Quality Assurance Project Plan
Former Fort Ord, California
Volume I, Appendix A

Addendum No. 1
Well Installation and Decommissioning
Update No. 1

Prepared for:

U.S. Department of the Army
Fort Ord BRAC
4463 Gigling Road, Room 101
Seaside, CA 93955

USACE Contract No.	W9123824D0003
Task Order No.	W9123824F0033
Task No.	5.5

Prepared by:
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Report Date:	April 2025
Report Version:	Draft Final

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Figures

Attachments

Acronyms and Abbreviations

Ahtna	Ahtna Global, LLC
Army	U.S. Department of the Army
CCRWQCB	California Regional Water Quality Control Board, Central Coast Region
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CQM	Construction Quality Management
CPR	cardiopulmonary resuscitation
DTSC	California Department of Toxic Substances Control
GIS	geographic information system
H&S	health and safety
HAZWOPER	Hazardous Waste Operations and Emergency Response
IDW	investigation-derived waste
N/A	not applicable
OU2	Operable Unit 2
QA	quality assurance
QAPP	Quality Assurance Project Plan
QC	quality control
SOP	standard operating procedure
USACE	U.S. Army Corps of Engineers
USEPA	U.S. Environmental Protection Agency

1.0 Introduction

Ahtna Global, LLC (Ahtna) prepared this *Quality Assurance Project Plan, Former Fort Ord, California, Volume 1, Appendix A, Addendum No. 1, Well Installation and Decommissioning Update No. 1* (QAPP Addendum Update)[1] under USACE Contract Number W9123824D0003, Task Order Number W9123824F0033. This QAPP Addendum Update describes groundwater monitoring well decommissioning to be performed at the former Fort Ord Operable Unit 2 (OU2) (Figure 1). This work is being conducted under the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA or "Superfund"). This QAPP Addendum details quality assurance (QA) and quality control (QC) procedures for well decommissioning activities.

This document is an update to the *Quality Assurance Project Plan, Former Fort Ord, California, Volume 1, Appendix A, Addendum No. 1, Well Installation and Decommissioning* (QAPP Addendum; Ahtna, 2023b) and provides additional project-specific details. The QAPP Addendum is an addendum to the *Quality Assurance Project Plan, Former Fort Ord, California, Volume I, Appendix A, Final Revision 11, Groundwater Remedies and Monitoring at Operable Unit 2, Sites 2 and 12, and Operable Unit Carbon Tetrachloride Plume* (Groundwater QAPP Revision 11; Ahtna, 2023a). Groundwater QAPP Revision 11 and the QAPP Addendum will be referenced as appropriate in the worksheets contained herein. This QAPP Addendum Update specifically discusses well decommissioning activities for two groundwater monitoring wells at OU2 and therefore only includes Optimized Uniform Federal Policy (UFP)-QAPP Worksheets #1 & 2, #4, 7 & 8, #9, #14 & 16, #17, and #21 with additional information specifically applicable to this project. Other worksheets and information are available in Groundwater QAPP Revision 11 (Ahtna, 2023a) and the QAPP Addendum (Ahtna, 2023b).

[1] This document is an update to an addendum to Appendix A to the *Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume I*. Volume I is the governing document for sampling and analysis of groundwater (Appendix A), soil (Appendix B), soil gas (Appendix C), landfill gas (Appendix D), and per- and polyfluoroalkyl substances (Appendix E). Volume II of the QAPP pertains to the former Fort Ord military munitions response program.

2.0 Worksheet #1 & 2: Title and Approval Page

Site Name/Project Name: Former Fort Ord/Superfund Response Actions

Site Location: Former Fort Ord, California

Document Title: Quality Assurance Project Plan, Former Fort Ord, California, Volume I, Appendix A, Addendum No. 1, Well Installation and Decommissioning, Update No. 1

Lead Organization: U.S. Army Corps of Engineers

Preparer's Name, Organization, and Contact Info: Holly Dillon, Ahtna
9699 Blue Larkspur Lane, Suite 203, Monterey, CA 93940
(831) 324-3299
hdillon@ahtna.net

Preparation Date: October 14, 2024

Project Role	Name Organization	Signature	Date
Investigative Organization's Project Manager	Holly Dillon Ahtna		
Investigative Organization's Quality Control Manager	Steven Bennett Ahtna		
Investigative Organization's Project Chemist	Eric Schmidt Ahtna		
Lead Organization's Technical Lead	Erin Corr USACE		
Lead Organization's Project Chemist	Kyle Bayliff USACE		

Plans and reports from previous investigations relevant to this project:

Site Name/Project Name:	Former Fort Ord/Superfund Response Actions
Site Location:	Monterey County, California
Site Number/Code:	Not Applicable (N/A)
Operable Unit:	OU2
Contractor Name:	Ahtna Global, LLC
Contract Number:	W9123824D0003
Task Order Number:	W9123824F0033
Contract Title:	Environmental Remediation Services (ERS) with emphasis on Groundwater Treatment Plant & Groundwater Monitoring
Work Assignment Number:	N/A
Guidance used to prepare QAPP:	Uniform Federal Policy for Quality Assurance Project Plans, Optimized UFP-QAPP Worksheets, March 2012, Revision 1.
Regulatory Program:	CERCLA as amended by the Superfund Amendment and Reauthorization Act
Approval Entities:	U.S. Environmental Protection Agency (USEPA), California Department of Toxic Substance Control (DTSC), and Regional Water Quality Control Board, Central Coast Region (CCRWQCB) (collectively the "regulatory agencies")
Data Users:	U.S. Department of the Army (Army), USACE, USEPA (and its consultant TechLaw, Inc.), DTSC, CCRWQCB, Army/USACE contractors, citizen groups, and members of the public
Organizational partners (stakeholders) and connection with lead organization:	USACE, Army (lead agency/owner), USEPA (lead oversight agency), DTSC (support agency), and CCRWQCB (support agency)
The QAPP is (select one):	Generic:____ Project-Specific:_X_

Dates and titles of QAPP documents written for previous site work:

Title	Approval Date
Quality Assurance Project Plan, Former Fort Ord, California, Volume 1, Appendix A, Addendum No. 1, Well Installation and Decommissioning	December 2023
Quality Assurance Project Plan, Superfund Response Actions, Former Fort Ord, California, Volume I, Groundwater, Appendix A, Final Revision 11	November 2023

3.0 Worksheet #4, 7 & 8: Personnel Qualifications and Sign-Off Sheet

Organization: Ahtna

Name	Project Title/Role	Education/ Experience	Specialized Training/ Certifications[1]	Signature[2]	Date
Derek Lieberman	Program Manager	Resume on file	First aid, CPR, MEC, PE, H&S, HAZWOPER, CQM		
Eric Schmidt	Project Chemist	Resume on file	HAZWOPER, CQM		
Holly Dillon	Project Manager	Resume on file	First aid, CPR, MEC, HAZWOPER, CQM		
Steven Bennett	QC Manager	Resume on file	HAZWOPER, CQM		
Teri Farrell-Bage	Database Manager	Resume on file	Not applicable		
Andrew Mauck	GIS Manager	Resume on file	Not applicable		

Notes:

[1] Specialized Training/Certifications Key:
CPR: cardiopulmonary resuscitation
CQM: Construction Quality Management
GIS: geographic information systems
H&S: health and safety training including, but not limited to, hazard communication, fire extinguisher use, defensive driving, behavior-based safety, confined spaces
HAZWOPER: 40-hour and current 8-hour annual refresher Hazardous Waste Operations and Emergency Response
MEC: munitions and explosives of concern recognition and safety training
PE: registered Professional Engineer

[2] Signatures indicate personnel have read and agree to implement this QAPP as written.

4.0 Worksheet #9: Project Planning Session Summary

Project Name: Former Fort Ord Well Decommissioning **Projected Start Date:** January 2025 **Project Manager:** Derek Lieberman, Ahtna	**Site Name:** Former Fort Ord **Site Location:** Former Fort Ord, CA
Date of Session: August 5, 2024 **Scoping Session Purpose:** Discuss the scope of work	

Name	Title	Affiliation	Telephone #	E-mail Address
Derek Lieberman	Program Manager	Ahtna	(831) 224-3327	dlieberman@ahtna.net
Holly Dillon	Project Manager	Ahtna	(831) 324-3299	hdillon@ahtna.net

Planning Session Summary:
Reviewed scope of work. Determined that this QAPP will be an update to the previous QAPP Addendum that described well decommissioning and well installation activities. Some of the worksheets will require edits and the worksheets not edited will be incorporated by reference.

Worksheet #17 will be edited to describe the change in decommissioning method from pressure grouting to overdrilling due to obstructions in the wells MW-OU2-37-A and MW-OU2-37-180 that were found and unable to be removed. The wells were video logged on December 6, 2023, and the debris was determined to be dirt, ice plant, pieces of wood, and large rocks at 45 to 50 feet below ground surface in both wells. The Monterey County Department of Health (MCDOH) advised that the wells should be over drilled due to the obstructions.

Action Items:
Based on this review, Ahtna will initiate the update to the QAPP Addendum for appropriate worksheets and reference the QAPP Addendum where appropriate.

5.0 Worksheet #14 & 16: Project Tasks & Schedule

5.1 Project Tasks

Applicable standard operating procedures (SOPs) for the project tasks outlined in this Worksheet are listed in Worksheet #21 and provided in detail in Attachment A.

Two monitoring wells will be decommissioned as shown in Figure 2 and Figure 3 and listed in Table 1. These wells are no longer functional, no longer part of the OU2 groundwater monitoring program, and can be decommissioned as recommended in the associated annual groundwater monitoring report (Ahtna, 2024a).

Decommissioned wells will be overdrilled as specified by the Monterey County Department of Health due to obstructions in the well casing. After overdrilling is completed and well materials removed, the borehole will be grouted to the surface. Surface expressions of the well and any protective bollards will be entirely removed (either stick up or flush mount).

Decommissioning will follow the procedures outlined in SOP# FSOP-603.01 and investigation-derived waste (IDW) management SOP# FSOP-802.00 as noted for "Removal by Overdrilling" (Attachment A). Field forms are available in the QAPP Addendum (Ahtna, 2023b). Detailed information about well decommissioning is provided in Worksheet #17.

5.2 Investigation-Derived Waste Management and Equipment Decontamination

Liquid, solid, personal protective equipment and miscellaneous waste will be managed per the applicable provisions in SOP FSOP-802.00 (Attachment A).

5.2.1 Investigation-Derived Waste – Liquid

Liquid IDW will be contained in labeled drums or tanks and will be treated at the OU2 or Sites 2 and 12 GWTP. The OU2 and Sites 2 and 12 groundwater remedies consist of a groundwater pump and treatment system designed to remediate water containing chemicals of concern by pumping it through liquid-phase granular activated carbon.

5.2.2 Investigation-Derived Waste – Soil

Soil IDW will be contained in drums or bins onsite and will be disposed of at the Fort Ord Landfills, consistent with the *Record of Decision, Basewide Remedial Investigation Sites* (Army, 1997b) in conjunction with the *Explanation of Significant Differences, Consolidation of Remediation Waste in a Corrective Action Management Unit (CAMU), Operable Unit 2 Landfill* (Army, 1997a) and the *Explanation of Significant Differences, No Further Action for Munitions and Explosives of Concern, Landfill Gas Control, Reuse of Treated Groundwater, Designation of Corrective Action Management Unit (CAMU) Requirements as Applicable or Relevant and Appropriate Requirements (ARARs), Operable Unit 2, Fort Ord Landfills* (Army, 2006), which designates CAMU regulations as ARARs for the Fort Ord Landfills (Title 22 California Code of Regulations, Section 66264.552).

5.2.3 Investigation-Derived Waste – Solid Waste

Solid non-hazardous waste, such as disposable personal protective equipment, removed well materials, and non-reusable equipment, will be disposed of in a waste receptacle located at the OU2 GWTP. If the

volume of removed well materials exceeds the capacity of the waste receptacle, they may be disposed of at the Fort Ord Landfills.

5.3 Documentation and Records

Field records will be maintained and be sufficient to thoroughly document field activities. The information will be recorded in a permanently bound notebook with sequentially numbered pages. The following information will be recorded for field activities: (1) location, (2) date and time, (3) people performing activity, (4) weather conditions, and (5) logs of the activities being conducted. Record personnel present on site, site conditions, visitors to the site, and significant events and observations.

Each day of fieldwork, Ahtna will prepare a Project Field Report to describe onsite personnel, visitors, equipment, hours of operation, a summary of activities, quality and safety issues, corrective actions, and photographs. These daily Project Field Reports will be submitted to USACE following completion of fieldwork activities. A logbook will be kept, and documentation will follow the procedures outlined in SOP #FSOP-001.01 (Attachment A). Field forms are available in the QAPP Addendum (Ahtna, 2023b).

A Well Installation and Decommissioning Completion Report Addendum (Completion Report) will be prepared to document fieldwork activities. The Completion Report will include field data and documentation collected as part of these activities.

The fieldwork will also be summarized in the associated OU2 quarterly and annual groundwater monitoring reports to be prepared after the fieldwork activities are completed.

5.4 Project Schedule

The project schedule below is subject to change based on QAPP Addendum Update review and approval, subcontractor availability, and field conditions. After this QAPP Addendum Update is finalized, the updated schedule will be maintained, discussed with appropriate parties, and made available upon request. Decommissioning fieldwork activities are expected to be conducted in January 2025.

5.5 Other Tasks

See Groundwater QAPP Revision 11 Worksheet #14 & 16 (Ahtna, 2023a) for information about:

- QC Tasks
- Data Management Tasks
- Data Types
- Data Tracking and Management
- Computer Database
- Geographic Information System
- Data Management Documentation
- Presentation of Data
- Assessment and Audit Tasks
- Data Review Tasks

6.0 Worksheet #17: Sampling Design and Rationale

The field activities will be conducted in general accordance with the SOPs included in Attachment A. Daily field conditions and tasks will be recorded in the Field Logbook and Daily Field Report forms in the QAPP Addendum (Ahtna, 2023b). There are no sampling activities to be conducted as part of the QAPP Addendum Update fieldwork.

6.1 Environmental Protection Plan

Environmental protection is defined as maintaining the environment in its natural state, to the extent possible, during and after fieldwork activities and returning the disturbed site to conditions similar to those present prior to these activities. Environmental protection will consist of protecting air, water, land, and biological resources.

6.2 Air Resources Protection

Fieldwork activities will be conducted to minimize the release of airborne particulates within and outside of the boundaries of the site. Dust and particulates will be controlled in accordance with the Accident Prevention Plan (Ahtna, 2024b) to minimize contaminant dispersion and to protect human health and the environment. It is anticipated, based on the proposed activities, that significant dust will not be generated. The use of water to control dust will be minimized to avoid impact to natural resources. Visual air monitoring will be conducted to verify the effectiveness of the program.

6.3 Land Resources Protection

Fieldwork will minimize impact to natural resources and maintain existing site security. Following the well decommissioning activities, disturbed land around the wells will be restored as closely as possible to its original condition by limited grading as necessary.

6.4 Water Resources Protection

The potential for impact to surface water resources is assumed to be minimal because there is no surface water drainage or storm drains that lead to surface water within the project site. Equipment maintenance and fueling will be conducted away from open storm drain inlets.

6.5 Material Handling

Both hazardous and non-hazardous wastes may be generated during fieldwork activities. These wastes will be managed as described in Worksheet #14 & 16.

Chemicals brought onsite will be managed per the Hazard Communication Program in the Accident Prevention Plan (Ahtna, 2024b).

6.6 Pre-Field Activities

6.6.1 Notification and Access

Property owners will be notified of fieldwork activities at least three days before the start of work. Site users will be coordinated with for site access, limited access to the project site during construction, and scheduling changes. Right-of-entry agreements with owners of property at the former Fort Ord are not required because the former Fort Ord is a National Priorities List (NPL) site and the Army reserves a perpetual and assignable easement and right of access to the property pursuant to the applicable

provisions of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h). The property is owned by the City of Marina, with notification of property access provided to the City's Department of Public Works. There are no known access restrictions associated with the property that monitoring wells MW-OU2-37-A and -37-180 are located on.

6.6.2 Permitting

Permits for monitoring well decommissioning will be obtained from the Monterey County Department of Health; however, no permit fees are required to be paid because the former Fort Ord is a CERCLA site.

6.6.3 Utility Clearance

A utility clearance will be performed at each proposed well location before decommissioning activities commence to avoid encountering underground utilities and other potential obstructions. Clearance activities include notification of utility agencies and/or utility protection organizations, as appropriate, in addition to performing onsite surveys using the appropriate geophysical equipment. Locations of utilities will be marked on the ground surface with indications of the assumed type of utility. Prior to initiating intrusive activities, utility location information will be reviewed, including field markings and available drawings, to ensure utility avoidance.

6.6.4 Traffic Control Plan

The well decommissioning locations are in secured areas with no expected public and/or property user traffic. Traffic control will not be needed for this project.

6.7 Support Facilities

Support facilities include lockable containers, chemical toilets, portable containment tanks and bins with lids. Lockable support facilities will be secured when project personnel are not on site. Decontamination facilities will consist of portable secondary containment for personnel and an equipment decontamination pad. Decontamination water will be collected in portable tanks for disposal. It is anticipated most of the support facilities will be located in the vicinity of the Ahtna field offices adjacent to the OU2 groundwater treatment plant.

6.8 Well Decommissioning Field Activities

The specific methods and material requirements for well decommissioning are presented in this section.

Wells to be decommissioned are shown in Figure 2 and Figure 3, listed in Table 1, and well boring logs and construction diagrams presented in Attachment B. Two monitoring wells at OU2 will be decommissioned.

Monitoring wells will be decommissioned consistent with *ASTM D5299 – Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities* (ASTM International, 2018) and Federal, State, and local regulations, though well decommissioning requirements found in Monterey County Code Chapter 15.08 will take precedence over ASTM D5299 and well decommissioning will be consistent with previous practices at the former Fort Ord.

Decommissioning activities are described in detail in SOP FSOP-603.01 (Appendix A)[2] and generally include:

- Obstructions have been identified in both wells (Table 1).
- Wells will be abandoned by overdrilling the well casing and annular material with an eight-inch auger and removing them from the borehole to the extent practicable. The appropriate size and type of auger to remove the PVC casing and annular material may be adjusted as necessary based on the the 10-inch steel conductor casing at the well locations. It is assumed that a hollow stem auger can be placed between the PVC well casing and the steel conductor casing for over-drill decommissioning.
- Sealing material will consist of 3 to 5 percent bentonite neat cement grout. Grout will be carefully mixed using clean, potable water. Bentonite neat cement grout will be a minimum of 9.1 pounds per gallon and will be free of organic matter. The estimated volume of sealing material needed for MW-OU2-37-A is 673 gallons. The estimated volume of sealing material needed for MW-OU2-37-180 is 755 gallons.
- The borehole will be filled with sealing material using a tremie or grout pipe from the bottom of the well to within 5 feet below ground surface.
- Additional grout will be added if settlement occurs within 24 hours.
- Excess grout will be placed in portable metal bins or equivalent and disposed of as solid IDW. Displaced water will be containerized and disposed of as liquid IDW.
- The well surface completion will be removed, including concrete base pads, flush mount well boxes or vaults, risers, and bollards, if present.
- The excavation will be backfilled with native material and regraded to match the surrounding topography/conditions.
- Debris (well casing, annular material, excess sealing material, and trash) and surface components from the decommissioned well (bollards, well pad, protective casing, and well boxes) will be transported to the Fort Ord Landfills staging area pending recycling or proper disposal. The estimated volume of solid/soil IDW to be generated and disposed in the Fort Ord Landfills is eight cubic yards.

6.9 Deliverables and Reporting

Field daily reports will be presented in the contractor quality control report following completion of field activities. A Completion Report will be prepared following completion of field activities. The Completion Report will describe well decommissioning activities. Information will also be presented in the associated OU2 quarterly and annual groundwater monitoring reports.

