FINAL REPORT

Monitoring Well Installation

Solinst FLUTe™ Monitoring Wells
Bluewater Disposal Site
Cibola County, New Mexico

Prepared for:

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Acronyms and Abbreviations

ABI	acoustic televiewer
AES	Advanced Environmental Solutions, Inc.
ARCH	Air Rotary Casing Hammer
ASTM	American Society for Testing and Materials
bgs	below ground surface
CCLF	Cerro Colorado Landfill
COC	constituent of concern
COLOG	COLOG Borehole Geophysics
DOE-LM	Department of Energy Office of Legacy Management
EnviroWorks	EnviroWorks, LLC
EORR	End of Rotation Report
EPA	U.S. Environmental Protection Agency
Facility	Bluewater Disposal Site, Cibola County, New Mexico
FLUTe™	Solinst Flexible Liner Underground Technology
ft	foot/feet
GPM	gallons per minute
GWQB	Ground Water Quality Bureau
HMC	Homestake Mining Company
HPFM	heat-pulse flowmeter
IDW	investigation-derived waste
INTERA	INTERA Incorporated
Jet West	Jet West Geophysical Services
lbs.	pounds
MECS	Mining Environmental Compliance Section
NMED	New Mexico Environment Department
NOI	Notice of Intent
OBI	optical televiewer
OSE	Office of State Engineer
RHP	Reverse Head Profiles
RQ	Reportable Quantity
SAG	San Andres–Glorieta Aquifer
SLO	State Land Office
SWMP	Surface Water Management Plan
SWPPP	Stormwater Pollution Prevention Plan
TDS	total dissolved solids
USCS	Unified Soil Classification System

1.0 Introduction

INTERA Incorporated (INTERA) is pleased to provide this final report to the New Mexico Environment Department (NMED) and Department of Energy Office of Legacy Management (DOE-LM) for the installation and construction of five (5) multi-level groundwater monitoring wells. A sixth borehole was plugged and abandoned before completion. The monitoring wells were constructed with multiple sampling ports provided by Solinst Flexible Liner Underground Technologies, LLC (Solinst FLUTe™) and were installed in the San Andres–Glorieta (SAG) aquifer near the Bluewater Disposal Site (herein referred to as "Facility" to distinguish from the project drilling sites) in Cibola County, New Mexico (**Figure 1**). The field investigation was implemented by INTERA and their subcontractors which included Cascade Drilling, Jet West Geophysical Services (Jet West), COLOG Borehole Geophysics (COLOG), Solinst FLUTe™, EnviroWorks, LLC (EnviroWorks), Advanced Environmental Solutions, Inc. (AES) and Eurofins Laboratory – Albuquerque.

1.1 Project Purpose and Objectives

This project was designed to support the NMED and the DOE-LM's overall goal to identify potentially impacted groundwater within the underlying SAG aquifer downgradient of the Facility, as modeled by DOE-LM. Impacted groundwater within the SAG and overlying alluvial aquifers is present and has potentially migrated beyond the Facility license boundary. NMED and DOE-LM proposed to install six multiport Solinst FLUTe™ monitoring wells (five were ultimately installed during this investigation) to define the spatial extent of the plume and monitor groundwater outside of the Facility license boundary within the SAG aquifer. The Solinst FLUTe™ monitoring wells will allow long-term, depth-discrete sample ports for groundwater analysis.

1.2 Site Location

Site Address/Location:

The Facility is located in Cibola County, New Mexico, 9 miles northwest of Grants, New Mexico. All five (5) completed monitoring wells will be accessed via Anaconda Road.

Site Description:

The Facility is in Cibola County, approximately 9 miles northwest of Grants, New Mexico. Anaconda Copper Company constructed the original carbonate-leach mill at the Facility in 1953 to process limestone uranium ore mined in the immediate vicinity. An acid-leach mill was constructed in 1957 to process sandstone uranium ore from the Jackpile-Paguate mine, the largest open-pit uranium mine in North America, located on the Pueblo of Laguna. The carbonate-leach mill closed in 1959. Acid- leach milling operations ended in February 1982 (DOE, 2024).

1.3 Hydrogeology

The SAG aquifer is the primary drinking water aquifer in the region and contains layers of hydraulically-connected karstic limestone and sandstone. Uranium and Selenium are the main constituents of concern (COC) in the SAG aquifer and Uranium, Selenium, and Molybdenum are the COCs in the overlying Rio San Jose alluvial aquifer (DOE, 2024). Sulfate, chloride, and nitrate (as nitrogen) and molybdenum (in the SAG aquifer) are key indicator species of mill-related contamination and are analyzed as part of the Bluewater long term ground water monitoring program. Total dissolved solids (TDS) is another potential indicator of mill impacts and evaluated as part of the monitoring of the Bluewater long term monitoring program. The general thickness of the combined SAG within the project area is 250 to 350 feet (ft). The approximate depth to water is 130 ft below ground surface (bgs) to 150 ft bgs. Transmissivity values at the site have been measured at approximately 1,700 to 414,000 ft^2/day and average well flow rates are from 600 to 2,000 gallons per minute (GPM) (DOE-LM, 2014). The general groundwater flow direction within the SAG is east, southeast.

A generalized stratigraphy in the project area is as follows:

- Quaternary Surface alluvium – sands and silts where present, varying thickness
- Quaternary Bluewater Basalt – Flows from the El Tintero cinder cone, 30-70 ft thick
- Quaternary Rio San Jose ancestral alluvium, (ancestral alluvium on well diagrams) sometimes present underneath the basalt and logged as a distinct unit, up to 30 ft thick
- Triassic Chinle Formation – composed of mudstones, siltstone and some interbedded sandstones, up to 500 ft thick in project area
- Permian San Andres Limestone – upper part of the SAG aquifer, composed of limestone, dolomite, sandstone and chert, karstic properties, gray-yellow to brown and red limestone with yellow sandstone interbeds, usually a sharp contact with Chinle Formation above, ~110-190 ft thick
- Permian Glorieta Sandstone – lower part of the SAG aquifer – fine to medium sandstone, typically brown to grey, sometimes bluish in color, 130-200 ft thick
- Pennsylvanian Yeso Formation – fine grained sandstone, typically more yellow to reddish in color, possible gradational contact with Glorieta Sandstone above, up to 900 ft thick

1.4 Work Plan Deviations

The following is a summary of the work plan deviations, the three (3) work plan addendums are included in **Appendix C**.

