

Incident ID	nAPP2227233275
District RP	
Facility ID	
Application ID	

## Site Assessment/Characterization

*This information must be provided to the appropriate district office no later than 90 days after the release discovery date.*

What is the shallowest depth to groundwater beneath the area affected by the release?	<u>181.5</u> (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of an occupied permanent residence, school, hospital, institution, or church?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 500 horizontal feet of a spring or a private domestic fresh water well used by less than five households for domestic or stock watering purposes?	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
Are the lateral extents of the release within 1000 feet of any other fresh water well or spring?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within incorporated municipal boundaries or within a defined municipal fresh water well field?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
Did the release impact areas <b>not</b> on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No

Attach a comprehensive report (electronic submittals in .pdf format are preferred) demonstrating the lateral and vertical extents of soil contamination associated with the release have been determined. Refer to 19.15.29.11 NMAC for specifics.

**Characterization Report Checklist: Each of the following items must be included in the report.**

- Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.
- Field data
- Data table of soil contaminant concentration data
- Depth to water determination
- Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release
- Boring or excavation logs
- Photographs including date and GIS information
- Topographic/Aerial maps
- Laboratory data including chain of custody

If the site characterization report does not include completed efforts at remediation of the release, the report must include a proposed remediation plan. That plan must include the estimated volume of material to be remediated, the proposed remediation technique, proposed sampling plan and methods, anticipated timelines for beginning and completing the remediation. The closure criteria for a release are contained in Table 1 of 19.15.29.12 NMAC, however, use of the table is modified by site- and release-specific parameters.

State of New Mexico  
Oil Conservation Division

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I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Risa Czarnikow Title: Production Tech  
 Signature: *Risa Czarnikow* Date: 3-29-23  
 email: rczarnikow@helmsoil.com Telephone: (432) 688-3727

**OCD Only**

Received by: Jocelyn Harimon Date: 03/29/2023

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### Remediation Plan

**Remediation Plan Checklist:** Each of the following items must be included in the plan.

- Detailed description of proposed remediation technique
- Scaled sitemap with GPS coordinates showing delineation points
- Estimated volume of material to be remediated
- Closure criteria is to Table 1 specifications subject to 19.15.29.12(C)(4) NMAC
- Proposed schedule for remediation (note if remediation plan timeline is more than 90 days OCD approval is required)

**Deferral Requests Only:** Each of the following items must be confirmed as part of any request for deferral of remediation.

- Contamination must be in areas immediately under or around production equipment where remediation could cause a major facility deconstruction.
- Extents of contamination must be fully delineated.
- Contamination does not cause an imminent risk to human health, the environment, or groundwater.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to OCD rules and regulations all operators are required to report and/or file certain release notifications and perform corrective actions for releases which may endanger public health or the environment. The acceptance of a C-141 report by the OCD does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to groundwater, surface water, human health or the environment. In addition, OCD acceptance of a C-141 report does not relieve the operator of responsibility for compliance with any other federal, state, or local laws and/or regulations.

Printed Name: Risa Czarnikow Title: Production Tech  
 Signature: *Risa Czarnikow* Date: 3-29-23  
 email: rczarnikow@helmsoil.com Telephone: (432) 688-3727

**OCD Only**

Received by: Jocelyn Harimon Date: 03/29/2023

- Approved       Approved with Attached Conditions of Approval       Denied       Deferral Approved

Signature: *Jennifer Nobui* Date: 05/04/2023

# Remediation Summary & Variance Request

## H.L. Brown Operating, LLC Federal G #001

Roosevelt County, New Mexico  
Unit Letter "D", Section 3, Township 8 South, Range 37 East  
Latitude 33.6546570 North, Longitude 103.146285 West  
NMOCD Reference No. nAPP2227233275

Prepared By:

### Etech Environmental & Safety Solutions, Inc.

6309 Indiana Ave., Ste. D  
Lubbock, Texas 79413



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Ben J. Arguijo



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Zach Conder



Midland • San Antonio • Lubbock • Hobbs • Lafayette

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### 1.0 PROJECT INFORMATION

Etech Environmental & Safety Solutions, Inc. (Etech), on behalf of H.L. Brown Operating, LLC (henceforth, "H.L. Brown"), has prepared this *Remediation Summary & Variance Request* for the release site known as the Federal G #001. Details of the release are summarized below:

<b>Location of Release Source</b>				
Latitude: _____		33.6546570		Longitude: _____
				-103.146285
Provided GPS are in WGS84 format.				
Site Name: _____			Site Type: _____	
Federal G #001			Well Head	
Date Release Discovered: _____			API # (if applicable): _____	
9/7/2022			30-041-20504	
Unit Letter	Section	Township	Range	County
"D"	3	8S	37E	Roosevelt
Surface Owner: <input checked="" type="checkbox"/> State <input type="checkbox"/> Federal <input type="checkbox"/> Tribal <input type="checkbox"/> Private (Name _____ New Mexico Dept. of Game & Fish )				
<b>Nature and Volume of Release</b>				
<input checked="" type="checkbox"/> Crude Oil	Volume Released (bbls)	5	Volume Recovered (bbls)	0
<input type="checkbox"/> Produced Water	Volume Released (bbls)		Volume Recovered (bbls)	
	Is the concentration of total dissolved solids (TDS) in the produced water > 10,000 mg/L?		<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> N/A	
<input type="checkbox"/> Condensate	Volume Released (bbls)		Volume Recovered (bbls)	
<input type="checkbox"/> Natural Gas	Volume Released (Mcf)		Volume Recovered (Mcf)	
<input type="checkbox"/> Other (describe)	Volume/Weight Released		Volume/Weight Recovered	
Cause of Release: Unknown historic release found during site inspection.				
<b>Initial Response</b>				
<input checked="" type="checkbox"/> The source of the release has been stopped. <input checked="" type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input checked="" type="checkbox"/> Release materials have been contained via the use of berms or dikes, absorbent pad, or other containment devices <input checked="" type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.				

Previously submitted portions of the NMOCD Form C-141 are available in the NMOCD Imaging System.

## 2.0 SITE CHARACTERIZATION

A search of groundwater databases maintained by the New Mexico Office of the State Engineer (NMOSE) and United States Geological Survey (USGS) was conducted in an effort to determine the horizontal distance to known water sources within a half-mile radius of the Federal G #001 release site. Probable groundwater depth was determined using data generated by numeric models based on available water well data and published information. Depth to groundwater information is provided as Appendix A.

What is the shallowest depth to groundwater beneath the area affected by the release?	181.5'		
Did the release impact groundwater or surface water?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are the lateral extents of the release within 300 feet of a continuously flowing watercourse or any other significant watercourse?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Are the lateral extents of the release within 200 feet of any lakebed, sinkhole, or playa lake (measured from the ordinary high-water mark)?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
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Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	
Did the release impact areas not on an exploration, development, production or storage site?	<input type="checkbox"/> Yes	<input checked="" type="checkbox"/> No	

NMOCD Siting Criteria data was gathered from available resources including Bureau of Land Management (BLM) and Fish & Wildlife Services (FWS) shapefiles, topographic maps, NMOSE and USGS databases, and aerial imagery. The results are depicted in Figures 1, 2, 4, and 5.

## 3.0 CLOSURE CRITERIA FOR SOILS IMPACTED BY A RELEASE

Based on the volume and nature of the release, inferred depth to groundwater, and NMOCD Siting Criteria, the NMOCD Closure Criteria and NMOCD Reclamation Standards for the Federal G #001 release site are as follows:

Probable Depth to Groundwater	Constituent	Laboratory Analytical Method	Closure Criteria*†	Reclamation Standard*‡
181.5'	Chloride (Cl-)	EPA 300.0 or SM4500 Cl B	600	600
	Total Petroleum Hydrocarbons (TPH)	EPA SW-846 Method 8015M Ext	100	100
	Gas Range Organics + Diesel Range Organics (GRO + DRO)	EPA SW-846 Method 8015M	N/A	N/A
	Benzene	EPA SW-846 Methods 8021b or 8260b	10	10
	Benzene, Toluene, Ethylbenzene, Total Xylenes (BTEX)	EPA SW-846 Methods 8021b or 8260b	50	50

\* Measured in milligrams per kilogram (mg/kg)

† Table I, Section 19.15.29.12 of the New Mexico Administrative Code (NMAC).

‡ The NMOCD Reclamation Standard applies only to the top 4' of soil in non-production areas. Section 19.15.29.13 D.(1) NMAC.

## 4.0 REMEDIATION ACTIVITIES SUMMARY

On October 26, 2022, remediation activities commenced at the release site. In accordance with NMOCD regulatory guidelines, impacted soil affected above the NMOCD Closure Criteria and/or NMOCD Reclamation Standards was excavated and stockpiled on-site, pending transfer to an NMOCD-permitted surface waste facility for disposal. Olfactory/visual senses and/or a Hach Quantab® chloride test kit were utilized to field-screen the extent of impacted soil and to guide the excavation. The sidewalls of the excavation were advanced until field tests and field observations suggested BTEX, TPH, and chloride concentrations were below the applicable NMOCD Closure Criteria and/or NMOCD Reclamation Standards. The excavation was initially advanced vertically to approximately four (4) feet below ground surface (bgs).

On November 8, 2022, Etech advanced a test trench (T.T. 1) in the floor of the excavated area in an effort to determine the vertical extent of impacted soil. During the advancement of the test trench, soil samples were collected and field-screened for concentrations of chloride utilizing a chloride test kit and/or the presence of Volatile Organic Compounds (VOCs) utilizing olfactory/visual senses. Based on field observations and field test data, five (5) delineation soil samples (T.T. 1 @ 4', T.T. 1 @ 6', T.T. 1 @ 8', T.T. 1 @ 10', and T.T. 1 @ 12') were submitted to a certified, commercial laboratory (henceforth, "the laboratory") for analysis of BTEX, TPH, and chloride. Laboratory analytical results indicated BTEX and TPH concentrations were below the applicable NMOCD Closure Criteria, NMOCD Reclamation Standards, and laboratory method detection limit (MDL) in each of the submitted soil samples. Chloride concentrations exceeded the NMOCD Closure Criterion in each of the submitted soil samples and ranged from 2,800 mg/kg in soil sample T.T. 1 @ 6' to 11,900 mg/kg in soil sample T.T. 1 @ 10'.