[2] Conforms with ASTM D5299.

7.0 Worksheet #21: Field SOPs

SOP #	Title, Revision, Date	Originating Organization	Equipment Type	Modified for Project Work? Y/N	Comments
FSOP-001.01	Fieldwork Documentation, Revision 1, 10/10/22	Ahtna	• Bound, waterproof field logbook • Waterproof, indelible pens/markers in black or blue ink • Digital camera/video, cell phone, or other devices capable of digital imagery • Electronic device(s) for recording and storing field-related data (e.g., data loggers and GPS units) • Batteries and charging blocks	N	
FSOP-603.01	Groundwater Well Decommissioning, Revision 1, 10/10/22	Ahtna	Measuring tape	N	
FSOP-802.00	Investigation Derived Waste Management, Revision 0, 4/1/22	Ahtna	• PPE • 55-gallon drums or other approved containers • Drum/bung wrench and drum funnel • Forklift or vehicle with drum grappler • Vendor-supplied roll-off bin(s), with liners if applicable	Y	• Waste manifests not required because no IDW will leave the former Fort Ord • Secondary containment not required because IDW is subject to immediate disposal.

8.0 References[3]

Ahtna Global, LLC (Ahtna), 2023a. *Quality Assurance Project Plan, Former Fort Ord, California, Volume I, Appendix A, Final Revision 11, Groundwater Remedies and Monitoring at Operable Unit 2, Sites 2, and 12, and Operable Unit Carbon Tetrachloride Plume* (Groundwater QAPP Revision 11). November. BW-2785V.

Ahtna, 2023b. *Quality Assurance Project Plan, Former Fort Ord, California, Volume I, Appendix A, Final Addendum No. 1, Well Installation and Decommissioning*. December. BW-2785W.

Ahtna, 2024a. *Draft Operable Unit 2 Remedy Monitoring and Operations and Maintenance, Fourth Quarter 2022 through Third Quarter 2023, Former Fort Ord, California*. June. OU2-745.

Ahtna, 2024b. *Accident Prevention Plan, Operable Unit 2, Sites 2 and 12, and Operable Unit Carbon Tetrachloride Plume, Former Fort Ord, California.* August.

ASTM International, 2018. *ASTM D5299 – Standard Guide for Decommissioning of Groundwater Wells, Vadose Zone Monitoring Devices, Boreholes, and Other Devices for Environmental Activities*. December 4.

U.S. Department of the Army (Army), 1997a. *Explanation of Significant Differences, Consolidation of Remediation Waste in a Corrective Action Management Unit (CAMU), Operable Unit 2 Landfill, Fort Ord, California.* January 13. OU2-523.

Army, 1997b. *Record of Decision, Basewide Remedial Investigation Sites, Fort Ord, California.* January 13. RI-025.

Army, 2006. *Explanation of Significant Differences, No Further Action for Munitions and Explosives of Concern, Landfill Gas Control, Reuse of Treated Groundwater, Designation of Corrective Action Management Unit (CAMU) Requirements as Applicable or Relevant and Appropriate Requirements (ARARs), Operable Unit 2, Fort Ord Landfills, Former Fort Ord, California*. August. OU2-656.

[3] At the end of references included in the Fort Ord Document Library are the Record Numbers (e.g., BW-1234). To find the referenced document, this number may be typed into the online search tool at: http://www.fortordcleanup.com/documents/search/. Please note the referenced documents were available in the Fort Ord Document Library at the time this document was issued; however, some may have been superseded by more current versions and were subsequently withdrawn.

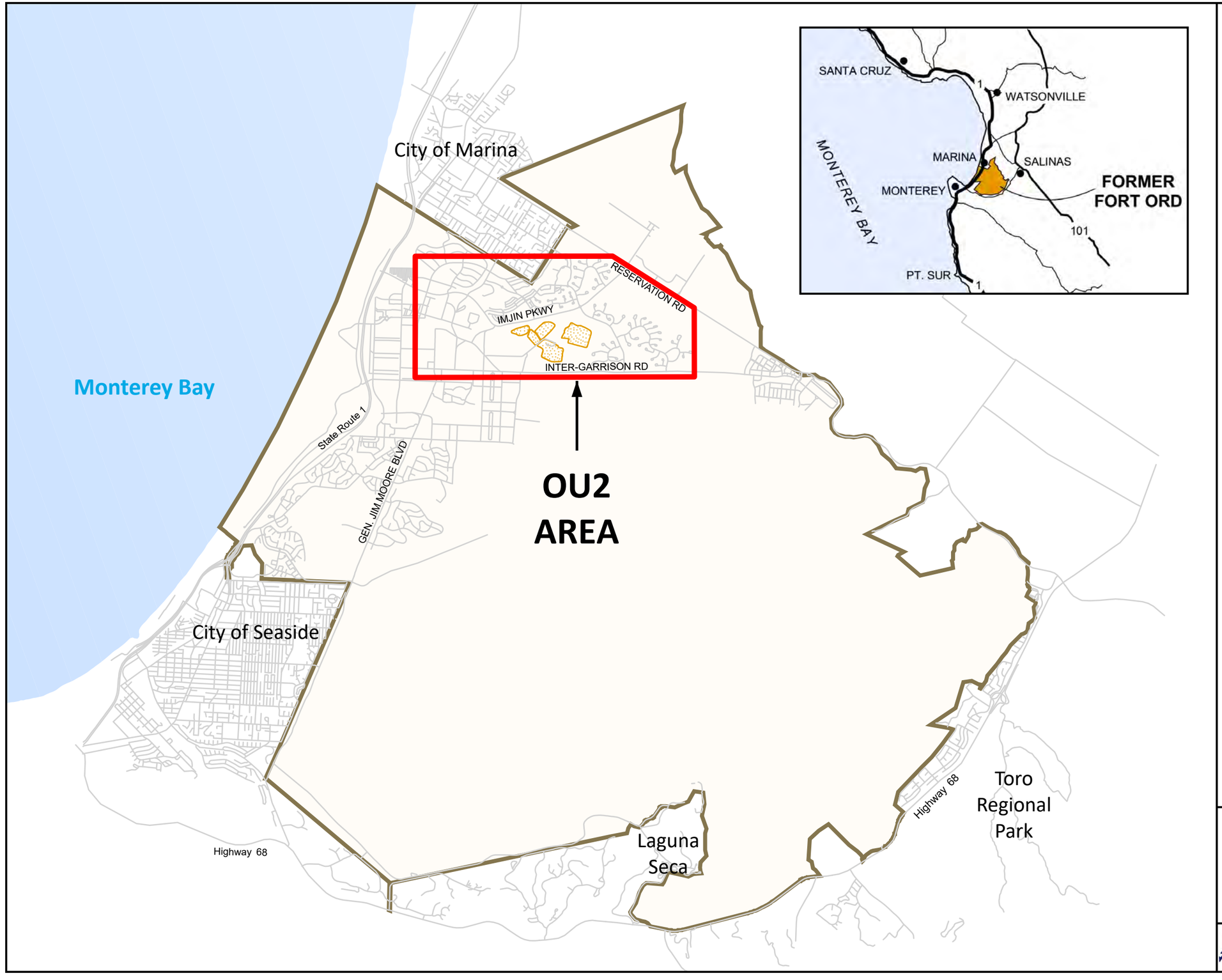
TABLE

Table 1. Wells to be Decommissioned Construction Details

Well ID	Site	Aquifer	Casing Diameter (inches)	Casing Type	Total Depth (ft btoc)		Screen Depth (ft btoc)	Screen Length (ft)	Surface Completion
					Constructed	2024-3Q			
MW-OU2-37-A^	OU2	A-Aquifer	5	Schedule 80 PVC	164.00	N/A	152-162	10	Flush vault
MW-OU2-37-180^	OU2	Upper 180-Foot Aquifer	5	Schedule 80 PVC	185.00	N/A	173-183	10	Flush vault

Note:
^ Well screen blocked by obstruction or fill material
Acronyms and Abbreviations:
btoc: below top of casing
ft: feet
N/A: not applicable
OU2: Operable Unit 2

FIGURES



EXPLANATION

- Operable Unit 2 (OU2) Area boundary
- Approximate extent of Operable Unit 2 Landfill areas (Areas B through F)
- Former Fort Ord boundary

N
W E
S

0 1 2
Miles

LOCATION MAP
Quality Assurance Project Plan Former Fort Ord, California
Volume I Appendix A,
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Well Decommissioning

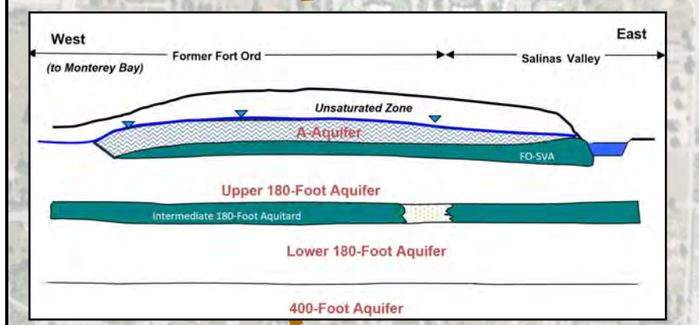
Ahtna | Date: 3/4/2025 | Figure: 1

0 1,000 2,000
Feet

N
W E
S

MW-OU2-37-A

B
C
D
E
F



EXPLANATION

- General groundwater flow direction
- Approximate edge of Fort Ord - Salinas Valley Aquitard (FO-SVA)
- Approximate extent of Operable Unit 2 Landfill areas (Areas B through F)
- Former Fort Ord boundary

Groundwater Divide

- Approximate location of the A-Aquifer groundwater divide
- Approximate location of the Upper 180-Foot Aquifer groundwater divide

Well Type and Recommendation

- Monitoring well - To be decommissioned
- Active extraction well
- Inactive extraction well
- Monitoring well
- Injection well
- Infiltration well

3Q2024 Chemical of concern (COC) Aquifer Cleanup Level (ACL) Exceedance Contour in µg/L.

- 5 — Trichloroethene (TCE) plume extent
- 3 — Tetrachloroethene (PCE) plume extent
- 5 — 1,1-Dichloroethane (1,1-DCA) plume extent
- 0.5 — 1,2-Dichloroethane (1,2-DCA) plume extent
- 6 — cis 1,2-Dichloroethene (cis 1,2-DCE) plume extent
- 0.1 — Vinyl Chloride (VC) plume extent

A-AQUIFER MONITORING WELL
TO BE DECOMMISSIONED
Quality Assurance Project Plan Former Fort Ord, California
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Well Decommissioning

Ahtna | Date: 3/4/2025 | Figure: 2

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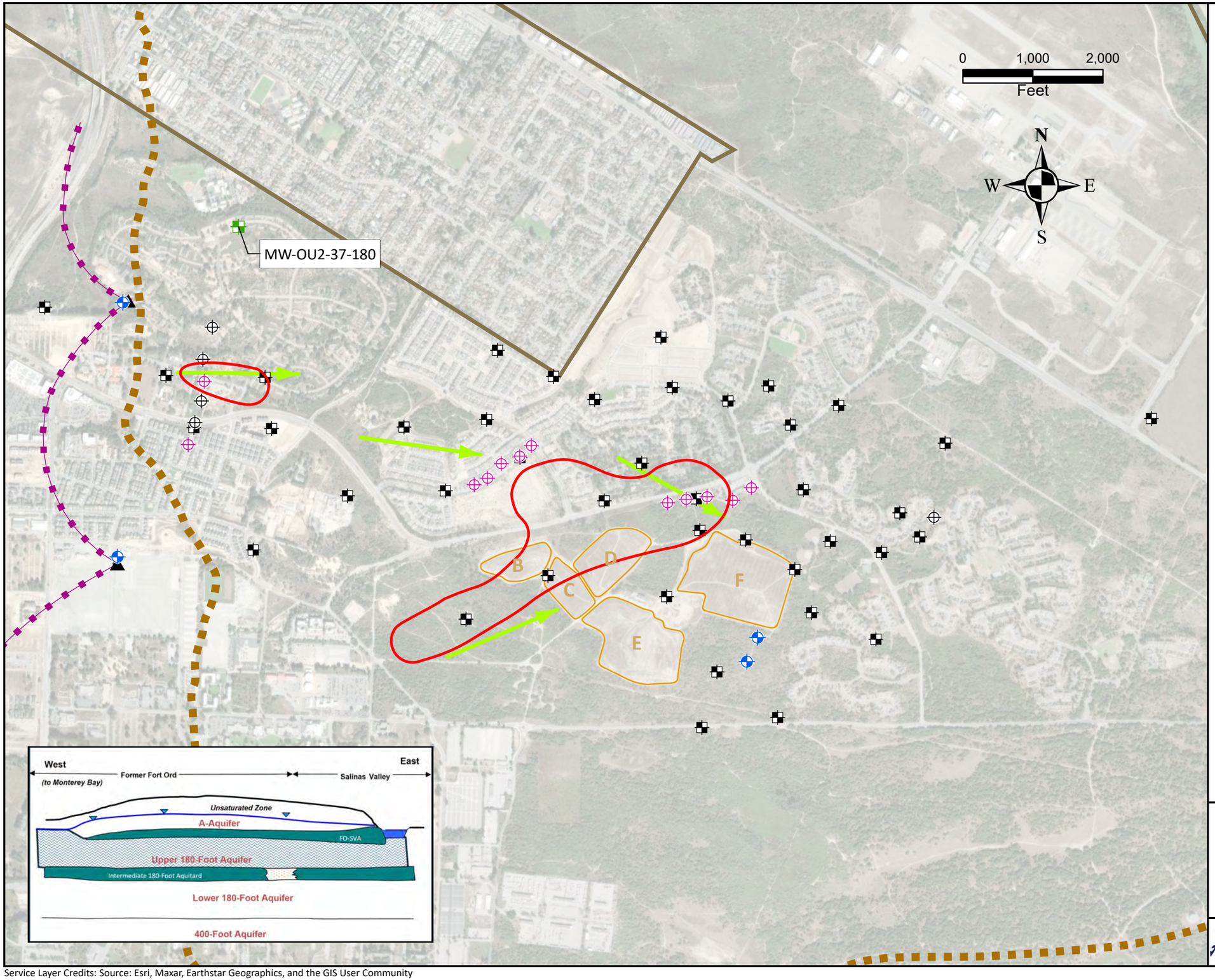
Imagery Date: October 27, 2023



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- Monitoring well
- Injection well
- Infiltration well

3Q2024 Chemical of concern (COC) Aquifer Cleanup Level (ACL) Exceedance Contour in µg/L.

5 — Trichloroethene (TCE) plume extent

UPPER 180-FOOT AQUIFER MONITORING WELL
TO BE DECOMMISSIONED
Quality Assurance Project Plan Former Fort Ord, California
Volume I Appendix A,
Update to Addendum No. 1
Well Decommissioning

Ahtna | Date: 3/4/2025 | Figure: 3

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Imagery Date: October 27, 2023

ATTACHMENTS

ATTACHMENT A

Standard Operating Procedures (SOPs)

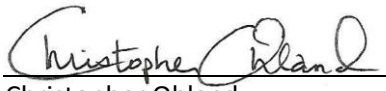
Field SOPs

SOP #	Title
FSOP-001.01	Fieldwork Documentation
FSOP-603.01	Groundwater Well Decommissioning
FSOP-802.00	Investigation Derived Waste (IDW) Management

Fieldwork Documentation

Document Number	FSOP-001
Revision	1
Department	Ahtna Southwest Operations
Previous Document Number	Original Document
Originally Released	April 1, 2022
Effective Date	October 10, 2022

Approvals



Christopher Ohland
SWE Quality Assurance Manager

October 10, 2022
Date

Bruce Wilcer

October 10, 2022
Date

Project-Specific Modification[1]

[1] Document project-specific modifications in this section. No other modification to the SOP is authorized.

Revision History

Rev 1, 10/10/2022: Revised to include PFAS- friendly supplies and procedures.

Table of Contents

1.0 Introduction

1.1 Purpose

This SOP provides field personnel with the procedures for:

- Recording real-time, chronological logs of field activities and circumstances in field logbooks/notepads, field forms, and digital/electronic media
- Documenting fieldwork and fieldwork variances
- Ensuring documentation is reviewed, organized, and safely stored until the project closed out

Adequate documentation is necessary to describe the work performed and variances to work plans if any. Attention to detail is vital since field documentation protects our client and Ahtna with secure, legally defensible evidence and has been helpful in administrative, legal, and cost-recovery requirements. For example, field documentation may be used as evidence in legal proceedings to defend procedures and techniques employed during site investigations. Therefore, field documentation must be factual, complete, accurate, consistent, and not contain subjective language. These principles also apply when photographic or videography techniques document site activities. The goal of written, digital, and photographic/video graphics documentation is to represent field activities that accurately portray site conditions or procedures.

1.2 Scope

The scope of this SOP includes data entry and format requirements for various field documentation.

When required by the project, use the PFAS-free equipment, materials, and procedures recommended in this SOP which are indicated by [PFAS Project].

Written records

- Field logbooks
- Field notepads
- Field forms

Digital records

- Audio
- Photographic/video
- Data loggers

Digital data entry using field tablets is described in the EQuIS Collect User Guide.

- **Note**: *It is important to review contracts and Performance Work Statements to identify specific documentation and format requirements applicable to your project*.
- **Note**: *Contracts may contain requirements for field records. The typical* language states: "*The Contractor shall maintain field records sufficiently to recreate all field activities. The information shall be recorded in a permanently bound notebook with sequentially numbered pages. At the end of each workday, the Contractor shall complete a daily log.*"

- **Note**: *Contracts issued by the USACE may contain requirements for the project archive, both ongoing and after completion of the contract.*

1.3 Roles and Responsibilities

Field Team. A Field Team is one or more individuals working together. Each Field Team is responsible for maintaining a field log of their activities, as applicable

Field Team Lead (FTL). The FTL provides direction and oversight of the fieldwork. The FTL is responsible for reviewing and confirming the adequacy of the field documentation during fieldwork as soon as possible and before releasing the daily quality control report. The FTL keeps the Project (PL) informed of field variances or problems encountered in the field.

Project Lead (PL). The PL is responsible for providing adequate resources to the field staff and ensuring that field staff has adequate experience and training to comply with this SOP successfully. The PL is responsible for approving and documenting techniques not described in this SOP but are considered the best methods for the current project. The PL documents changes as a variance to the plans and forwards the variance to the Program Manager (PgM) for approval. The PL is also responsible for confirming the adequacy of the field documentation after fieldwork. An entry confirming which information was reviewed must be added to the post-event field documentation package (Section 5.0).

Program Manager (PgM). For each SWE Program, the PgM is responsible for providing written instruction to their Field Team, which complies with the requirements of this SOP and the client-contracted specifications.

Site Supervisor.[1] The Site Supervisor is responsible for maintaining a project-specific FLB/notepad and field forms of their activities, as applicable, and providing copies to the PL for review.

Safety Representative. The Safety Representative meets the experience and training requirements of USACE EM-385-1-1 (USACE, 2014). The Safety Representative oversees site-specific health and safety activities and ensures compliance with the project requirements. The Safety Representative notifies the FTL of safety deficiencies and incidents and actions to correct those. If the circumstance warrants, the FTL approves those actions and notifies the PL and Site Safety and Health Officer for their approval.

Quality Control Lead (QC Lead). The QC Lead ensures work inspections are performed using the 3-Phases of Quality Control. Method described in the project work plans. The QC Lead notifies the PL of quality deficiencies and actions to correct those. The PL approves those actions or notifies the SWE Field QC Manager for their approval if the circumstance warrants involvement.

SWE Quality Assurance Manager and SWE Field QC Manager report to the SWE Vice-President. When mentioned in this SOP, The “SWE” prefix is shown to distinguish from the QC Lead assignment shown in the project organization chart.

[1] In this context, a Site Supervisor is a person assigned to oversee long-term operations or construction work; the roles and responsibilities are like that of the Field Team Leader.