Addendum No. 1 – September 12, 2025 (updated September 26, October 24, and November 5, 2025)

Addendum No. 1 revised the Work Plan to have Cascade use a rotary coring rig to core the upper interval in SAGA6 (abandoned before completion) and the SAG interval in all six (6) boreholes. Addendum No. 1 also included the use of dewatering containers for soil and water investigation-derived waste (IDW), as well as the use of frac tanks for IDW water, and the use of BARASORB® to help solidify wet soil IDW.

Addendum No. 1 also instituted the use of multiple field logs, forms and reports, listed below.

List of Field Logs:

- Driller Down Time Log
- Rain Gauge Log (Rain Gauge located on gate post at SAGA6)
- Waste Tracking Log
- Field Changes Log

Inspections:

- Surface Water Management Plan (SWMP) Inspection Forms – All drill sites except SAGA2
- Storm Water Pollution Prevention Plan (SWPPP) Notice of Intent (NOI) – SAGA2 Drill Site and Access Road on State Land Office Property
- Bluewater laydown area to be inspected twice each rotation, also as a component of SWMP and SWPPP inspections (conducted every 14 days or after a precipitation event of over 0.25 inches within a 24-hour time period).
- All active investigative derived waste (IDW) waste containers will be inspected each day for capacity (any other observations noted). An IDW section will be added to the Daily Summary Email. Daily summary emails are included as **Appendix G** to this report.

Reports:

- End of Rotation Reports (EORR)
- Spill Reporting within 24 hours of an incident (verbal or email)
- Notification to NMED and DOE-LM 24 hours prior to IDW shipment off site (verbal or email)

Addendum No. 2 – November 26, 2025

Due to the use of drilling additives while drilling/coring, a downhole camera may be deployed to check for additives suspended in the water column or adhered to fractures/borehole wall and a flocculant (LiquiSperse) may be used to remove sediments from water suspension in order to give the best chances of optimum performance of the FLUTe™ water liner. Additionally, Cascade may switch from Air Rotary Casing Hammer (ARCH) Drilling to Mud Rotary to get a competent borehole into the top of the SAG so that an 8-inch conductor casing can be securely cemented at its target depth, and to use pre-approved drilling products such as Quik-Gel or EZ-Mud.

Addendum No. 2 also included provisions for borehole development that were ultimately not implemented.

Addendum No. 3 – March 8, 2026

Addendum No. 3 established the process for surface restoration work at the SAGA monitoring well sites on the Homestake Mining Company (HMC) Property (SAGA1, SAGA5, and SAGA6) and the Elkins Property (SAGA3 and SAGA4). In addition, a separate SAGA2 monitoring well drill site and access road

reclamation plan was developed and submitted to the New Mexico State Land Office (SLO) for approval. INTERA implemented procedures intended to restore the surface of each site to as near pre-drilling conditions as possible. Once all drilling and associated equipment was removed from each drill site, surface restoration work was conducted. INTERA utilized subcontractor EnviroWorks to perform surface restoration activities. Surface restoration steps included removing all equipment and storm water controls, removing all drill cuttings that were present at the surface, gamma scanning the ground surface to make sure there were no readings above background, and if so, removing additional soil. This was followed by scarification, hand seeding a native seed mix previously approved by NMED and DOE-LM, and then chain-dragging to provide cover.

Other Work Plan deviations not included in a Work Plan addendum but agreed to by NMED and DOE-LM include:

- SAGA5 – cored to a diameter of 4.8 inches to total depth and not reamed to a diameter of nominally 6-inches.
- SAGA6 – borehole abandoned and not completed as a monitoring well because of geologic conditions and schedule and budget limitations. SAGA6 plugging plan is included as **Appendix S**.
- JetWest went out of business on December 31, 2025. It was decided on December 23, 2025, that INTERA subcontract COLOG for the project required geophysical logging services starting on January 1, 2026.
- SAGA1 borehole completion was modified due to stuck downhole drilling casing.
- Bollards were no longer required at Homestake locations (SAGA1, SAGA5 and SAGA6).
- IDW Water from Solinst FLUTe™ installations was added to a 750-gallon stock tank at the laydown area and allowed to evaporate.
- Added three Solinst FLUTe™ transducers to each monitoring well. Transducer selection for each monitoring well completed by DOE-LM in consultation with NMED and Solinst FLUTe™.

1.5 Spills

As discussed in Work Plan Addendum No. 1, any liquid release from a decontamination pad, drill pad, or IDW container, unless the result of an event in which a decontamination pad is constructed, has not yet been used and overflows as a result of precipitation, will be reported to DOE and if required by NMED, the NMED Ground Water Quality Bureau (GWQB) Mining Environmental Compliance Section (MECS) (NMAC 20.6.2.1203). The release notification is to include the following information:

- name, address, and telephone number of the person or persons in charge of the facility, as well as of the owner and/or operator of the facility;
- the name and address of the facility;
- the date, time, location, and duration of the discharge;
- the source and cause of discharge;
- a description of the discharge, including its chemical composition;
- the estimated volume of the discharge; and,

- any actions taken to mitigate immediate damage from the discharge including any material removed for disposal.

The release report must occur via verbal communication with NMED within 24 hours of the spill and a written report with the above information must be submitted to NMED within seven (7) days. INTERA will conduct the initial verbal notification and prepare a written notification report, as necessary, for NMED Project Manager review prior to submittal to the NMED GWQB. The NMED GWQB may request additional response measures following initial mitigation controls implemented following a spill. Any additional NMED response measures will be coordinated with the NMED Project Manager prior to implementation. In addition, DOE reviewed all reported spills and determined that none of the spilled constituents met a CERCLA Reportable Quantity (RQ) release and so reporting was not required to the National Response Center.

Minor spills recorded during the well installation work included the loss of less than a gallon of hydraulic oil from a forklift at the laydown area (by a vendor working for Cascade). The stained soil was collected by INTERA in a 5-gallon bucket and placed in a soil container for disposal. This spill occurred on September 30, 2025. In addition, IDW water was released from container 20-6 on October 6, 2025. Spill containers, plastic, and wattles were used to collect leaking water (less than 25 gallons) and containerized for disposal as IDW Water. This leak was observed near SAGA3 on October 6, 2025, and resulted in the issuance of Addendum No. 1 – the use of dewatering containers and addition of BARASORB® to help solidify wet soil contents.