On November 28, 2022, test trench T.T. 1 was re-entered and advanced to a total depth of 32 feet bgs in an effort to further investigate the vertical extent of impacted soil. To prevent sloughing and collapse of the open hole, the sidewalls of the trench were advanced horizontally in each cardinal direction, creating a "test pit". During the advancement of the test pit, soil samples were collected and field-screened for concentrations of chloride utilizing a chloride test kit and/or the presence of VOCs utilizing olfactory/visual senses. Based on field observations and field test data, four (4) delineation soil samples (T.T. 1 @ 20', T.T. 1 @ 24', T.T. 1 @ 28', and T.T. 1 @ 32') were submitted to the laboratory for analysis of chloride. Laboratory analytical results indicated chloride concentrations exceeded the NMOCD Closure Criterion in each of the submitted soil samples and ranged from 4,040 mg/kg in soil sample T.T. 1 @ 32' to 9,330 mg/kg in soil sample T.T. 1 @ 24'.

On November 30, 2022, test pit T.T. 1 was re-entered and advanced to a total depth of 40 feet bgs in an effort to further investigate the vertical extent of impacted soil. During the advancement of the test pit, soil samples were collected and field-screened for concentrations of chloride utilizing a chloride test kit and/or the presence of VOCs utilizing olfactory/visual senses. Based on field observations and field test data, one (1) delineation soil sample (T.T. 1 @ 40') was submitted to the laboratory for analysis of chloride. Laboratory analytical results indicated the chloride concentration was 48.0 mg/kg and below the NMOCD Closure Criterion. Based on these laboratory analytical results, the vertical extent of impacted soil was adequately defined.

On December 5, 2022, Etech advanced a series of test trenches (NH 1, EH 1, SH 1, and WH 1) along the inferred edges of the affected area in an effort to determine the horizontal extent of impacted soil. The test trenches were each advanced to a total depth of 18 feet bgs. During the advancement of the test trenches, soil samples were collected and field-screened for concentrations of chloride utilizing a chloride test kit and/or the presence of VOCs utilizing olfactory/visual senses. Based on field observations and field test data, four (4) delineation soil samples (NH 1 @ 18', EH 1 @ 18', SH 1 @ 18', and WH 1 @ 18') were submitted to the laboratory for analysis of BTEX, TPH, and chloride. Laboratory analytical results indicated BTEX, TPH, and chloride concentrations were below the applicable NMOCD Closure Criteria in each of the submitted soil samples. BTEX and TPH concentrations were also below the laboratory MDL. Chloride concentrations ranged from 16.0 mg/kg in soil sample NH 1 @ 18' to 224 mg/kg in soil sample WH 1 @ 18'. Based on these laboratory analytical results, the horizontal extent of impacted soil was adequately defined.

The dimensions of the excavated area/test pit are approximately 25 feet in length by 25 feet in width, and varying in depth from four (4) to 18 feet bgs. To date Etech has transported approximately 220 cubic yards of impacted soil to an NMOCD-permitted surface waste facility for disposal and imported approximately 200 cubic yards of locally sourced, non-impacted material to the site for use as backfill.

The extent of the excavated area/test pit and the locations of the test trenches are depicted in Figure 3, "Site & Sample Location Map". Soil chemistry data is summarized in Table 1. Field data is provided in Appendix B. General photographs of the site are provided in Appendix C. Laboratory analytical reports are provided in Appendix D.

## 5.0 IN-SITU CHLORIDE MIGRATION MODELING

The majority of the test pit, which is inferred to be the area most heavily impacted by the release, has been excavated vertically to the extent practicable (approximately 18 feet bgs). H.L. Brown believes that deeper excavation poses environmental and safety risks that exceed the benefits of the removal of additional soil affected above the NMOCD Closure Criteria.

Etech utilized the Environmental Protection Agency's (EPA) Multimedia Exposure Assessment Model (MULTIMED) to determine if the chloride contamination remaining in-situ poses a threat to groundwater quality, as well as to simulate the efficacy of installing a geosynthetic liner to inhibit vertical migration of the contamination. The most appropriate and conservative parameter values possible for the site were used for the assessment model in regard to depth to groundwater, contaminant concentration (i.e., 11,900 mg/kg, the maximum chloride concentration encountered during delineation), soil porosity, etc. Additional parameter values were utilized that have been previously approved by the NMOCD as being representative of the general area and for simulating lined versus unlined excavations and/or oil and gas facilities. The model indicates the peak concentration of chloride in the underlying groundwater contributed by the contamination remaining in-situ would be approximately 104 mg/L in 1,200 years with a liner installed versus 1,385 mg/L in 349 years with no liner (see Appendix E).

Since the estimated peak concentration of chloride is below the standard of 250.0 mg/L specified in Section 20.6.2.3103 B.(1) NMAC, pursuant to Section 19.15.29.14.A(2) NMAC, the migration model effectively demonstrates that installation of a geosynthetic liner provides an "equal or better protection of fresh water, public health and the environment" as compared to a deeper excavation.

## 6.0 VARIANCE REQUEST & PROPOSED ACTIVITIES

Pursuant to Section 19.15.29.14 NMAC, H.L. Brown requests a variance to install a 20-mil, string-reinforced liner at approximately six (6) feet bgs atop impacted soil affected above the NMOCD Closure Criteria. Prior to installation of the liner, the test pit will be partially backfilled with locally sourced, non-impacted material to approximately six (6) feet bgs. The test pit sidewalls will be advanced horizontally to the areas characterized by test trenches NH 1, EH 1, SH 1, and WH 1. The newly excavated area will be advanced vertically to a total depth of approximately six (6) feet bgs. Representative five-point composite confirmation soil samples will be collected every 50 linear feet from the excavation sidewalls to be submitted for laboratory analysis. Upon receiving laboratory analytical results from confirmation soil samples, approximately six (6) inches of pad material will be installed on the floor of the excavated area both above and below the proposed liner in an effort to maintain its integrity during backfilling activities. The liner will be sloped to facilitate shedding of moisture outside both the footprint of the excavated area and the maximum horizontal extent of impacted soil. This engineered control is designed to inhibit the vertical migration of chloride contamination remaining in-situ.

Immediately following installation of the liner and pad material, the remainder of the excavated area will be backfilled with locally sourced, non-impacted, "like" material placed at or near original relative positions and compacted/contoured to fit the needs of the Federal G #001 facility.

Following backfilling, a *Remediation Summary & Soil Closure Request* will be submitted to the NMOCD, documenting completed liner installation and site restoration activities.

## 7.0 RECLAMATION & RE-VEGETATION PLAN

The release was limited to the production pad of an active well and tank battery. Final reclamation and re-vegetation of the affected area will be conducted in accordance with Section 19.15.29.13 NMAC upon decommission and abandonment of the facility.

## 8.0 LIMITATIONS

Etech Environmental & Safety Solutions, Inc., has prepared this *Remediation Summary & Variance Request* to the best of its ability. No other warranty, expressed or implied, is made or intended. Etech has examined and relied upon documents referenced in the report and on oral statements made by certain individuals. Etech has not conducted an independent examination of the facts contained in referenced materials and statements. Etech has presumed the genuineness of these documents and statements and that the information provided therein is true and accurate. Etech has prepared the report in a professional manner, using the degree of skill and care exercised by similar environmental consultants. Etech notes that the facts and conditions referenced in this report may change over time, and the conclusions and recommendations set forth herein are applicable only to the facts and conditions as described at the time of this report.

This report has been prepared for the benefit of H.L. Brown Operating, LLC. Use of the information contained in this report is prohibited without the consent of Etech and/or H.L. Brown Operating, LLC.

## 9.0 DISTRIBUTION

***H.L. Brown Operating, LLC***

*300 West Louisiana  
Midland, TX 79702-2237*

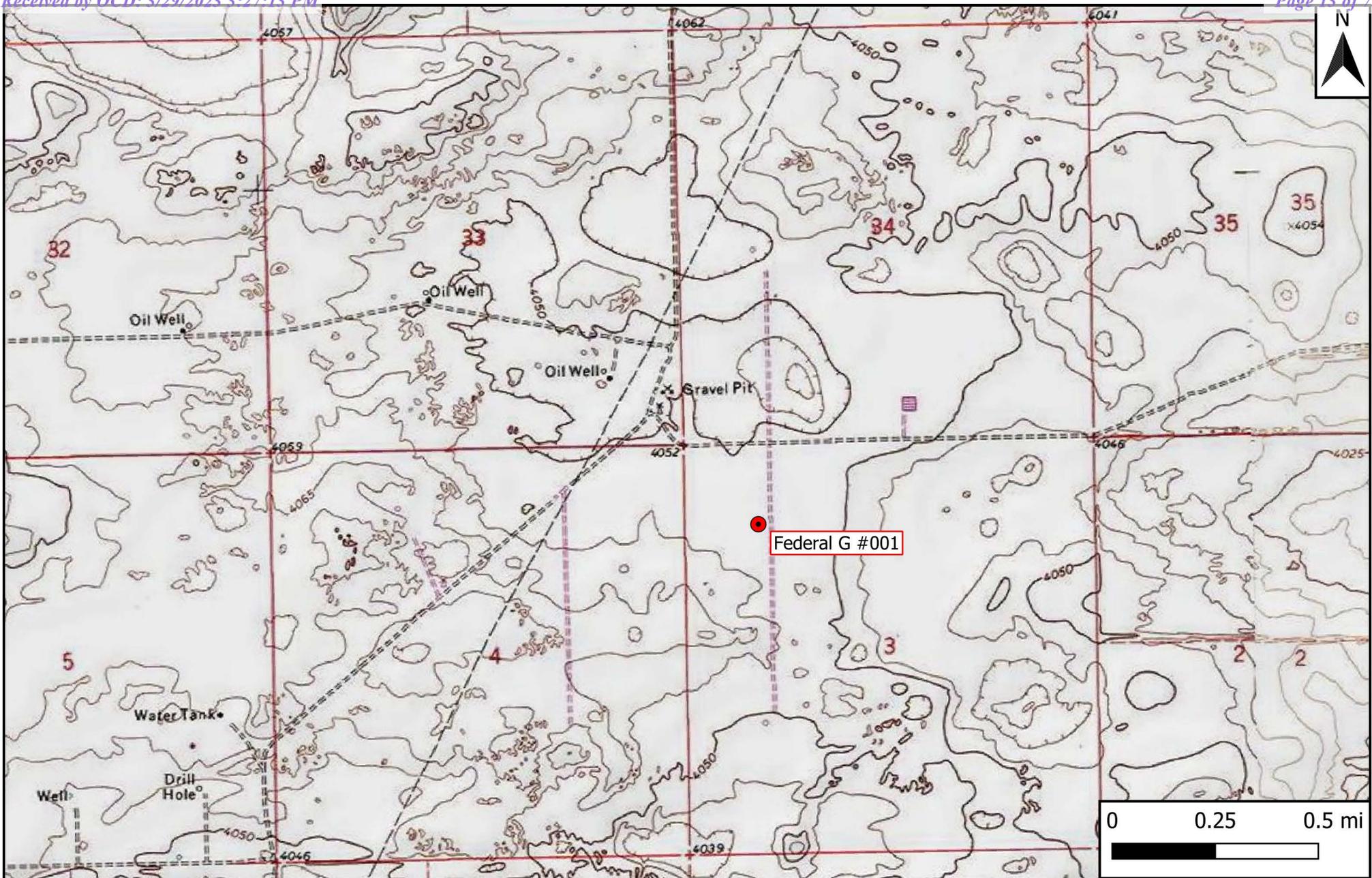
***New Mexico Energy, Minerals and Natural Resources Department***