1.4 Definitions

Field Documentation – The combination of field logbooks/notepads, field forms, digital/electronic forms, and other documentation in the project file.

Field Logbook (FLB) – A portable, bound, weatherproof notebook with consecutively numbered pages.

> [PFAS Project]: Use field logbook made of standard/loose plain paper (non-weatherproof), held together by an aluminum or Masonite field clipboard. Alternatively, a spiral-bound notebook with non-weatherproof paper and/or cover can be used.

Field Notepad – An unbound, company notepad containing pre-printed heading block and space (straight-lined, grid lined, or open) for recording information. This can be an alternative to the FLB. The notepad can be paper or electronic (Word, Excel, Access, etc.) as long as a hard copy of the individual sheets is sequentially numbered and maintained in a properly labeled binder/file folder.

Field Forms – Any documentation that preserves an accurate historical record of field activities but is recorded on unbound paper. These forms should be referenced in the FLB. A listing of the most commonly used SWE field forms is provided in Section 2, "Relevant Documents." Each data entry field should have an entry or indicate that data for that field is not available or not required.

> [PFAS Project]: Record of field events will be maintained on loose paper (PFAS-free) secured on Masonite or aluminum clipboards. Plastic clipboards, binders, or spiral hard cover notebooks are not acceptable. Field logbooks are permanently assigned to a specific project.
>
> In addition, Field Form FFRM-004.00 "Daily PFAS Sampling Checklist, must be completed each day of fieldwork when activities may compromise environmental media that is sampled.

Data Loggers – Field equipment providing digital/electronic information to supplement field forms. Examples include water-level transducers for aquifer tests, flow sensors and meters in pump and treat systems, and air monitoring equipment (Section 4.1.7).

Digital/Electronic Files – Any documentation that preserves an accurate historical record of field activities but is recorded electronically through field instruments and digital devices. These records should be referenced in the FLB. Digital/electronic information includes global positioning system (GPS) coordinates, photographs, and videos.

2.0 Relevant Documents

SWE file folder m:\\Environmental\Quality Control Procedures\SWE Field Forms\ has the current, approved form templates.

3.0 Equipment List

[PFAS Project]: Products containing waterproof features (e.g., Post-it-notes, waterproof coated paper) cannot be used on per- and polyfluoroalkyl substances (PFAS) projects.

- Applicable field forms

  [PFAS Project]: Work activities will be maintained on loose paper (PFAS-free) secured on Masonite or aluminum clipboards. Plastic clipboards, binders, or spiral hard cover notebooks are not acceptable.

- Bound, waterproof field logbook (FLB; e.g., Rite in the Rain™ or similar) with pre-numbered consecutive pages for field documentation or notepad

  [PFAS Project]: Use field logbook made of standard/loose plain paper (non-weatherproof), held together by an aluminum or Masonite field clipboard. Alternatively, a spiral-bound notebook with non-weatherproof paper and/or cover can be used.

- Waterproof, indelible pens/markers in black or blue ink

  [PFAS Project]: Ball-point pens: do not use markers, felt pens, or pens with water resistant ink

- Digital camera/video, cell phone, or other devices capable of digital imagery
- Electronic device(s) for recording and storing field-related data (e.g., data loggers and GPS units)
- Batteries and charging blocks

4.0 Procedures

This section describes various mechanisms of recording documentation, including requirements and procedures. Before fieldwork, each project should define project instructions that identify the mechanism for documentation. The instruction is intended to promote procedural consistency, defined roles and responsibilities, and common language across project teams, promoting efficient reviews and cross-team utilization and training. Once established, project staff shall follow the project instruction.

4.1 Document Control and Storage

4.1.1 Project File

While in the field, the fieldwork documentation project file is managed by the FTL and consists of:

- Written records: FLB/notepads, field forms
- Digital/electronic records: photos, videos, GPS records
- Downloads from electronic devices such as data loggers

The PL is responsible for providing the location and details for storage. All field documentation is a part of the project file and should be maintained with safe document handling and archiving procedures. Hardcopy documentation and digital files are official records of fieldwork. Scans of official records are helpful for ease of access to project information and generating reports but are not official records.

The PL is responsible for all forms of field documentation, and scans of paperwork, digital records, and downloads from electronic devices are placed in the m:\\ drive project file. All original documents shall be assembled into a data package, submitted to the PL, and archived in the project file. The goal is that all documentation is organized by task/event and stored in a single location.

4.1.2 Problems in the Field and Variances from Project Plans

Variances or problems encountered during the fieldwork that cannot be resolved promptly must be communicated promptly in writing to the FTL /Site Supervisor, who will notify the PL. This may be completed by sending a variance notice by email or other means to promptly communicate the variance or problem and allow for the continuation of the fieldwork. The PL shall provide written approval of recommended solutions or provide an approved alternate solution.

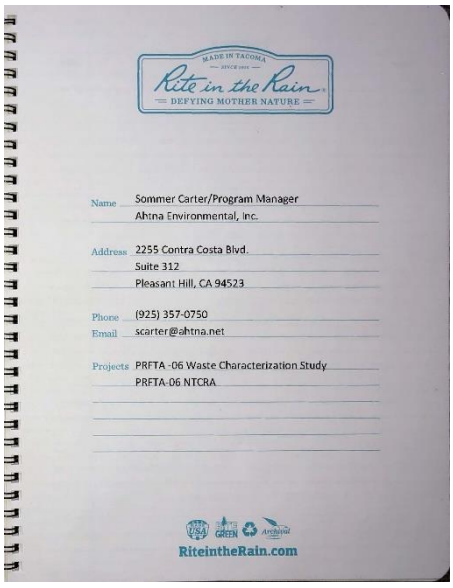
The need for a corrective action addressing variances or problems in the field will be determined by the PL in collaboration with the FTL/Site Supervisor. The PL will notify the PgM and SWE Field QC Manager of any needed corrective action for their concurrence or follow-up.

Documentation of variances to project plans, problems encountered, or corrective actions will be kept in the FLB/notepad or forms.

4.1.3 Field Logbook

Field logbooks can be spiral- or adhesive-bound and are distributed by the PgM or designee. The cover of the FLB is labeled with the project number and name of the Installation/Site(s).

The inside cover of the FLB contains the name, address, phone, and email address of the PgM and a list of projects the FLB is used to record. The information is updated if the project is assigned to another PgM.



The FLB shall be project/task-specific. The Field Team uses the FLB to record details of their responsibility (e.g., sampling, QC, safety, oversight, etc.) and provide them to the FTL/Site Supervisor for their review before submitting daily QC reports (DQCRs).

The FLB records are scanned, and the scan is saved as a PDF file on the Ahtna server in the project folder to create an electronic record for project reports. The PL shall ensure the FLBs are stored safely until project closeout. The field job box could be used for temporary storage.

4.1.4 Field Notepads

Three-ring punched, loose-leaf notepads or individual sheets can be printed on field form SWE-FFRM-001.[2] Each sheet contains a heading block, and block entries must be filled in on the first page of a new date.

Example Heading Block for Long-Term O&M or Construction

Installation/Site	Sharpe Army Depot/Sitewide	Project Number	05206.000.01.0000
Site Supervisor	Paul Marsden	Date	July 27, 2021
Subject	Telephone Record	Recorded By	Izzy Done

Example Heading Block for Environmental Studies

Project Number	05206.000.01.0000	FTL	Who Dunnit
Installation/Site	MOTCO Site 2	Recorded By	Izzy Done
Event Name	1Q 2021 GW Sampling and LF Inspection	Date	July 27, 2021

Notepads (loose-leaf paper) are used by the Field Team to record details of their responsibility (e.g., sampling, plant operations, QC, safety, oversight, etc.) and provided to the FTL/Site Supervisor for their review before submitting DQCRs.

The PL shall ensure the sheets are stored in three-ring binders or another filing system (Section 5.0), labeled with the Installation/Site name, project number, and a descriptive name of the project. If an FLB or field form is also used, a scanned copy of the FLB pages and original copies of the field forms are stored in the binder. The sheets are sequentially numbered and reviewed by the FTL/Site Supervisor. The PL reviews and approves the Site Supervisor's notepad sheets. The PL is responsible for safely storing the binder or other filing system until project closeout.

The notepad binder will be kept in the site office project file or job box. As soon as possible, the unbound records shall be scanned and saved on the Ahtna server in the m:\\ drive project folder to create an electronic record to ensure document preservation and use in project reports.

4.1.5 Field Forms

SWE-approved field form templates are available at M:\Environmental\Quality Control Procedures\SWE Field Forms\. Activity-specific SOPs reference the field forms that should be used. If preferred, individual sheets can be printed on pre-punched three-hole paper (or punched later). If the printer is capable, use a heavy paper stock for a durable form. Field forms supplement the FLB/notepad and provide a way to record detailed information using a structured format. When new forms are available, they will be posted

[2] Project-specific format designs may be used. Computer applications such as Microsoft Word or similar may also be used as long as the header information is shown, and printed copies are stored in three-ring binders.

in the template folder. The SWE Technical Writer oversees version control and will notify SWE staff when the form is posted.

Each sheet contains a heading block to enter the Installation/Site name, descriptive activity name, FTL, project number, and QAPP SOP number for the performed activity-specific fieldwork. Depending on the activity, the names of staff assigned with lead roles, weather conditions, date of recorded information, or other information may appear on the form. The heading block entries must be filled-in for each sheet to bind the field form to the project/activity.

Example Field Form Heading Block

Project Number	05108.001.02	FTL	Jared Wilson
Installation/Site	MOTCO/Site 1	SOP No.	FSOP-002
Activity Name	1Q 2021 GW Sampling and LF Inspection	Date	08/06/2021
Field Team (name/organization)	Jared Wilson/Ahtna, Izzy Done/Forever Waiting		
Weather Forecast	Sunny, 65–80°F, SW winds 5–10 mph		

Field forms are used by the Field Team to record details of their responsibility (e.g., sampling, O&M operations, QC, safety, oversight, etc.) and provided to the FTL/Site Supervisor for their review before submitting DQCRs.

The PL shall ensure the sheets are stored in three-ring binders or another filing system (Section 5.0), labeled with the Installation/Site name, project number, and a descriptive name of the project. If an FLB/notepad is also used, a scanned copy of the FLB/notepad pages and original copies of the field forms are stored in the binder. The sheets are sequentially numbered, reviewed, and approved by the PL. As soon as possible, the unbound forms shall be scanned and saved on the Ahtna server in the m:\\folder to create an electronic record to ensure document preservation and use in project reports.

The PL is responsible for safely storing the binder or other filing system until project closeout.

4.1.6 Electronic Files

Photographs and Video

All original digital field documentation (Section 1.4) shall be downloaded as soon as possible to a designated location for project use. Exclude files that are unnecessary due to unusable image quality or content. As soon as possible, the date/time, location, direction (compass point or radial degree), and purpose of the image should be documented before the information is forgotten. The use of metadata and smartphone applications to gather this information can assist. Files can be edited but maintain the original file and save the edited file with a suffix description. Alternately, use field form SWE-FFRM-002 to log photos. This form is helpful for tasks where few pictures will be taken.

The PL is responsible for providing the location and storage details. Files should be uploaded to the project folders and caption descriptions documented as soon as possible after the fieldwork ends.

Data Loggers

Examples of data loggers include equipment used in combination with:

- Water-level transducers for aquifer tests
- Flow sensors and meters in pump and treat systems
- Air monitoring equipment (e.g., particle counters)

The use of data loggers should be recorded in an FLB/notepad or field form and include the type of logger, make, model, S/N, calibration if required, and any input specifications used.

Document data acquisition activities using data loggers (data logging equipment) and related observations in the FLB.notepad. Written notes provide a permanent record of field activities that support digital data temporarily stored on various data loggers.

Specific steps and guidelines for the data acquisition activity being performed should be reviewed in the respective SOP guiding the activity.

The observations and data will be recorded in the FLB/notepad or field form. Because of the variability of features and operation of various data loggers, each field SOP and manufacturer's instructions should be carefully reviewed before beginning field activities.

The PL is responsible for providing the location and details for storage. Files should be uploaded to the project folders as soon as possible after the fieldwork ends. Files should not be edited. If needed, modifications to the captured data should be noted in the project reports. Hardcopy printouts in comma-delimited format (or similar) are recommended should the source file become corrupt.

Global Positioning Systems

GPS data acquisition activities and related observations will be digitally-recorded and later downloaded, and the file saved as described above.

Alternately, the GPS data can be recorded in field documentation to provide a permanent record of field activities supporting digital data that is temporarily stored on the GPS unit. As applicable, observations and data may be recorded in an FLB/notepad or field forms. The field forms will record the survey location identifier (e.g., well/boring location, structural feature) and corresponding coordinates and elevation.

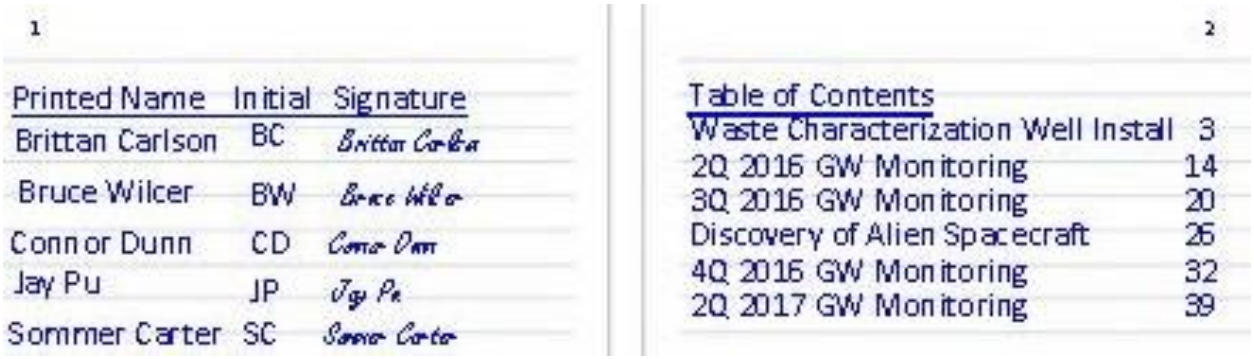
The GPS operator should also be thoroughly familiar with the manufacturer's instructions and SOP for Global Positioning System (FSOP-103) before performing GPS work in the field.

4.2 Field Logbook

The FLB is the written record of all fieldwork elements, such as Ahtna staff, subcontractors, visitors at the site, weather forecast/conditions, field equipment calibrations, construction activities, and sample collection activities. Fieldwork can be recorded on a notepad or forms described in Sections 4.3 and 4.4. When field forms are used, a brief description of the activity is added to the FLB/notepad, and details are added to the form.

4.2.1 Guidelines

Pages 1 and 2 of the FLB should be reserved to provide a signature page and table of contents. The signature page lists the employee's name, initials, and signature. The printed name and signature bind the employee to their written documentation, and the initial is helpful when limited space is available for writing a full name on subsequent pages. Each initial on page 1 must be unique. Page 2 is not required but helpful to quickly locate information in the FLB. If more space is needed, the back cover pages could be used. An entry for a significant event and the page number that initiates the documentation is typical. Open space on pages 1 and 2 does not need to be lined out, as the list will grow during work execution.



1

Printed Name	Initial	Signature
Brittan Carlson	BC	Brittan Carlson
Bruce Wilcer	BW	Bruce Wilcer
Connor Dunn	CD	Connor Dunn
Jay Pu	JP	Jay Pu
Sommer Carter	SC	Sommer Carter

2

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Field documentation shall adhere to the following guidelines:

- Write entries in blue or black waterproof ballpoint pen (older copier machines do not recognize other colors). Avoid felt tip pens. *Do not use a pencil*.
- List personnel making entries in the FLB and include initials and signatures on the inside cover page.
- Use a table of contents on page 2 (recommended but not required).
- Start a new page at the beginning of each day.
- Entries should be chronological – a time notation should introduce each entry.
- Language should be objective, factual, and free of personal feelings or inappropriate terminology.
- Do not erase or scratch out errors. Draw a single line through the error, then insert the corrected material. The person who corrected it shall initial and date the correction. If an explanation is needed, add that in the next available blank area in the FLB and cross-reference the error and explanation.
- The FLB shall be signed at the end of each day. Signatures shall be written on a single diagonal line drawn across the blank portion of the page following the day's last entry.
- All FLB shall be returned to the FTL/Site Supervisor for review and safe storage. The FTL/Site Supervisor shall review daily as soon as possible and before the DQCR is released.

4.2.2 Entries to Include

Initial daily entries shall include the following:

- **Date and time**: The time shall be based on military time (i.e., 2100 instead of 9 pm)
- **Field Team Leader**: Name of the Field Team Leader or Site Supervisor
- **Safety Representative**: Name of the task Safety Representative (meets EM 385-1-1 requirements)
- **QC Lead**: Name of the task QC Lead

- **Site Personnel**: Full name, title/role, and affiliation of personnel onsite, including visitors and subcontractors, with arrival and departure time noted
- **Planned Activities**: General description of various work activities for the day
- **Weather**: Weather forecast (temperature, cloud cover, wind speed, and direction). Changing weather that impact site conditions should be recorded throughout the day
- **Notes**: Taken By: Name(s) the FLB/notepad author(s)

The following are examples of ongoing daily entries. Use those and others as applicable:

- When field forms are used, record a brief description of the field activity, then record details on the field form. Do not duplicate information referenced on the field forms in the daily field documentation
- Participation in the Site Safety Tailgate Meeting, details can be added to the Site Safety and Tailgate Meeting form
- Level of personal protective equipment (PPE) and describe upgrade and downgrade of PPE levels
- Type of field instrumentation and calibrations performed, details can be added to the equipment calibration form
- Work start/stop times
- Time and location of activities
- Site physical conditions, changing weather conditions, major task decisions, or other valuable site investigation information and other essential observations
- Level of PPE and describe upgrade and downgrade of PPE levels
- All relevant field observations, major task decisions, or other valuable site investigation information
- Location of work areas if the survey has not been completed
- Survey and location of any sampling points, including swing-tie measurements
- Decontamination times and methods
- All field measurements. If field measurements of this type are being recorded on dedicated field forms, it is not necessary to record in the FLB, but the use of the form should be noted
- Type, amount, method, and location of storing and disposal for investigation-derived waste
- Changes/deviations/variances from the work plan and reason for deviations change/variance.
- Thoroughly document all FTL/Site Supervisor or PL-approved directives, guidance, or potential corrective actions from client and oversite government personnel. Directives that give personnel specific authority to make critical decisions must be documented in the FLB
- Communications with the FTL, Site Supervisor, or PL or client about decisions being made in the field
- Work deficiencies and corrective actions
- Approved work variances
- Persons contacted and topics discussed

4.2.3 Documentation of Project Variances

Thoroughly document all variances from the Performance Work Statements, Work Plans, and QAPP or changes in fieldwork procedures. Problems, delays, or any unusual occurrences such as improper equipment or breakdowns should be included, along with PL-approved resolutions. Summarize the content and conclusions of all relevant meetings, discussions, and telephone conversations that involve you.

4.2.4 References to Locations

This section applies to new locations. Established locations are referred to by the location name or code. Previously established locations are typically shown on site maps/figures.

Whenever an activity (sample collection, field measurement/monitoring, etc.) is performed at a new location (i.e., the location has not been surveyed and shown in a figure), mark the location with a survey stake or similar marker, a detailed description of the location must be recorded in the FLB/notepad or field form and accompanied by a photo, sketch, or point on an attached map as part of the daily field documentation package (sketches with accompanying photographs when appropriate, with north arrow and approximate scale). Record unusual site physical conditions or signs of contamination such as oily discharges, discolored surfaces, unusual odors, dead or distressed vegetation, including types of plants, if possible.

4.3 Notepads

When notepads are used, the requirement and procedures for the FLB (Section 4.2) also apply to the notepad documentation.