SAGA5 Drilling Fluid Release on December 9, 2025. **Release Description:** 500 gallons of fresh drilling mud (did not circulate downhole) was lost to the ground surface – the area below the container was lined, but it did travel off onto the ground surface. Wattles were able to contain free flowing mud and kept it on the drill pad. Cascade lost a full tank which consisted of 500 gallons of drilling mud. The breakdown of the additives includes: 500 gallons of water, 0.042 gallons of Penetrol®, 0.42 pounds (lbs.) of EZ- Mud® Gold, 4 lbs. of Quik-Trol® Gold, 0.8 lbs. of soda ash, and 179 lbs. of Quik-Gel®. Corrective actions that took place are listed below.

- **Removal of released mud:** The drilling mud release was contained and excavated; all visibly affected mud and associated impacted material were removed from the site.
- **Demobilization of ARCH drilling rig and support equipment:** All drilling equipment associated with mud rotary operations, including the drill rig, was removed from the SAGA5 site by December 20, 2025. The remaining equipment at the SAGA5 drill site included dewatering roll-off 10955751 (removed on January 12, 2026), Frac Tank 11926723 (pumped out and removed on January 21, 2026), porta potty, and an empty dewatering roll-off (DR134298). Dewatering roll-off DRI34298 was moved to SAGA6 on February 27, 2026.
- **Retention of existing wattles:** The wattles that came into contact with the spilled mud were inspected, found to be in good condition, and remained in place at the SAGA5 drill site to provide ongoing storm water runoff control. These wattles were disposed of during site reclamation activities.
- **Disposal:** The released mud and excavated soil removed in response to the mud release was placed in dewatering roll-off 10955751 and disposed of as drilling-derived IDW (IDW Soil). The

IDW Soil sample analytical result from roll-off 10955751 indicates the released mud and excavated soil generated by the mud release clean-up is chemically similar to other IDW Soil generated during the drilling at SAGA5. No additional screening or special handling was required for the mud and excavated soil.

NMED issued a Corrective Action Approval Letter on February 10, 2026. SAGA5 spill documentation is included in **Appendix E**.

2.0 Borehole Advancement

2.1 Premobilization Activities

Premobilization activities included pre-drilling meetings with NMED, DOE-LM, Cascade, and Solinst FLUTe™ to discuss all planning, health and safety (see **Appendix B**), access, drilling, and completion methods. NMED and DOE obtained access agreements with each of the three landowners (see **Appendix A**). INTERA and Cascade both contacted New Mexico 811 to satisfy subsurface utility locating requirements for all drill sites. Cascade secured potable water from the City of Milan, New Mexico and water usage was tracked by INTERA and reported to NMED and DOE-LM on a daily and quarterly basis. Field work began on July 9, 2025.

Monitoring well locations were determined by DOE-LM in consultation with NMED. SAGA1 and SAGA2 were selected to reduce uncertainty in the groundwater plume to the southeast of the Facility, along with helping to define an east-west trending fault in this area. SAGA3 and SAGA4 were selected to better understand the plume concentrations to the southwest of the Facility, and to help understand the north-south trending Ambrosia Lake Fault's role in groundwater flow. SAGA5 and SAGA6 were selected as sentinel wells, located downgradient of the interpolated plume boundary (SAGA6 was not installed as a permanent monitoring well).

2.2 Drill Site Preparation Construction Activities

At each location a 300 ft by 300 ft area was checked for sensitive biological and cultural resources by DOE-LM and their prime support contractor (RSI Entech of Grand Junction, Colorado). INTERA then subcontracted EnviroWorks to clear and designate a 200 ft by 200 ft construction area/drill pad for drilling activities. In addition, an access road was built to access the SAGA2 drill site (from Homestake Property east to the final location of SAGA2). Please see the SAGA2 Access Road and Drill Site SWPPP included in **Appendix D** for additional information pertaining to the construction of the SAGA2 drill pad and access road.

2.3 SWPPP - SAGA2

A SWPPP inspection report was completed every 14 days by INTERA personnel and delivered to NMED and DOE. Additionally, a report was made when 0.25-inches or greater of rain or 3.5-inches of snow occurred, which happened four (4) times during field work. Copies of the SAGA2 SWPPP Inspection Reports are included in **Appendix D**.

2.4 Stormwater Protection - SAGA1, SAGA3, SAGA4, SAGA5 and SAGA6

In accordance with the SWMP, inspection reports were completed every 14 days by INTERA personnel for the SAGA1, SAGA3, SAGA4, SAGA5 and SAGA6 drill sites. Additionally, an inspection and report for each drill site were developed when a significant precipitation event occurred (0.25-inches or greater of rain or 3.5-inches of snow), which happened four times during field activities. Copies of the drill site SWMP inspection reports are included in **Appendix D**.

2.5 Coring- Upper Boreholes

To support the Work Plan objectives of identifying the spatial extent of the groundwater plume and groundwater pathways within the SAG aquifer, core drilling was utilized throughout the drilling process to collect continuous core from each boring location and gather detailed lithologic data at all proposed monitoring well locations. All boreholes were cored into the top of the SAG with a core barrel advanced via Rotosonic drilling methods, except for SAGA6 which was primarily cored with a Rotary coring rig(the upper 80 feet of SAGA6 was cored using Rotosonic drilling methods, the remainder of SAGA6 was cored using rotary coring methods). Each upper borehole was then reamed to a minimum of 12-inches in diameter using ARCH drilling to accept an 8-inch conductor casing, except SAGA6 (SAGA6 was not reamed; an 8-inch conductor casing was not installed at SAGA6). Table 3 outlines the specific rigs that were used for coring, reaming, and/or conductor casing installation (and depth intervals) at each borehole. Also included in Table 3 are the drilling fluids added (mud volumes) during the coring and reaming of the lower boreholes. It should be noted that drilling fluids (mud) was only used during the coring and reaming of the lower boreholes, except at SAGA5. The upper portion of SAGA5, from 235 ft bgs to 335 ft bgs had to drilled for the installation of the conductor casing by converting the air rotary ARCH rig to mud rotary to drill the lower 100’ feet of the upper borehole and installation of the conductor casing.

The 8-inch conductor casing was grouted to stabilize the upper borehole and into the top of the SAG (installed approximately 10 ft into the SAG). Widening the borehole for the 8-inch conductor was achieved by a series of ARCH drilling telescoping bits and casing diameters to safely reach the required 12-inch nominal hole diameter 10 ft into the SAG aquifer. All five (5) completed wells successfully cemented 8-inch casing a minimum of 10 ft into the SAG, while SAGA1 has an additional 7-inch string of casing hung onto the 8-inch casing at the surface. OSE permits and well completion reports are included in **Appendix F**, and details on casing depths and hole diameters for each well can be found in **Appendix I**.