*Oil Conservation Division, District 1  
1220 South St. Francis Drive  
Santa Fe, NM 87505*

*(Electronic Submission)*

# **Figure 1**

## **Topographic Map**



Legend  
 ● Site Location

**Figure 1**  
 Topographic Map  
 H.L. Brown Operating, LLC  
 Federal G #001  
 GPS: 33.654657, -103.146285  
 Roosevelt County

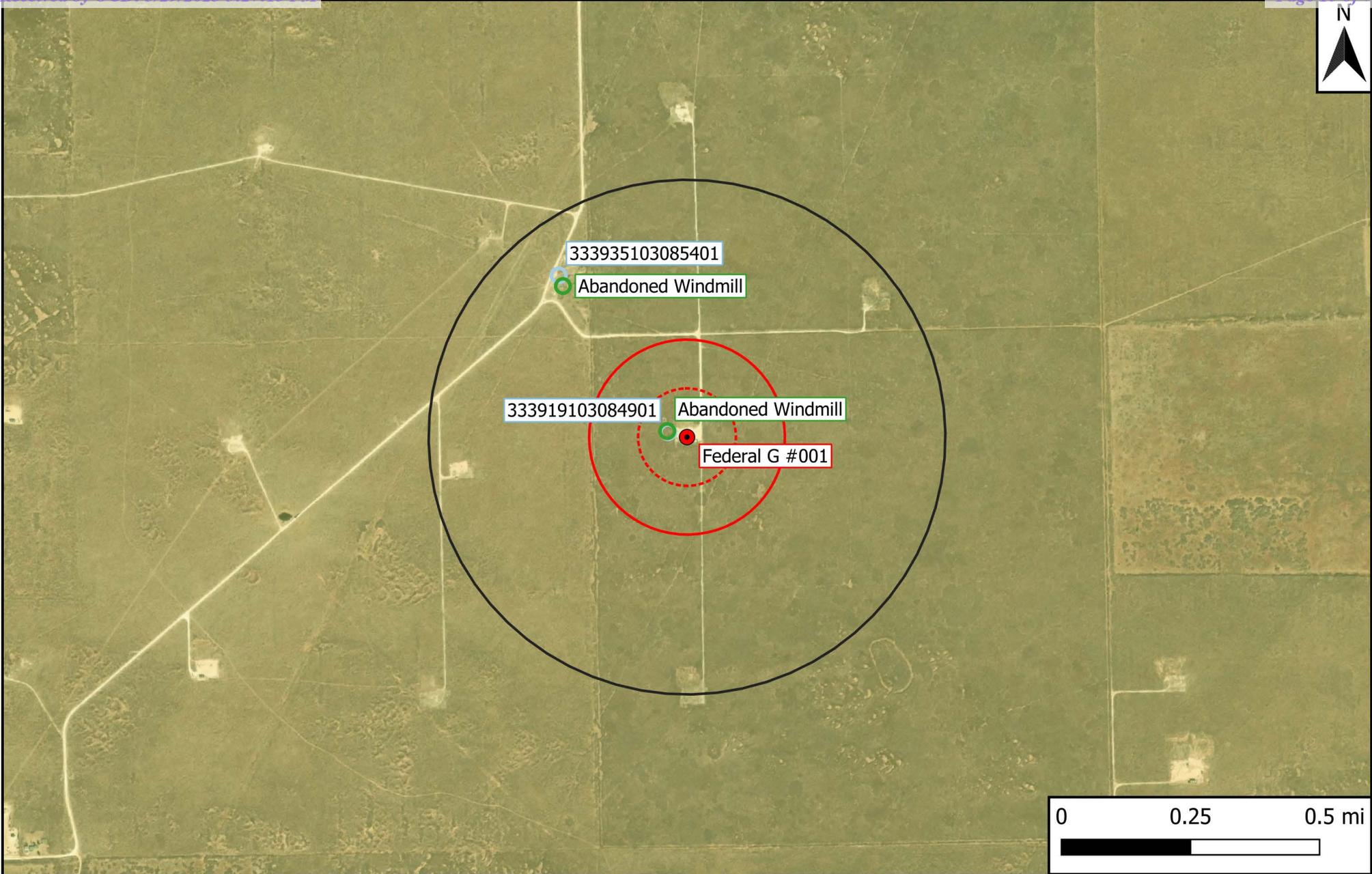


Drafted: bja

Checked: zc

Date: 1/9/23

## Figure 2 Site Characterization Map



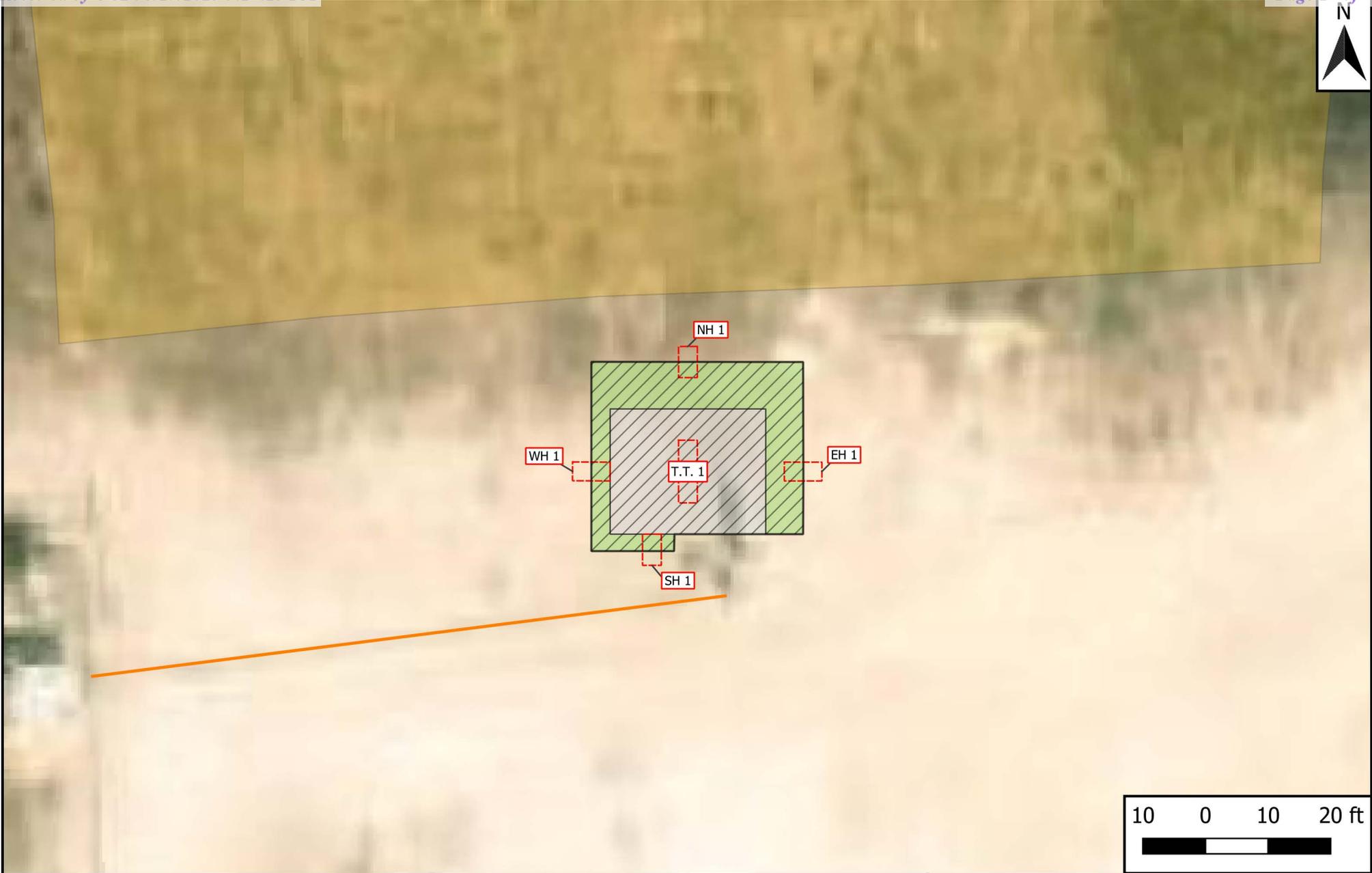
Legend		
Site Location	1% Annual Flood Chance	500-Ft Radius
Well - NMOSE	Emergent/Forested Wetlands	1,000-Ft Radius
Well - USGS	Freshwater Pond/Lake	0.5-Mi Radius
Well - Exploratory/Monitor	Karst Potential (Low/Med./High)	Municipal Boundary
Potash Mine Workings	Riverine	

**Figure 2**  
 Site Characterization Map  
 H.L. Brown Operating, LLC  
 Federal G #001  
 GPS: 33.654657, -103.146285  
 Roosevelt County



Drafted: bja      Checked: zc      Date: 3/9/23

## **Figure 3 Site & Sample Location Map**



Legend	
	Proposed Excavation
	Proposed Liner
	Test Pit (≈18' bgs)
	Test Trench
	Historical Reserve Pit
	Pipeline

**Figure 3**  
 Site & Sample Location Map  
 H.L. Brown Operating, LLC  
 Federal G #001  
 GPS: 33.654657, -103.146285  
 Roosevelt County