4.4 Field Forms

Field forms are used in addition to FLBs/notepads. Field forms are activity-specific and may be completed for each location/sample/well, etc., or one per field event as appropriate. Each form contains a heading block to bind the field form to the FLB/notepad. Field forms augment but do not replace the FLB/notepads. Avoid duplicating information recorded in the FLB/notepad and field form.

The forms include space (check box, table cell, and underlined space) for recording the information necessary for the project to ensure complete and proper information is recorded. Each space must be completed on a field form, and if not needed, then struck out or listing “not applicable.” Blank space can be misunderstood as missing information. Version-controlled template files of the forms are stored in the M:\Environmental\Quality Control Procedures\SWE Field Forms.

Field forms may be modified for project-specific use with the SWE Quality Assurance Manager’s approval.

All unbound data documentation is a part of the field records and should be maintained with safe document handling and archiving procedures. These records should be recorded in the same manner as notes in the FLB/field notpad using black or blue waterproof, indelible ink, and on weatherproof paper as necessary (projects testing for PFAS cannot use products with fluorinated constituents).

4.5 Field Documentation Data Package

After a short-term, specific event (e.g., well installation, sample collection, landfill inspection, and similar), copies of the FLB pages and hardcopies of loose-leaf documentation and relevant correspondence (emails and phone records) should be organized assembled into an event-based data package. The package should include a cover page listing the Installation/Site, project number, and event description.

The PL is responsible for the safe storage of the data package until project closeout. A copy of the package should be scanned and saved in the m:\\ drive project folder. The scan file could replace other scanned files described in the project instructions (Section 4.0).

If the fieldwork is a long-term task such as operating an O&M treatment system, remedial actions (e.g., excavation and disposal), or other qualifying fieldwork, the timeframe for producing the data package should be defined in the PgMs project instructions, but that period should not exceed one per year or end of the contract period.

5.0 Quality Assurance/Quality Control

Conduct the 3-Phases of Quality Control Method described in the project work plans.

Quality Assurance (QA) and QC procedures for field documentation review will be performed by the FTL/Site Supervisor and checked by the PL to ensure the content and level of detail comply with this SOP. The FTL/Site Supervisor can approve variances and fieldwork problems in coordination with the PL. The FTL/Site Supervisor should try to resolve the issue so that work can continue; however, should the variance/incident/problem affect the contracted scope of work or a project decision made from the evaluation of date, the resolution must be coordinated with PgM and SWE Field QC Manager if corrective action is needed. The PgM should notify the SWE Quality Assurance Manager of all corrective actions.

6.0 Documentation Review

The FTL is responsible for the daily review of the fieldwork documentation for compliance with requirements (Section 4.0 “Procedures”) and legibility. Errors and omissions should be explained and revisions to an entry signed and dated by the FTL.

The PL is responsible for reviewing and signing approved documents stored in the project file (Section 4.1).

7.0 References

U.S. Department of Defense, 2013. *DoD Environmental Field Sampling Handbook, Revision 1.0*. April.

Groundwater Well Decommissioning

Document Number	SWE-FSOP-603
Revision	1
Department	Ahtna Southwest Operations
Previous Document Number	Original Document
Originally Released	April 1, 2022
Effective Date	October 10, 2022

Approvals

Christopher Ohland — October 10, 2022
Christopher Ohland
SWE Quality Assurance Manager
Date

Bruce Wilcer — October 10, 2022
Bruce Wilcer
SWE Field Quality Control Manager
Date

Project-Specific Modification[1]

[1] Document project-specific modifications in this section. No other modification to the SOP is authorized.

Revision History

Rev 1, 10/10/2022: Revised to include PFAS-friendly supplies and procedures

Table of Contents

1.0 Introduction

Improperly decommissioned wells pose a potential threat to groundwater quality because they may act as a conduit for surface pollutants and allow migration into the subsurface or allow mixing of groundwater through interconnecting isolated aquifers. Other terms commonly used for a decommissioned well include “destroyed” or “permanently sealed.”

1.1 Purpose

The purpose of this standard operating procedure (SOP) is to direct field staff in the proper techniques and documentation during decommissioning of groundwater monitoring wells, extraction wells, temporary wells (hereafter referred to as “groundwater wells”), and piezometers.

1.2 Scope

The scope of this SOP applies to field staff conducting well decommissioning oversight. The SOP includes guidance for the performance, management, and completion of decommissioning groundwater wells using drilling and in-place methods and includes descriptions of staff responsibilities, relevant documentation, equipment, procedures, and quality control. Potential hazards related to well decommissioning is addressed in project-specific Accident Prevention Plans (APP) and Site Safety and Health Plans.

Per- and polyfluoroalkyl substances (PFAS) friendly procedures are also provided in this SOP. When required by the project, use the PFAS-free equipment, materials, and procedures recommended in this SOP which are indicated by [PFAS Projects].

1.3 Responsibilities

Field Team Lead (FTL). The FTL is responsible for reviewing project work plans to understand the health and safety needs, procedural specifications, and field documentation requirements. The FTL is responsible for reviewing and confirming the adequacy of the fieldwork documentation.

Field Geologist. A Field Geologist is responsible for overseeing drilling activities according to project specifications. The Field Geologist is a registered geologist or a person performing work under the supervision of a registered geologist.

Project Geologist. The registered Project Geologist is responsible for oversight of the drilling subcontractor, proper completion of work activities, and field documentation. When a Field Geologist performs the oversight, the Project Geologist is responsible for fieldwork variances/deficiencies, completeness, and accuracy of field documentation.

Project Lead (PL). The PL is responsible for providing adequate resources to the field staff and ensuring the Field Team has adequate experience and training to comply with the SOP successfully. The PL is responsible for approving and documenting techniques not described in this SOP but are considered the best methods for the current project.

Safety Representative. The Safety Representative meets the experience and training requirements of the current version of U.S. Army Corps of Engineers EM-385-1-1 Safety and Health Requirements. The Safety

Representative oversees site-specific health and safety activities and ensures compliance with the project requirements. The Safety Representative notifies the FTL of safety deficiencies and incidents and actions to correct those. The FTL approves those actions or, if the circumstance warrants, notifies the PL and Site Safety and Health Officer for their approval.

Quality Control Lead (QC Lead). The QC Lead ensures work inspections are performed using the 3-Phases of Quality Control method described in the project work plans. The QC Lead notifies the PL of quality deficiencies and actions to correct those. The PL approves those actions or notifies the SWE Field QC Manager for their approval if the circumstance warrants involvement.

1.4 Definitions

Abandoned Well. In general, a well that has not been used for a prescribed duration identified in the applicable well standard (e.g., one year). This status may also be termed "permanently inactive." If the well may be used in the future, some level of maintenance may be required.

Annular Space. The space between any of the following:

- An inner drill pipe and outer drive casing
- Drill pipe or drive casing and the borehole wall
- Well screen or casing and the borehole wall

Borehole – Any hole drilled into the subsurface to identify lithology, collect soil samples, and install groundwater wells.

Field Documentation – The combination of field logbooks/notepads, field forms, digital/electronic forms, and other documentation in the project file.

Field Forms – Any documentation that preserves an accurate historical record of field activities but is recorded on unbound paper. These forms should be referenced in the FLB. Each data entry field should have an entry or indicate that data for that field is not available or not required.

Field Logbook (FLB) – A portable, bound, weatherproof notebook with consecutively numbered pages.

Field Notepad – A unbound notepad or loose-leaf paper with consecutively numbered pages.

Filter Pack – Granular filter material (sand, gravel, etc.) placed in the annular space between the well screen and the borehole to increase the effective diameter of the well and prevent fine-grained material from entering the well.

Grout – For this SOP, the term "grout" consists of a neat cement grout generally containing three to five percent bentonite powder to water by weight. The grout acts as a surface seal and is emplaced as a slurry. When set and cured, it can restrict the movement of water.

Tremie – A tubular device or pipe used to place grout, bentonite, or filter pack in the annular space.

Well Decommissioning. The process of eliminating a well structure and borehole as a possible means for the preferential migration of poor-quality water, pollutants, and contaminants; and to prevent a possible hazard to humans and animals. This usually requires removing all well materials and grouting the remaining borehole or grouting the well in place.

Well Screen – A perforated, wire-wound, continuous wrap, or slotted casing segment used in a well to maximize the entry of water from the producing zone and to minimize the entrance of sand and fine particulates.

2.0 Relevant Documents

This SOP focuses on the decommissioning of groundwater monitoring wells and associated tasks and should be used in conjunction with other project documents applicable SOPs, including the following:

Standard Operating Procedures

- SWE-FSOP-001 Field Documentation
- SWE-FSOP-300 Series (various drilling methods)
- SWE-FSOP-801 Equipment Decontamination
- SWE-FSOP-802 Investigation-Derived Waste (IDW) Management

Field Forms

- SWE-FFRM-004, Daily PFAS Sampling Checklist [PFAS Projects]

Well construction details and a copy of the well construction diagram should be carefully reviewed to identify details regarding materials and dimensions of the casing, screen, seals, and filter packs.

3.0 Equipment List

The list below identifies equipment expected to be used by staff while supervising the decommissioning of monitoring wells.

- A bound, waterproof field logbook (FLB; e.g., Rite in the Rain™ or similar) with pre-numbered consecutive pages for field documentation

  [PFAS Project]: Field logbook made of standard/loose plain paper (non-weatherproof), held together by an aluminum or Masonite field clipboard. Alternatively, a spiral-bound notebook with non-weatherproof paper and/or cover can be used.

- Waterproof, indelible pens/markers in black or blue ink

  [PFAS Project]: Use ball-point pens. Do not use markers, felt pens, or pens with water resistant ink.

- Digital camera/video, cell phone, or other devices capable of digital imagery
- Appropriate PPE

The following materials are commonly used during well decommissioning and may or may not involve using a drill rig depending on requirements; review project-specific work plans for specific or unique materials or decommissioning procedures.

- Measuring tape
- Plastic sheeting to protect decontaminated equipment

  [PFAS Project]: Clean, dry well materials should be stored within a protective medium (e.g., HDPE bag) or staged in a clean area for future use.

- Cement and pure bentonite powder (for grouting wells/boreholes; confirm the type of each and mixture specifications)
- Bentonite chips/pellets
- Tremie pipe
- Grout pump

4.0 Procedures

Procedures are provided for:

- Pre-Field Tasks (Section 4.1)
- Preparation (Section 4.2)
- Mobilization and Setup (Section 4.3)
- Well Decommissioning (Section 4.4)
- Demobilization/Site Restoration (Section 4.5)

In general, the preferred method to decommission a well is to remove the well casing and screen from the borehole, clean out the borehole, and backfill with a cement or bentonite grout, neat cement, or concrete. However, some circumstances and ordinances may allow in-place well decommissioning where appropriate and approved. General procedures are described here because of variability in well construction, materials, nature of aquifer materials associated with the well, and acceptable decommissioning methods. Therefore, it is strongly recommended to document in project-specific work plans the appropriate and allowable well decommissioning method(s), approved before starting work, and clearly understood by all field personnel. Additional guidance can be found in SWE-FSOPs in Section 2.0.

4.1 Pre-Field Tasks

Planning well-decommissioning methodologies depend on several factors including, but not limited to:

- Total depth of the well
- Depth to groundwater
- Casing material, diameter, and condition
- Original seal condition within the annulus
- Well plumbness
- Hydrogeologic conditions
- Level of contamination if present, and the zone(s) where the contamination occurs
- Access to the well and surrounding site conditions

4.2 Preparation

4.2.1 Confirm Clearances

Before mobilization of a rig to the well site, ensure that the well location has been appropriately cleared for underground utilities, buried objects, overhead hazards, and permits issued per the project work plans.

- Review all forms and diagrams documenting the location of the well site and the location of any identified underground utility lines or other buried objects, especially if decommissioning activities will affect areas outside the original borehole diameter.
- It may be necessary for military installations/government property to obtain dig permits from the Department/Directorate of Public Works (DPW) or similar office before proceeding with work.
- Contact State 811 call-before-you-dig services (e.g., USA North 811, Dig Alert, etc.) to request that the location of buried utilities be marked with paint or flags so that you do not unintentionally contact an underground utility line. Confirm responses from each utility and retain copies of the confirmations.
- Before raising the mast on any drilling rig, ensure appropriate clearances are maintained from overhead structures and power and communication lines.

4.2.2 Health and Safety

- Tailgate Safety Meetings should be held in the manner and frequency stated in the health and safety plan.
- All personnel at the site should have appropriate training and qualifications as per the health and safety plan.
- All personnel within the exclusion zone should pay close attention to rig operations during drilling. The rotating or swinging drilling components can snag or catch loose clothing or strike personnel and cause severe injury or death.
- Establishing clear communication signals with the drilling crew is mandatory since verbal signals may not be heard during the drilling process. The entire crew should be made aware to inform the driller of any unforeseen hazard—or when anyone is approaching the exclusion zone.

4.2.1 Personal Protective Equipment (PPE)

Don the appropriate PPE as specified in the project work plans and APP.

4.2.2 Decontamination

Decontaminate all downhole equipment, appropriate portions of the rig, and materials per SWE-FSOP-801 (Equipment Decontamination).

4.2.3 Calibrations

Calibrate health and safety monitoring equipment according to the instrument manufacturer's specifications.

4.3 Mobilization and Setup

4.3.1 Site Preparation

The logistics of well decommissioning should be determined before mobilizing. The site should be prepared as per the project work plans.

- Clear the work site of all brush and obstructions and then mobilize the rig to the well location.
- As per the site health and safety plan, appropriate barriers and markers should be in place before drilling.
- Plastic sheeting (e.g., Visqueen™) may be required beneath the rig.
- Appropriate cuttings and other IDW containment should be set onsite before the commencement of drilling.
- Provisions should ensure adequate containment if formation water is expected to be produced during decommissioning operations.

4.4 Well Decommissioning

4.4.1 Preliminary Work

Investigate the well before it is decommissioned to determine its condition and details of its construction.

- Remove all undesirable hardware and equipment, including dedicated pumps, wiring, conveyance piping, and well-related debris.
- Remove contaminants in the form of oil from oil-lubricated pumps or pollutants and contaminants that could interfere with well decommissioning. Remove and dispose of the contaminants appropriately as IDW (see SWE-FSOP-802, IDW Management).
- Run a video log of the well if the condition of the well casing is suspect or of concern.
- Calculate expected quantities of grout during any well decommissioning in advance.
- Be prepared to continuously track grout quantities in the FLB during the grouting process to verify that the volume of the grout placed equals or exceeds the volume to be filled and sealed.

4.4.2 Sealing in Place

Where state regulations and conditions permit, it may be permissible to grout a well casing in place. Decommissioning a well in place is allowed where it is agreed (usually by enforcing agency) that it cannot or should not be removed. The procedure consists of cementing the sand pack, well screen, and casing in place, usually with a cement bentonite grout. The type and composition of the grout mixture should be specified in the project work plans. The grout is commonly pumped through a tremie pipe inside the well.

- The well should be sounded in advance to ensure no obstructions exist that interfere with filling and sealing the entire well.
- If granular material (e.g., sand pack, formation sediment, etc.) is believed present inside the well based upon the sounding, a bailer may be run to the bottom to attempt to ascertain the type of debris. The granular well debris should then be removed from the well to the extent possible by bailing, pumping, or other appropriate techniques.
- The surface pad should be demolished and the area around the casing excavated if necessary to allow the casing to be cut off below ground surface.

Circumstances may require perforation of the casing across low permeability zones, at excess sand pack intervals (i.e., behind blank casing), and intervals of known or suspected poor cement seals. Perforation techniques may include using a perforation gun (with explosives) or a tool such as a Mills Knife Perforator. Well end caps may also be punctured based on specific requirements.

The grouting is commonly conducted in successive stages across the perforated intervals. In some instances, local ordinances or regulatory agencies may require pressure grouting techniques to complete in-place well decommissioning. Specific procedures and safety measures, especially when working with pressurized systems, need to be developed in advance and clearly understood by all field personnel before activities start.

- Calculate the expected quantities of grout in advance (Section 4.4.1). Calculated quantity should include the volume of the well casing and void space in the surrounding filter pack.
- If tremieing is required, pump the grout via a tremie pipe (or equivalent) placed near the bottom of the well, with the tremie pipe progressively removed as grouting progresses. Grout should be pumped under sufficient pressure (e.g., capping the well casing if necessary, for pressure grouting, especially for shallow wells) to permeate the well screen and sand pack.
- Contain well water displaced by the neat cement as IDW.
- Place excess neat cement in portable metal bins or equivalent and dispose of as solid IDW after it is allowed to set.
- Top off wells with fresh, neat cement to offset any settling that may have occurred overnight.
- Complete the final well surface according to project work plans, including covering the area with native soil, repaving the surface if the well was installed in a paved area, etc.

4.4.3 Removal of Well Materials

Several factors such as aquifer locations and characteristics, project requirements, local ordinances, and regulatory requirements may necessitate the removal of all materials associated with a groundwater well during decommissioning. Materials to be removed could include well casing, screens, filter pack, seals, surface monuments, and protective covers. Removal of all well materials is usually required if the following conditions exist:

- The well is located in an area of known or potential pollution or contamination, and
- The well's annular seal, casing, screen, filter pack, or other components were not constructed or maintained according to applicable standards so that well decommissioning by merely filling the well casing with sealing material (Sealing in Place: Section 4.4.2) would not prevent potential water-quality degradation caused by the movement of poor-quality water, pollutants, or contaminants through the decommissioned well structure.

Removal of well materials may be accomplished by drilling or over drilling, or if the well is shallow and permitted, by pulling the well casing from the ground followed by removing the seal and filter pack materials.

Temporary Well Decommissioning

Temporary well boreholes must be decommissioned after sampling and removing the screen and riser.

1. Backfilling the holes with cuttings for shallow holes in uniform materials with expected low contamination levels may be allowed but must be confirmed before proceeding.
2. If contaminated soil, groundwater, or waste materials were encountered or a confining layer was breached, soil cuttings should not be permitted.
3. If the borehole cannot be backfilled with the soil cuttings, then reference the project Site Waste Management Plan and SWE-FSOP-802 (IDW Management) regarding the disposal of the cuttings as IDW.
4. Calculate expected quantities of grout to be used in advance (Section 4.4.1).
5. Contain well water displaced by the neat cement as IDW.
6. Place excess neat cement in portable metal bins or equivalent and dispose of as solid IDW after it is allowed to set.
7. After 24 hours, check the grout for settling, add additional grout if necessary. Grouting is complete when the neat cement has hardened and no settlement has occurred.

Casing Pulling

Casing pulling involves removing the well casing by lifting the well structure (if possible) from the borehole. Casing pulling may be an acceptable method to use when no contamination is present, or contamination is present, and the well does not penetrate a confining layer. Also, the well construction materials and well depth must be such that pulling will not break the aboveground portion of the well. Because of its brittleness, a PVC well casing may be more challenging than a metal casing to remove from the borehole. Wells with little or no grouted annular space and/or sound well casings are usually best suited for removal.

General procedures for well casing removal are as follows:

1. Calculate expected quantities of grout to be used in advance (Section 4.4.1).
2. Knock out the bottom of the screen with a steel drill rod/pipe, which will allow grout to flow out the bottom of the casing into the borehole as the casing is removed.
3. Ensure that sealing grouts, when used, are correctly mixed and prepared in accordance with the work plan and/or enforcing agency guidelines before placement. If bentonite chips are used instead of grout, they will require hydration after placement.
4. Do not add grout into the casing via free-fall placement. Add sealing grout to the well through the tremie pipe until the materials are near the ground surface.
5. Add sealing material as the casing is withdrawn to maintain a grout column inside the casing. Allowing the materials to vacate the well casing during removal may cause the borehole to slough and compromise the seal. Keeping the column close to full will help avoid this and also fill any borehole void space should the casing break while being pulled.
6. Contain well water displaced by the neat cement as IDW.
7. When the grout has reached the prescribed level (commonly 2 to 5 feet below ground surface), allow the grout to settle and cure.