2.6 Lithological Logging

Borehole sediment and rock cores were collected continuously by Cascade and provided to the INTERA Geologist (and NMED and DOE-LM representatives, if present) for lithologic logging. Unconsolidated material was described by the INTERA Geologist using the Unified Soil Classification System (USCS) in accordance with ASTM Standard D 2488–17e1 Standard Practice for Description and Identification of Soils (Visual-Manual Procedure) (ASTM, 2018). Rock cores were characterized in accordance with the

American Society for Testing and Materials (ASTM) Standard Practice for Rock Core Drilling and Sampling of Rock for Site Exploration (ASTM D2113-14) and the U.S. Environmental Protection Agency (EPA) Geologic Logging Guidance Document (EPA, 1998). The sample descriptions were directly documented using an electronic data logging device and saved daily to the INTERA server and data cloud. Logging information described tops/bottoms of formations as applicable, and any significant lithologic changes that would influence groundwater flow. Core generated from the drilling was then stored in core boxes provided by Cascade. Core boxes were labeled with boring name and depth, core was placed in the box(es) by INTERA, and then the full boxes were transported by Cascade to the laydown area. Boxes of core containing San Jose Ancestral Alluvium, SAG, and Yeso samples were shipped to Grand Junction by DOE-LM for storage on February 25, 2026. Core boxes of Chinle formation are currently stored on pallets (total of 10 pallets) at the laydown area and ready for shipment off-site.

2.7 Conductor Casing installation

As described in **Section 2.5**, once the borehole had been cored to a minimum of 10 ft beneath the base of the Chinle Formation, the ARCH rig was mobilized to the drill site and used to ream the borehole to a minimum diameter of 12-inches. The 8-inch casing was then welded and lowered piece by piece to 10 ft into the SAG and then using tremie pipe, neat cement was used to cement the steel conductor casing into place. After the cement had settled, it was topped off to surface.

2.8 Coring/Reaming - Lower Boreholes

After the 8-inch conductor casing was set, rotary coring of the SAG commenced at a diameter of 4.8 inches. The boreholes were then reamed via Rotosonic drilling methods into the SAG with a final minimum diameter of 6.2 inches, except SAGA5 which was not reamed and SAGA6 which was not completed. Table 3 shows which rigs were used for all depths at each wellbore. Reaming stopped at total depth into the top of the Yeso Formation, the geologic formation directly below the SAG. Penetration depth into the Yeso was one additional drilling run after initial contact with the top of the unit (approximately 5 to 10 ft of penetration into the underlying Yeso Formation). Measured depth of the casing, depth to water, total borehole depth, and thickness of the formations for each borehole are presented in **Table 1**. OSE permits and well completion reports are available as **Appendix F**, and details on casing depths and borehole diameters for each multi-port well can be found in **Appendix I.** Core Photographs and Field Photographs are included as **Appendix J** and **Appendix P**, respectively.

EORRs are included in **Appendix H**.

2.9 Ground Water Sampling During Drilling

Discrete “dart point” push-ahead grab groundwater samples were collected during the sonic drilling of the indicated borehole and from the following Chinle formation intervals, except where noted:

- SAGA1 – 151 to 152 ft bgs and 190 to 191 ft bgs
- SAGA2 – 220.5 to 225 ft bgs and 277 to 292.5 ft bgs
- SAGA4 – 195 ft bgs

- SAGA5 – 94 to 95 ft bgs (Ancestral Rio San Jose Alluvium) and 197 to 198 ft bgs

Laboratory results from the push-ahead ground water sampling are included in **Appendix Q**.

2.10 Geophysical Logging

Geophysical logging was conducted after reaching the borehole total depth as determined by NMED and DOE-LM. Generally, three days were provided for an open borehole to stabilize before geophysical logging. Geophysical logging utilized Elog (16" and 64" Normal, Spontaneous Potential and Single Point Resistance), gamma ray, caliper, heat-pulse flowmeter (HPFM), acoustic televiewer (ABI), optical televiewer (OBI), fluid temperature (FTemp), and fluid resistivity (Fres) geophysical logging tools to document the subsurface stratigraphy of each newly installed borehole. Gamma ray logs are effective in identifying formation lithology changes through the casing and were used in conjunction with the other geophysical information and the lithologic log to identify geologic contacts and inform each final well design. Jet West was planned to provide geophysical logging services at each borehole, but they went out of business on December 31, 2025, having provided geophysical logs for SAGA3 and two open boreholes at the Facility. COLOG was subcontracted to conduct geophysical logging starting on January 1, 2026; they provided geophysical logging services at SAGA1, SAGA2, SAGA4, and SAGA5.

Geophysical logging data was provided to NMED and DOE-LM immediately upon receipt from Jet West and COLOG. In addition, geophysical logging data was included on the Final INTERA borehole logs. All geophysical logs and testing data are included in **Appendix K**.

2.11 Investigation Derived Waste

IDW Soil was stored in 20-yard, lined, open top roll-off containers or 25-yard dewatering roll-off containers. The 20-yard roll-off containers were provided by EnviroWorks and the 25-yard dewatering roll-offs were provided by Cascade (rented from United Rentals). All IDW soils were disposed of at Cerro Colorado Landfill (CCLF) in Albuquerque, New Mexico. A total of 20 loads (137.53 tons) were transported from the Facility and disposed of at the CCLF.

IDW water was generated from either dewatering roll-offs, which are designed to separate water from wet soil, or from FLUTe™ blank and Water FLUTe™ installations. A total of 6,900 gallons were removed from the Facility by AES, Inc. and disposed of at the EnviroTech Disposal Facility in Farmington, New Mexico. In addition, approximately 850 gallons of IDW Water was disposed of by evaporation from a stock tank at the laydown yard.

Municipal Waste – A single, 20 cubic yard roll-off container was used for municipal waste. This container was emptied four times and a total of 7.25 tons of municipal waste was generated during the project.

IDW volumes and tracking information can be found in **Appendix O** and laboratory results are included in **Appendix R**.

Decontamination of tools and equipment took place on decon pads constructed of 10 mil plastic and wattles. Fluid on these decon pads was allowed to evaporate and then any solid IDW was placed into IDW roll-offs for disposal. All downhole equipment was decontaminated prior to starting work at a new location and also before equipment was demobilized from the Facility.

