

## SITE INFORMATION

**Report Type: Deferment Report      2RP-5161**

### General Site Information:

<b>Site:</b>	Blue Thunder Federal Com #001				
<b>Company:</b>	COG Operating LLC				
<b>Section, Township and Range</b>	Unit H	Sec. 05	T 19S	R 31E	
<b>Lease Number:</b>	API No. 30-015-34991				
<b>County:</b>	Eddy County				
<b>GPS:</b>	32.69087			-103.88563	
<b>Surface Owner:</b>	Federal				
<b>Directions:</b>	From the intersection of 249 and 222 head north on 222 for 230 feet, turn southwest onto unnamed lease road and follow road 0.63 miles, turn south and go 365 feet, turn southwest and go 260 feet miles and arrive at location				

### Release Data:

<b>Date Released:</b>	12/21/2018
<b>Type Release:</b>	Crude Oil
<b>Source of Contamination:</b>	Hole in Oil Tank
<b>Fluid Released:</b>	20 bbl water
<b>Fluids Recovered:</b>	0 bbls water

### Official Communication:

<b>Name:</b>	Ike Tavaréz	Clair Gonzales
<b>Company:</b>	COG Operating, LLC	Tetra Tech
<b>Address:</b>	One Concho Center 600 W. Illinois Ave.	901 West Wall Street Suite 100
<b>City:</b>	Midland Texas, 79701	Midland, Texas
<b>Phone number:</b>	(432) 686-3023	(432) 687-8110
<b>Fax:</b>	(432) 684-7137	
<b>Email:</b>	<a href="mailto:itavarez@concho.com">itavarez@concho.com</a>	<a href="mailto:Clair.Gonzales@tetrattech.com">Clair.Gonzales@tetrattech.com</a>

### Site Characterization

<b>Depth to Groundwater:</b>	261' below surface
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### Recommended Remedial Action Levels (RRALs)

Benzene	Total BTEX	TPH (GRO+DRO)	TPH (GRO+DRO+MRO)	Chlorides
10 mg/kg	50 mg/kg	1,000 mg/kg	2,500 mg/kg	20,000 mg/kg



May 23, 2019

Mr. Mike Bratcher  
District Supervisor  
Oil Conservation Division, District 2  
811 S. First Street  
Artesia, New Mexico 88210

**Re: Deferment Report for the COG Operating, Blue Thunder 5 Federal Com #1, Unit H, Section 5, Township 19 South, Range 31 East, Eddy County, New Mexico. 2RP-5161**

Mr. Bratcher:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating, LLC (COG) to assess a release that occurred at the Blue Thunder 5 Federal Com #1, Unit H, Section 5, Township 19 South, Range 31 East, Eddy County, New Mexico (Site). The spill site coordinates are 32.69087°, -103.88563°. The site location is shown on Figures 1 and 2.

## **Background**

According to the State of New Mexico C-141 Initial Report the release was discovered on December 21, 2018. Approximately 20 barrels of crude oil was released due to a hole that formed in an oil stock tank, which has since been removed. A vacuum truck was dispatched, but no free-standing fluids were recovered. The release was contained within the earthen berm of the tank battery and measured approximately 20' X 20'. The initial C-141 Forms are included in Appendix A.

## **Site Characterization**

A site characterization was performed for the site and no watercourses, lakebeds, sinkholes, playa lakes, residences, schools, hospitals, institutions, churches, springs, private domestic water wells, springs, wetlands, incorporated municipal boundaries, subsurface mines, or floodplains are located within the specified distances and the site is in a low karst potential area. The nearest well is listed in the USGS National Water Information Database website in Section 35, Township 18 South, Range 31 East, approximately 2.36 miles northeast-east of the site, and has a reported depth to groundwater of 261 feet below ground surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in this area is 175' to 200' below surface. The groundwater data is shown in Appendix B.

## **Regulatory**

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and

Tetra Tech

4000 North Big Spring, Suite 401, Midland, TX 79705

Tel 432.682.4559 Fax 432.682.3946 [www.tetrattech.com](http://www.tetrattech.com)

Releases, updated August 14, 2018. The guidelines require a risk-based evaluation of the site to determine recommended remedial action levels (RRAL) for benzene, toluene, ethylbenzene and xylene (collectively referred to as BTEX) and total petroleum hydrocarbons (TPH) in soil. The proposed RRAL for benzene was determined to be 10 parts per million (ppm) or milligrams per kilogram (mg/kg) and 50 ppm for total BTEX (sum of benzene, toluene, ethylbenzene, and xylene). Based upon the site characterization, the proposed RRAL for TPH is 2,500 mg/kg (GRO + DRO + MRO) and 1,000 mg/kg (GRO + DRO). Additionally, based on the site characterization, the proposed RRAL for chlorides is 20,000 mg/kg.

### **Remediation Activities**

Tetra Tech personnel were onsite between March 3<sup>rd</sup> and 24<sup>th</sup>, 2019 to supervise the remediation activities. The release area was excavated to 1.5' below surface. Two (2) bottom hole composite samples (Bottom Hole 1 and Bottom Hole 2) and eight (8) sidewall composite samples (North Sidewall 1, North Sidewall 2, South Sidewall 1, South Sidewall 2, East Sidewall 1, East Sidewall 2, West Sidewall 1, and West Sidewall 2) were collected every 200 square feet to ensure proper removal of the impacted soils. The samples were submitted to the laboratory to be analyzed for TPH method 8015 extended, BTEX method 8021B, and Chloride by EPA Method 300.0. The sampling results are summarized in Table 1. The excavation depths and sample locations are shown in Figure 4.

Referring to Table 1, confirmation samples (Bottom Hole 2, North Sidewall 2, East Sidewall 1, East Sidewall 2, South Sidewall 2, and West Sidewall 2) showed benzene, total BTEX and TPH concentrations below the RRAL's. Additionally, all samples collected showed chloride concentrations below the RRAL's. However, confirmation samples (Bottom Hole 1, North Sidewall 1, South Sidewall 1, and West Sidewall 1) showed benzene, total BTEX, and TPH above the RRAL's.

Based on the laboratory results, one backhoe trench (T-1) was installed in the area of confirmation sample (Bottom Hole 1) to establish vertical delineation at the site. A TPH high of 1,753 mg/kg was noted at 0-1' (1.5' BEB) and a total BTEX high of 154 mg/kg was noted at 3' (1.5' BEB). The TPH and BTEX concentrations then declined with depth, to below the RRAL's at 4' (1.5' BEB).

The areas of confirmation samples (Bottom Hole 1 and West Sidewall 1) were then expanded to the maximum extent practical, with consideration given to the existing oilfield infrastructure and equipment in place. The area of Bottom Hole 1 was benched and excavated to 5.0' to remove the impacted material to the maximum extent safely possible, as vertically defined by trench (T-1). However, the area of (Bottom Hole 1) could not be resampled due to safety concerns for onsite personnel. The areas of (North Sidewall 1 and South Sidewall 1) could not be expanded due to the onsite tanks and equipment.

Approximately 30 cubic yards of material was excavated and transported offsite for proper disposal. The areas were then backfilled with clean material to surface grade.



## Conclusion

Based on the laboratory results and remediation activities performed COG requests deferment of remaining impact until site abandonment. The final C-141 is enclosed in Appendix A. If you have any questions or comments concerning the assessment or remediation activities for this site, please call at (432) 682-4559.

Respectfully submitted,  
TETRA TECH

A handwritten signature in blue ink that reads 'Clair Gonzales'.

Clair Gonzales,  
Project Manager

A handwritten signature in blue ink that reads 'Johnathon P. Kell'.

