>> Subject: Disposition of equipment

Roy,

All equipment removed from OU-1 site was e-wasted or disposed at the Monterey regional landfill.

Approximately 50 pounds of electronics were recycled at e-waste at the Monterey regional landfill.

Approximately 100 pounds of other equipment, wire, enclosures, and miscellaneous items were disposed at the landfill.

Kim

Kim Cohan Telemetrix <u>3024 Owen Ave</u> <u>Marina, CA 93933</u> <u>kim@telemetrix.com</u>