3.0 FLUTe™ Monitoring Well Installation

FLUTe™ conducted borehole testing at boreholes SAGA3, SAGA4, and SAGA2. Due to drilling conditions, FLUTe™ did not conduct borehole testing at SAGA1 or SAGA5. FLUTe™ testing results are included in **Appendix L**, and order forms are included in **Appendix M**.

3.1 Blank Liners

At the conclusion of drilling, FLUTe™ installed a blank temporary FLUTe™ liner within the borehole. FLUTe™ conducted transmissivity testing during blank liner installation. After the transmissivity profiles were completed in SAGA2 and SAGA3; the blank liner was slowly removed while conducting the Reverse Head Profiles (RHP) aquifer test used to aid in determining appropriate flow zones and potential sample port locations. Once the RHP and transmissivity testing were complete, the blank liner was reinstalled. Blank liner installation, transmissivity profiles and RHP took one to two days on average to complete. A RHP was not run on SAGA1, SAGA4, nor SAGA5 due to the tightness of the boreholes in SAGA4 and SAGA5, and because of stuck casing in SAGA1. FLUTe™ Transmissivity testing was completed at boreholes SAGA2, SAGA3, SAGA4, and SAGA5.

NMED and DOE-LM used the FLUTe™ testing results, as well as the geophysical and lithological information from each borehole in order to select final Water FLUTe™ ports. **Appendix L** includes the FLUTe™ port placement justification documents developed by DOE-LM. The FLUTe™ testing results are also included in **Appendix L**.

3.2 Water FLUTe™/Transducers

The final design of the proposed monitoring wells and FLUTe™ sampling port locations were based on the detailed lithologic descriptions, flow path profiling, and geophysical logging results. The multiport liners were custom manufactured based on the borehole profile and delivered to Facility by FLUTe™, where they were installed by FLUTe™ with assistance from INTERA and Cascade. During installation, INTERA collected detailed notes on Water FLUTe™ installation, specifications, timing of installations, all port depths, etc. relevant to each installation. Manufacture of the Water FLUTe™ liners took approximately 3 weeks for each Water FLUTe™, followed by one to two days for final installation. Cascade delivered fresh water to each borehole as needed for the Water FLUTe™ installations. Blank liners for SAGA1, SAGA3, SAGA4, and SAGA5 were everted from each borehole and the blank liner was disposed of into the municipal waste roll-off at laydown. **Table 2** summarizes Water FLUTe™ installation information per borehole and a detailed listing of liner depths, ports, and transducers can be found in **Appendix N**.

3.3 Wellhead Completions

The well surface completion was completed by Cascade, comprised of an above ground monument that complied with DOE-LM specifications including: (1) a minimum 2.5 ft stickup of the 8-inch conductor casing; (2) use of a Solinst FLUTe™ aboveground locking cover that attaches to the 8-inch conductor

casing; and (3) a 3 ft x 3 ft concrete pad with a minimum thickness of 4-inches was placed around each 8-inch permanent conductor casing. Surface completion work at each monitoring well has been completed by Cascade.

4.0 Site Restoration

4.1 Core Transfer

All core boxes with samples of the Rio San Jose Ancestral Alluvium, SAG, and Yeso were transported off site by DOE-LM on February 25, 2026, for long-term storage. The alluvial core located at the laydown area was disposed of as IDW soil and placed in an IDW soil container. The basalt core was dispersed to the ground surface at the laydown, to the south of the large gravel pile and to the west of the Chinle core pallets. The pallets of Chinle core have been placed to the south of the large gravel pile on pallets for short-term storage. The understanding is that this core material will be transported from the laydown by either DOE-LM or donated for research.

4.2 SAGA2 Restoration

After the conclusion of drilling and equipment decontamination activities, each pad underwent reclamation processes. Site reclamation was conducted by EnviroWorks, who subcontracted Caldron Reclamation for reclamation of SAGA2. The SAGA2 drill pad underwent the following steps for reclamation:

- All wattles were removed from along the access road and drill site.
  - The wood stakes holding the wattles in place were pulled from the ground and the stakes placed in a municipal waste roll-off bin for disposal at the CCLF. Wattles from SAGA2 were broken open and the straw spread across the pad after reseeding, the netting from the wattles was taken to the municipal trash dumpster along with the wooden stakes.
- Surveyal of background gamma radiation at the pad:
  - Gamma measurements were in a grid pattern every 40 ft, creating a 6 x 6 grid of measurements on the 200 x 200 ft drill pad. Gamma was also measured at selected locations on the pad, including former locations of the drill rigs, decon pads, roll-off bins, and other down-hole equipment.
- Removal of work area soils:
  - A thin layer of surface soil was excavated and removed from the site around the wellhead, and former locations of rigs, roll-off bins, and other equipment.
- Scarification:
  - Locations where natural vegetation was disturbed were scarified to a depth of approximately 4 inches using a rake attachment on a front-end loader (skip loader).
- Re-seeding:
  - Scarified areas were re-seeded by hand with a native seed mix.

- Caldron Reclamation performed re-seeding using a seeder. After re-seeding, fresh straw was crimped into the soil to further promote re-vegetation. Straw from the wattles formerly located along the SAGA2 access road was spread along the edges of the pad.

Detailed information on the restoration plan can be found in Addendum No. 3 in **Appendix C**, including initial background radiation levels for each site, native seed mixture, and details on pre-construction appearance of sites. Site restoration drill site scan results can be found in **Appendix T**.

4.3 Other Drill Site Restorations

After the conclusion of drilling activities, each pad underwent reclamation processes. Site reclamation was conducted by EnviroWorks. Each of the well pads underwent the following steps for reclamation.

- All wattles were removed from each drill site.
  - The wood stakes holding the wattles in place were pulled from the ground and the stakes and wattles were picked up and placed in the municipal waste roll-off bin for disposal at the CCLF.
- Survey of background gamma radiation at each drill pad:
  - Gamma measurements were taken every 40 ft, creating a 6 x 6 grid of measurements for each 200 x 200 ft pad (SAGA3 and SAGA4 were irregularly shaped, but the maximum 40 ft measurement distance was still followed). Gamma was also measured at selected locations on the pad, including former locations of drill rigs, decon pads, roll-off bins, and other down-hole equipment.
- Removal of work area soils:
  - A thin layer of surface soil was excavated and removed from each drill pad around wellheads, and former locations of rigs, roll-off bins, and other equipment.
- Scarification:
  - Locations where natural vegetation was disturbed were scarified to a depth of approximately 4 inches using a rake attachment on a front-end loader (Skip Loader).
- Re-seeding:
  - Scarified areas were re-seeded by hand with a native seed mix by EnviroWorks and then chain-dragged to provide soil cover for the recently broadcast seeds.