**Table 1**  
**Concentrations of BTEX, TPH & Chloride in Soil**

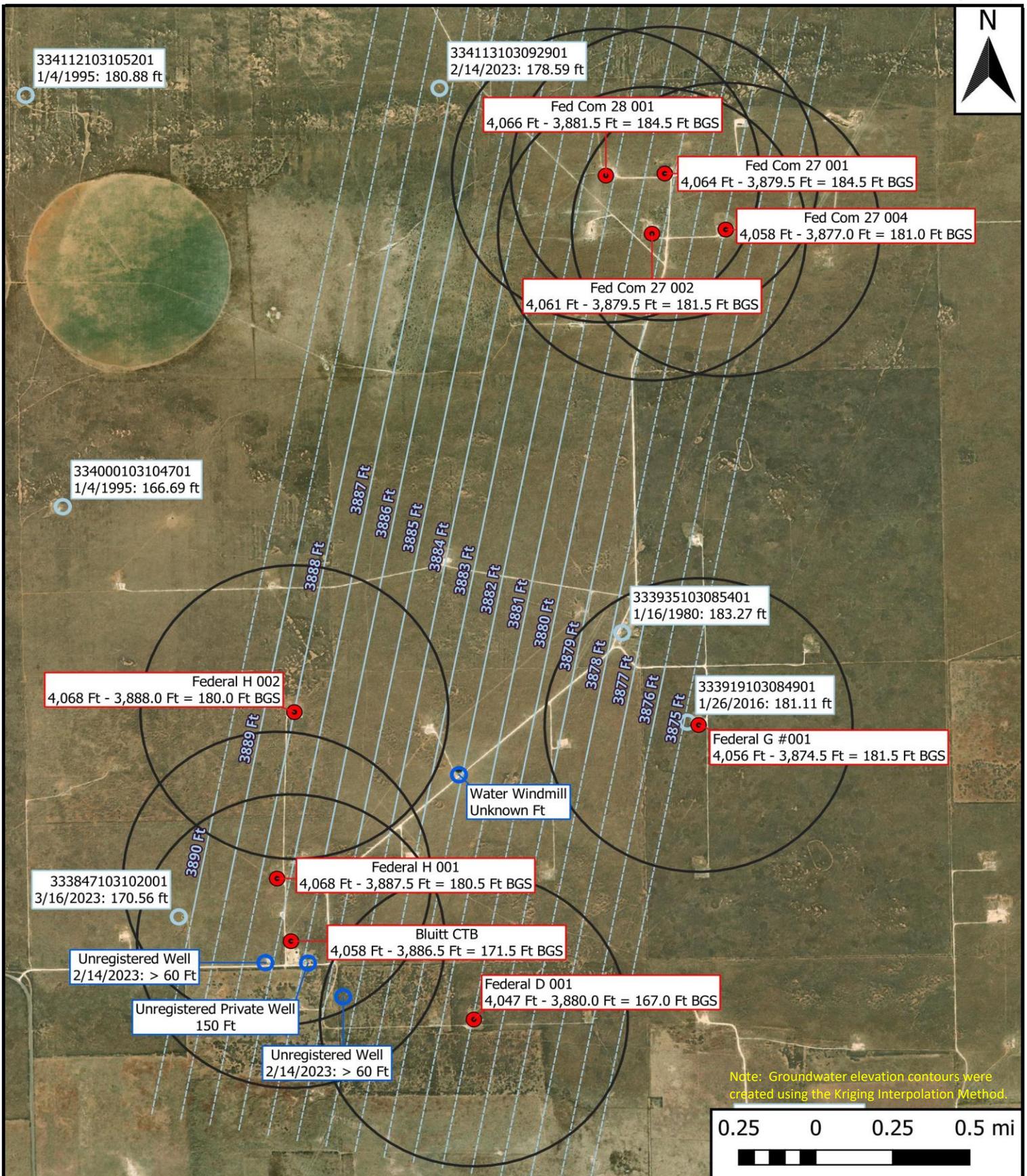
<b>Table 1</b> <b>Concentrations of BTEX, TPH &amp; Chloride in Soil</b> <b>H.L. Brown Operating, LLC</b> <b>Federal G #001</b> <b>NMOCD Ref. #: nAPP2227233275</b>											
NMOCD Closure Criteria				10	50	N/A	N/A	N/A	N/A	100	600
NMOCD Reclamation Standard				10	50	N/A	N/A	N/A	N/A	100	600
Sample ID	Date	Depth (Feet)	Soil Status	SW 846 8021B		SW 846 8015M Ext.					4500 Cl
				Benzene (mg/kg)	BTEX (mg/kg)	GRO C <sub>6</sub> -C <sub>10</sub> (mg/kg)	DRO C <sub>10</sub> -C <sub>28</sub> (mg/kg)	GRO + DRO C <sub>6</sub> -C <sub>28</sub> (mg/kg)	ORO C <sub>28</sub> -C <sub>36</sub> (mg/kg)	TPH C <sub>6</sub> -C <sub>36</sub> (mg/kg)	Chloride (mg/kg)
T.T. 1 @ 4'	11/8/2022	4	Excavated	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	<b>7,200</b>
T.T. 1 @ 6'	11/8/2022	6	Excavated	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	<b>2,800</b>
T.T. 1 @ 8'	11/8/2022	8	Excavated	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	<b>11,300</b>
T.T. 1 @ 10'	11/8/2022	10	Excavated	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	<b>11,900</b>
T.T. 1 @ 12'	11/8/2022	12	Excavated	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	<b>11,800</b>
T.T. 1 @ 20'	11/28/2022	20	In-Situ	-	-	-	-	-	-	-	<b>7,680</b>
T.T. 1 @ 24'	11/28/2022	24	In-Situ	-	-	-	-	-	-	-	<b>9,330</b>
T.T. 1 @ 28'	11/28/2022	28	In-Situ	-	-	-	-	-	-	-	<b>7,200</b>
T.T. 1 @ 32'	11/28/2022	32	In-Situ	-	-	-	-	-	-	-	<b>4,040</b>
T.T. 1 @ 40'	11/30/2022	40	In-Situ	-	-	-	-	-	-	-	48.0
NH 1 @ 18'	12/5/2022	18	In-Situ	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	16.0
EH 1 @ 18'	12/5/2022	18	In-Situ	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	176
SH 1 @ 18'	12/5/2022	18	In-Situ	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	192
WH 1 @ 18'	12/5/2022	18	In-Situ	<0.050	<0.300	<10.0	<10.0	<20.0	<10.0	<30.0	224

Dash (-): Sample not analyzed for that constituent.

**Bold:** NMOCD Closure Criteria exceedance.**Red:** NMOCD Reclamation Standard exceedance.

# **Appendix A**

## **Depth to Groundwater Information**



- Site Location
- Half Mile Radius
- Well - USGS
- Well - Other
- Groundwater Contours (Ft MSL)
- Extended Groundwater Contours

**HL Brown Sites**  
 Inferred Depth to Groundwater Map  
 H.L. Brown Operating, LLC

Map GPS: 33.66350422, -103.15426221  
 Roosevelt County, NM

**ETECH**  
 Environmental & Safety Solutions, Inc.

Drafted: mag  
 Checked: jwl Date: 3/17/23













---

# New Mexico Office of the State Engineer

## Water Column/Average Depth to Water

---

(quarters are 1=NW 2=NE 3=SW 4=SE)  
(quarters are smallest to largest) (NAD83 UTM in meters)

No records found.

**UTMNAD83 Radius Search (in meters):**

**Easting (X):** 671889.86

**Northing (Y):** 3725414.63

**Radius:** 3220

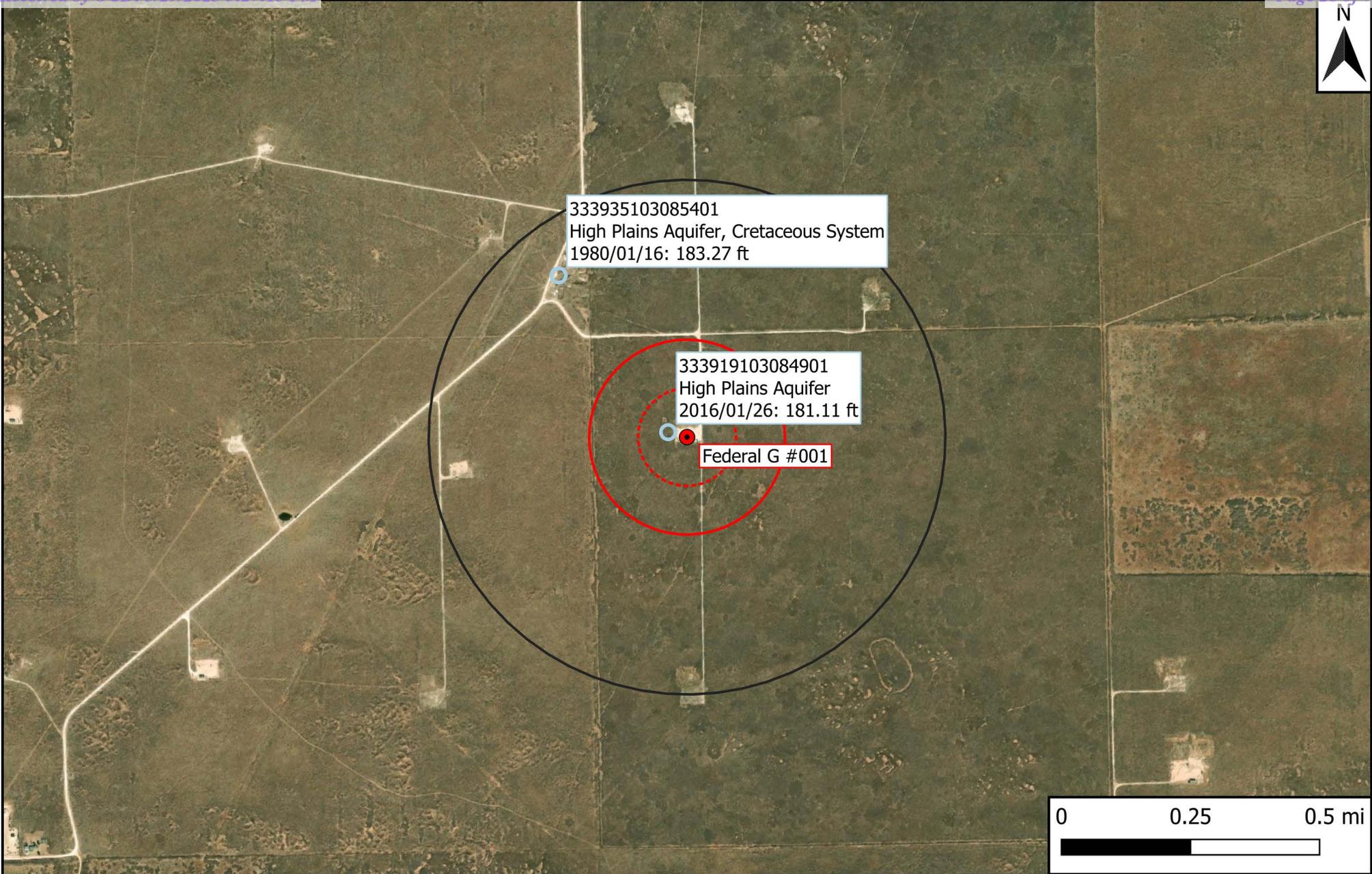
---

The data is furnished by the NMOSE/ISC and is accepted by the recipient with the expressed understanding that the OSE/ISC make no warranties, expressed or implied, concerning the accuracy, completeness, reliability, usability, or suitability for any particular purpose of the data.