Johnathon Kell,  
Geologist

cc: Ike Tavarez – COG  
Rebecca Haskell - COG  
Jim Amos - BLM

# Tables

**Table 1**  
**COG**  
**Blue Thunder 5 Fed 1**  
**Eddy County, New Mexico**

Sample ID	Sample Date	Sample Depth (ft)	BEB Sample Depth (ft)	Soil Status		TPH (mg/kg)					Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Xylene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
				In-Situ	Removed	GRO	DRO	GRO+DRO	ORO	Total						
<b>Bottom Hole 1</b>	4/3/2019	-	1.5		X	3,360	2,910	<b>6,270</b>	33.7	<b>6,304</b>	2.97	91.9	29.0	247	<b>371</b>	80.0
<b>Bottom Hole 2</b>	4/8/2019	-	1.5	X		<10.0	20.6	20.6	<10.0	20.6	<0.050	<0.050	<0.050	<0.150	<0.300	48.0
<b>North Sidewall 1</b>	4/3/2019	-	-	X		2,600	2,450	<b>5,050</b>	35.6	<b>5,086</b>	1.11	53.1	21.2	184	<b>260</b>	64.0
<b>North Sidewall 2</b>	4/8/2019	-	-	X		<10.0	11.9	11.9	<10.0	11.9	<0.050	<0.050	<0.050	<0.150	<0.300	80.0
<b>East Sidewall 1</b>	4/3/2019	-	-		X	3,240	2,650	<b>5,890</b>	42.2	<b>5,932</b>	5.35	124	31.0	251	<b>412</b>	16.0
	4/8/2019	-	-	X		14.7	50.0	64.7	<10.0	64.7	<0.050	<0.050	<0.050	<0.150	<0.300	32.0
<b>East Sidewall 2</b>	4/8/2019	-	-	X		<10.0	11.1	11.1	<10.0	11.1	<0.050	<0.050	<0.050	<0.150	<0.300	80.0
<b>South Sidewall 1</b>	4/3/2019	-	-	X		3,850	2,540	<b>6,390</b>	33.7	<b>6,424</b>	8.50	176	42.2	342	<b>569</b>	160
<b>South Sidewall 2</b>	4/8/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	64.0
<b>West Sidewall 1</b>	4/3/2019	-	-		X	1,140	1,910	<b>3,050</b>	26.3	<b>3,076</b>	0.368	16.8	8.37	81.6	<b>107</b>	1,490
<b>West Sidewall 2</b>	4/8/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0
<b>Trench 1</b>	4/8/2019	0-1	1.5		X	<b>944</b>	<b>809</b>	<b>1,753</b>	<10.0	<b>1,753</b>	2.64	48.7	12.8	87.0	<b>151</b>	16.0
	"	2	"		X	<b>107</b>	<b>187</b>	<b>294</b>	<10.0	<b>294</b>	0.480	7.45	1.97	11.1	21.0	48.0
	"	3	"		X	<b>703</b>	<b>752</b>	<b>1,455</b>	<10.0	<b>1,455</b>	3.47	57.0	12.3	80.9	<b>154</b>	48.0
	"	4	"	X		30.7	57.7	88.4	<10.0	88.4	<0.050	0.217	0.104	0.678	0.998	32.0
	"	5	"	X		12.1	18.2	30.3	<10.0	30.3	<0.050	0.278	0.061	0.304	0.642	32.0
	"	6	"	X		<10.0	21.4	21.4	<10.0	21.4	<0.050	<0.050	<0.050	<0.150	<0.300	64.0
	"	8	"	X		<10.0	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	64.0
"	9	"	X		<10.0	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	96.0	

BEB - Below Excavation Bottom

 Excavation Depths

## Figures



**LEGEND**

- SITE LOCATION

**CONCHO**

FIGURE 1

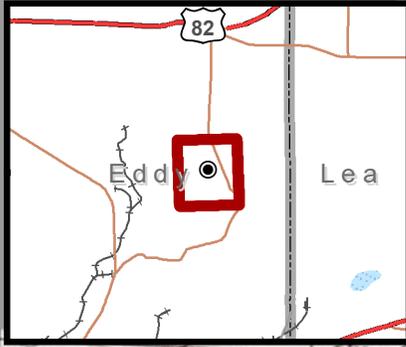
BLUE THUNDER 5 FEDERAL #1  
(32.690856°,-103.885636°)

OVERVIEW MAP

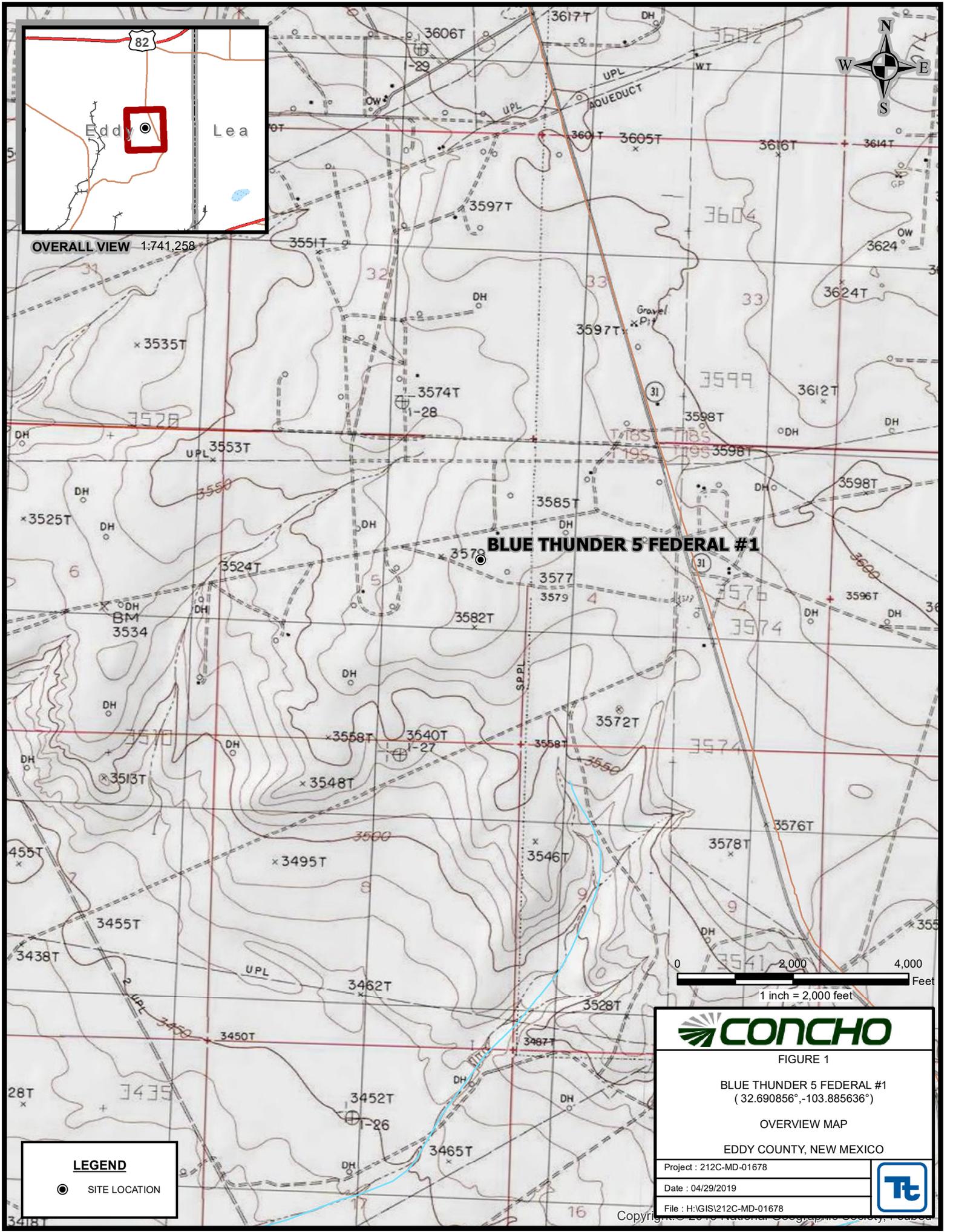
EDDY COUNTY, NEW MEXICO

Project : 212C-MD-00000	
Date : 00/00/2018	
File : H:\GIS\212C-MD-00000	

Sources: Esri, HERE, Garmin, Japan, METI, Esri China (Hong Kong), Swatch, Bing, OpenStreetMap contributors, and the GIS User Community



OVERALL VIEW 1:741,258



**BLUE THUNDER 5 FEDERAL #1**

**LEGEND**

● SITE LOCATION



FIGURE 1

BLUE THUNDER 5 FEDERAL #1  
(32.690856°, -103.885636°)