Additional details pertaining to site restoration activities are outlined in **Appendix C**.

4.4 Bluewater Laydown

After drilling was completed, the Bluewater laydown area was used to store all of the boxed core, the municipal waste roll-off, and two metal tanks on a decon pad used to evaporate water during the blank liner removals and Water FLUTe™ installations. Currently all boxes of core have been transported from laydown except the Chinle core, which has been placed on 10 pallets to be removed from the laydown area by DOE-LM or donated for research.

4.5 Demobilization

Demobilization of equipment began after all five (5) monitoring wells had been drilled and SAGA6 had successfully been plugged and abandoned. After decontamination, Cascade removed the drilling rig and support truck and all their equipment, piping, and tools. Locks were put on each of the wellhead covers while installation of the FLUTe™ water liners were finished. Poly-totes used by FLUTe™, and all FLUTe™ tools and equipment, were removed from the Facility after the last Water FLUTe™ was installed at SAGA5 on June 19, 2026.

5.0 Drilling Challenges

SAGA1 – Coring rig casing became lodged in the borehole while reaming at a depth of 263 ft bgs. Flowing sands were encountered from the bottom of the conductor casing (200 ft bgs) to approximately 225 ft bgs. Sonic wash over conducted to remove the core rig drill casing. Sonic rig was then used to continue the reaming work. The sonic casing broke during additional reaming and wash over efforts. Sonic drill casing remains in formation at SAGA1. 7-inch sonic casing remains from the ground surface to a depth of 237 ft bgs. 7-inch sonic casing also remains in formation from a depth of 315 ft bgs to 385 ft bgs, and 6-inch sonic casing remains in formation from 374 ft bgs to 394 ft bgs. Because of the difficulties of reaming the lower portion of SAGA1, two months of additional field work were added to the project schedule. Due to schedule delays and the fact that drill casing remains in the majority of the borehole, neither Solinst FLUTe™ transmissivity profile nor reverse head profile testing was conducted at this borehole.

SAGA2 – Two wash overs had to be conducted at SAGA2—one to remove stuck sonic casing and one to conduct stuck core rig drill casing, both at the depth of approximately 320 ft bgs (surface conductor installed to a depth of 290 ft bgs). Casing lodging issues were believed to be the result of flowing sands and/or the presence of large vertical fractures in the upper SAG unit. The resulting drilling issues resulted in approximately one additional month of field work than was planned at SAGA2.

SAGA4 – The hydraulic conductivity at this borehole was the lowest of the five boreholes that were completed as monitoring wells, which resulted in trouble ultimately flushing or clearing this borehole after drilling and reaming activities. There was also a wash over conducted at SAGA4, believed to be result of an angled drill casing against the bottom of the conductor casing and not the direct result of difficulties with the formation materials. Due to the lower hydraulic conductivity at SAGA4, approximately 800 gallons of water were pumped from SAGA4 in an effort to develop to open borehole prior to the installation of the final Solinst FLUTe™ liner. Also, because of the lower transmissivity at SAGA4, Solinst FLUTe™ RHP testing was not conducted at this borehole.

SAGA5 – Due to schedule and budget constraints, the project decision was made to not ream the lower portion of the SAGA5 borehole to a final diameter of 6.2 inches. Solinst FLUTe™ personnel were able to install a Water FLUTe™ in a borehole with a minimal diameter of 4.89 inches, the outer diameter of coring rig PQ casing. SAGA5 was drilled to total depth using PQ coring techniques, with a final diameter of 4.8 inches. There were issues installing the Solinst FLUTe™ blank liner past a depth of 440 ft bgs (total depth of SAGA5 is 590 ft bgs). Downhole video camera work indicated large vertical fractures in this

area, with ledges and angular rock features. Several attempts by Solinst FLUTe™ personnel to install the blank liner past this zone proved unsuccessful. The final Water FLUTe™ is installed to a TD of 444 ft bgs, and the borehole remains open to a depth of 590 ft bgs, sealed by the Water FLUTe™ liner above.

IDW – Additional types of IDW were generated during the project and a work plan addendum was generated in order to efficiently handle the additional IDW waste streams (please see **Appendix A**). The additional waste streams (IDW wet soil and IDW water) required additional containers (dewatering containers and frac tanks) that needed to be incorporated on the drill sites. The project also needed to dedicate more funding to IDW than originally planned, including dedicated time/products to try and solidify wet soil in order to receive acceptance for disposal at the CCLF. For additional details, please see the waste tracking log in **Appendix O**.

All drilling challenges are documented in the daily email reports included in **Appendix G** and in the drilling downtime log in **Appendix O**.

6.0 Conclusions

Cascade finished drilling operations on April 19, 2026. Five boreholes and FLUTe™ monitoring wells were drilled to completion; SAGA6 was partially drilled and then plugged and abandoned. Please see **Table 1** and **Table 2** for additional details. FLUTe™ finished the installation and final calibrations for all five (5) FLUTe™ monitoring wells on June 19, 2026. After the completion of the FLUTe™ activities, INTERA sent the FLUTe™ manifolds to DOE-LM via Federal Express overnight delivery. Additionally, EnviroWorks finished all site restoration work on June 19, 2026, and all roll-offs and equipment were removed from all drill sites and laydown by June 22, 2026. On July 2, 2026, two metal tanks on plastic for evaporating IDW water were removed by Cascade. The only items left on site related to the Bluewater drilling project are 10 tarped pallets of Chinle core. All gates and wellhead covers were locked when INTERA left site on June 19, 2026, and the key to the Facility was mailed back to DOE-LM on July 2, 2026.

7.0 References

United States Department of Energy – Legacy Management (DOE-LM). 2024. Bluewater, New Mexico, Disposal Site, An UMTRCA Title II site, Fact Sheet. November.

_____. 2014. Site Status Report: Groundwater Flow and Contaminant Transport in the Vicinity of the Bluewater, New Mexico, Disposal Site. November.