---

10/13/22 9:20 AM

WATER COLUMN/ AVERAGE  
DEPTH TO WATER



- Legend
- Site Location
  - Well - USGS
  - ⊞ 500-Ft Radius
  - ⊞ 1,000-Ft Radius
  - ⊞ 0.5-Mi Radius

**Figure 4**  
 USGS Well Proximity Map  
 H.L. Brown Operating, LLC  
 Federal G #001  
 GPS: 33.654657, -103.146285  
 Roosevelt County





USGS Home  
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National Water Information System: Web Interface

[USGS Water Resources](#)

Data Category:

Groundwater

Geographic Area:

United States

GO



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Groundwater levels for the Nation



Important: [Next Generation Monitoring Location Page](#)

Search Results -- 1 sites found

Agency code = usgs

site\_no list =

- 333919103084901

Minimum number of levels = 1

[Save file of selected sites](#) to local disk for future upload

USGS 333919103084901 08S.37E.03.11322

Roosevelt County, New Mexico

Latitude 33°39'17.3", Longitude 103°08'48.9" NAD83

Land-surface elevation 4,055 feet above NAVD88

The depth of the well is 184 feet below land surface.

This well is completed in the High Plains aquifer (N100HGHPLN) national aquifer.

Output formats

<a href="#">Table of data</a>
<a href="#">Tab-separated data</a>
<a href="#">Graph of data</a>
<a href="#">Reselect period</a>

Date	Time	Water-level date-time accuracy	Parameter code	Water level, feet below land surface	Water level, feet above specific vertical datum	Referenced vertical datum	Status	Method of measurement	Measuring agency	Source of measurement	Water-level approval status
1995-02-08		D	72019	177.76			1	S	USGS	S	A
2016-01-26	18:00 UTC	m	72019	181.11			1	S	USGS	S	A

Explanation

Section	Code	Description
Water-level date-time accuracy	D	Date is accurate to the Day
Water-level date-time accuracy	m	Date is accurate to the Minute
Parameter code	62610	Groundwater level above NGVD 1929, feet
Parameter code	62611	Groundwater level above NAVD 1988, feet
Parameter code	72019	Depth to water level, feet below land surface
Referenced vertical datum	NAVD88	North American Vertical Datum of 1988
Referenced vertical datum	NGVD29	National Geodetic Vertical Datum of 1929
Status	1	Static
Method of measurement	S	Steel-tape measurement.
Measuring agency	USGS	U.S. Geological Survey
Source of measurement	S	Measured by personnel of reporting agency.
Water-level approval status	A	Approved for publication -- Processing and review completed.

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**Title: Groundwater for USA: Water Levels**

**URL: <https://nwis.waterdata.usgs.gov/nwis/gwlevels?>**



Page Contact Information: [USGS Water Data Support Team](#)

Page Last Modified: 2023-01-16 21:12:18 EST

0.3 0.25 nadww01



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National Water Information System: Web Interface

[USGS Water Resources](#)

Data Category:

Groundwater

Geographic Area:

United States

GO



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Groundwater levels for the Nation



Important: [Next Generation Monitoring Location Page](#)

Search Results -- 1 sites found

Agency code = usgs

site\_no list =

- 333935103085401

Minimum number of levels = 1

[Save file of selected sites](#) to local disk for future upload

**USGS 333935103085401 07S.37E.33.444213**

Roosevelt County, New Mexico

Latitude 33°39'33", Longitude 103°09'00" NAD27

Land-surface elevation 4,049.00 feet above NGVD29

The depth of the well is 208 feet below land surface.

This well is completed in the High Plains aquifer (N100HGHPLN) national aquifer.

This well is completed in the Cretaceous System (210CRCS) local aquifer.

Output formats

<a href="#">Table of data</a>
<a href="#">Tab-separated data</a>
<a href="#">Graph of data</a>
<a href="#">Reselect period</a>

Date	Time	Water-level date-time accuracy	Parameter code	Water level, feet below land surface	Water level, feet above specific vertical datum	Referenced vertical datum	Status	Method of measurement	Measuring agency	Source of measurement	Water-level approval status
1980-01-16		D	72019	183.27			1	Z			A

Explanation

Section	Code	Description
Water-level date-time accuracy	D	Date is accurate to the Day
Parameter code	62610	Groundwater level above NGVD 1929, feet
Parameter code	62611	Groundwater level above NAVD 1988, feet
Parameter code	72019	Depth to water level, feet below land surface
Referenced vertical datum	NAVD88	North American Vertical Datum of 1988
Referenced vertical datum	NGVD29	National Geodetic Vertical Datum of 1929
Status	1	Static
Method of measurement	Z	Other.
Measuring agency		Not determined
Source of measurement		Not determined
Water-level approval status	A	Approved for publication -- Processing and review completed.

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**Title: Groundwater for USA: Water Levels**

**URL: <https://nwis.waterdata.usgs.gov/nwis/gwlevels?>**

Page Contact Information: [USGS Water Data Support Team](#)

Page Last Modified: 2023-01-16 21:13:29 EST

0.32 0.24 nadww01

## **Appendix B Field Data**



### Sample Log

Project: Federal G 001

Date: 10/26/22

Project Number: 16854

Latitude: 33.654722

Longitude: 600/100 -103.146262

Sample ID	PID/Odor	Chloride Conc.	GPS
FL1@1'	light	7.2 H.S. 9372	
FL1@3'	-	6.0 H.S. 5904	
NWI	-	60 5904	
EWI	-	7.8 58.5.0 11916, 5464, 3992	
SWI	-	4.0, 7.0, 7.8 628, 1916, 2548	
WWI	-	5.0, 4.4, 4.4 3992, 748, 748	
FL1@5'	-	7.8 2548	
FL1@7'	-	7.8 2548	
FL1@9'	-	7.8 2548	
FL1@10'	-	5.8 H.S. 5464	
FL1@12'	-	6.0 H.S. 5904	
FL1@20'		17,744	
FL1@22'		6,468	
FL1@24'		3,676	
FL1@26'		4,324	
FL1@28'		5,080	
FL1@30'		4,324	
FL1@32'		2,624	
TT1@34'		1,808	
TT1@36'		1,604	
TT1@38'		432 1008	
TT1@40'		432	
EH@18'		2.8	

Sample Point = SP #1 @ ## etc

Test Trench = TT #1 @ ##

Resamples = SP #1 @ 5b or SW #1b

Floor = FL #1 etc

Refusal = SP #1 @ 4'-R

Stockpile = Stockpile #1

Sidewall = SW #1 etc

Soil Intended to be Deferred = SP #1 @ 4' In-Situ

GPS Sample Points, Center of Comp Areas

# **Appendix C**

## **Laboratory Analytical Reports**



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

---

November 14, 2022

JOEL LOWRY

Etech Environmental & Safety Solutions

2617 W MARLAND

HOBBS, NM 88240

RE: FEDERAL G 001

Enclosed are the results of analyses for samples received by the laboratory on 11/10/22 8:59.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-22-15. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	11/10/2022	Sampling Date:	11/08/2022
Reported:	11/14/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	Cool & Intact
Project Number:	16854	Sample Received By:	Shalyn Rodriguez
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: T.T. 1 @ 4' (H225314-01)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	6.63	
Toluene*	<0.050	0.050	11/12/2022	ND	2.11	105	2.00	5.27	
Ethylbenzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	4.22	
Total Xylenes*	<0.150	0.150	11/12/2022	ND	6.06	101	6.00	3.01	
Total BTEX	<0.300	0.300	11/12/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 87.9 % 69.9-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	7200	16.0	11/11/2022	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	11/11/2022	ND	193	96.3	200	3.74	
DRO >C10-C28*	<10.0	10.0	11/11/2022	ND	203	102	200	6.14	
EXT DRO >C28-C36	<10.0	10.0	11/11/2022	ND					

Surrogate: 1-Chlorooctane 96.3 % 45.3-161

Surrogate: 1-Chlorooctadecane 111 % 46.3-178

Cardinal Laboratories

\* = Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	11/10/2022	Sampling Date:	11/08/2022
Reported:	11/14/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	Cool & Intact
Project Number:	16854	Sample Received By:	Shalyn Rodriguez
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: T.T. 1 @ 6' (H225314-02)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	6.63	
Toluene*	<0.050	0.050	11/12/2022	ND	2.11	105	2.00	5.27	
Ethylbenzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	4.22	
Total Xylenes*	<0.150	0.150	11/12/2022	ND	6.06	101	6.00	3.01	
Total BTEX	<0.300	0.300	11/12/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 87.8 % 69.9-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2800	16.0	11/11/2022	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	11/11/2022	ND	193	96.3	200	3.74	
DRO >C10-C28*	<10.0	10.0	11/11/2022	ND	203	102	200	6.14	
EXT DRO >C28-C36	<10.0	10.0	11/11/2022	ND					

Surrogate: 1-Chlorooctane 98.0 % 45.3-161

Surrogate: 1-Chlorooctadecane 107 % 46.3-178

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	11/10/2022	Sampling Date:	11/08/2022
Reported:	11/14/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	Cool & Intact
Project Number:	16854	Sample Received By:	Shalyn Rodriguez
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: T.T. 1 @ 8' (H225314-03)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	6.63	
Toluene*	<0.050	0.050	11/12/2022	ND	2.11	105	2.00	5.27	
Ethylbenzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	4.22	
Total Xylenes*	<0.150	0.150	11/12/2022	ND	6.06	101	6.00	3.01	
Total BTEX	<0.300	0.300	11/12/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 85.3 % 69.9-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	11300	16.0	11/11/2022	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	11/11/2022	ND	193	96.3	200	3.74	
DRO >C10-C28*	<10.0	10.0	11/11/2022	ND	203	102	200	6.14	
EXT DRO >C28-C36	<10.0	10.0	11/11/2022	ND					

Surrogate: 1-Chlorooctane 90.8 % 45.3-161

Surrogate: 1-Chlorooctadecane 100 % 46.3-178

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	11/10/2022	Sampling Date:	11/08/2022
Reported:	11/14/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	Cool & Intact
Project Number:	16854	Sample Received By:	Shalyn Rodriguez
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: T.T. 1 @ 10' (H225314-04)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	6.63	
Toluene*	<0.050	0.050	11/12/2022	ND	2.11	105	2.00	5.27	
Ethylbenzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	4.22	
Total Xylenes*	<0.150	0.150	11/12/2022	ND	6.06	101	6.00	3.01	
Total BTEX	<0.300	0.300	11/12/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 87.3 % 69.9-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	11900	16.0	11/11/2022	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	11/11/2022	ND	193	96.3	200	3.74	
DRO >C10-C28*	<10.0	10.0	11/11/2022	ND	203	102	200	6.14	
EXT DRO >C28-C36	<10.0	10.0	11/11/2022	ND					