8. Place excess neat cement in portable metal bins or equivalent and dispose of as solid IDW after it is allowed to set.
9. After 24 hours, check the grout for settling, add additional grout if necessary. Grouting is complete when the neat cement has hardened and no settlement has occurred.
10. Complete by filling the remaining 2 to 5 feet with approved material (e.g., native soil, sand, or gravel) and restoring the final surface per the work plan and applicable specifications (e.g., repair asphalt/cement).

Because the ability to decommission a well using this method depends on numerous factors related to its construction and the surrounding environment as well as local ordinances and agency acceptance, the decision of whether or not to use this method and the specific approach should be made on an individual well basis with appropriate approvals in place.

Removal by Overdrilling

Overdrilling to remove a well may be accomplished using a hollow stem auger over the well casing down to the bottom of the borehole, thereby removing the grout and filter pack materials surrounding the well casing.

1. Calculate expected quantities of grout to be used in advance (Section 4.4.1).
2. Select the auger size so that the inside diameter of the augers is greater than the well casing and screen and the outside diameter of the augers is equal to or slightly larger than the original borehole.
3. Center the auger over the casing with the center plug and pilot bit removed or a small guide plug inserted in the casing. Then drill out the cement seal, bentonite seal, and sand pack with the augers as they are advanced or washed over the well casing and screen.
4. Once the cement seal, bentonite seal, and sand have been drilled out and circulated to the surface, pull the well casing and screen from inside the augers.
5. Tremie-grout the clean borehole from bottom to top through the inside of the augers as they are retracted.
6. Add grout while augers are removed to ensure that grout level does not fall below the bottom of the augers.
7. When the grout has reached the prescribed level (commonly 2 to 5 feet below ground surface), allow the grout to settle and cure.
8. Contain well water displaced by the neat cement as IDW.
9. Place excess neat cement in portable metal bins or equivalent and dispose of as solid IDW after it is allowed to set.
10. After 24 hours, check the grout for settling, add additional grout if necessary. Grouting is complete when the neat cement has hardened and no settlement has occurred.
11. Complete by filling the remaining 2 to 5 feet with approved material (e.g., native soil, sand, or gravel) and restoring the final surface per the work plan and applicable specifications (e.g., repair asphalt/cement).

Removal by Drilling Well Materials Out

When neither of the decommissioning methods described above can be successfully employed, it may be necessary to physically drill out the well casing in pieces and annular space materials. This can be an effective option when the well has been damaged, broken, filled, or plugged with soil or other extraneous media. The concern with re-drilling a monitoring well borehole is that augers or drill bits will not necessarily follow the original borehole to the completed well depth. Based on the condition of the well and approved procedures, an extension, pilot bit, or "stinger" may be used ahead of the cutting head or bit to align the drilling by using the well casing as the guide.

General procedures are as follows:

1. Calculate expected quantities of grout to be used in advance (Section 4.4.1).
2. Remove the wellhead and re-drill the well while attempting to keep the augers/drill head centered on the well casing, and drill to the bottom of the casing.
3. A "stinger" extending beyond the drill bit or end of the augers may be incorporated to keep the bit/augers centered over the casing.
4. Select the diameter of the augers/drill bit to match or exceed the diameter of the original borehole.
5. Retrieve as much of the well materials as possible, as cuttings, and place them in containers as IDW.
6. Tremie-grout the clean borehole from bottom to top through the inside of the augers or drill string as they are retracted.
7. Grout should be added while augers/drill string are removed to ensure that the grout level does not fall below the bottom opening of the tools.
8. When the grout has reached the prescribed level (commonly 2 to 5 feet below ground surface), allow the grout to settle and cure.
9. Contain well water displaced by the neat cement as IDW.
10. Place excess neat cement in portable metal bins or equivalent and dispose of as solid IDW after it is allowed to set.
11. After 24 hours, check the grout for settling, add additional grout if necessary. Grouting is complete when the neat cement has hardened and no settlement has occurred.
12. Complete by filling the remaining 2 to 5 feet with approved material (e.g., native soil, sand, or gravel) and restoring the final surface per the work plan and applicable specifications (e.g., repair asphalt/cement).

4.4.4 Documentation

Record all measurements and pertinent information in the FLB or other appropriate form(s) as specified in the project work plans and conformance with SWE-FSOP-001 (Field Documentation):

- Date
- Site
- Well or boring number
- Location
- Observed field conditions
- Weather conditions

- Any unusual circumstances
- During drilling, track and note changes in the drilling process (e.g., sounds, rotation speed, sudden drops, etc.)
- See SWE-FSOP-001 (Field Documentation) for additional procedures related to field documentation.

4.5 Demobilization/Site Restoration

After well installation decommissioning is completed, the casing, drill string, and tools should be laid down, the mast lowered, and the rig moved off the location. The FTL or designee supervises the demobilization/site restoration.

All debris generated by the drilling operation should be disposed of appropriately. The site should be cleaned, the ground washed as necessary, and the site conditions restored as per the project work plans. All abandoned borings should be topped off and completed per the project work plans. Any hazards remaining due to drilling activities should be identified, and appropriate barriers and markers should be put in place, as per the APP. All fluids and waste should be adequately contained, clearly labeled, and maintained to comply with the project work plans.

5.0 Quality Assurance/Quality Control

Conduct the 3-Phases of Quality Control Method described in the project work plans.

Quality Assurance (QA) and Quality Control (QC) procedures for drilling and field documentation review will be performed by the FTL or PL to check that procedures and documentation content and level of detail comply with this SOP. If a deficiency or a variance was taken to the SOP, the PL should document the deficiency/variance and determine the need for corrective action in coordination with the QA Manager.

If a non-registered geologist performs the oversight, a registered Project Geologist is responsible for reviewing the fieldwork documentation for the accurate and complete representation of the drilling and approval of final logs.

6.0 Documentation Review

The FTL is responsible for daily review of the activities performed at the site and fieldwork documentation for compliance with requirements (Section 4.0) and legibility. Errors and omissions should be explained and revisions to an entry signed and dated by the FTL.

7.0 References

None cited.

Investigation Derived Waste Management

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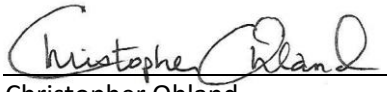
Approvals



Christopher Ohland
SWE Quality Assurance Manager

April 1, 2022
Date

Bruce Wilcer
SWE Field Quality Control Manager

April 1, 2022
Date

Project-Specific Modification[1]

[1] Document project-specific modifications in this section. No other modification to the SOP is authorized.

Revision History

Table of Contents

1.0 Introduction

1.1 Purpose

The purpose of this standard operating procedure (SOP) is to direct field staff in the proper techniques, and documentation for handling, labeling, tracking, and disposing of investigation derived waste (IDW) encountered or generated during environmental field activities. This SOP gives descriptions of equipment, field development procedures, field data collection, and personnel responsibilities.

1.2 Scope

The scope of this SOP is to describe procedures for projects that generate IDW.

Materials that may become IDW include but are not limited to:

- Personal protective equipment (PPE) includes disposable coveralls, gloves, booties, respirator canisters, splash suits, and other non-soil, solid wastes
- Disposable equipment and items include plastic ground and equipment covers, aluminum foil, conduit pipe, disposal samplers (e.g., bailers), tubing, and others
- Soil cuttings/spoils from boreholes/trenches and other soil wastes generated during sampling
- Drilling mud or water used or generated during drilling
- Groundwater obtained through well development or well purging
- Cleaning fluids such as spent solvents and wash water
- Packing and shipping materials
- Sediment from surface water bodies (rivers, lakes, ponds)
- Wash and rinse waste from decontamination activities

These types of IDW may require classification as non-hazardous or hazardous waste and should be containerized, stored, profiled, transported, and disposed of appropriately according to regulatory and client-specific requirements. Review project-specific work plans and waste management plans to confirm appropriate procedures for each site.

1.3 Responsibilities

Field Team. A Field Team is one or more individuals working together. The Field Team is responsible for the oversight of IDW as specified in this SOP.

Field Team Lead (FTL). The FTL is responsible for reviewing project work plans to understand the health and safety needs, procedural specifications, and field documentation requirements. The FTL is responsible for reviewing and confirming the adequacy of the fieldwork documentation.

Project Lead (PL). The PL is responsible for providing adequate resources to the field staff and ensuring the Field Team has adequate experience and training to comply with the SOP successfully. The PL is responsible for approving and documenting techniques not described in this SOP but are considered the best methods for the current project.

Safety Representative. The Safety Representative meets the experience and training requirements of USACE EM-385-1-1 (USACE, 2014). The Safety Representative oversees site-specific health and safety activities and ensures compliance with the project requirements. The Safety Representative notifies the

FTL of safety deficiencies and incidents and actions to correct those. The FTL approves those actions or, if the circumstance warrants, notifies the PL and Site Safety and Health Officer for their approval.

Quality Control Lead (QC Lead). The QC Lead ensures work inspections are performed using the 3-Phases of Quality Control method described in the project work plans. The QC Lead notifies the PL of quality deficiencies and actions to correct those. The PL approves those actions or notifies the SWE Field QC Manager for their approval if the circumstance warrants involvement.

1.4 Definitions

Field Documentation – The combination of field logbooks/notepads, field forms, digital/electronic forms, and other documentation in the project file.

Field Forms – Any documentation that preserves an accurate historical record of field activities but is recorded on unbound paper. These forms should be referenced in the FLB. Each data entry field should have an entry or indicate that data for that field is not available or not required.

Field Logbook (FLB) – A portable, bound, weatherproof notebook with consecutively numbered pages.

Field Notepad – A unbound notepad or loose-leaf paper with consecutively numbered pages.

Investigation Derived Waste (IDW). Waste that is generated in the process of investigating or examining a contaminated site.

Personal Protective Equipment (PPE). Personal health and safety equipment is used to protect the individual from contaminant exposure and physical injury.

2.0 Relevant Documents

This SOP focuses on the IDW management task and applications and should be used in conjunction with other applicable SOPs and forms, including the following:

2.1.1 Standard Operating Procedures

- SWE-FSOP-001, Field Documentation
- SWE-FSOP-801, Equipment Decontamination

3.0 Equipment List

The following materials and equipment may be needed for IDW management:

- Bound field logbook (FLB) with consecutive page numbers and waterproof, indelible pens/markers
- PPE as outlined in site-specific Accident Prevention Plans (APPs)
- Decontamination equipment and supplies (e.g., wash/rinse tubs, brushes, Liquinox™, plastic sheeting, paper towels, sponges, garden-type water sprayers, large plastic bags (minimum 0.85 mil), potable water, distilled water, and deionized water)
- Department of Transportation (DOT)-rated 55-gallon drums or other approved containers for containing soil cuttings, decontamination water, and formation water
- Drum/bung wrench and drum funnel

- Heavy equipment forklift or vehicle with drum grappler (as necessary)
- Photoionization detector (PID)
- Vendor-supplied roll-off bin(s), with liners if applicable
- Laboratory-supplied sample containers
- Wood pallets (as necessary)
- Non-porous (e.g., stainless steel) trowels
- Field notebook/notepad and waterproof permanent marking pens
- Waste manifests
- Secondary containment materials (i.e., spill containment platform/pallet with drain, absorbent pads)

4.0 Procedures

The procedures below are provided for managing non-liquid and liquid IDW generated during field activities.

4.1 IDW Staging Area

Identify an onsite area for staging drums, bins, and other storage containers. The area should be large enough to allow temporary storage and safe access to the drums and bins of IDW. If IDW is left onsite without supervision, then the area must be secured from unauthorized access and containers labeled appropriately. Hazardous IDW may not be accumulated for more than 90 days.

4.2 Soil IDW

Place IDW (soil cuttings/spoils generated during drilling, trenching, soil sampling, or other) into DOT-rated 55-gallon drums, appropriately-sized containers/bins, or stockpiles at the point of generation. In most cases, mixing the cuttings from several borings or sampling locations is permissible to fill the containers or entire stockpiles but must be confirmed in advance by the PL/FTL. Ask the FTL whether potentially hazardous solids should be segregated from non-hazardous.

When drums or containers are full or daily activities are completed, the drum lids and rings will be fastened. Full drums or containers will be transported to the designated IDW accumulation area regularly to avoid the accumulation of drums or containers at investigation sites for extended periods.

Waste profiling analyses will be performed before disposal (Section 4.5). Each project may have unique waste profiling, storage, and disposal—review project-specific work plans and coordinate activities between the PL and client.

Unless approved, hazardous soil cuttings and excavation spoils must not be used to fill boreholes, test pits, or excavations. Place soil cuttings/spoils on plastic sheets or containerize them when generated; dispose of the plastic sheets with the used PPE or soil cuttings.

4.3 Liquid IDW

Contain liquids in DOT-rated drums or appropriately-sized watertight containers at the point of generation. Mixing the water from several sampling locations, decontamination water, process water,

and other IDW sources may be permissible to fill the drums but should be confirmed in advance with the PL or FTL. Ask the FTL whether potentially hazardous liquids should be segregated from non-hazardous.

When drums or containers are full or daily activities are completed, the drum lids and rings will be fastened. Full drums or containers will be transported to the designated IDW accumulation area regularly to avoid accumulating drums or containers at investigation sites for extended periods. All drums or containers will be labeled appropriately at the end of each day's activities. Perform waste profiling before disposal (Section 4.5). Each project may have unique requirements for waste profiling, storage, and disposal—review project-specific plans and coordinate activities with the PL or FTL.

4.4 PPE and Other Consumable Supplies

Inspect equipment and PPE (e.g., plastic sheets, screens, coveralls, boot covers, or other) to determine proper disposal procedures. If there is no evidence of contamination, materials can be disposed of with regular trash.

Decontaminate and discard PPE and other used supplies in plastic bags and sealed in metal barrels for final storage, transport, and disposal. Decontamination procedures consist of brushing off or using small amounts of water to scrub off potential gross contamination (see SWE-FSOP-801, Equipment Decontamination).

4.5 Waste Profiling

Waste profiling requirements will be coordinated by the PL with the client and disposal facility. At a minimum, a representative sample of the solid and aqueous IDW will be collected and analyzed for all chemicals of potential concern. When approved by the PL, generator knowledge is an acceptable alternative to laboratory testing. The PL will also coordinate with the client, disposal facility, and waste transporter to manage the completion of the waste manifest and ensure that an adequate number of manifests are available for the amounts and types of material to be disposed of. An example manifest is provided in Attachment 1.

Waste manifests are signed by the client or client's representative (usually identified on the manifest as the "owner" and/or "generator"). Field personnel are not allowed to sign manifests under any circumstances.

4.6 Labeling

Apply a label immediately after adding soil or groundwater to drums or soil to bins. If the waste generated has not been profiled, apply a "Pending Analysis" label (Figure 1). Add the contents, date(s) of generation, the origin of materials, address of generation, and contact information to the label. Because drum and container labels may be exposed to the elements, it is essential to use waterproof markers to fill in the information on labels and possibly clear packaging tape over the labels to preserve the information.

Once the material has been profiled, remove the "Pending Analysis" label and add the appropriate "Non-Hazardous" (Figure 2) or "Hazardous" label (Figure 3). Add the shipper, address, date(s) of generation, contents, and contact information to the label.

Figure 1 – Label: Pending Analysis

Figure 2– Label: Non-Hazardous

Figure 3– Label: Hazardous

4.7 Disposal of IDW

Soil and groundwater IDW will be placed in drums or appropriately configured bins and stored in a designated hazardous/non-hazardous waste storage area, the location and use of which will be coordinated with the client. Manifesting and disposal of IDW during field activities will be coordinated with the client before the initiation of field activities. As applicable, field activities that generate IDW will be conducted consistent with sustainable practices (e.g., reducing the volume of routine waste or IDW generated by decreasing materials consumption).

4.8 Document Control

The FTL is responsible for documenting or reviewing field team documentation of IDW management, including collection, sampling, labeling (if applicable), staging, and ultimate disposition of IDW. Disposition may include manifesting the waste and transportation offsite or releasing the waste to the client for ultimate disposal. The information entered in field documentation concerning IDW should include the following:

- Project Name
- Names of personnel
- Site location
- Type of activities
- Date waste generated
- Boring, well, or site number(s)
- Matrix
- Type of container(s)
- Estimated volume
- Disposition of contents
- Comments (field evidence of contamination [e.g., PID reading, odors])
- Any variance to procedures described in this SOP

After completing a task or project, all field documentation, including the field logbook, field datasheets, and electronic data, shall be scanned and placed on the server in the appropriate folder. All original documents shall be submitted to the PL and kept in the project file. See FSOP-001 (Field Documentation).

5.0 Quality Assurance/Quality Control

Conduct the 3-Phases of Quality Control method described in the project work plans.

Quality Assurance (QA) and Quality Control (QC) procedures for IDW field documentation review will be performed by the PL and QC Manager to confirm that content and level of detail comply with the applicable planning documents. Identification of errors and corrections made during QA/QC reviews will follow documentation requirements described in SWE-FSOP-001 (Fieldwork Documentation).

6.0 Documentation Review

The FTL is responsible for reviewing hazardous waste characteristics, ensuring the disposal facility is licensed to receive the IDW, and reviewing waste manifests and bills of lading.

The FTL is responsible for the daily review of fieldwork documentation for compliance with requirements (Section 4.0) and legibility. Errors and omissions should be explained and revisions to an entry signed and dated by the FTL.

7.0 References

None cited.

Attachments

Attachment 1.
Uniform Hazardous Waste Manifest

Please print or type. (Form designed for use on elite (12-pitch) typewriter.) **A7 2002939203-001** **SC PPW 12/9/2008** Form Approved. OMB No.2050-0039

UNIFORM HAZARDOUS WASTE MANIFEST	1. Generator ID Number	2. Page 1 of 1	3. Emergency Response Phone	4. Manifest Tracking Number

5. Generator's Name and Mailing Address — Generator's Site Address(if different than mailing address)

Generator's Phone:

6. Transporter 1 Company Name — U.S.EPA ID Number

7. Transporter 2 Company Name — U.S.EPA ID Number

8. Designed Facility Name and Site Address — U.S.EPA ID Number

Facility's Phone:

9a. HM	9b. U.S. DOT Description (Including Proper Shipping Name, Hazard Class, ID Number, and Packing Group(If any))	10. Containers No.	10. Containers Type	11. Total Quantity	12. Unit Wt./Vol.	13. Waste Codes		

14.Special Handling Instructions and Additional Information

Contract retained by generator confers agency authority on initial transporter to add or substitute additional transporters on generator's behalf for purposes of transportation efficiency, convenience, or safety

15. GENERATION'S/OFFEROR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by the proper shipping name, and are classified, packaged, marked and labeled/placarded, and are in all respects in proper condition for transport according to applicable international and national governmental regulations. If export shipment and I am the Primary Exporter, I certify that the contents of this consignment conform to the terms of the attached EPA Acknowledgment of Consent.
I Certify that the waste minimization statement identified in 40 CFR 262.27(a) (if I am a large quantity generator) or (b) (if I am a small quantity generator) is true.

Generator's/Offeror's Printed/Typed Name — Signature — Month Day Year

16. International Shipments ☐ Import to U.S. ☐ Export from U.S. Port of entry/exit :

Transporter Signature (for exports only): Date leaving U.S. :

17. Transporter Acknowledgement of Receipt of Materials

Transporter 1 Printed/Typed Name — Signature — Month Day Year

Transporter 2 Printer/Typed Name — Signature — Month Day Year

18. Discrepancy

18a. Discrepancy Indication Space ☐ Quantity ☐ Type ☐ Residue ☐ Partial Rejection ☐ Full Rejection

Manifest Reference Number:

18b. Alternate Facility (or Generator) — U.S. EPA ID Number

Facility's Phone:

18c. Signature of Alternate Facility (or Generator) — Month Day Year

19. Hazardous Waste Report Management Method Codes (i.e., codes for hazardous waste treatment, disposal, and recycling systems)

1.	2.	3.	4.