OVERVIEW MAP

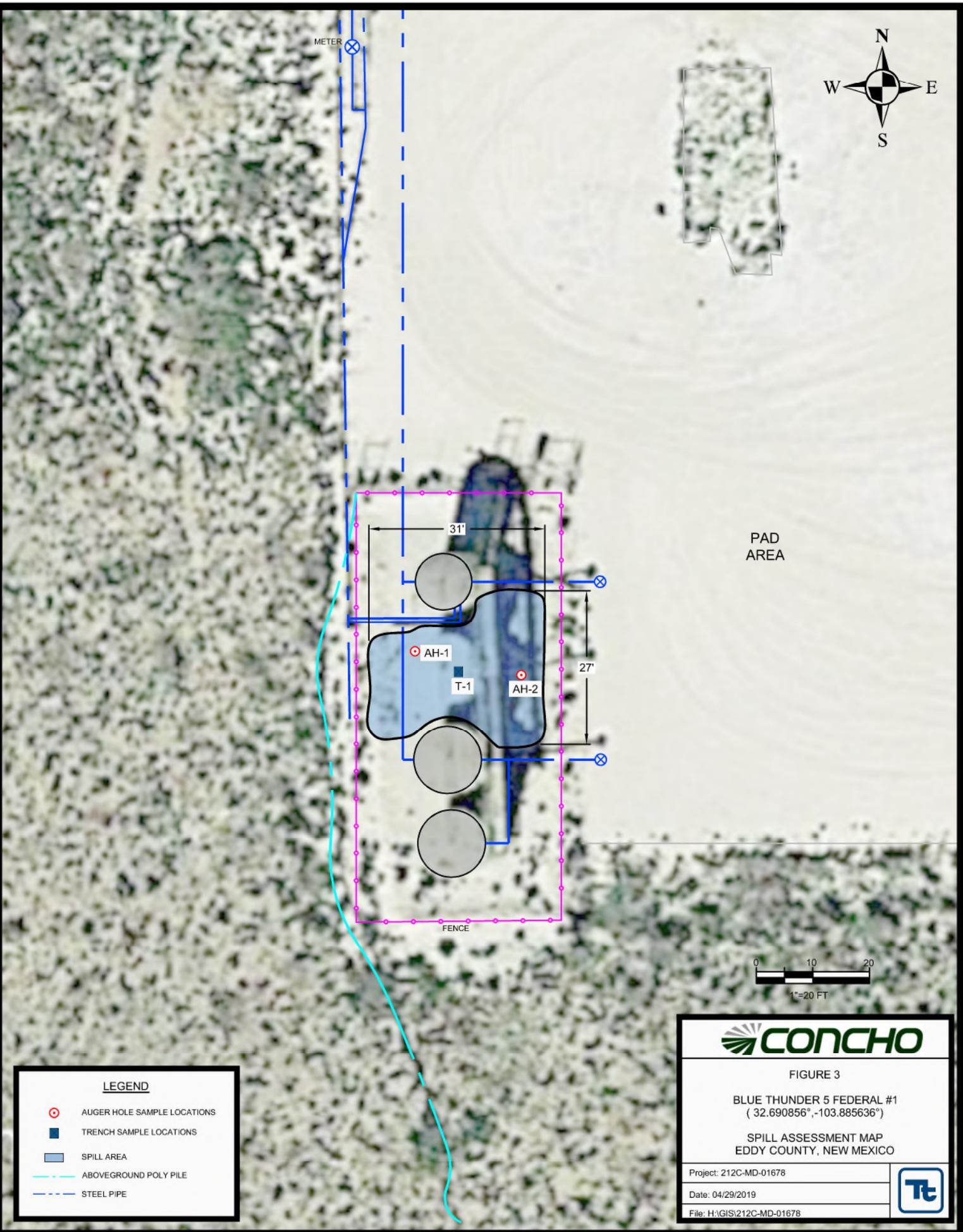
EDDY COUNTY, NEW MEXICO

Project : 212C-MD-01678

Date : 04/29/2019

File : H:\GIS\212C-MD-01678





**LEGEND**

- AUGER HOLE SAMPLE LOCATIONS
- TRENCH SAMPLE LOCATIONS
- SPILL AREA
- ABOVEGROUND POLY PILE
- STEEL PIPE

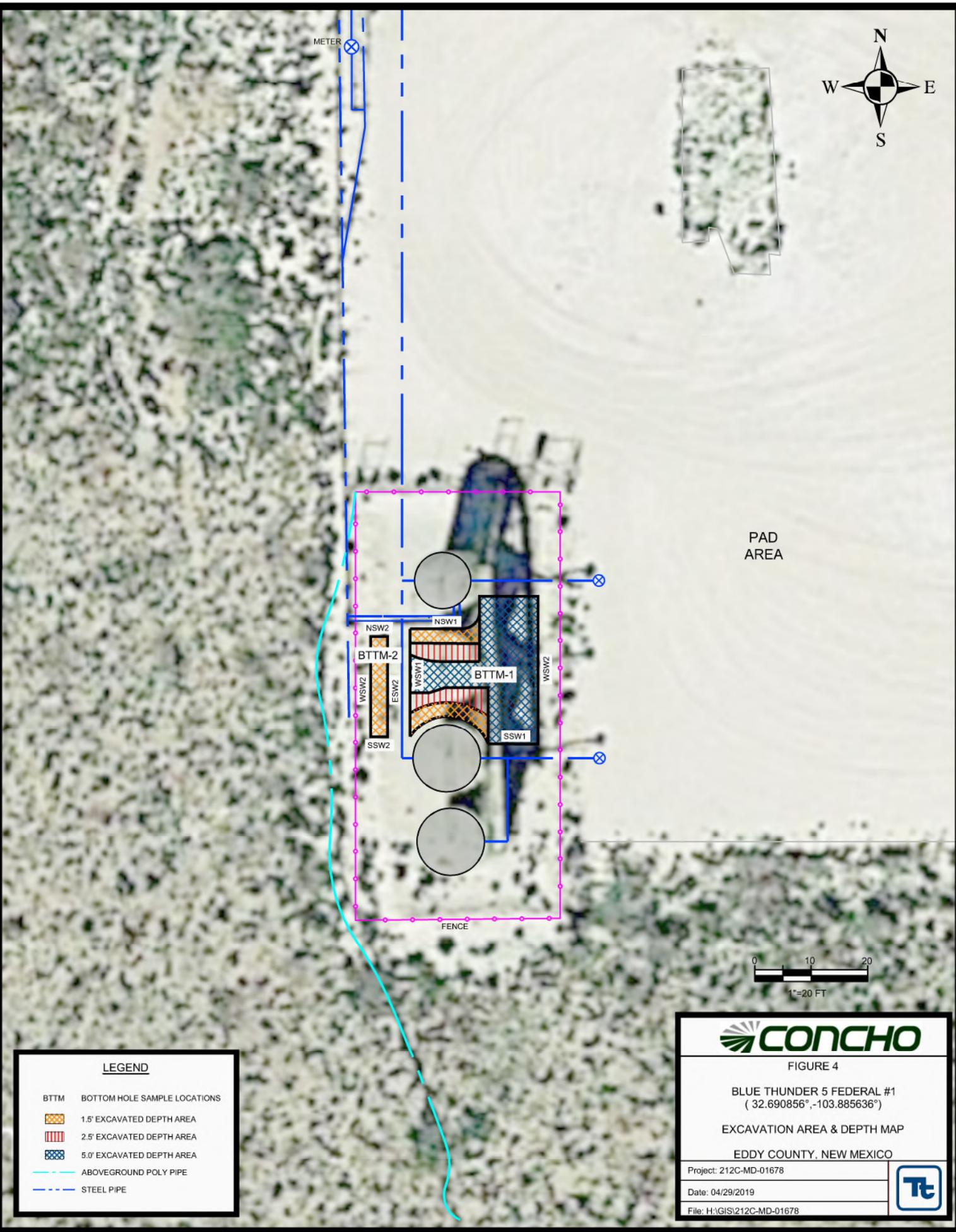
**CONCHO**

FIGURE 3

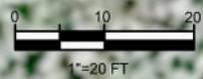
BLUE THUNDER 5 FEDERAL #1  
( 32.690856°, -103.885636°)

SPILL ASSESSMENT MAP  
EDDY COUNTY, NEW MEXICO

Project: 212C-MD-01678	
Date: 04/29/2019	
File: H:\GIS\212C-MD-01678	



PAD AREA



LEGEND	
BTTM	BOTTOM HOLE SAMPLE LOCATIONS
	1.5' EXCAVATED DEPTH AREA
	2.5' EXCAVATED DEPTH AREA
	5.0' EXCAVATED DEPTH AREA
	ABOVEGROUND POLY PIPE
	STEEL PIPE



FIGURE 4

BLUE THUNDER 5 FEDERAL #1  
( 32.690856°,-103.885636°)

EXCAVATION AREA & DEPTH MAP

EDDY COUNTY, NEW MEXICO

Project: 212C-MD-01678	
Date: 04/29/2019	
File: H:\GIS\212C-MD-01678	

Photos

COG  
Blue Thunder 5 Federal Com #1  
Eddy County, New Mexico



TETRA TECH



Area of Excavation – View West



Area of Excavation – View South

# Appendix A

District I  
1625 N. French Dr., Hobbs, NM 88240  
District II  
811 S. First St., Artesia, NM 88210  
District III  
1000 Rio Brazos Road, Aztec, NM 87410  
District IV  
1220 S. St. Francis Dr., Santa Fe, NM 87505

State of New Mexico  
Energy Minerals and Natural  
Resources Department

Oil Conservation Division  
1220 South St. Francis Dr.  
Santa Fe, NM 87505

Form C-141  
Revised August 24, 2018  
Submit to appropriate OCD District office

Incident ID	
District RP	
Facility ID	
Application ID	

## Release Notification

### Responsible Party

Responsible Party	OGRID
Contact Name	Contact Telephone
Contact email	Incident # (assigned by OCD)
Contact mailing address	

### Location of Release Source

Latitude \_\_\_\_\_ Longitude \_\_\_\_\_  
(NAD 83 in decimal degrees to 5 decimal places)

Site Name	Site Type
Date Release Discovered	API# (if applicable)

Unit Letter	Section	Township	Range	County

Surface Owner:  State  Federal  Tribal  Private (Name: \_\_\_\_\_)

### Nature and Volume of Release

Material(s) Released (Select all that apply and attach calculations or specific justification for the volumes provided below)

<input type="checkbox"/> Crude Oil	Volume Released (bbls)	Volume Recovered (bbls)
<input type="checkbox"/> Produced Water	Volume Released (bbls)	Volume Recovered (bbls)
	Is the concentration of dissolved chloride in the produced water >10,000 mg/l?	<input type="checkbox"/> Yes <input type="checkbox"/> No
<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 (provide units)	Volume/Weight Recovered (provide units)

Cause of Release

Incident ID	
District RP	
Facility ID	
Application ID	

Was this a major release as defined by 19.15.29.7(A) NMAC?  <input type="checkbox"/> Yes <input type="checkbox"/> No	If YES, for what reason(s) does the responsible party consider this a major release?
If YES, was immediate notice given to the OCD? By whom? To whom? When and by what means (phone, email, etc)?	