Surrogate: 1-Chlorooctane 85.1 % 45.3-161

Surrogate: 1-Chlorooctadecane 91.9 % 46.3-178

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Celey D. Keene, Lab Director/Quality Manager



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**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	11/10/2022	Sampling Date:	11/08/2022
Reported:	11/14/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	Cool & Intact
Project Number:	16854	Sample Received By:	Shalyn Rodriguez
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: T.T. 1 @ 12' (H225314-05)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	6.63	
Toluene*	<0.050	0.050	11/12/2022	ND	2.11	105	2.00	5.27	
Ethylbenzene*	<0.050	0.050	11/12/2022	ND	2.01	101	2.00	4.22	
Total Xylenes*	<0.150	0.150	11/12/2022	ND	6.06	101	6.00	3.01	
Total BTEX	<0.300	0.300	11/12/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 82.9 % 69.9-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>11800</b>	16.0	11/11/2022	ND	416	104	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	11/11/2022	ND	193	96.3	200	3.74	
DRO >C10-C28*	<10.0	10.0	11/11/2022	ND	203	102	200	6.14	
EXT DRO >C28-C36	<10.0	10.0	11/11/2022	ND					

Surrogate: 1-Chlorooctane 82.8 % 45.3-161

Surrogate: 1-Chlorooctadecane 88.0 % 46.3-178

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



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Notes and Definitions

- S-04 The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on acceptable LCS recovery.
ND Analyte NOT DETECTED at or above the reporting limit
RPD Relative Percent Difference
\*\* Samples not received at proper temperature of 6°C or below.
\*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C
Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

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Celey D. Keene

Celey D. Keene, Lab Director/Quality Manager





PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

---

November 30, 2022

JOEL LOWRY

Etech Environmental & Safety Solutions

2617 W MARLAND

HOBBS, NM 88240

RE: FEDERAL G 001

Enclosed are the results of analyses for samples received by the laboratory on 11/28/22 15:55.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-22-15. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	11/28/2022	Sampling Date:	11/28/2022
Reported:	11/30/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	** (See Notes)
Project Number:	16854	Sample Received By:	Shalyn Rodriguez
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: T.T. 1 @ 20' (H225573-01)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	7680	16.0	11/29/2022	ND	448	112	400	0.00	

**Sample ID: T.T. 1 @ 24' (H225573-02)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	9330	16.0	11/29/2022	ND	448	112	400	0.00	

**Sample ID: T.T. 1 @ 28' (H225573-03)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	7200	16.0	11/29/2022	ND	448	112	400	0.00	

**Sample ID: T.T. 1 @ 32' (H225573-04)**

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	4040	16.0	11/29/2022	ND	448	112	400	0.00	

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Celey D. Keene, Lab Director/Quality Manager



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Notes and Definitions

- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

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*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager





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---

December 05, 2022

JOEL LOWRY

Etech Environmental & Safety Solutions

2617 W MARLAND

HOBBS, NM 88240

RE: FEDERAL G 001

Enclosed are the results of analyses for samples received by the laboratory on 11/30/22 15:25.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-22-15. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene". The signature is written in a cursive style.

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	11/30/2022	Sampling Date:	11/30/2022
Reported:	12/05/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	Cool & Intact
Project Number:	16854	Sample Received By:	Tamara Oldaker
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: T.T. 1 @ 40' (H225611-01)**

Chloride, SM4500Cl-B	mg/kg	Analyzed By: AC							
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>48.0</b>	16.0	12/02/2022	ND	432	108	400	0.00	

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Celey D. Keene, Lab Director/Quality Manager



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Notes and Definitions

- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

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*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager





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---

December 12, 2022

JOEL LOWRY

Etech Environmental & Safety Solutions

2617 W MARLAND

HOBBS, NM 88240

RE: FEDERAL G 001

Enclosed are the results of analyses for samples received by the laboratory on 12/05/22 12:50.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-22-15. Accreditation applies to drinking water, non-potable water and solid and chemical materials. All accredited analytes are denoted by an asterisk (\*). For a complete list of accredited analytes and matrices visit the TCEQ website at [www.tceq.texas.gov/field/qa/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/qa/lab_accred_certif.html).

Cardinal Laboratories is accredited through the State of Colorado Department of Public Health and Environment for:

Method EPA 552.2	Haloacetic Acids (HAA-5)
Method EPA 524.2	Total Trihalomethanes (TTHM)
Method EPA 524.4	Regulated VOCs (V1, V2, V3)

Accreditation applies to public drinking water matrices.

This report meets NELAP requirements and is made up of a cover page, analytical results, and a copy of the original chain-of-custody. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

A handwritten signature in black ink that reads "Celey D. Keene".

Celey D. Keene

Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	12/05/2022	Sampling Date:	12/05/2022
Reported:	12/12/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	** (See Notes)
Project Number:	16854	Sample Received By:	Tamara Oldaker
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: NH 1 @ 18' (H225689-01)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/08/2022	ND	2.09	105	2.00	2.61	
Toluene*	<0.050	0.050	12/08/2022	ND	2.19	110	2.00	2.86	
Ethylbenzene*	<0.050	0.050	12/08/2022	ND	2.13	107	2.00	2.10	
Total Xylenes*	<0.150	0.150	12/08/2022	ND	6.50	108	6.00	2.48	
Total BTEX	<0.300	0.300	12/08/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.9 % 69.9-140

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	16.0	16.0	12/08/2022	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	12/06/2022	ND	178	89.1	200	10.3	
DRO >C10-C28*	<10.0	10.0	12/06/2022	ND	193	96.4	200	9.36	
EXT DRO >C28-C36	<10.0	10.0	12/06/2022	ND					

Surrogate: 1-Chlorooctane 64.1 % 45.3-161

Surrogate: 1-Chlorooctadecane 69.8 % 46.3-178

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	12/05/2022	Sampling Date:	12/05/2022
Reported:	12/12/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	** (See Notes)
Project Number:	16854	Sample Received By:	Tamara Oldaker
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: EH 1 @ 18' (H225689-02)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/08/2022	ND	2.09	105	2.00	2.61	
Toluene*	<0.050	0.050	12/08/2022	ND	2.19	110	2.00	2.86	
Ethylbenzene*	<0.050	0.050	12/08/2022	ND	2.13	107	2.00	2.10	
Total Xylenes*	<0.150	0.150	12/08/2022	ND	6.50	108	6.00	2.48	
Total BTEX	<0.300	0.300	12/08/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.9 % 69.9-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	176	16.0	12/08/2022	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	12/06/2022	ND	178	89.1	200	10.3	
DRO >C10-C28*	<10.0	10.0	12/06/2022	ND	193	96.4	200	9.36	
EXT DRO >C28-C36	<10.0	10.0	12/06/2022	ND					

Surrogate: 1-Chlorooctane 72.0 % 45.3-161

Surrogate: 1-Chlorooctadecane 77.3 % 46.3-178

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	12/05/2022	Sampling Date:	12/05/2022
Reported:	12/12/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	** (See Notes)
Project Number:	16854	Sample Received By:	Tamara Oldaker
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: SH 1 @ 18' (H225689-03)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/08/2022	ND	2.09	105	2.00	2.61	
Toluene*	<0.050	0.050	12/08/2022	ND	2.19	110	2.00	2.86	
Ethylbenzene*	<0.050	0.050	12/08/2022	ND	2.13	107	2.00	2.10	
Total Xylenes*	<0.150	0.150	12/08/2022	ND	6.50	108	6.00	2.48	
Total BTEX	<0.300	0.300	12/08/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 101 % 69.9-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	192	16.0	12/08/2022	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	12/07/2022	ND	194	96.9	200	4.87	
DRO >C10-C28*	<10.0	10.0	12/07/2022	ND	168	84.1	200	10.6	
EXT DRO >C28-C36	<10.0	10.0	12/07/2022	ND					

Surrogate: 1-Chlorooctane 95.7 % 45.3-161

Surrogate: 1-Chlorooctadecane 90.2 % 46.3-178

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

**Analytical Results For:**

Etech Environmental & Safety Solutions  
 JOEL LOWRY  
 2617 W MARLAND  
 HOBBS NM, 88240  
 Fax To:

Received:	12/05/2022	Sampling Date:	12/05/2022
Reported:	12/12/2022	Sampling Type:	Soil
Project Name:	FEDERAL G 001	Sampling Condition:	** (See Notes)
Project Number:	16854	Sample Received By:	Tamara Oldaker
Project Location:	HL BROWN-RURAL ROOSEVELT CO., NM		

**Sample ID: WH 1 @ 18' (H225689-04)**

BTEX 8021B		mg/kg		Analyzed By: JH					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	12/08/2022	ND	2.09	105	2.00	2.61	
Toluene*	<0.050	0.050	12/08/2022	ND	2.19	110	2.00	2.86	
Ethylbenzene*	<0.050	0.050	12/08/2022	ND	2.13	107	2.00	2.10	
Total Xylenes*	<0.150	0.150	12/08/2022	ND	6.50	108	6.00	2.48	
Total BTEX	<0.300	0.300	12/08/2022	ND					

Surrogate: 4-Bromofluorobenzene (PID) 100 % 69.9-140

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	224	16.0	12/08/2022	ND	416	104	400	3.77	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
GRO C6-C10*	<10.0	10.0	12/07/2022	ND	194	96.9	200	4.87	
DRO >C10-C28*	<10.0	10.0	12/07/2022	ND	168	84.1	200	10.6	
EXT DRO >C28-C36	<10.0	10.0	12/07/2022	ND					

Surrogate: 1-Chlorooctane 91.5 % 45.3-161

Surrogate: 1-Chlorooctadecane 85.0 % 46.3-178

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager



PHONE (575) 393-2326 ° 101 E. MARLAND ° HOBBS, NM 88240

Notes and Definitions

- ND Analyte NOT DETECTED at or above the reporting limit
- RPD Relative Percent Difference
- \*\* Samples not received at proper temperature of 6°C or below.
- \*\*\* Insufficient time to reach temperature.
- Chloride by SM4500Cl-B does not require samples be received at or below 6°C  
Samples reported on an as received basis (wet) unless otherwise noted on report

Cardinal Laboratories

\*=Accredited Analyte

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*Celey D. Keene*

Celey D. Keene, Lab Director/Quality Manager



# **Appendix D**

## **Photographic Log**

### Photographic Log

<b>Photo Number:</b> 1	 <p>9/7/2022 33.654829,-103.146299</p>
<b>Photo Direction:</b> North-Northeast	
<b>Photo Description:</b>  View of the affected area.	