20. Designated Facility Owner or Operator: Certification of receipt of hazardous materials covered by the manifest except as noted in Item 18a.

Printed/Typed Name — Signature — Month Day Year

EPA Form 8700-22v (Rev. 3-05) Prevolus editions are obsolete.

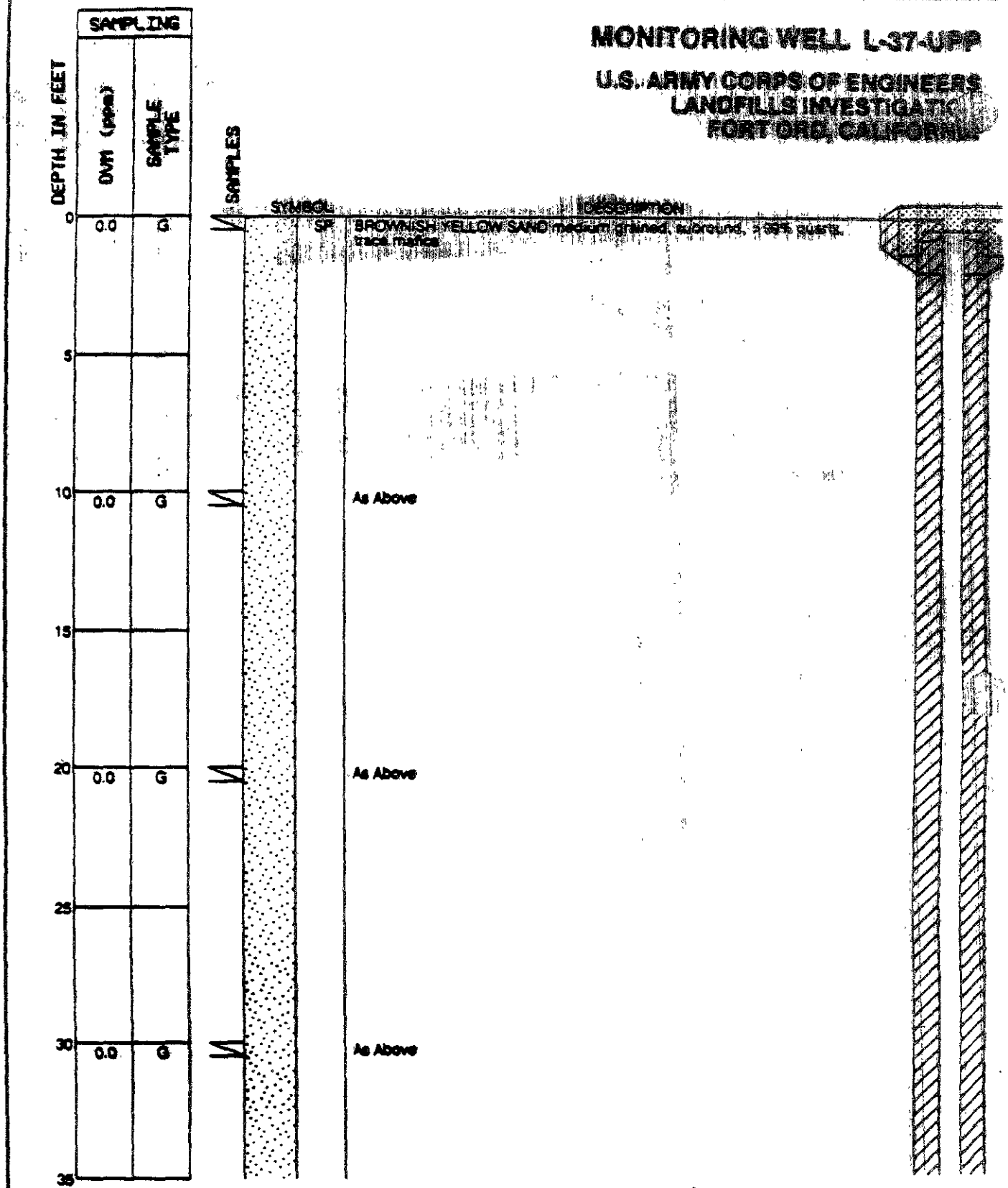
ATTACHMENT B

Wells to be Decommissioned Boring Logs and Construction Diagrams

MW-OUL-37-A

MONITORING WELL L-37-UPP

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATIO
FORT ORD, CALIFORNI



See Plate A-1 for general log notes and explanation of the terms and symbols.

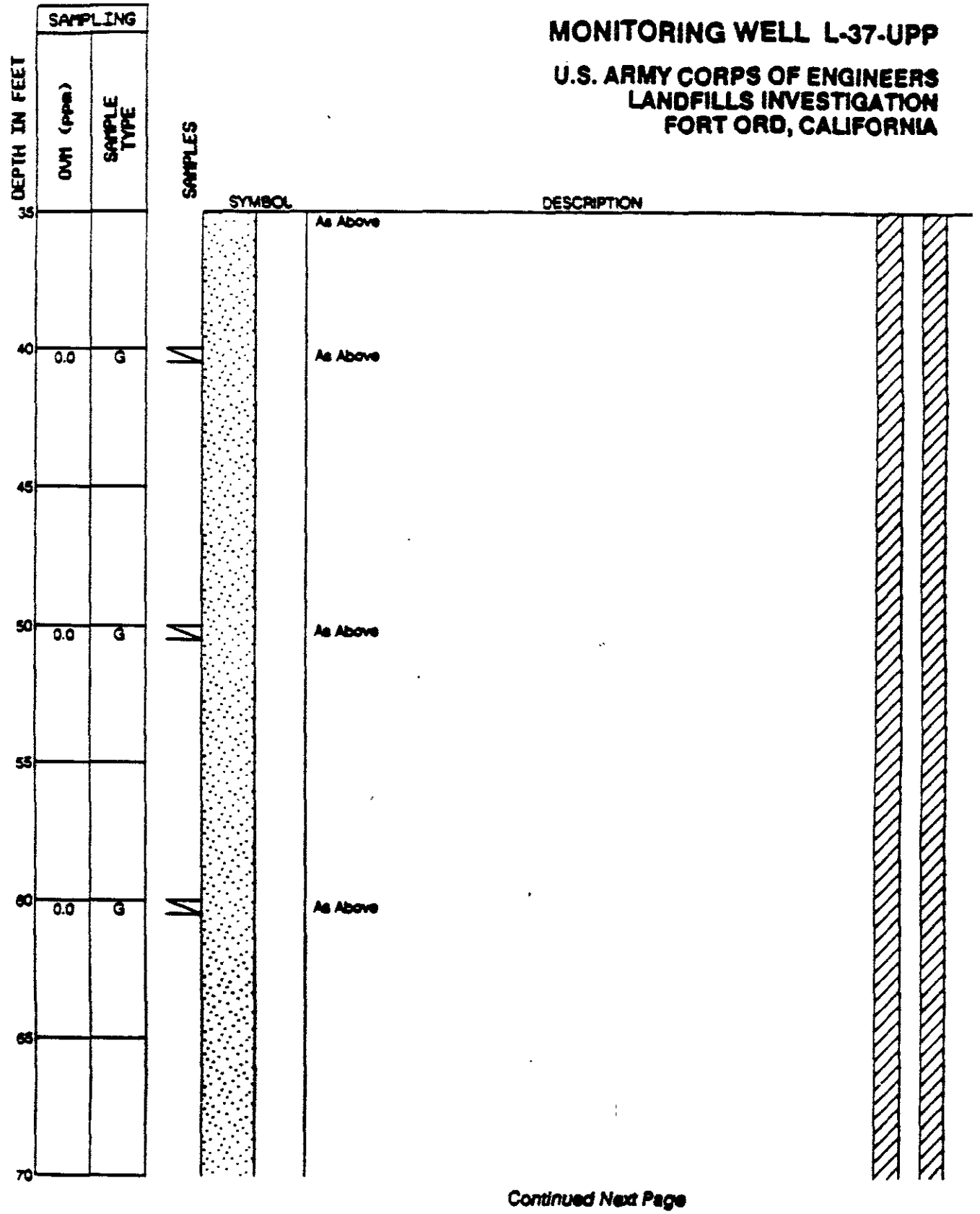
Continued Next Page

Job No.: 13846-007-043 Ser. No.: L-37-UPP	Dames & Moore	Log of Boring
Date Completed: 11/30/93 Boring Depth: 164.0 ft.	Grade Elev: 125.80 FT MSL Coordinates: 5000010.03 N ; 1179129.96 E 1927 Zone IV	Location: FORT ORD, CA
Top of Casing Elev: 125.44 ft. MSL Casing Type: Sch 80 PVC PVC Casing Depth: 164.0 ft. Casing Diam: 5.0 in.	Screened Interval: 152.0-162.0 ft. Effective Interval: 146.0-164.0 ft.	Slot Size: 0.020 in. Sand Pack: #2/12

MW-DUL-37-A

MONITORING WELL L-37-UPP

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATION
FORT ORD, CALIFORNIA



Continued Next Page

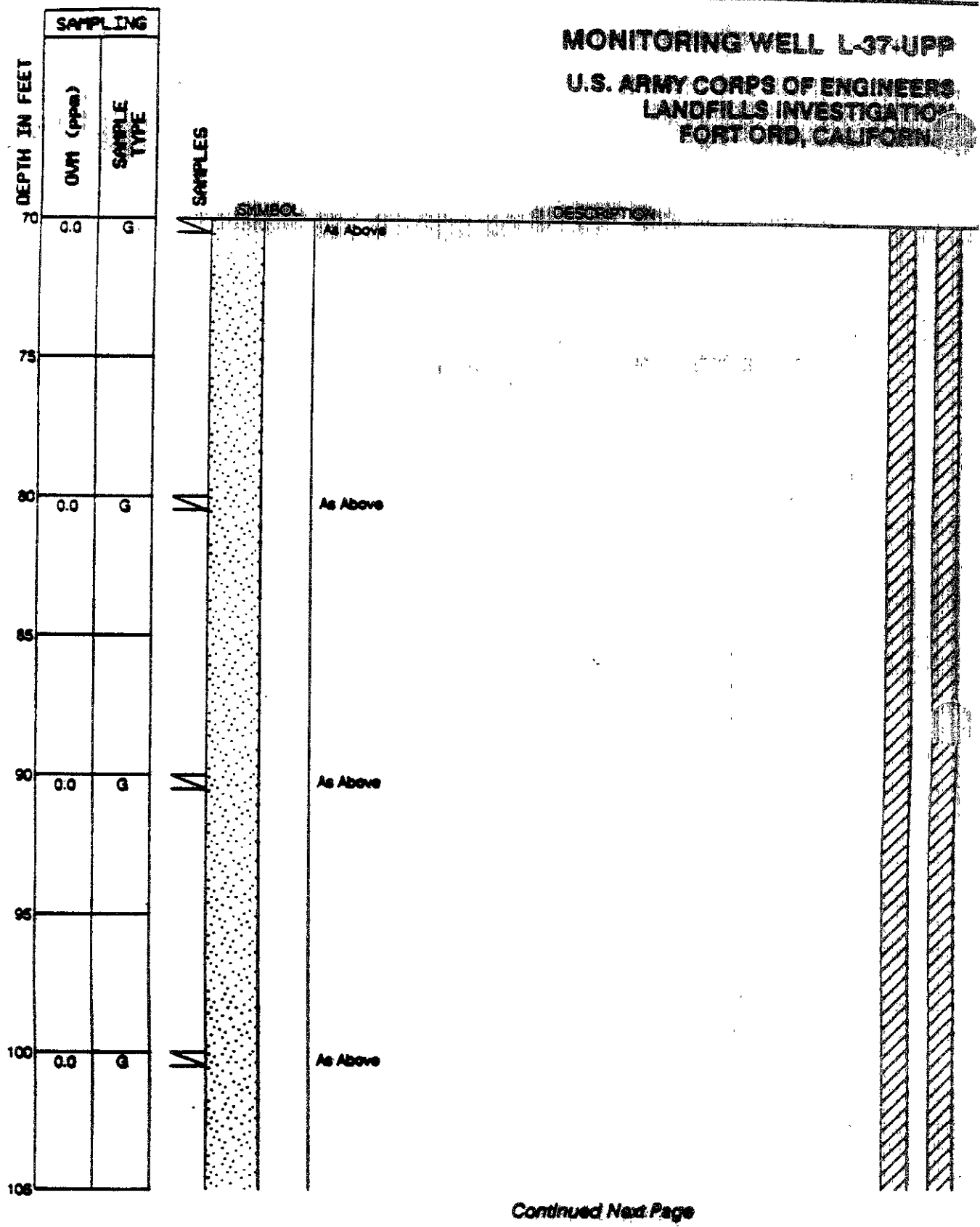
See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-UPP	Dames & Moore	Log f Boring

MW-UVL-37-A

MONITORING WELL L-37-UPP

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATION
FORT ORD, CALIFORNIA



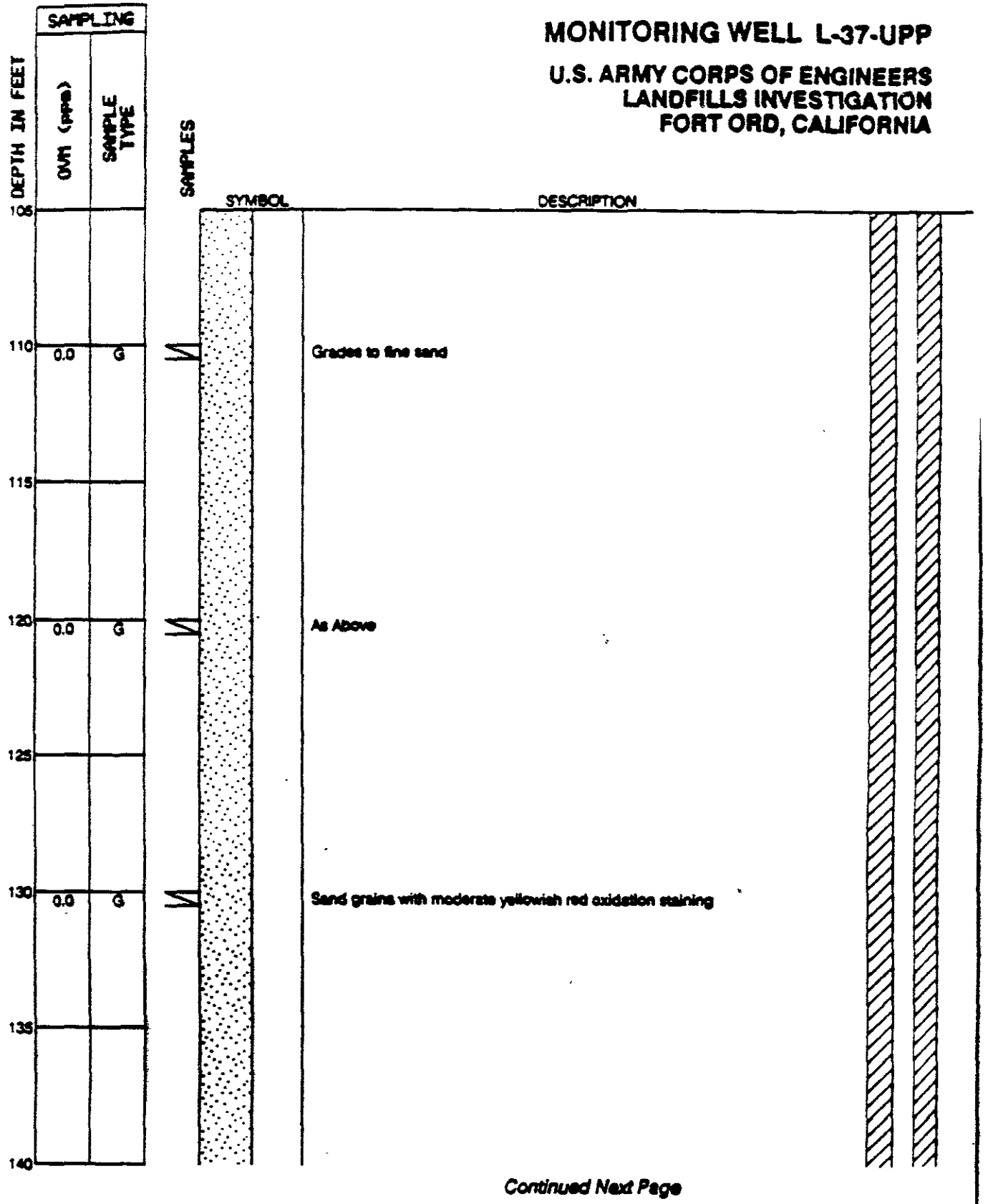
See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-UPP	Dames & Moore	Log of Boring
Log Template: WELL3	March 21, 1994	PAGE 3 of 5

MW-002-37-A

MONITORING WELL L-37-UPP

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATION
FORT ORD, CALIFORNIA



Continued Next Page

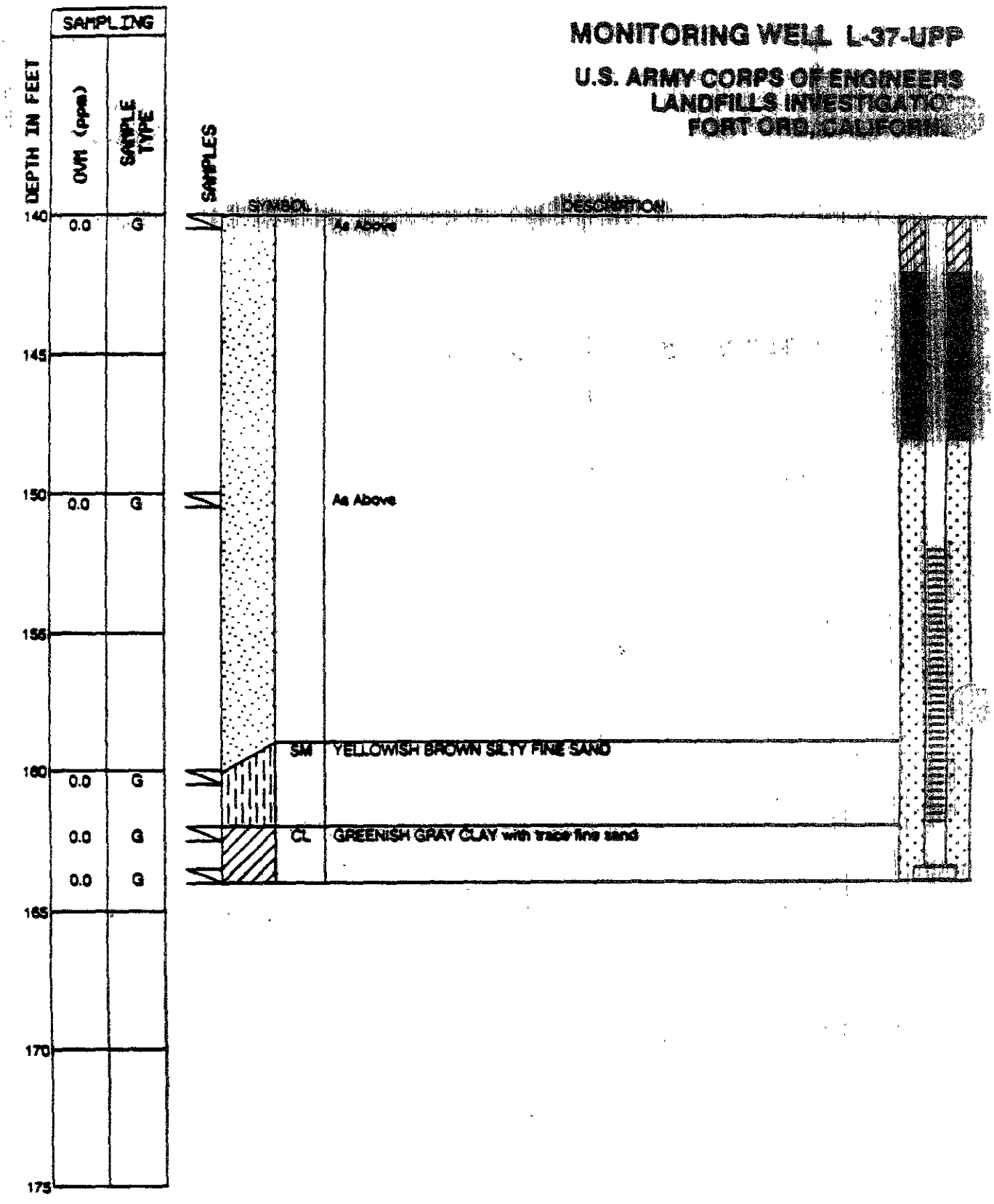
See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-UPP	Dames & Moore	Log of Boring

MW-6UL-37-A

MONITORING WELL L-37-UPP

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATIO
FORT ORD, CALIFORNI



See Plate A-1 for general log notes and explanation of the terms and symbols.