### Initial Response

*The responsible party must undertake the following actions immediately unless they could create a safety hazard that would result in injury*

<input type="checkbox"/> The source of the release has been stopped. <input type="checkbox"/> The impacted area has been secured to protect human health and the environment. <input type="checkbox"/> Released materials have been contained via the use of berms or dikes, absorbent pads, or other containment devices. <input type="checkbox"/> All free liquids and recoverable materials have been removed and managed appropriately.
If all the actions described above have <u>not</u> been undertaken, explain why:
Per 19.15.29.8 B. (4) NMAC the responsible party may commence remediation immediately after discovery of a release. If remediation has begun, please attach a narrative of actions to date. If remedial efforts have been successfully completed or if the release occurred within a lined containment area (see 19.15.29.11(A)(5)(a) NMAC), please attach all information needed for closure evaluation.
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: _____ Title: _____ Signature: <u>Delynn O'neal</u> Date: _____ email: _____ Telephone: _____
<b><u>OCD Only</u></b> Received by: <u>Amalia Bontamante</u> Date: _____

Incident ID	
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?	_____ (ft bgs)
Did this release impact groundwater or surface water?	<input type="checkbox"/> Yes <input 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 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 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 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 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 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 type="checkbox"/> No
Are the lateral extents of the release within 300 feet of a wetland?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are the lateral extents of the release overlying a subsurface mine?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are the lateral extents of the release overlying an unstable area such as karst geology?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Are the lateral extents of the release within a 100-year floodplain?	<input type="checkbox"/> Yes <input type="checkbox"/> No
Did the release impact areas <b>not</b> on an exploration, development, production, or storage site?	<input type="checkbox"/> Yes <input 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.

<p><b><u>Characterization Report Checklist:</u> Each of the following items must be included in the report.</b></p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Scaled site map showing impacted area, surface features, subsurface features, delineation points, and monitoring wells.</li> <li><input type="checkbox"/> Field data</li> <li><input type="checkbox"/> Data table of soil contaminant concentration data</li> <li><input type="checkbox"/> Depth to water determination</li> <li><input type="checkbox"/> Determination of water sources and significant watercourses within ½-mile of the lateral extents of the release</li> <li><input type="checkbox"/> Boring or excavation logs</li> <li><input type="checkbox"/> Photographs including date and GIS information</li> <li><input type="checkbox"/> Topographic/Aerial maps</li> <li><input type="checkbox"/> Laboratory data including chain of custody</li> </ul>
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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.

Incident ID	
District RP	
Facility ID	
Application ID	

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: \_\_\_\_\_ Title: \_\_\_\_\_

Signature: *[Handwritten Signature]* \_\_\_\_\_ Date: \_\_\_\_\_

email: \_\_\_\_\_ Telephone: \_\_\_\_\_

**OCD Only**

Received by: \_\_\_\_\_ Date: \_\_\_\_\_

Incident ID	
District RP	
Facility ID	
Application ID	

## 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: \_\_\_\_\_ Title: \_\_\_\_\_

Signature:  \_\_\_\_\_ Date: \_\_\_\_\_

email: \_\_\_\_\_ Telephone: \_\_\_\_\_

**OCD Only**

Received by: \_\_\_\_\_ Date: \_\_\_\_\_

- Approved
  Approved with Attached Conditions of Approval
  Denied
  Deferral Approved

Signature: \_\_\_\_\_ Date: \_\_\_\_\_

## Appendix B

**Water Well Data**  
**Average Depth to Groundwater (ft)**  
**COG-Blue Thunder Federal Com #001**  
**Eddy County, New Mexico**

18 South			30 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23 44	24
30	29	28	27	26	25
31	32	33	34	35	36

18 South			31 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15 98	14	13
19	20	21	22	23 317	24
30	29	28	27	26	25
31	32	33	34	35 261	36

18 South			32 East		
6	5	4 65	3	2	1
7 460	8	9	10	11	12
82	17	16	15	14	13
19	20	21 84	22	23	24
30	29 164	28	27 429	26	25
31	32	33	34 117	35	36

19 South			30 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
90	31	32	33	34	35
115					

19 South			31 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33 180	34	35	36
		101			130

19 South			32 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17 365	16	15	14	13 135
19	20	21	22	23	24
102	345				
30	29	28	27	26	25
31	32	33	34	35	36
				250	

20 South			30 East		
6	5 3.5	4	3	2	1
7	8	9	10 6	11	12
18	17	16	15	14	13
19	20	21 29	22	23	24
30	29 29	28 150	27	26	25
31	32 170	33 191	34	35	36

20 South			31 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15 130	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36 80

20 South			32 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
89	19	20	21	22	23
30	29	28	27	26	25
9.9	31	32	33	34 12.3	35
					46

- 88** New Mexico State Engineers Well Reports
- 105** USGS Well Reports
- 90** Geology and Groundwater Conditions in Southern Lea, County, NM (Report 6)  
 Geology and Groundwater Resources of Eddy County, NM (Report 3)
- 34** NMOCD - Groundwater Data
- 123** Tetra Tech installed temporary wells and field water level
- 143** NMOCD Groundwater map well location



USGS Home  
 Contact USGS  
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## National Water Information System: Web Interface

[USGS Water Resources](#)

Data Category:

Groundwater

Geographic Area:

New Mexico

Click to hide News Bulletins

- [Introducing The Next Generation of USGS Water Data for the Nation](#)
- [Full News](#) 

Groundwater levels for New Mexico

Click to hide state-specific text

### Search Results -- 1 sites found

site\_no list =

- 324159103503801

Minimum number of levels = 1

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

### USGS 324159103503801 18S.31E.35.31324

Available data for this site

Groundwater: Field measurements

Eddy County, New Mexico

Hydrologic Unit Code 13060011

Latitude 32°42'07.3", Longitude 103°50'50.1" NAD83

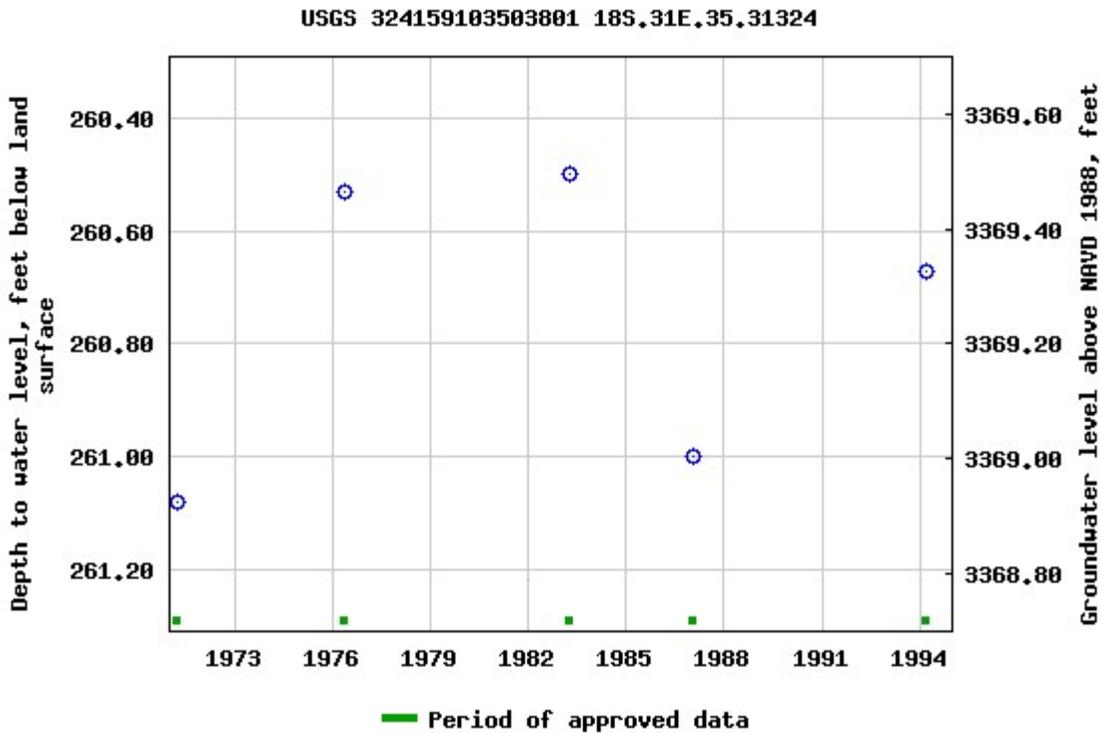
Land-surface elevation 3,630 feet above NAVD88

The depth of the well is 300 feet below land surface.

This well is completed in the Chinle Formation (231CHNL) 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>



Breaks in the plot represent a gap of at least one year between field measurements.