<b>Photo Number:</b> 2	 <p>9/7/2022 33.654869,-103.146307</p>
<b>Photo Direction:</b> Northeast	
<b>Photo Description:</b>  View of the affected area.	

### Photographic Log

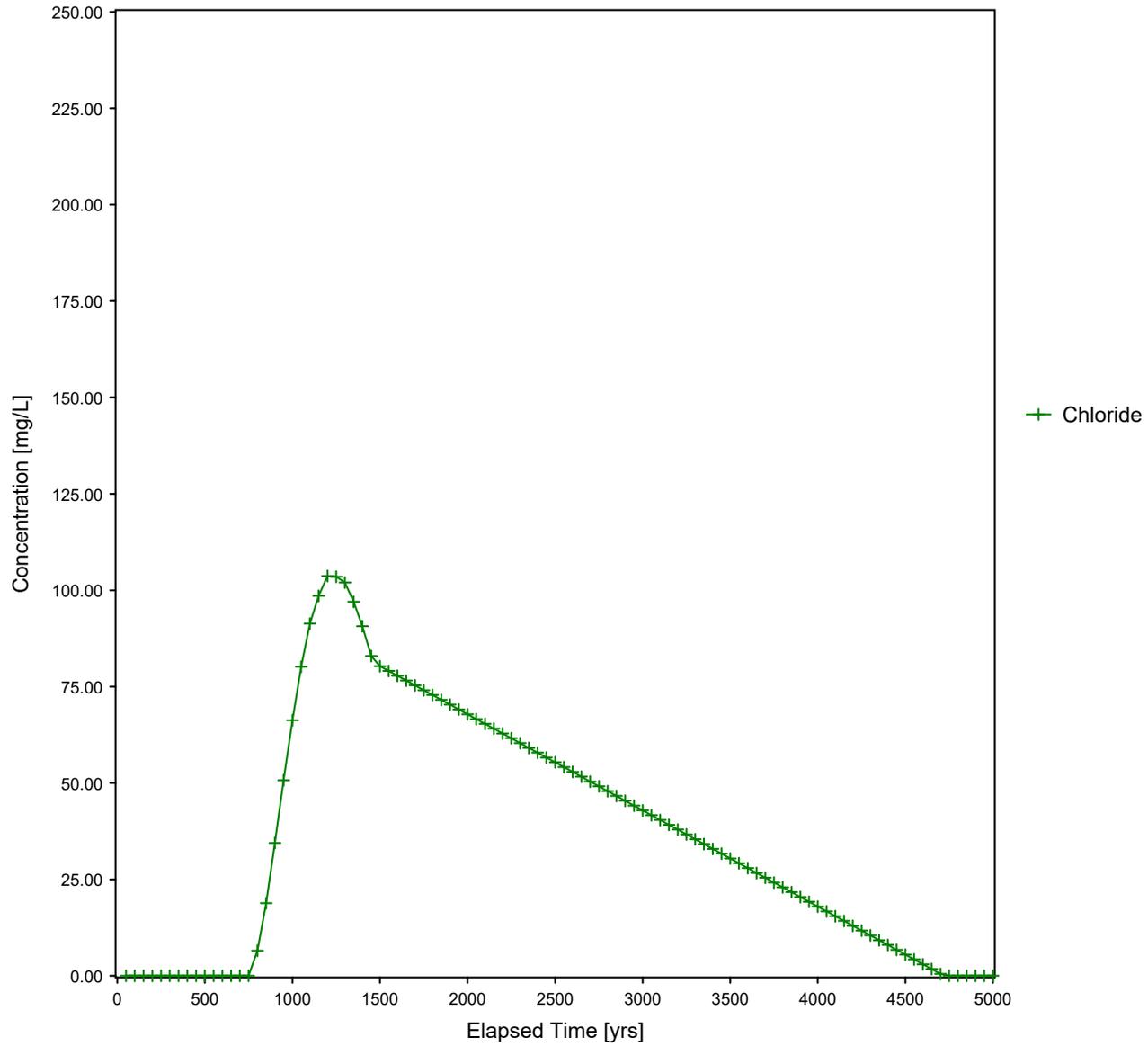
<b>Photo Number:</b> 3	
<b>Photo Direction:</b> Southwest	
<b>Photo Description:</b>  View of the excavated area & test pit/trench.	

<b>Photo Number:</b> 4	
<b>Photo Direction:</b> South	
<b>Photo Description:</b>  View of the advancement of test trench T.T. 1.	

# **Appendix E**

## **Multimedia Exposure Assessment Model (MULTIMED)**

### Chloride Concentration At The Receptor Well (with Liner) H.L. Brown Operating, LLC Federal G #001



U. S. ENVIRONMENTAL PROTECTION AGENCY  
EXPOSURE ASSESSMENT  
MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

Switched to Stehfest algorithm to avoid numerical problems  
with Convolution algorithm. Problems were caused by  
high source decay rate. Everything ok now, execution continuing...

1  
Run options  
-----

H.L. Brown Operating, LLC

Federal G #001  
Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models  
Run was DETERMIN  
Infiltration Specified By User: 7.620E-03 m/yr  
Run was transient  
Well Times: Find Maximum Concentration  
Reject runs if Y coordinate outside plume  
Reject runs if Z coordinate outside plume  
Gaussian source used in saturated zone model

1  
1  
UNSATURATED ZONE FLOW MODEL PARAMETERS  
(input parameter description and value)

NP	- Total number of nodal points	240
NMAT	- Number of different porous materials	1
KPROP	- Van Genuchten or Brooks and Corey	1
IMSHGN	- Spatial discretization option	1
NVFLAYR	- Number of layers in flow model	1

1  
OPTIONS CHOSEN  
-----  
Van Genuchten functional coefficients  
User defined coordinate system

1  
Layer information  
-----  
LAYER NO. LAYER THICKNESS MATERIAL PROPERTY  
-----  
. 1 42.98 1

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DATA FOR MATERIAL 1  
-----  
VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	-999.	-999.
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	-999.	-999.
Air entry pressure head	m	CONSTANT	0.700	-999.	-999.	-999.
Depth of the unsaturated zone	m	CONSTANT	43.0	0.000	0.000	0.000

DATA FOR MATERIAL 1  
-----  
VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Residual water content	--	CONSTANT	0.116	-999.	-999.	-999.
Brook and Corey exponent, EN	--	CONSTANT	-999.	-999.	-999.	-999.
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	-999.	-999.
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	-999.	-999.

1

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY	- Number of different layers used		1
NTSTPS	- Number of time values concentration calc		40
DUMMY	- Not presently used		1
ISOL	- Type of scheme used in unsaturated zone		1
N	- Stehfest terms or number of increments		18
NTEL	- Points in Lagrangian interpolation		3
NGPTS	- Number of Gauss points		104
NIT	- Convolution integral segments		2
IBOUND	- Type of boundary condition		3
ITSGEN	- Time values generated or input		1
TMAX	- Max simulation time	--	0.0
WTFUN	- Weighting factor	--	1.2

OPTIONS CHOSEN

-----  
 Stehfest numerical inversion algorithm  
 Exponentially decaying continuous source  
 Computer generated times for computing concentrations

1

VADOSE TRANSPORT VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	43.0	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.99	-999.	-999.	-999.
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Reference temperature	C	CONSTANT	25.0	-999.	-999.	-999.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	-999.	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Air diffusion coefficient	cm2/s	CONSTANT	-999.	-999.	-999.	-999.
Reference temperature for air diffusion	C	CONSTANT	-999.	-999.	-999.	-999.
Molecular weight	g/M	CONSTANT	-999.	-999.	-999.	-999.
Mole fraction of solute	--	CONSTANT	-999.	-999.	-999.	-999.
Vapor pressure of solute	mm Hg	CONSTANT	-999.	-999.	-999.	-999.
Henry's law constant	atm-m <sup>3</sup> /M	CONSTANT	-999.	-999.	-999.	-999.
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Not currently used		CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.762E-02	-999.	-999.	-999.
Area of waste disposal unit	m <sup>2</sup>	CONSTANT	90.0	-999.	-999.	-999.
Duration of pulse	yr	DERIVED	0.100E-08	-999.	-999.	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	-999.	-999.
Recharge rate	m/yr	CONSTANT	0.000	-999.	-999.	-999.
Source decay constant	1/yr	CONSTANT	0.250E-01	0.000	0.000	0.000
Initial concentration at landfill	mg/l	CONSTANT	0.119E+05	-999.	-999.	-999.

Length scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Width scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

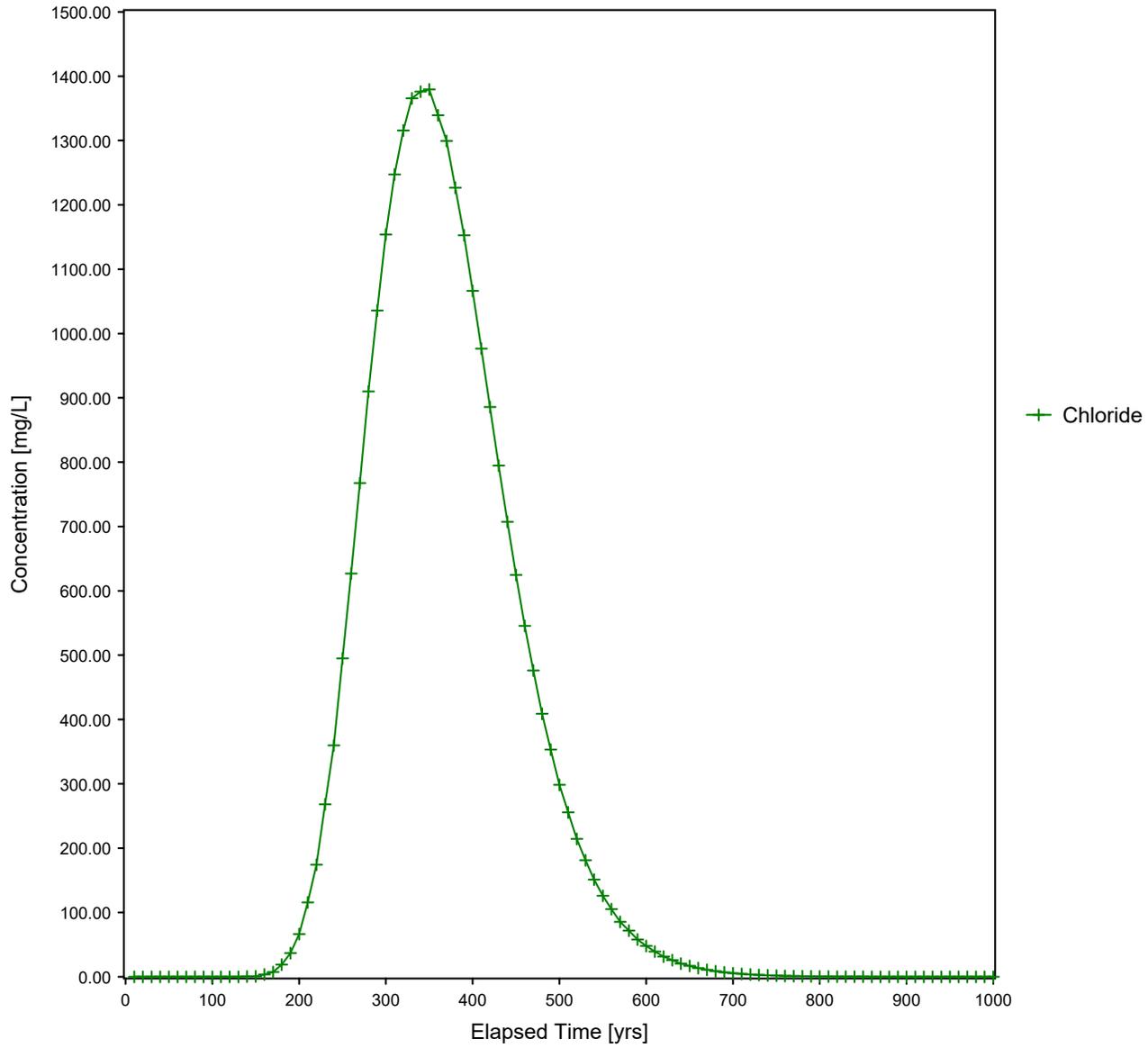
AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Particle diameter	cm	CONSTANT	-999.	-999.	-999.	-999.
Aquifer porosity	--	CONSTANT	0.300	-999.	-999.	-999.
Bulk density	g/cc	CONSTANT	1.86	-999.	-999.	-999.
Aquifer thickness	m	CONSTANT	6.10	-999.	-999.	-999.
Source thickness (mixing zone depth)	m	DERIVED	-999.	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	315.	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.300E-02	-999.	-999.	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.
Angle off center	degree	CONSTANT	0.000	-999.	-999.	-999.
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.