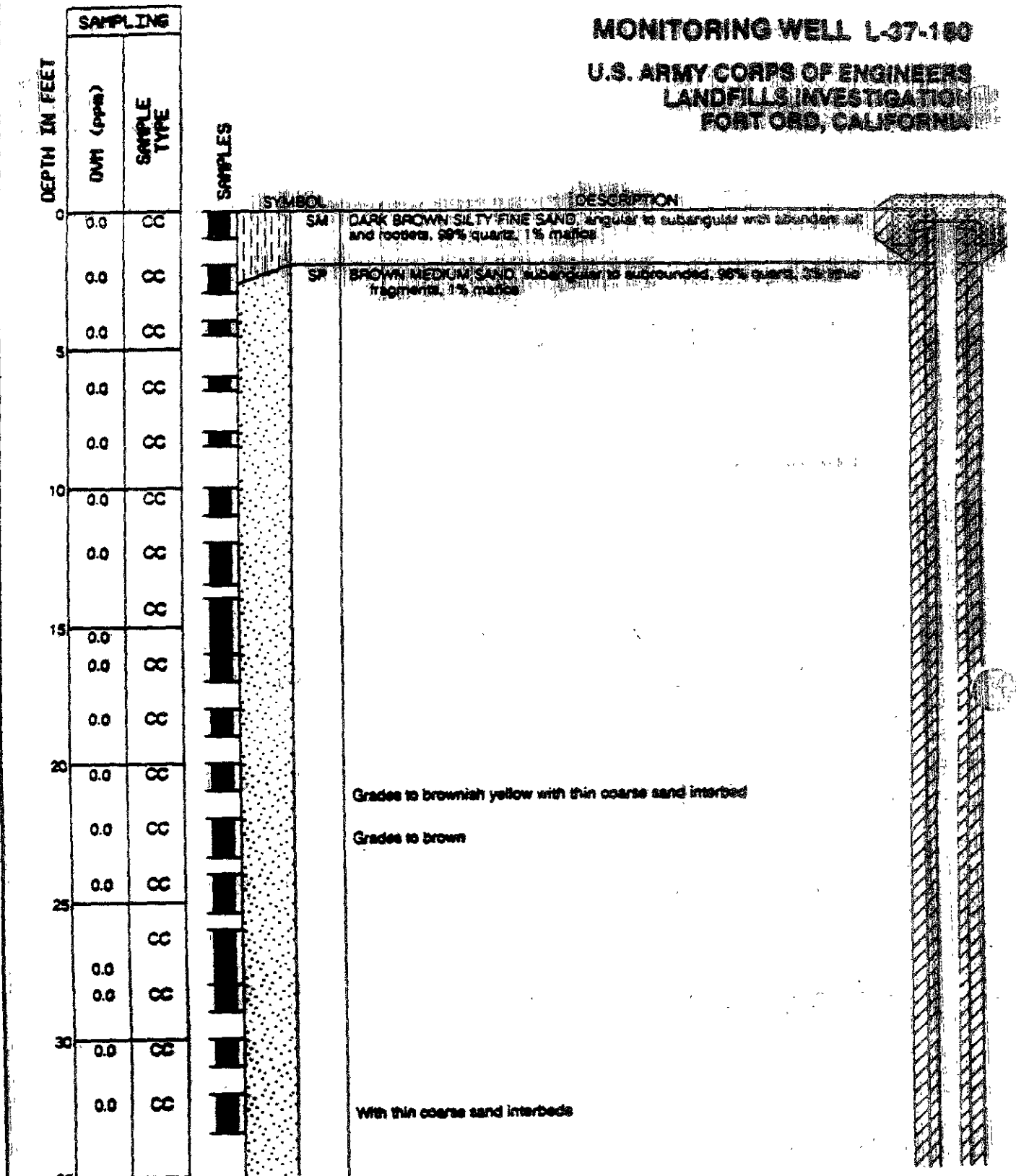
Job No.: 13846-007-043 Ser. No.: L-37-UPP	Dames & Moore	Log of Boring

Log Template: WELL3 March 21, 1994 PAGE 5 of 5

MW-OU2-37-180

MONITORING WELL L-37-180

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATION
FORT ORD, CALIFORNIA



Continued Next Page

See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-180	Dames & Moore	Log of Boring
Date Completed: 11/18/93 Boring Depth: 196.0 ft.	Grade Elev: 126.60 FT MSL Coordinates: 469908.99 N ; 1179118.22 E 1927 Zone IV	Location: FORT ORD, CA
Top of Casing Elev: 126.24 ft. MSL PVC Casing Depth: 185.0 ft.	Casing Type: Sch 80 PVC Casing Diam: 5.0 in.	Screened Interval: 173.0-183.0 ft. Effective Interval: 170.5-186.0 ft.	Slot Size: 0.020 in. Sand Pack: #2/12

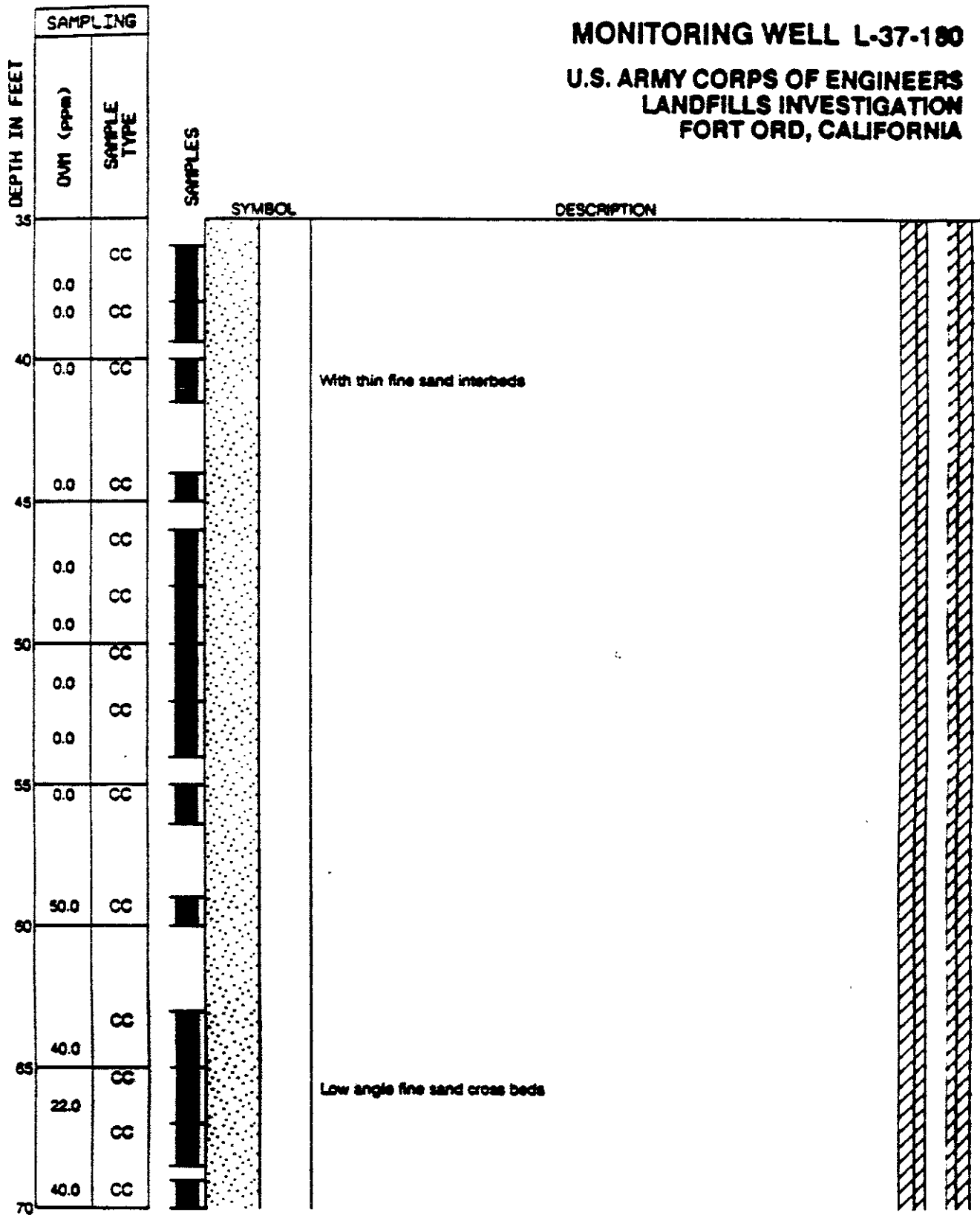
Log Template: WELL3

March 21, 1994

MW-002-37-180

MONITORING WELL L-37-180

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATION
FORT ORD, CALIFORNIA



Continued Next Page

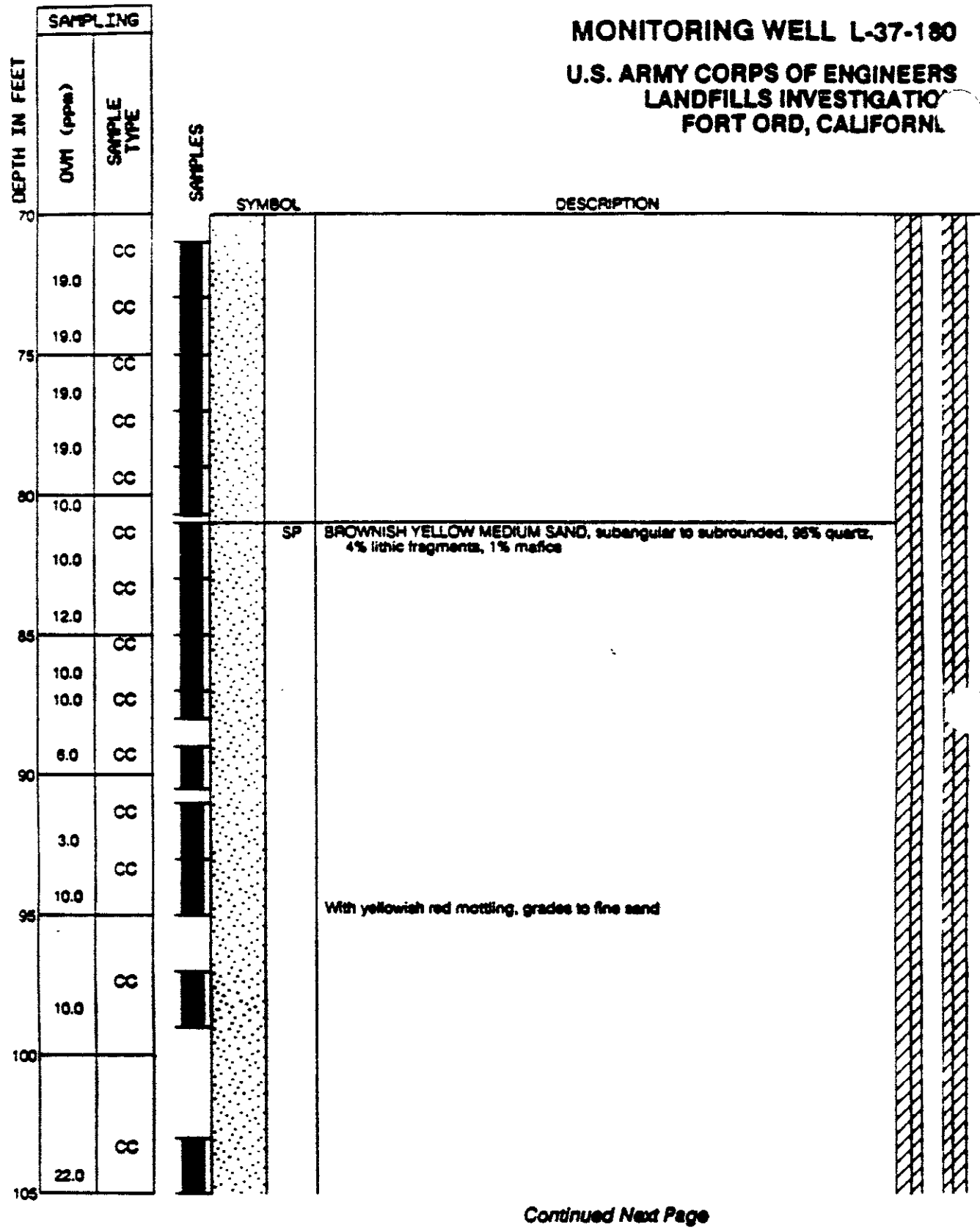
See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-180	Dames & Moore	Log of Boring

MW-OU2-37-180

MONITORING WELL L-37-180

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATIO
FORT ORD, CALIFORNI



Continued Next Page

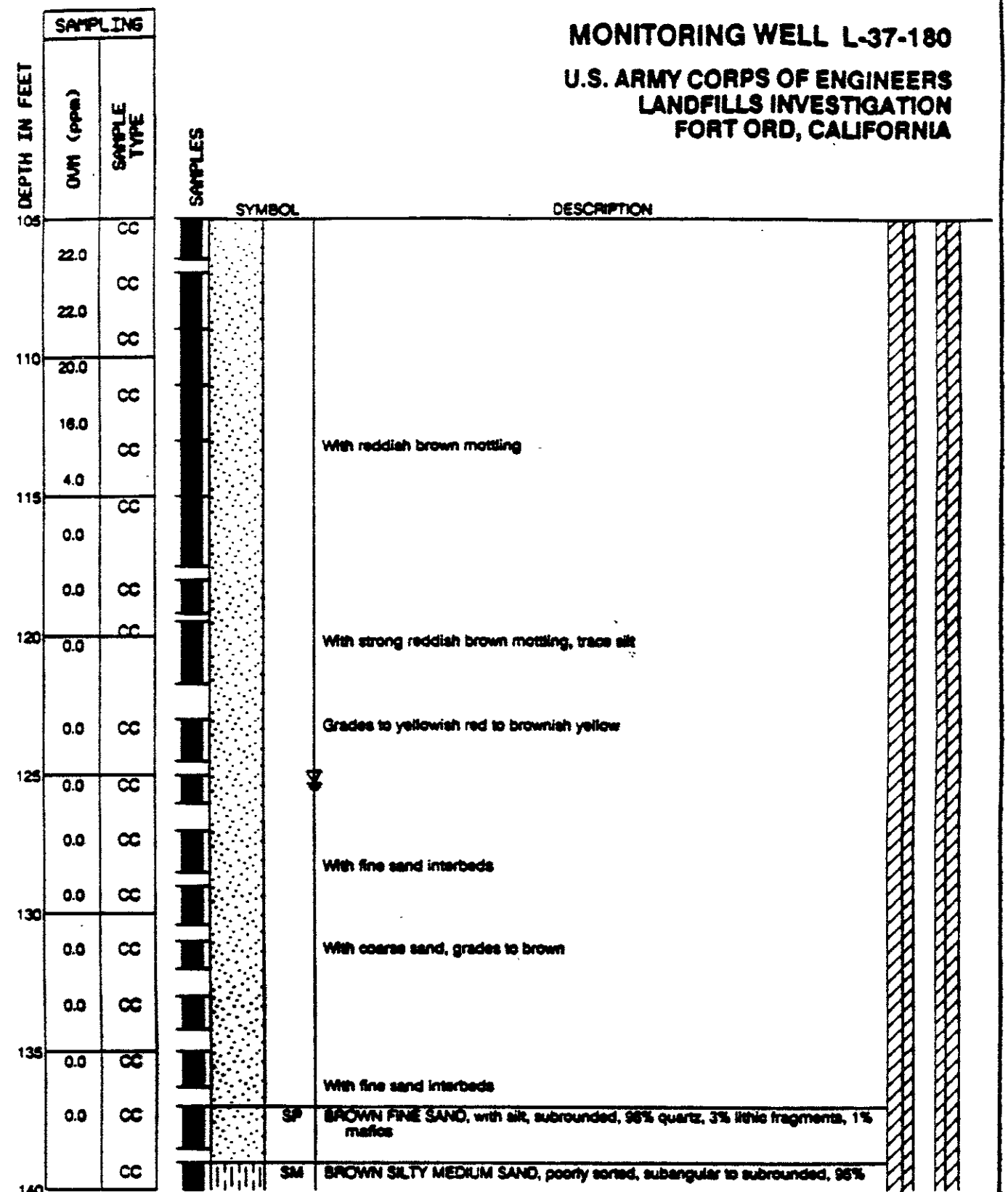
See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-180	Dames & Moore	Log f Boring

MW-002-37-180

MONITORING WELL L-37-180

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATION
FORT ORD, CALIFORNIA



Continued Next Page

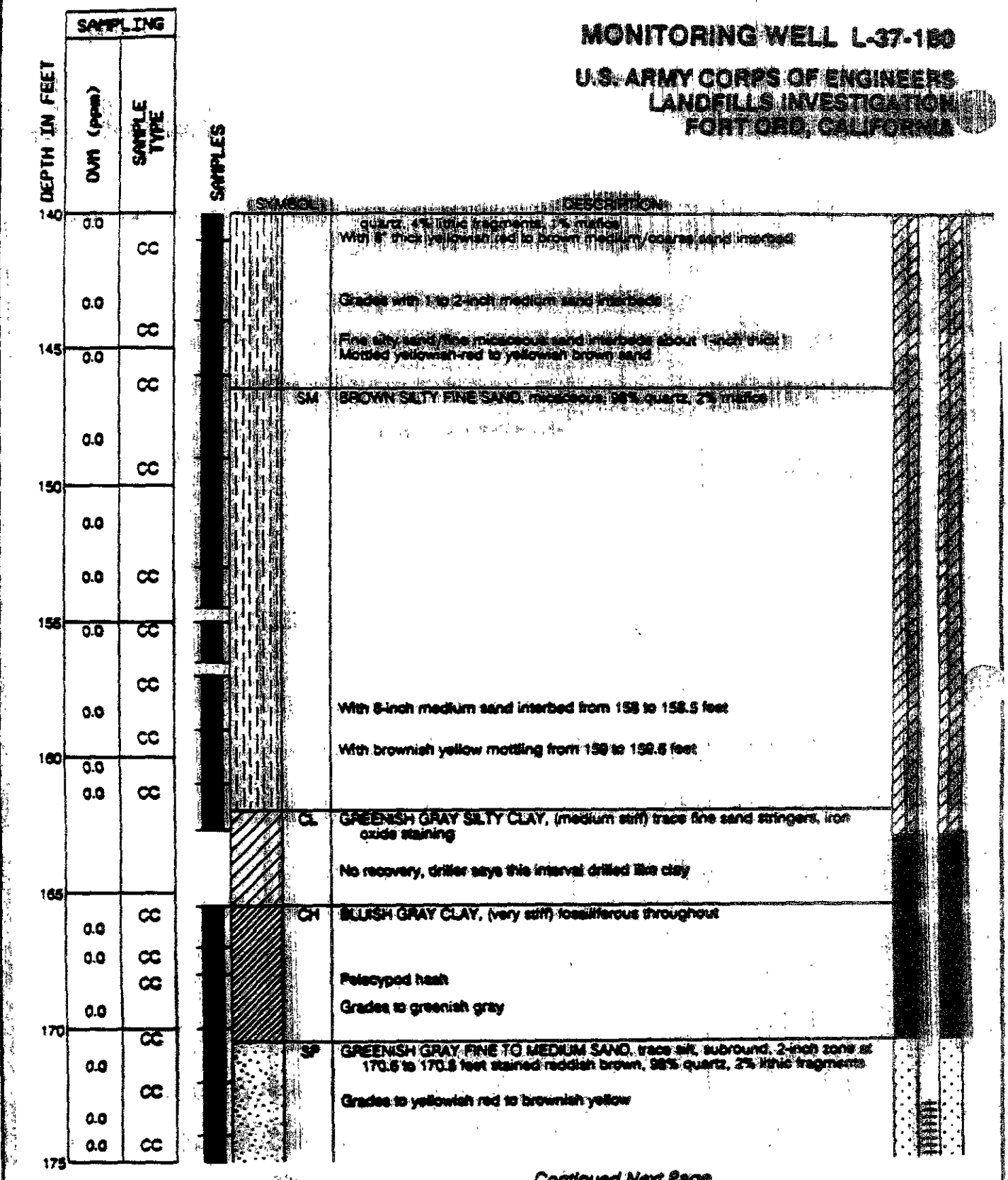
See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-180	Dames & Moore	Log of Boring