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[U.S. Department of the Interior](#) | [U.S. Geological Survey](#)

**Title: Groundwater for New Mexico: Water Levels**

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



Page Contact Information: [New Mexico Water Data Maintainer](#)

Page Last Modified: 2019-04-30 15:03:32 EDT

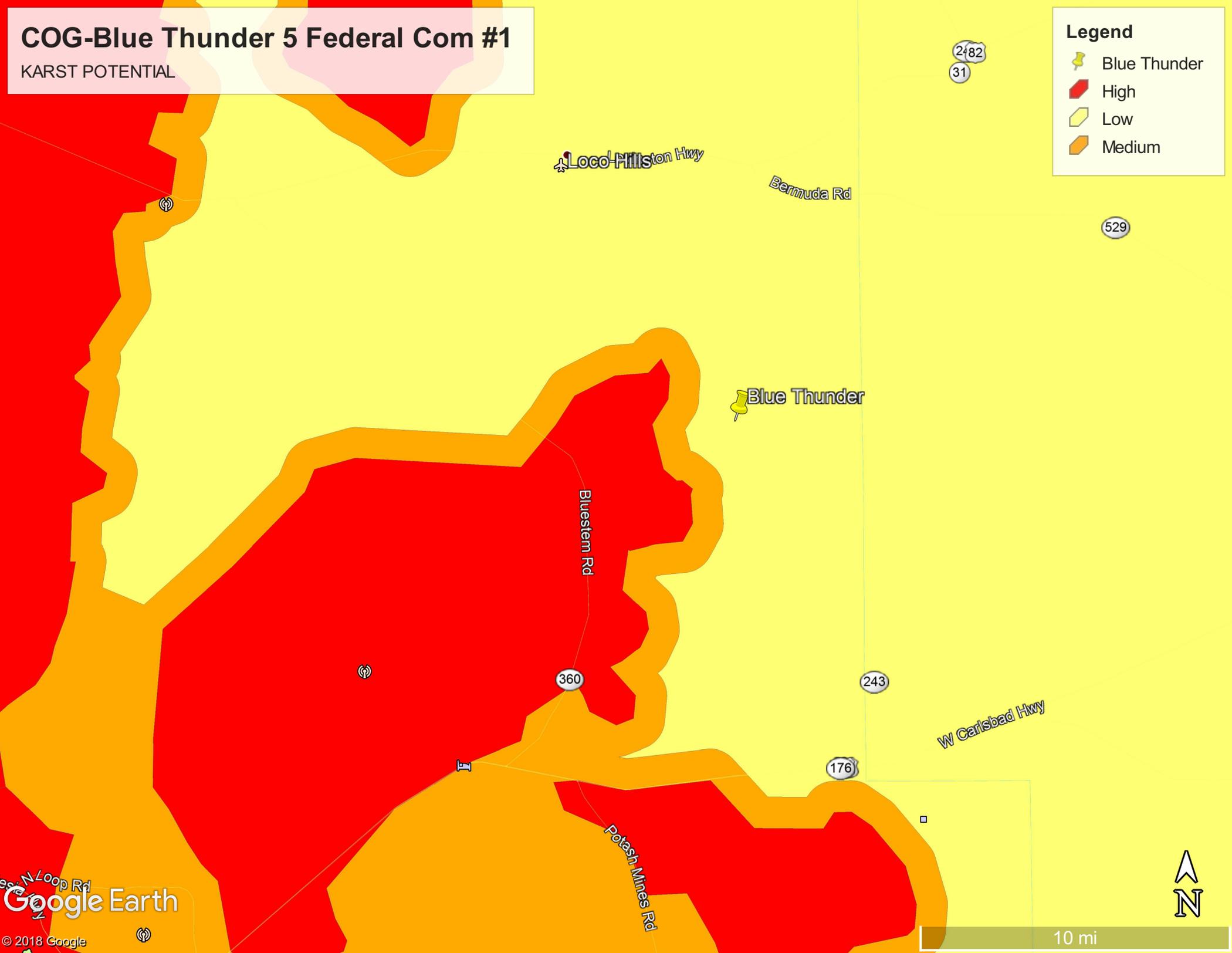
1.07 0.91 nadww01

# COG-Blue Thunder 5 Federal Com #1

KARST POTENTIAL

## Legend

-  Blue Thunder
-  High
-  Low
-  Medium



Loco Hills

Bermuda Rd

Blue Thunder

Bluestem Rd

360

243

176

W Carlsbad Hwy

Potash Mines Rd

Google Earth

© 2018 Google

10 mi

# NFHL Web Mapping Application



## Appendix C



April 04, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: BLUE THUNDER 5 FED COM 1

Enclosed are the results of analyses for samples received by the laboratory on 04/03/19 13:35.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/03/2019	Sampling Date:	04/03/2019
Reported:	04/04/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678 ( 12.21.18 )	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: BOTTOM HOLE #1 ( 1.5' BEB ) (H901226-01)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>2.97</b>	2.00	04/04/2019	ND	2.09	105	2.00	0.380	
<b>Toluene*</b>	<b>91.9</b>	2.00	04/04/2019	ND	1.87	93.7	2.00	1.81	
<b>Ethylbenzene*</b>	<b>29.0</b>	2.00	04/04/2019	ND	1.99	99.6	2.00	0.242	
<b>Total Xylenes*</b>	<b>247</b>	6.00	04/04/2019	ND	6.24	104	6.00	1.72	
<b>Total BTEX</b>	<b>371</b>	12.0	04/04/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 105 % 73.3-129

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>80.0</b>	16.0	04/04/2019	ND	448	112	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10*</b>	<b>3360</b>	10.0	04/03/2019	ND	179	89.4	200	8.61		
<b>DRO &gt;C10-C28*</b>	<b>2910</b>	10.0	04/03/2019	ND	183	91.7	200	3.47		
<b>EXT DRO &gt;C28-C36</b>	<b>33.7</b>	10.0	04/03/2019	ND						

Surrogate: 1-Chlorooctane 396 % 41-142

Surrogate: 1-Chlorooctadecane 104 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/03/2019	Sampling Date:	04/03/2019
Reported:	04/04/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678 ( 12.21.18 )	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: NORTH 1 SIDEWALL (H901226-02)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>1.11</b>	1.00	04/04/2019	ND	2.09	105	2.00	0.380	
<b>Toluene*</b>	<b>53.1</b>	2.00	04/04/2019	ND	1.87	93.7	2.00	1.81	
<b>Ethylbenzene*</b>	<b>21.2</b>	2.00	04/04/2019	ND	1.99	99.6	2.00	0.242	
<b>Total Xylenes*</b>	<b>184</b>	6.00	04/04/2019	ND	6.24	104	6.00	1.72	
<b>Total BTEX</b>	<b>260</b>	11.0	04/04/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 103 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>64.0</b>	16.0	04/04/2019	ND	448	112	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10*</b>	<b>2600</b>	10.0	04/03/2019	ND	179	89.4	200	8.61		
<b>DRO &gt;C10-C28*</b>	<b>2450</b>	10.0	04/03/2019	ND	183	91.7	200	3.47		
<b>EXT DRO &gt;C28-C36</b>	<b>35.6</b>	10.0	04/03/2019	ND						

Surrogate: 1-Chlorooctane 336 % 41-142

Surrogate: 1-Chlorooctadecane 100 % 37.6-147

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/03/2019	Sampling Date:	04/03/2019
Reported:	04/04/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678 ( 12.21.18 )	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: EAST 1 SIDEWALL (H901226-03)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>5.35</b>	2.00	04/04/2019	ND	2.09	105	2.00	0.380	
<b>Toluene*</b>	<b>124</b>	2.00	04/04/2019	ND	1.87	93.7	2.00	1.81	
<b>Ethylbenzene*</b>	<b>31.0</b>	2.00	04/04/2019	ND	1.99	99.6	2.00	0.242	
<b>Total Xylenes*</b>	<b>251</b>	6.00	04/04/2019	ND	6.24	104	6.00	1.72	
<b>Total BTEX</b>	<b>412</b>	12.0	04/04/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 103 % 73.3-129

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>16.0</b>	16.0	04/04/2019	ND	448	112	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10*</b>	<b>3240</b>	10.0	04/03/2019	ND	179	89.4	200	8.61		
<b>DRO &gt;C10-C28*</b>	<b>2650</b>	10.0	04/03/2019	ND	183	91.7	200	3.47		
<b>EXT DRO &gt;C28-C36</b>	<b>42.2</b>	10.0	04/03/2019	ND						

Surrogate: 1-Chlorooctane 291 % 41-142

Surrogate: 1-Chlorooctadecane 106 % 37.6-147

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/03/2019	Sampling Date:	04/03/2019
Reported:	04/04/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678 ( 12.21.18 )	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: SOUTH 1 SIDEWALL (H901226-04)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>8.50</b>	2.00	04/04/2019	ND	2.09	105	2.00	0.380	
<b>Toluene*</b>	<b>176</b>	2.00	04/04/2019	ND	1.87	93.7	2.00	1.81	
<b>Ethylbenzene*</b>	<b>42.2</b>	2.00	04/04/2019	ND	1.99	99.6	2.00	0.242	
<b>Total Xylenes*</b>	<b>342</b>	6.00	04/04/2019	ND	6.24	104	6.00	1.72	
<b>Total BTEX</b>	<b>569</b>	12.0	04/04/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 104 % 73.3-129

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>160</b>	16.0	04/04/2019	ND	448	112	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10*</b>	<b>3850</b>	10.0	04/04/2019	ND	179	89.4	200	8.61		
<b>DRO &gt;C10-C28*</b>	<b>2540</b>	10.0	04/04/2019	ND	183	91.7	200	3.47		
<b>EXT DRO &gt;C28-C36</b>	<b>33.7</b>	10.0	04/04/2019	ND						

Surrogate: 1-Chlorooctane 331 % 41-142

Surrogate: 1-Chlorooctadecane 103 % 37.6-147

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/03/2019	Sampling Date:	04/03/2019
Reported:	04/04/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678 ( 12.21.18 )	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: WEST 1 SIDEWALL (H901226-05)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>0.368</b>	0.250	04/04/2019	ND	2.09	105	2.00	0.380	
<b>Toluene*</b>	<b>16.8</b>	0.500	04/04/2019	ND	1.87	93.7	2.00	1.81	
<b>Ethylbenzene*</b>	<b>8.37</b>	0.500	04/04/2019	ND	1.99	99.6	2.00	0.242	
<b>Total Xylenes*</b>	<b>81.6</b>	1.50	04/04/2019	ND	6.24	104	6.00	1.72	
<b>Total BTEX</b>	<b>107</b>	2.75	04/04/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 112 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>1490</b>	16.0	04/04/2019	ND	448	112	400	0.00	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10*</b>	<b>1140</b>	10.0	04/04/2019	ND	179	89.4	200	8.61		
<b>DRO &gt;C10-C28*</b>	<b>1910</b>	10.0	04/04/2019	ND	183	91.7	200	3.47		
<b>EXT DRO &gt;C28-C36</b>	<b>26.3</b>	10.0	04/04/2019	ND						

Surrogate: 1-Chlorooctane 254 % 41-142

Surrogate: 1-Chlorooctadecane 90.7 % 37.6-147

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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Notes and Definitions**

- S-04            The surrogate recovery for this sample is outside of established control limits due to a sample matrix effect.
- 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 SM450Cl-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, Lab Director/Quality Manager

Analysis Request of Chain of Custody Record



Tetra Tech, Inc.