MAXIMUM WELL CONCENTRATION IS 104.0 AT 1200 YEARS

### Chloride Concentration At The Receptor Well (No Liner)

H.L. Brown Operating, LLC  
Federal G #001



U. S. ENVIRONMENTAL PROTECTION AGENCY

EXPOSURE ASSESSMENT

MULTIMEDIA MODEL

MULTIMED (Version 1.50, 2005)

1  
Run options  
-----

1  
H.L. Brown Operating, LLC

1  
Federal G #001  
Chemical simulated is Chloride

Option Chosen Saturated and unsaturated zone models  
Run was DETERMIN  
Infiltration Specified By User: 3.048E-02 m/yr  
Run was transient  
Well Times: Find Maximum Concentration  
Reject runs if Y coordinate outside plume  
Reject runs if Z coordinate outside plume  
Gaussian source used in saturated zone model

1  
1  
UNSATURATED ZONE FLOW MODEL PARAMETERS  
(input parameter description and value)  
NP - Total number of nodal points 240  
NMAT - Number of different porous materials 1  
KPROP - Van Genuchten or Brooks and Corey 1  
IMSHGN - Spatial discretization option 1  
NVFLAYR - Number of layers in flow model 1

1  
OPTIONS CHOSEN  
-----  
Van Genuchten functional coefficients  
User defined coordinate system

1

Layer information  
-----

LAYER NO.	LAYER THICKNESS	MATERIAL PROPERTY
1	42.98	1

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VADOSE ZONE MATERIAL VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Saturated hydraulic conductivity	cm/hr	CONSTANT	3.60	-999.	-999.	-999.
Unsaturated zone porosity	--	CONSTANT	0.250	-999.	-999.	-999.
Air entry pressure head	m	CONSTANT	0.700	-999.	-999.	-999.
Depth of the unsaturated zone	m	CONSTANT	43.0	0.000	0.000	0.000

DATA FOR MATERIAL 1

VADOSE ZONE FUNCTION VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Residual water content	--	CONSTANT	0.116	-999.	-999.	-999.
Brook and Corey exponent, EN	--	CONSTANT	-999.	-999.	-999.	-999.
ALFA coefficient	1/cm	CONSTANT	0.500E-02	-999.	-999.	-999.
Van Genuchten exponent, ENN	--	CONSTANT	1.09	-999.	-999.	-999.

UNSATURATED ZONE TRANSPORT MODEL PARAMETERS

NLAY - Number of different layers used 1  
 NTSTPS - Number of time values concentration calc 40  
 DUMMY - Not presently used 1  
 ISOL - Type of scheme used in unsaturated zone 2  
 N - Stehfest terms or number of increments 18  
 NTEL - Points in Lagrangian interpolation 3  
 NGPTS - Number of Gauss points 104  
 NIT - Convolution integral segments 2  
 IBOUND - Type of boundary condition 3  
 ITSGEN - Time values generated or input 1  
 TMAX - Max simulation time -- 0.0  
 WTFUN - Weighting factor -- 1.2

OPTIONS CHOSEN

-----  
 Convolution integral approach  
 Exponentially decaying continuous source  
 Computer generated times for computing concentrations

DATA FOR LAYER 1

VADOSE TRANSPORT VARIABLES

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VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Thickness of layer	m	CONSTANT	43.0	-999.	-999.	-999.
Longitudinal dispersivity of layer	m	DERIVED	-999.	-999.	-999.	-999.
Percent organic matter	--	CONSTANT	0.000	-999.	-999.	-999.
Bulk density of soil for layer	g/cc	CONSTANT	1.99	-999.	-999.	-999.
Biological decay coefficient	1/yr	CONSTANT	0.000	-999.	-999.	-999.

CHEMICAL SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Solid phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Dissolved phase decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Overall chemical decay coefficient	1/yr	DERIVED	-999.	-999.	-999.	-999.
Acid catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Neutral hydrolysis rate constant	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Base catalyzed hydrolysis rate	1/M-yr	CONSTANT	0.000	-999.	-999.	-999.
Reference temperature	C	CONSTANT	25.0	-999.	-999.	-999.
Normalized distribution coefficient	ml/g	CONSTANT	0.000	-999.	-999.	-999.
Distribution coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Biodegradation coefficient (sat. zone)	1/yr	CONSTANT	0.000	-999.	-999.	-999.
Air diffusion coefficient	cm2/s	CONSTANT	-999.	-999.	-999.	-999.
Reference temperature for air diffusion	C	CONSTANT	-999.	-999.	-999.	-999.
Molecular weight	g/M	CONSTANT	-999.	-999.	-999.	-999.
Mole fraction of solute	--	CONSTANT	-999.	-999.	-999.	-999.
Vapor pressure of solute	mm Hg	CONSTANT	-999.	-999.	-999.	-999.
Henry`s law constant	atm-m^3/M	CONSTANT	-999.	-999.	-999.	-999.
Overall 1st order decay sat. zone	1/yr	DERIVED	0.000	0.000	0.000	1.00
Not currently used		CONSTANT	0.000	0.000	0.000	0.000
Not currently used		CONSTANT	0.000	0.000	0.000	0.000

SOURCE SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Infiltration rate	m/yr	CONSTANT	0.305E-01	-999.	-999.	-999.
Area of waste disposal unit	m^2	CONSTANT	90.0	-999.	-999.	-999.
Duration of pulse	yr	DERIVED	0.100E-08	-999.	-999.	-999.
Spread of contaminant source	m	DERIVED	-999.	-999.	-999.	-999.
Recharge rate	m/yr	CONSTANT	0.000	-999.	-999.	-999.
Source decay constant	1/yr	CONSTANT	0.250E-01	0.000	0.000	0.000
Initial concentration at landfill	mg/l	CONSTANT	0.119E+05	-999.	-999.	-999.
Length scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Width scale of facility	m	DERIVED	-999.	-999.	-999.	-999.
Near field dilution		DERIVED	1.00	0.000	0.000	1.00

AQUIFER SPECIFIC VARIABLES

VARIABLE NAME	UNITS	DISTRIBUTION	PARAMETERS		LIMITS	
			MEAN	STD DEV	MIN	MAX
Particle diameter	cm	CONSTANT	-999.	-999.	-999.	-999.
Aquifer porosity	--	CONSTANT	0.300	-999.	-999.	-999.
Bulk density	g/cc	CONSTANT	1.86	-999.	-999.	-999.
Aquifer thickness	m	CONSTANT	6.10	-999.	-999.	-999.
Source thickness (mixing zone depth)	m	DERIVED	-999.	-999.	-999.	-999.
Conductivity (hydraulic)	m/yr	CONSTANT	315.	-999.	-999.	-999.
Gradient (hydraulic)		CONSTANT	0.300E-02	-999.	-999.	-999.
Groundwater seepage velocity	m/yr	DERIVED	-999.	-999.	-999.	-999.
Retardation coefficient	--	DERIVED	-999.	-999.	-999.	-999.
Longitudinal dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Transverse dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Vertical dispersivity	m	FUNCTION OF X	-999.	-999.	-999.	-999.
Temperature of aquifer	C	CONSTANT	20.0	-999.	-999.	-999.
pH	--	CONSTANT	7.00	-999.	-999.	-999.
Organic carbon content (fraction)		CONSTANT	0.000	-999.	-999.	-999.
Well distance from site	m	CONSTANT	1.00	-999.	-999.	-999.
Angle off center	degree	CONSTANT	0.000	-999.	-999.	-999.
Well vertical distance	m	CONSTANT	0.000	-999.	-999.	-999.

MAXIMUM WELL CONCENTRATION IS 1385. AT 349 YEARS

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**District II**  
 811 S. First St., Artesia, NM 88210  
 Phone:(575) 748-1283 Fax:(575) 748-9720  
**District III**  
 1000 Rio Brazos Rd., Aztec, NM 87410  
 Phone:(505) 334-6178 Fax:(505) 334-6170  
**District IV**  
 1220 S. St Francis Dr., Santa Fe, NM 87505  
 Phone:(505) 476-3470 Fax:(505) 476-3462

**State of New Mexico**  
**Energy, Minerals and Natural Resources**  
**Oil Conservation Division**  
**1220 S. St Francis Dr.**  
**Santa Fe, NM 87505**

CONDITIONS

Action 202027

**CONDITIONS**

Operator: H L BROWN OPERATING, LLC P.O. Box 2237 Midland, TX 79702	OGRID: 213179
	Action Number: 202027
	Action Type: [C-141] Release Corrective Action (C-141)

**CONDITIONS**

Created By	Condition	Condition Date
jnobui	Remediation Plan Approved with Conditions. Variance approved to install a liner at 6'.	5/4/2023