1 HN-OU2-37-180

MONITORING WELL L-37-180

U.S. ARMY CORPS OF ENGINEERS LANDFILLS INVESTIGATION FORT ORD, CALIFORNIA



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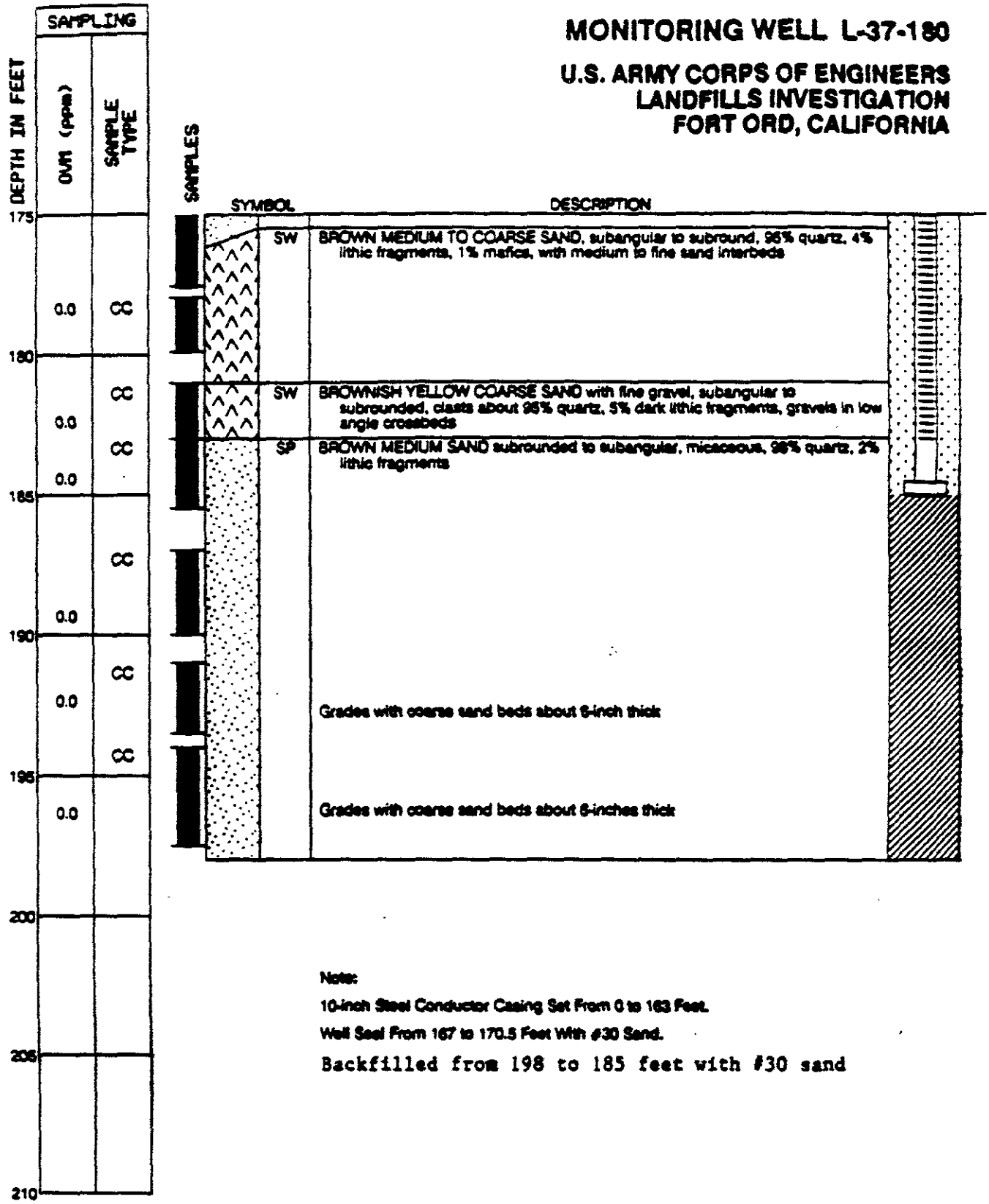
See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-180	Dames & Moore	Log of Boring

MW-062-37-180

MONITORING WELL L-37-180

U.S. ARMY CORPS OF ENGINEERS
LANDFILLS INVESTIGATION
FORT ORD, CALIFORNIA



Note:

10-inch Steel Conductor Casing Set From 0 to 163 Feet.

Well Seal From 167 to 170.5 Feet With #30 Sand.

Backfilled from 198 to 185 feet with #30 sand

See Plate A-1 for general log notes and explanation of the terms and symbols.

Job No.: 13846-007-043 Ser. No.: L-37-180	Dames & Moore	Log of Boring

Log Template: WELL3 | March 21, 1994 | PAGE 6 of 6

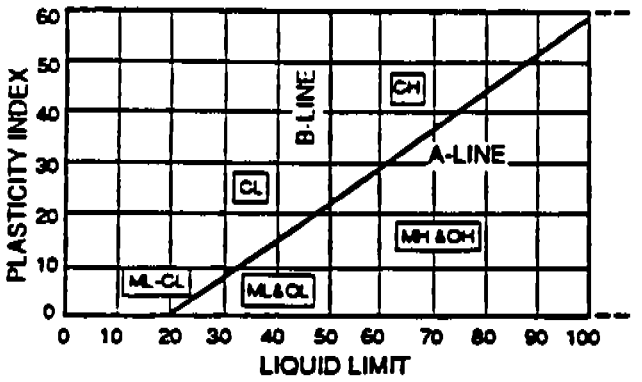
UNIFIED SOIL CLASSIFICATION SYSTEM

SYMBOL	LETTER	DESCRIPTION	MAJOR DIVISIONS		
	GW	WELL-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	CLEAN GRAVELS (LITTLE OR NO FINES)	GRAVELS: MORE THAN HALF OF COARSE FRACTION IS LARGER THAN NO.4 SIEVE SIZE	COARSE-GRAINED SOILS: MORE THAN HALF OF MATERIAL IS LARGER THAN NO.200 SIEVE SIZE
	GP	POORLY-GRADED GRAVELS OR GRAVEL-SAND MIXTURES, LITTLE OR NO FINES			
	GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	GRAVELS WITH FINES (APPRECIABLE AMOUNT OF FINES)		
	GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES			
	SW	WELL-GRADED SAND OR GRAVELLY SANDS, LITTLE OR NO FINES	CLEAN SANDS (LITTLE OR NO FINES)	SANDS: MORE THAN HALF OF COARSE FRACTION IS SMALLER THAN NO.4 SIEVE SIZE	
	SP	POORLY-GRADED SANDS OR GRAVELLY SANDS, LITTLE OR NO FINES			
	SM	SILTY SANDS, SAND-SILT MIXTURES	SANDS WITH FINES (APPRECIABLE AMOUNT OF FINES)		
	SC	CLAYEY SANDS, SAND-CLAY MIXTURES			
	ML	INORGANIC SILTS, VERY FINE SANDS, ROCK FLOUR, SILTY OR CLAYEY FINE SANDS OR CLAYEY SILTS WITH SLIGHT PLASTICITY	SILTS & CLAYS LIQUID LIMIT LESS THAN 50		FINE-GRAINED SOILS: MORE THAN HALF OF MATERIAL IS SMALLER THAN NO.200 SIEVE SIZE
	CL	INORGANIC CLAYS OF LOW TO MEDIUM PLASTICITY, GRAVELLY CLAYS, SANDY CLAYS, SILTY CLAYS, LEAN CLAYS			
	OL	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY			
	MH	ORGANIC SILTS AND ORGANIC SILT-CLAYS OF LOW PLASTICITY	SILTS & CLAYS LIQUID LIMIT GREATER THAN 50		
	CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS			
	OH	ORGANIC CLAYS OF MEDIUM TO HIGH PLASTICITY, ORGANIC SILTS			
	PT	PEAT AND OTHER HIGHLY ORGANIC SOILS	HIGHLY ORGANIC SOILS		

FOR VISUAL CLASSIFICATION, THE 1/4" SIZE MAY BE USED AS EQUIVALENT TO THE NO.4 SIEVE SIZE

THE NO.200 U.S. STANDARD SIEVE IS ABOUT THE SMALLEST PARTICLE VISIBLE TO THE NAKED EYE

PLASTICITY CHART



KEY TO SAMPLES

- INDICATES UNDISTURBED SAMPLE
- INDICATES DISTURBED SAMPLE
- INDICATES NO RECOVERY
- STANDING WATER LEVEL AFTER COMPLETION

TYPES OF SOIL SAMPLERS

U - DAMES & MOORE TYPE "U" SAMPLER

G - GRAB SAMPLE

SOIL CLASSIFICATION CHART AND KEY TO TEST DATA

Dames & Moore

ATTACHMENT C

Responses to Comments on the Draft Quality Assurance Project Plan submitted by the U.S. Environmental Protection Agency, Region IX

Responses to Comments on the Draft Quality Assurance Project Plan submitted by the U.S. Environmental Protection Agency, Region IX[1]

COMMENT 1: Section 3.0, Worksheet #4, 7 & 8: Personnel Qualifications and Sign-Off Sheet, Page 4: This section contains a table with a column titled "Education/Experience," but all of the cells in this column state "Resume on file." Please revise this section to include a brief education and experience summary in the table.

RESPONSE TO COMMENT 1: *Section 3.0, Worksheet #4, 7 & 8 was not revised based on the comment. Referencing the resume on file is consistent with all other Quality Assurance Project Plans (QAPPs) for the former Fort Ord, including the one that this QAPP is an addendum to, and necessary because the extensive education and experience of the personnel listed in Worksheet #4, 7 & 8 cannot be reasonably consolidated into a single cell in the table in the worksheet.*

COMMENT 2: Section 6.6.1, Notification and Access, Page 8: The first sentence states that, "Property owners will be notified of fieldwork activities at least three days before the start of work;" however, this section does not mention whether right-of entry agreements with the owners are in place, allowing for quick access. Also, the second sentence is confusing as it seems to describe different types of access, but it is unclear what these will entail and how access with users will be coordinated. Please revise the text to clarify whether right-of-entry agreements are in place to confirm that access with a three-day notice is realistic. Also, please revise this section to provide details on how access for site users will be coordinated and whether and how access restrictions will vary during the course of the project.

RESPONSE TO COMMENT 2: *Right-of-entry agreements with owners of property at the former Fort Ord are not required because the former Fort Ord is an National Priorities List (NPL) site and the Army reserves a perpetual and assignable easement and right of access to the property pursuant to the applicable provisions of Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) Section 120(h). Accordingly, a three-day notice is sufficient and realistic. The property is owned by the City of Marina, with notification of property access provided to the City's Department of Public Works. There are no known access restrictions associated with the property that monitoring wells MW-OU2-37-A and -37-180 are located on. Section 6.6.1 was revised to include this information.*

COMMENT 3: Figure 2, A-Aquifer Monitoring Well To Be Decommissioned, and Figure 3, Upper 180-Foot Aquifer Monitoring Well to Be Decommissioned. Figures 2 and 3 depict the plume extents for various contaminants of concern (COCs) but do not indicate groundwater flow direction. Please revise Figures 2 and Figure 3 to indicate the direction of groundwater flow.

RESPONSE TO COMMENT 3: *Figures 2 and 3 were revised per the comment and updated to the Third Quarter 2024 COC plumes.*

[1] In a letter dated February 24, 2025 (see Administrative Record No. BW-2785AA*). The comments are reproduced here as provided to the U.S. Department of the Army (Army) and there have been no changes to spelling, grammar, or punctuation.

ATTACHMENT D

Response to Comments on the Draft Quality Assurance Project Plan submitted by the Central Coast Regional Water Quality Control Board – Central Coast Region

Response to Comments on the Draft Quality Assurance Project Plan submitted by the Central Coast Regional Water Quality Control Board – Central Coast Region [1]

COMMENT 1: Section 5.2.2, Investigation-Derived Waste – Soil, Profiling

Provide additional details regarding soil Investigation-Derived Waste (IDW) profiling.

a. Update this section to include the proposed number of composite samples and proposed analytical methods to properly characterize the IDW. Adequately profiling this waste is necessary to ensure proper disposal and waste management within the Fort Ord Landfills and compliance with OU2's Record of Decision (ROD) and Explanation of Significant Differences (ESDs).[2]
b. Central Coast Water Board staff recommend adequately profiling the soil IDW by collecting a sufficient number of composite samples and analyzing them using the analyses the Army would be expected to use if disposing of this IDW to an offsite landfill. The Army needs to determine whether IDW is considered hazardous in accordance with California Code of Regulations (CCR), Title 22, sections 66261.21 through 66261.24.[3] We recommend analyzing composite samples for the following:
    i. Total Petroleum Hydrocarbons (TPH) U.S. Environmental Protection Agency (EPA) Method 8015
    ii. Volatile Organic Compounds (VOCs) EPA Method 8260
    iii. Semi-Volatile Organic Compounds (SVOCs) EPA Method 8270
    iv. CAM Metals[4] EPA Method 6010 and EPA Method 7471 (Hg only)
    v. Per- and polyfluoroalkyl substances (PFAS) with current Regional Screening Levels (RSLs) EPA Method 1633A. PFAS sampling is warranted because:
        1. The IDW may contain PFAS because the lateral extent of PFAS impacts in the upper 180-foot aquifer from the discharge of PFAS wastes at Site 2 are not yet fully delineated.
        2. The Army must conform with the guidance from the Secretary of Defense as outlined in the Memorandum for Interim Guidance on Destruction or Disposal of Materials Containing PFAS in the US[5] and Investigating PFAS within the Department of Defense Cleanup Program.[6]

[1] In a letter dated February 24, 2025 (see Administrative Record No. BW-2785AA*). The comments are reproduced here as provided to the U.S. Department of the Army (Army) and there have been no changes to spelling, grammar, or punctuation.
[2] Relevant documents are provided under OU2, at this website: https://fortordcleanup.com/reference-documents/records-of-decision/
[3] California Hazardous Waste: https://dtsc.ca.gov/defining-hazardous-waste/
[4] California Administrative Manual (CAM) 17 metals: Ag, As, Ba, Be, Cd, Cr, Co, Cu, Mo, Ni, Pb, Sb, Se, Tl, V, Zn, Hg
[5] Memorandum for Interim Guidance on Destruction or Disposal of Materials Containing PFAS in the U.S https://www.acq.osd.mil/eie/eer/ecc/pfas/docs/news/Memorandum_for_Interim_Guidance_on_Destruction_or_Disposal_of_Materials_Containing_PFAS_in_the_U.S.pdf
[6] Investigating PFAS within the Department of Defense Cleanup Program https://www.acq.osd.mil/eie/eer/ecc/pfas/docs/policies/Memo-for-Investigating-DoD-PFAS-Cleanup.pdf

RESPONSE TO COMMENT 1a: *Section 5.2.2 was not revised based on the comment. IDW characterization is not warranted based on site conditions and is not required for compliance with relevant OU2 decision documents. As indicated in the QAPP that this one is an addendum to, IDW characterization is only required for installation of new wells, not decommissioning of existing wells. There is no evidence of releases of hazardous substances or petroleum products on the property or upgradient from where monitoring wells MW-OU2-37-A and -37-180 are located, and COCs have not been detected in these wells for at least 25 years.*

RESPONSE TO COMMENT 1b: *See the response to Comment 1a. IDW characterization is not warranted based on site conditions. Further, monitoring wells MW-OU2-37-A and -37-180 are located east of the groundwater divide that hydraulically separates Sites 2/12 from OU2, precluding the possibility of any PFAS from Site 2 migrating to this location in either the A-Aquifer or the Upper 180-Foot Aquifer, as evidenced by the fact that COCs have not been detected in these wells for at least 25 years.*

COMMENT 2: Section 5.2.2, Investigation-Derived Waste – Soil, Disposal

Provide additional details regarding soil IDW disposal.

a. Include or provide a reference to the decision criteria used to determine the appropriate disposal of IDW at the Fort Ord landfills in accordance with the ROD and ESDs. The decision criteria should outline:
   i. The screening levels that analytical results will be compared to.
   ii. The circumstances that IDW will be placed under a minimum of 12 inches of an interim soil cover in the Area E, Phase II, Vertical Expansion Area.

RESPONSE TO COMMENT 2: *See the response to Comment 1. No additional details regarding soil IDW disposal are necessary because IDW characterization is not warranted based on site conditions, there will be no analytical results to compare to screening levels and therefore no circumstances requiring that IDW be placed under an interim soil cover in the Area E Phase 2 area.*

COMMENT 3: Section 6.6.1, Notification and Access – Please provide Central Coast Water Board staff notification of scheduled fieldwork activities.

RESPONSE TO COMMENT 3: *The Regional Water Quality Control Board (RWQCB) will be advised of the fieldwork schedule at Base Realignment and Closure (BCT) meetings.*

COMMENT 4: Section 6.8, Well Decommissioning Field Activities – Include the following information in this section or in a table:

a. Proposed drill rig auger diameter,
b. Estimated volume of sealing material needed for each well, and
c. Estimated volume of solid/soil IDW to be generated and disposed in the Fort Ord Landfills.

RESPONSE TO COMMENT 4a: *Proposed auger diameter is eight inches. Section 6.8 was revised per the comment.*

RESPONSE TO COMMENT 4b: *The estimated volume of sealing material needed for MW-OU2-37-A is 673 gallons. The estimated volume of sealing material needed for MW-OU2-37-180 is 755 gallons. Section 6.8 was revised to include this information.*

RESPONSE TO COMMENT 4c: *Estimated volume of solid/soil IDW to be generated and disposed in the Fort Ord Landfills is eight cubic yards. Section 6.8 was revised to include this information.*

COMMENT 5: Table 1, Wells to be Decommissioned Construction Details – Provide the type of well casing material within this table.

RESPONSE TO COMMENT 5: *Table 1 was revised per the comment.*

COMMENT 6: Attachment B, Decommission Wells Boring Logs and Construction Diagrams – Provide the following clarification and additional details:

a. Include Plate A-1 referenced on the well boring logs.
b. Clarification on whether a 10-foot diameter steel conductor casing is present at MW-OU2-37-180. If the conductor casing is present, provide proposed activities to property abandon this monitoring well within the text of the Draft QAPP Update.

RESPONSE TO COMMENT 6a: *Plate A-1 was added to Attachment B per the comment.*

RESPONSE TO COMMENT 6b: *For MW-OU2-37-180, there is a 10-inch steel pipe visible around the 5-inch PVC well casing, so it is assumed that this is the conductor casing noted on the boring log. The text in Section 6.8 was revised to describe proposed activities to decommission this monitoring well.*