901W Wall Street, Ste 100  
Midland, Texas 79705  
Tel (432) 682-4559  
Fax (432) 682-3946

Client Name: **COA** Site Manager: **CLAIRE GONZALES**

Project Name: **BLUE THUNDER S FED COM 1 (12.21.18)** Project #: **212C-WD-0167B**

Project Location: **Eddy Co, NM** Invoice to: **COA-LIKE TANAVEZ**

Receiving Laboratory: **CARDINAL** Sampler Signature: **LOUVER MBEHAINA**

Comments: **TONY LEONARDA**

LAB #	SAMPLE IDENTIFICATION	SAMPLING		MATRIX		PRESERVATIVE METHOD		# CONTAINERS	FILTERED (Y/N)
		DATE	TIME	WATER	SOIL	HCL	HNO <sub>3</sub>		
1	Bottom Hole # 1 (1.5' BEB)	4/3/19		X		X		1	2
2	NORTH 1 SideWall	4/3/19		X		X		1	2
3	EAST 1 SideWall	4/3/19		X		X		1	2
4	South 1 SideWall	4/3/19		X		X		1	2
5	WEST 1 SideWall	4/3/19		X		X		1	2

Relinquished by: **[Signature]** Date: **4/3/19** Time: **1337**  
 Received by: **[Signature]** Date: **4/3/19** Time: **13:35**

ANALYSIS REQUEST  
(Circle or Specify Method No.)

<input checked="" type="checkbox"/>	BTEX 8021B	BTEX 8260B
<input checked="" type="checkbox"/>	TPH TX1005 (Ext to C35)	
<input checked="" type="checkbox"/>	TPH 8015M ( GRO - DRO - ORO - MRO)	
<input checked="" type="checkbox"/>	PAH 8270C	
<input checked="" type="checkbox"/>	Total Metals Ag As Ba Cd Cr Pb Se Hg	
<input checked="" type="checkbox"/>	TCLP Metals Ag As Ba Cd Cr Pb Se Hg	
<input checked="" type="checkbox"/>	TCLP Volatiles	
<input checked="" type="checkbox"/>	TCLP Semi Volatiles	
<input checked="" type="checkbox"/>	RCI	
<input checked="" type="checkbox"/>	GC/MS Vol. 8260B / 624	
<input checked="" type="checkbox"/>	GC/MS Semi. Vol. 8270C/625	
<input checked="" type="checkbox"/>	PCB's 8082 / 608	
<input checked="" type="checkbox"/>	NORM	
<input checked="" type="checkbox"/>	PLM (Asbestos)	
<input checked="" type="checkbox"/>	Chloride	
<input checked="" type="checkbox"/>	Chloride Sulfate TDS	
<input checked="" type="checkbox"/>	General Water Chemistry (see attached list)	
<input checked="" type="checkbox"/>	Anion/Cation Balance	

LAB USE ONLY  
 Sample Temperature: **#97**  
 REMARKS:  
 STANDARD  
 RUSH: Same Day (24 hr) 48 hr 72 hr  
 Rush Charges Authorized  
 Special Report Limits or TRRP Report

ORIGINAL COPY

(Circle) HAND DELIVERED / FEDEX UPS Tracking #: \_\_\_\_\_



April 09, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: BLUE THUNDER 5 FED COM 1

Enclosed are the results of analyses for samples received by the laboratory on 04/08/19 16:05.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 0-1' ) ( 1.5' BEB ) (H901278-01)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>2.64</b>	1.00	04/09/2019	ND	1.80	89.9	2.00	0.879	
<b>Toluene*</b>	<b>48.7</b>	1.00	04/09/2019	ND	1.68	84.2	2.00	0.693	
<b>Ethylbenzene*</b>	<b>12.8</b>	1.00	04/09/2019	ND	1.74	87.1	2.00	1.77	
<b>Total Xylenes*</b>	<b>87.0</b>	3.00	04/09/2019	ND	5.27	87.8	6.00	2.01	
<b>Total BTEX</b>	<b>151</b>	6.00	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 102 % 73.3-129

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>16.0</b>	16.0	04/09/2019	ND	400	100	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS						S-04
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier	
<b>GRO C6-C10*</b>	<b>944</b>	10.0	04/08/2019	ND	199	99.7	200	10.3	QM-07	
<b>DRO &gt;C10-C28*</b>	<b>809</b>	10.0	04/08/2019	ND	182	91.2	200	3.08	QM-07	
EXT DRO >C28-C36	<10.0	10.0	04/08/2019	ND						

Surrogate: 1-Chlorooctane 143 % 41-142

Surrogate: 1-Chlorooctadecane 91.4 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 2' ) ( 1.5' BEB ) (H901278-02)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>0.480</b>	0.050	04/09/2019	ND	1.80	89.9	2.00	0.879	
<b>Toluene*</b>	<b>7.45</b>	0.050	04/09/2019	ND	1.68	84.2	2.00	0.693	
<b>Ethylbenzene*</b>	<b>1.97</b>	0.050	04/09/2019	ND	1.74	87.1	2.00	1.77	
<b>Total Xylenes*</b>	<b>11.1</b>	0.150	04/09/2019	ND	5.27	87.8	6.00	2.01	
<b>Total BTEX</b>	<b>21.0</b>	0.300	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 114 % 73.3-129

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	04/09/2019	ND	400	100	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>GRO C6-C10*</b>	<b>107</b>	10.0	04/09/2019	ND	199	99.7	200	10.3	
<b>DRO &gt;C10-C28*</b>	<b>187</b>	10.0	04/09/2019	ND	182	91.2	200	3.08	
EXT DRO >C28-C36	<10.0	10.0	04/09/2019	ND					

Surrogate: 1-Chlorooctane 89.0 % 41-142

Surrogate: 1-Chlorooctadecane 87.2 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 3' ) ( 1.5' BEB ) (H901278-03)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Benzene*</b>	<b>3.47</b>	1.00	04/09/2019	ND	1.80	89.9	2.00	0.879	
<b>Toluene*</b>	<b>57.0</b>	1.00	04/09/2019	ND	1.68	84.2	2.00	0.693	
<b>Ethylbenzene*</b>	<b>12.3</b>	1.00	04/09/2019	ND	1.74	87.1	2.00	1.77	
<b>Total Xylenes*</b>	<b>80.9</b>	3.00	04/09/2019	ND	5.27	87.8	6.00	2.01	
<b>Total BTEX</b>	<b>154</b>	6.00	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.3 % 73.3-129

Chloride, SM4500CI-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	04/09/2019	ND	400	100	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>GRO C6-C10*</b>	<b>703</b>	10.0	04/09/2019	ND	199	99.7	200	10.3	
<b>DRO &gt;C10-C28*</b>	<b>752</b>	10.0	04/09/2019	ND	182	91.2	200	3.08	
EXT DRO >C28-C36	<10.0	10.0	04/09/2019	ND					

Surrogate: 1-Chlorooctane 121 % 41-142

Surrogate: 1-Chlorooctadecane 86.5 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 4' ) ( 1.5' BEB ) (H901278-04)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/09/2019	ND	1.80	89.9	2.00	0.879	
<b>Toluene*</b>	<b>0.217</b>	0.050	04/09/2019	ND	1.68	84.2	2.00	0.693	
<b>Ethylbenzene*</b>	<b>0.104</b>	0.050	04/09/2019	ND	1.74	87.1	2.00	1.77	
<b>Total Xylenes*</b>	<b>0.678</b>	0.150	04/09/2019	ND	5.27	87.8	6.00	2.01	
<b>Total BTEX</b>	<b>0.998</b>	0.300	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 95.5 % 73.3-129

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>32.0</b>	16.0	04/09/2019	ND	400	100	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>GRO C6-C10*</b>	<b>30.7</b>	10.0	04/09/2019	ND	199	99.7	200	10.3	
<b>DRO &gt;C10-C28*</b>	<b>57.7</b>	10.0	04/09/2019	ND	182	91.2	200	3.08	
EXT DRO >C28-C36	<10.0	10.0	04/09/2019	ND					

Surrogate: 1-Chlorooctane 91.6 % 41-142

Surrogate: 1-Chlorooctadecane 87.8 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 5' ) ( 1.5' BEB ) (H901278-05)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/09/2019	ND	1.69	84.3	2.00	1.34	
<b>Toluene*</b>	<b>0.278</b>	0.050	04/09/2019	ND	1.74	86.8	2.00	0.924	
<b>Ethylbenzene*</b>	<b>0.061</b>	0.050	04/09/2019	ND	1.74	87.1	2.00	0.579	
<b>Total Xylenes*</b>	<b>0.304</b>	0.150	04/09/2019	ND	5.11	85.2	6.00	0.977	
<b>Total BTEX</b>	<b>0.642</b>	0.300	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 97.7 % 73.3-129