FIGURES

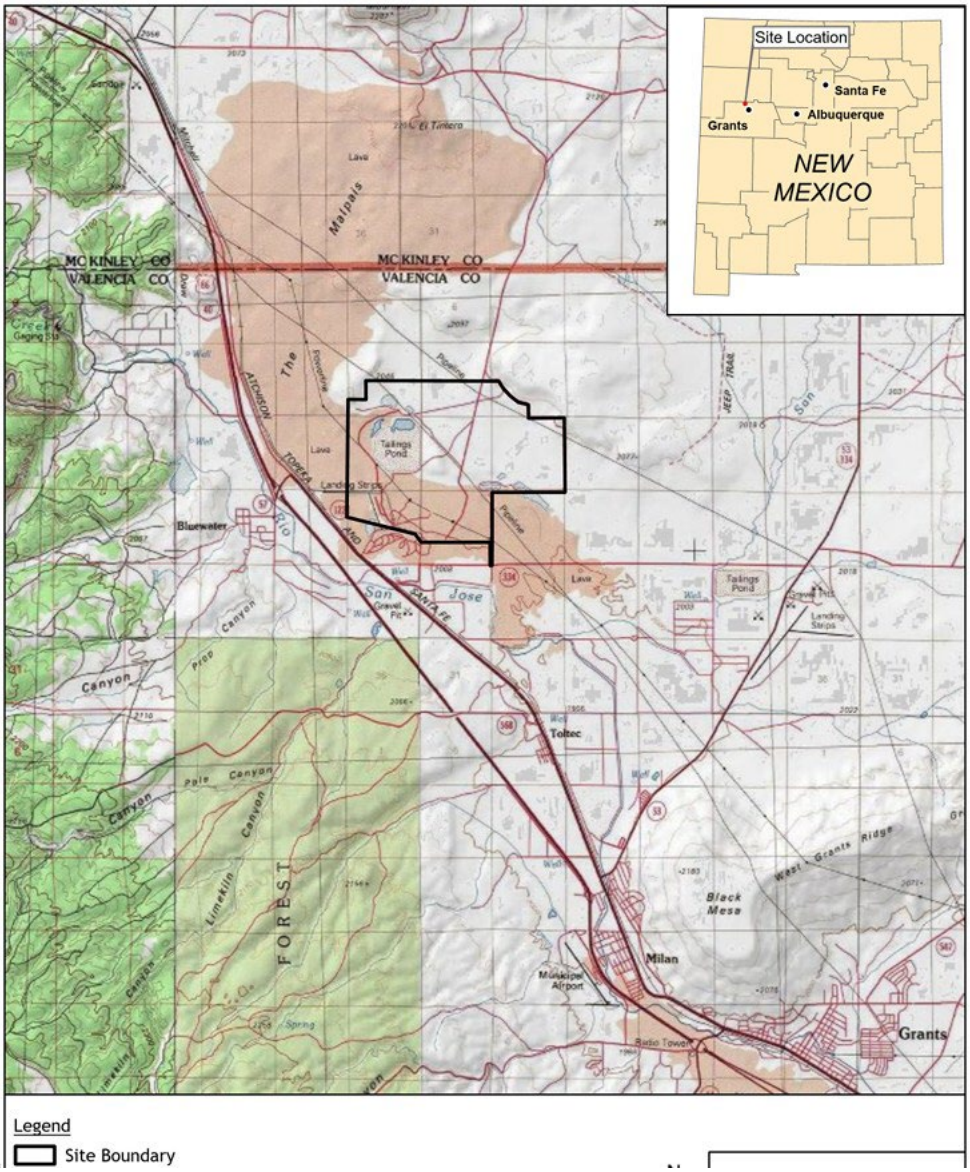

Figure 1. Bluewater Disposal Site Location, Cibola County, New Mexico.