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>32.0</b>	16.0	04/09/2019	ND	400	100	400	3.92	

TPH 8015M		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>GRO C6-C10*</b>	<b>12.1</b>	10.0	04/09/2019	ND	199	99.7	200	10.3	
<b>DRO &gt;C10-C28*</b>	<b>18.2</b>	10.0	04/09/2019	ND	182	91.2	200	3.08	
EXT DRO >C28-C36	<10.0	10.0	04/09/2019	ND					

Surrogate: 1-Chlorooctane 85.8 % 41-142

Surrogate: 1-Chlorooctadecane 82.0 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 6' ) ( 1.5' BEB ) (H901278-06)**

BTEX 8021B		mg/kg		Analyzed By: MS					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/09/2019	ND	1.69	84.3	2.00	1.34	
Toluene*	<0.050	0.050	04/09/2019	ND	1.74	86.8	2.00	0.924	
Ethylbenzene*	<0.050	0.050	04/09/2019	ND	1.74	87.1	2.00	0.579	
Total Xylenes*	<0.150	0.150	04/09/2019	ND	5.11	85.2	6.00	0.977	
Total BTEX	<0.300	0.300	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 90.3 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
<b>Chloride</b>	<b>64.0</b>	16.0	04/09/2019	ND	400	100	400	3.92	

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	04/09/2019	ND	199	99.7	200	10.3	
<b>DRO &gt;C10-C28*</b>	<b>21.4</b>	10.0	04/09/2019	ND	182	91.2	200	3.08	
EXT DRO >C28-C36	<10.0	10.0	04/09/2019	ND					

Surrogate: 1-Chlorooctane 83.9 % 41-142

Surrogate: 1-Chlorooctadecane 85.1 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 8' ) ( 1.5' BEB ) (H901278-07)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/09/2019	ND	1.80	89.9	2.00	0.879	
Toluene*	<0.050	0.050	04/09/2019	ND	1.68	84.2	2.00	0.693	
Ethylbenzene*	<0.050	0.050	04/09/2019	ND	1.74	87.1	2.00	1.77	
Total Xylenes*	<0.150	0.150	04/09/2019	ND	5.27	87.8	6.00	2.01	
Total BTEX	<0.300	0.300	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 92.2 % 73.3-129

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	64.0	16.0	04/09/2019	ND	400	100	400	3.92	

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	04/09/2019	ND	199	99.7	200	10.3	
DRO >C10-C28*	<10.0	10.0	04/09/2019	ND	182	91.2	200	3.08	
EXT DRO >C28-C36	<10.0	10.0	04/09/2019	ND					

Surrogate: 1-Chlorooctane 82.9 % 41-142

Surrogate: 1-Chlorooctadecane 82.8 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 CLAIR GONZALES  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701  
 Fax To: (432) 682-3946

Received:	04/08/2019	Sampling Date:	04/08/2019
Reported:	04/09/2019	Sampling Type:	Soil
Project Name:	BLUE THUNDER 5 FED COM 1	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01678	Sample Received By:	Tamara Oldaker
Project Location:	COG- EDDY CO NM		

**Sample ID: TRENCH - 1 ( 9' ) ( 1.5' BEB ) (H901278-08)**

BTEX 8021B		mg/kg		Analyzed By: ms					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Benzene*	<0.050	0.050	04/09/2019	ND	1.80	89.9	2.00	0.879	
Toluene*	<0.050	0.050	04/09/2019	ND	1.68	84.2	2.00	0.693	
Ethylbenzene*	<0.050	0.050	04/09/2019	ND	1.74	87.1	2.00	1.77	
Total Xylenes*	<0.150	0.150	04/09/2019	ND	5.27	87.8	6.00	2.01	
Total BTEX	<0.300	0.300	04/09/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 91.1 % 73.3-129

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>96.0</b>	16.0	04/09/2019	ND	400	100	400	3.92	

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	04/09/2019	ND	199	99.7	200	10.3	
DRO >C10-C28*	<10.0	10.0	04/09/2019	ND	182	91.2	200	3.08	
EXT DRO >C28-C36	<10.0	10.0	04/09/2019	ND					

Surrogate: 1-Chlorooctane 88.9 % 41-142

Surrogate: 1-Chlorooctadecane 83.3 % 37.6-147

Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**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



---

Celey D. Keene, Lab Director/Quality Manager



**CHAIN-OF-CUSTODY AND ANALYSIS REQUEST**

101 East Marland, Hobbs, NM 88240  
 (575) 393-2326 FAX (575) 393-2476

**BILL TO**

**ANALYSIS REQUEST**

Company Name: TETRA TECH		P.O. #:	
Project Manager: CURT COZZALES		Company:	COG
Address: 901 W. WALL ST. STE 100		Attn: ILE TAVAREZ	
City: MIDLAND	State: TX	Zip: 79705	
Phone #:	Fax #:	Address:	
Project #: 212C-WO-01678	Project Owner:	City:	
Project Name: COG-BEAT THUNDER S FED COM 1	State:	Zip:	
Project Location: Eddy County	Phone #:		
Sampler Name: CONNER WOERNING / TONY LEAREDA	Fax #:		
FOR LAB USE ONLY			
Lab I.D.	Sample I.D.		
H901278			
1	TRENCH - 1 (0-1') (1.5' BEB)	(G)RAB OR (C)OMP.	
2	TRENCH - 1 (2') (1.5' BEB)	# CONTAINERS	
3	TRENCH - 1 (3') (1.5' BEB)	GROUNDWATER	
4	TRENCH - 1 (4') (1.5' BEB)	WASTEWATER	
5	TRENCH - 1 (5') (1.5' BEB)	SOIL	
6	TRENCH - 1 (6') (1.5' BEB)	OIL	
7	TRENCH - 1 (8') (1.5' BEB)	SLUDGE	
8	TRENCH - 1 (9') (1.5' BEB)	OTHER:	
		ACID/BASE:	
		ICE / COOL	
		OTHER:	
		DATE	
		TIME	
		BTEX 8021B	BTEX 8260B
		TPH 8015M (GRO-DRO-ORO-MEO)	
		Chloride	

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Relinquished By: *Conner Woerning*  
 Date: 4/8/14  
 Time: 11:05  
 Received By: *Jessica Caldwell*  
 Date: 4/8/14  
 Time: 11:05

Delivered By: (Circle One)  UPS - Bus - Other: 3.7°C #97  
 Sample Condition: Cool  Intact   
 CHECKED BY: *TC*  
 REMARKS: 24 HR2 RUSH

April 23, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: BLUE THUNDER 5 FED - 1H

Enclosed are the results of analyses for samples received by the laboratory on 04/08/19 16:05.

Cardinal Laboratories is accredited through Texas NELAP under certificate number T104704398-18-11. 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/ga/lab\\_accred\\_certif.html](http://www.tceq.texas.gov/field/ga/lab_accred_certif.html).

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

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

Cardinal Laboratories is accredited through the State of New Mexico Environment Department for:

Method SM 9223-B	Total Coliform and E. coli (Colilert MMO-MUG)
Method EPA 524.2	Regulated VOCs and Total Trihalomethanes (TTHM)
Method EPA 552.2	Total Haloacetic Acids (HAA-5)

Accreditation applies to public drinking water matrices for State of Colorado and New Mexico.

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,



Celey D. Keene

Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
BOTTOM HOLE #2 ( 1.5' BEB )	H901279-01	Soil	08-Apr-19 00:00	08-Apr-19 16:05
WEST 2 SIDEWALL	H901279-02	Soil	08-Apr-19 00:00	08-Apr-19 16:05
NORTH 2 SIDEWALL	H901279-03	Soil	08-Apr-19 00:00	08-Apr-19 16:05
EAST 2 SIDEWALL	H901279-04	Soil	08-Apr-19 00:00	08-Apr-19 16:05
SOUTH 2 SIDEWALL	H901279-05	Soil	08-Apr-19 00:00	08-Apr-19 16:05
SOUTH 1 SIDEWALL	H901279-06	Soil	08-Apr-19 00:00	08-Apr-19 16:05

Sample ID for H901279-06 changed from 'East 3 Sidewall' to 'South 1 Sidewall' as per Conner 04/23/19. This is the revised report as per those instructions. This report will replace the one sent on 04/09/19.