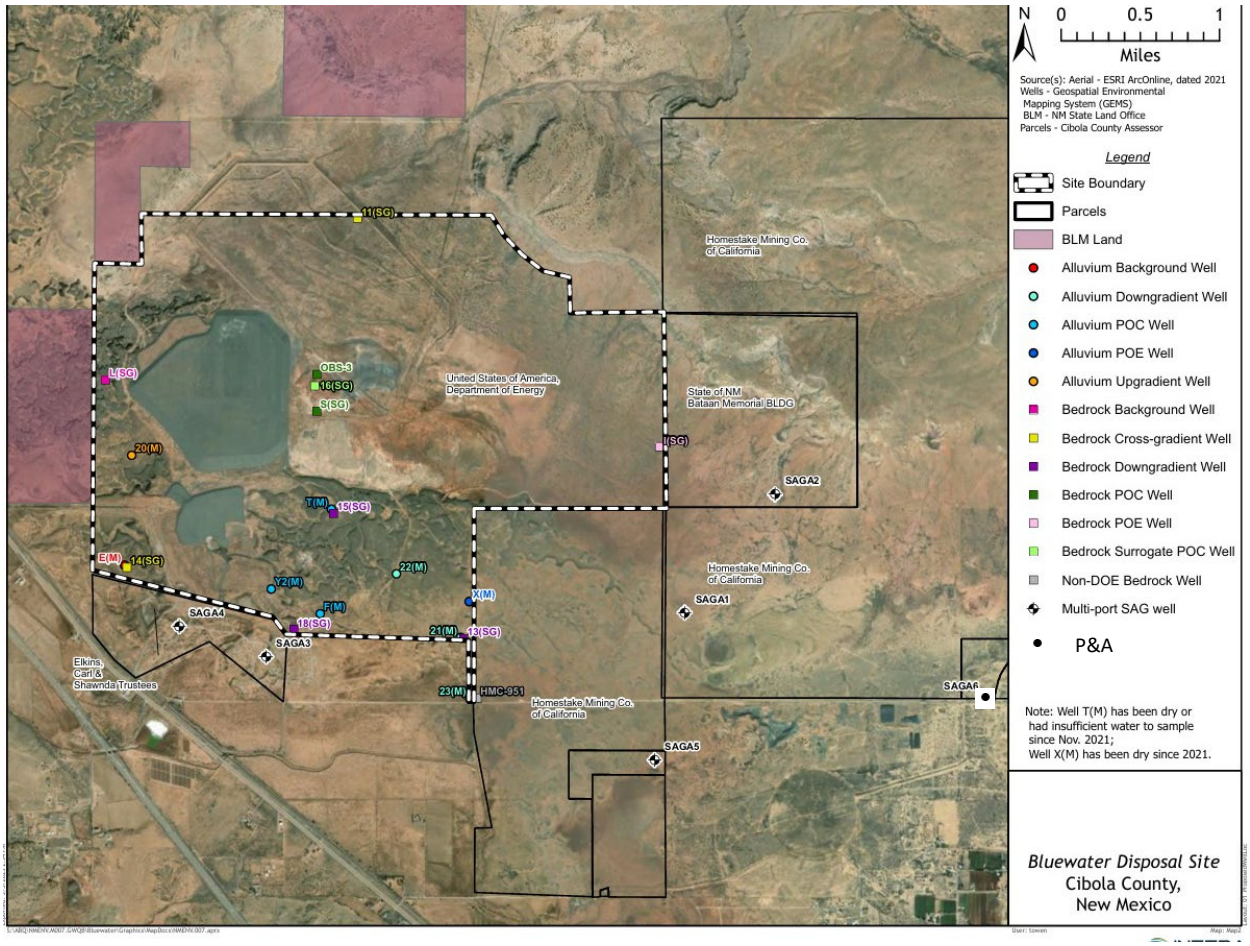

Figure 2. Existing monitoring well locations with Five Newly Installed FLUTe™ Monitoring Wells: SAGA1, SAGA2, SAGA3, SAGA4, and SAGA5. SAGA6 location abandoned.

TABLES

Table 1. Borehole Formation Contacts and Depth to Water

Formation Top	SAGA1	SAGA2	SAGA3	SAGA4	SAGA5	SAGA6 (PA)
Surface Alluvium	0 ft to 18.5 ft	0 ft to 11.0 ft	0 ft to 1.5 ft	0 ft to 12.0 ft	0 ft to 2.5 ft	0 ft to 39.5 ft
Bluewater Basalt	Not Present	Not Present	1.5 to 44.0 ft	12.0 to 44.0 ft	2.5 to 55.0 ft	Not Present
San Jose Ancestral Alluvium	Not Present	Not Present	44.0 to 65.0 ft	44.0 to 67.0 ft	55.0 to 95.0 ft	Not Present
Chinle	18.5 to 183.5 ft	11.0 to 277.0 ft	65.0 to 191.5 ft	67.0 to 186.5 ft	95.0 to 323.0 ft	39.5 to 549.0 ft
San Andres	183.5 to 271.5 ft	277.0 to 465.0 ft	191.5 ft to 284.0 ft	186.5 ft to 270.0 ft	323.0 to 401.5 ft	549.0 ft to 591 ft
Glorietta	271.5 to 454.0 ft	465.0 to 536.5 ft	284.0 ft to 441.0 ft	270.0 to 463.0 ft	401.5 to 585.0 ft	N/A
Yeso	454.0 ft to TD	536.5 ft to TD	441.0 ft to TD	463.0 ft to TD	585.0 ft to TD	N/A
Depth to Groundwater	139.8 ft	201.0 ft	149.9 ft	150.8 ft	122.2 ft	91.0 ft

Notes: All depths in feet below ground surface (ft bgs). SAGA6 drilled into top of SAG and then plugged/abandoned.

Table 2. SAGA Boreholes - Water FLUTe™ Construction Details

FLUTe™ Ports	SAGA1	SAGA2	SAGA3	SAGA4	SAGA5	SAGA6 (PA)
Surface Casing	8”: 200 ft bgs 7”: 237 ft bgs	290 ft bgs	205 ft bgs	200 ft bgs	336 ft bgs	N/A
Port 1	295 ft to 305 ft (T)	294 ft to 302 ft	232 ft to 240 ft (T)	225 ft to 235 ft (T)	338 ft to 342 ft (T)	N/A
Port 2	402 ft to 408 ft (T)	325 ft to 335 ft (T)	255 ft to 265 ft	245 ft to 255 ft	361 ft to 367 ft	N/A
Port 3	443 ft to 448 ft (T)	358 ft to 368 ft	275 ft to 285 ft (T)	281.5 to 291.5 ft (T)	376 ft to 381 ft (T)	N/A
Port 4	-	398 ft to 408 ft (T)	300 ft to 310 ft	314 ft to 324 ft	401 ft to 406 ft	N/A
Port 5	-	455 ft to 465 ft	353 ft to 363 ft	365 ft to 375 ft (T)	439 ft to 444 ft (T)	N/A
Port 6	-	510 ft to 520 ft (T)	393 ft to 403 ft (T)	387 ft to 397 ft	-	N/A

Notes: All depths in feet below ground surface (ft bgs). (T) signifies port with a transducer. SAGA1: Drill casing remains in place - 7-inch drill pipe from 315 ft to 385 ft bgs; 6-inch drill pipe from 374 ft to 394 ft bgs. SAGA5: Not reamed – diameter 4.8 inches and Water FLUTe™ bottom is 444 ft bgs while borehole total depth is 585 ft bgs.

Table 3. Drilling Methods Used and Mud Volumes

SAGA1	SAGA2	SAGA3	SAGA4	SAGA5	SAGA6 (PA)
Sonic Rig: Core 0' to 245'	Sonic Rig: Core 0' to 350'	Sonic Rig: Cored 0' to 202.5'	Sonic Rig: Cored 0' to 235'	Sonic Rig: Cored 0' to 335''	Sonic Rig: Core 0' to 80'
ARCH Rig: Ream 0' to 197'	ARCH Rig: Ream 0' to 290'	Arch Rig: Ream 0' to 205'	ARCH Rig: Ream 0' to 199.3'	ARCH Rig: Ream 0' to 235' using ARCH air rotary and then 235' to 335' using ARCH mud rotary	Rotary Rig: Core 80' to 591'
Rotary Rig: Core 245' to 458'	Rotary Rig: Core 350' to 546'	Rotary: Core 205' to 445.5'	Rotary Rig: Core 197' to 471'	Rotary Rig: Core 335' to 590'	Sonic Rig: Clean out 64' to 591'
Rotary Rig: Ream 198' - 263'	Sonic Rig: Ream 5.8"350' to 546'	Rotary: Ream 5.8" 205' to 445'	Sonic Rig: Ream 6.2" 199' to 471'	No Ream	No ARCH. No Ream.
Sonic Rig: Ream 7.2" 200' to 385' and 6.2"385' to 394'	Sonic Rig: Ream 6.2"350' to 546'	Rotary: Ream 6.2"205' to 445.5'			Plugged and Abandoned (see Appendix S)
Not reamed from 394' to 458'					
Mud Volume: 10,900 gal	Mud Volume: 4,500 gal	Mud Volume: 0 gal	Mud Volume: 9,250 gal	Mud Volume: 28,200 gal	Mud Volume: 7,000 gal