Cardinal Laboratories

\* = Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**BOTTOM HOLE #2 ( 1.5' BEB )**  
**H901279-01 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**
**Inorganic Compounds**

<b>Chloride</b>	<b>48.0</b>		16.0	mg/kg	4	9040907	AC	09-Apr-19	4500-Cl-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9040818	MS	09-Apr-19	8021B	

<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			89.3 %		73.3-129	9040818	MS	09-Apr-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
<b>DRO &gt;C10-C28*</b>	<b>20.6</b>		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	

<i>Surrogate: 1-Chlorooctane</i>			81.2 %		41-142	9040816	MS	09-Apr-19	8015B	
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<i>Surrogate: 1-Chlorooctadecane</i>			79.7 %		37.6-147	9040816	MS	09-Apr-19	8015B	
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Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**WEST 2 SIDEWALL**  
**H901279-02 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**
**Inorganic Compounds**

Chloride	32.0		16.0	mg/kg	4	9040907	AC	09-Apr-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9040818	MS	09-Apr-19	8021B	

Surrogate: 4-Bromofluorobenzene (PID)			95.3 %		73.3-129	9040818	MS	09-Apr-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	

Surrogate: 1-Chlorooctane			79.2 %		41-142	9040816	MS	09-Apr-19	8015B	
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Surrogate: 1-Chlorooctadecane			77.9 %		37.6-147	9040816	MS	09-Apr-19	8015B	
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Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**NORTH 2 SIDEWALL**
**H901279-03 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**
**Inorganic Compounds**

<b>Chloride</b>	<b>80.0</b>		16.0	mg/kg	4	9040907	AC	09-Apr-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9040818	MS	09-Apr-19	8021B	

<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			102 %		73.3-129	9040818	MS	09-Apr-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
<b>DRO &gt;C10-C28*</b>	<b>11.9</b>		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	

<i>Surrogate: 1-Chlorooctane</i>			78.2 %		41-142	9040816	MS	09-Apr-19	8015B	
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<i>Surrogate: 1-Chlorooctadecane</i>			76.0 %		37.6-147	9040816	MS	09-Apr-19	8015B	
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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**EAST 2 SIDEWALL**
**H901279-04 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**
**Inorganic Compounds**

<b>Chloride</b>	<b>80.0</b>		16.0	mg/kg	4	9040907	AC	09-Apr-19	4500-Cl-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9040818	MS	09-Apr-19	8021B	

<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			105 %	73.3-129		9040818	MS	09-Apr-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
<b>DRO &gt;C10-C28*</b>	<b>11.1</b>		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	

<i>Surrogate: 1-Chlorooctane</i>			80.5 %	41-142		9040816	MS	09-Apr-19	8015B	
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<i>Surrogate: 1-Chlorooctadecane</i>			78.7 %	37.6-147		9040816	MS	09-Apr-19	8015B	
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\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**SOUTH 2 SIDEWALL**
**H901279-05 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**
**Inorganic Compounds**

Chloride	64.0		16.0	mg/kg	4	9040908	AC	09-Apr-19	4500-Cl-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9040818	MS	09-Apr-19	8021B	

Surrogate: 4-Bromofluorobenzene (PID)			103 %	73.3-129		9040818	MS	09-Apr-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

GRO C6-C10*	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
DRO >C10-C28*	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
EXT DRO >C28-C36	<10.0		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	

Surrogate: 1-Chlorooctane			82.7 %	41-142		9040816	MS	09-Apr-19	8015B	
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Surrogate: 1-Chlorooctadecane			75.9 %	37.6-147		9040816	MS	09-Apr-19	8015B	
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Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**SOUTH 1 SIDEWALL**
**H901279-06 (Soil)**

Analyte	Result	MDL	Reporting Limit	Units	Dilution	Batch	Analyst	Analyzed	Method	Notes
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**Cardinal Laboratories**
**Inorganic Compounds**

<b>Chloride</b>	<b>32.0</b>		16.0	mg/kg	4	9040908	AC	09-Apr-19	4500-CI-B	
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**Volatile Organic Compounds by EPA Method 8021**

Benzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Toluene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Ethylbenzene*	<0.050		0.050	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total Xylenes*	<0.150		0.150	mg/kg	50	9040818	MS	09-Apr-19	8021B	
Total BTEX	<0.300		0.300	mg/kg	50	9040818	MS	09-Apr-19	8021B	

<i>Surrogate: 4-Bromofluorobenzene (PID)</i>			101 %		73.3-129	9040818	MS	09-Apr-19	8021B	
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**Petroleum Hydrocarbons by GC FID**

<b>GRO C6-C10*</b>	<b>14.7</b>		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
<b>DRO &gt;C10-C28*</b>	<b>50.0</b>		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	
<b>EXT DRO &gt;C28-C36</b>	<b>&lt;10.0</b>		10.0	mg/kg	1	9040816	MS	09-Apr-19	8015B	

<i>Surrogate: 1-Chlorooctane</i>			87.8 %		41-142	9040816	MS	09-Apr-19	8015B	
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<i>Surrogate: 1-Chlorooctadecane</i>			82.3 %		37.6-147	9040816	MS	09-Apr-19	8015B	
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Cardinal Laboratories

\*=Accredited Analyte

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**Inorganic Compounds - Quality Control**
**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9040907 - General Prep - Wet Chem**
**Blank (9040907-BLK1)**

Prepared &amp; Analyzed: 09-Apr-19

Chloride ND 16.0 mg/kg

**LCS (9040907-BS1)**

Prepared &amp; Analyzed: 09-Apr-19

Chloride 400 16.0 mg/kg 400 100 80-120

**LCS Dup (9040907-BSD1)**

Prepared &amp; Analyzed: 09-Apr-19

Chloride 416 16.0 mg/kg 400 104 80-120 3.92 20

**Batch 9040908 - General Prep - Wet Chem**
**Blank (9040908-BLK1)**

Prepared &amp; Analyzed: 09-Apr-19

Chloride ND 16.0 mg/kg

**LCS (9040908-BS1)**

Prepared &amp; Analyzed: 09-Apr-19

Chloride 416 16.0 mg/kg 400 104 80-120

**LCS Dup (9040908-BSD1)**

Prepared &amp; Analyzed: 09-Apr-19

Chloride 416 16.0 mg/kg 400 104 80-120 0.00 20

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**Volatile Organic Compounds by EPA Method 8021 - Quality Control**
**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9040818 - Volatiles**
**Blank (9040818-BLK1)**

Prepared: 08-Apr-19 Analyzed: 09-Apr-19

Benzene	ND	0.050	mg/kg							
Toluene	ND	0.050	mg/kg							
Ethylbenzene	ND	0.050	mg/kg							
Total Xylenes	ND	0.150	mg/kg							
Total BTEX	ND	0.300	mg/kg							
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>	<i>0.0991</i>		<i>mg/kg</i>	<i>0.100</i>		<i>99.1</i>	<i>73.3-129</i>			

**LCS (9040818-BS1)**

Prepared: 08-Apr-19 Analyzed: 09-Apr-19

Benzene	1.69	0.050	mg/kg	2.00		84.3	72.2-131			
Toluene	1.74	0.050	mg/kg	2.00		86.8	71.7-126			
Ethylbenzene	1.74	0.050	mg/kg	2.00		87.1	68.9-126			
Total Xylenes	5.11	0.150	mg/kg	6.00		85.2	71.4-125			
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>	<i>0.107</i>		<i>mg/kg</i>	<i>0.100</i>		<i>107</i>	<i>73.3-129</i>			

**LCS Dup (9040818-BSD1)**

Prepared: 08-Apr-19 Analyzed: 09-Apr-19

Benzene	1.71	0.050	mg/kg	2.00		85.4	72.2-131	1.34	6.91	
Toluene	1.75	0.050	mg/kg	2.00		87.6	71.7-126	0.924	7.12	
Ethylbenzene	1.75	0.050	mg/kg	2.00		87.6	68.9-126	0.579	7.88	
Total Xylenes	5.16	0.150	mg/kg	6.00		86.0	71.4-125	0.977	7.46	
<i>Surrogate: 4-Bromofluorobenzene (PID)</i>	<i>0.105</i>		<i>mg/kg</i>	<i>0.100</i>		<i>105</i>	<i>73.3-129</i>			

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Celey D. Keene, Lab Director/Quality Manager

**Analytical Results For:**

 TETRA TECH  
 901 WEST WALL STREET , STE 100  
 MIDLAND TX, 79701

 Project: BLUE THUNDER 5 FED - 1H  
 Project Number: 212C-MD-01678  
 Project Manager: CLAIR GONZALES  
 Fax To: (432) 682-3946

 Reported:  
 23-Apr-19 15:49

**Petroleum Hydrocarbons by GC FID - Quality Control**
**Cardinal Laboratories**

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
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**Batch 9040816 - General Prep - Organics**
**Blank (9040816-BLK1)**

Prepared &amp; Analyzed: 08-Apr-19

GRO C6-C10	ND	10.0	mg/kg							
DRO >C10-C28	ND	10.0	mg/kg							
EXT DRO >C28-C36	ND	10.0	mg/kg							
<i>Surrogate: 1-Chlorooctane</i>	40.4		mg/kg	50.0		80.8	41-142			
<i>Surrogate: 1-Chlorooctadecane</i>	40.7		mg/kg	50.0		81.4	37.6-147			

**LCS (9040816-BS1)**

Prepared &amp; Analyzed: 08-Apr-19

GRO C6-C10	199	10.0	mg/kg	200		99.7	76.5-133			
DRO >C10-C28	182	10.0	mg/kg	200		91.2	72.9-138			
Total TPH C6-C28	382	10.0	mg/kg	400		95.4	78-132			
<i>Surrogate: 1-Chlorooctane</i>	44.6		mg/kg	50.0		89.2	41-142			
<i>Surrogate: 1-Chlorooctadecane</i>	41.1		mg/kg	50.0		82.2	37.6-147			

**LCS Dup (9040816-BSD1)**

Prepared &amp; Analyzed: 08-Apr-19

GRO C6-C10	180	10.0	mg/kg	200		89.9	76.5-133	10.3	20.6	
DRO >C10-C28	177	10.0	mg/kg	200		88.4	72.9-138	3.08	20.6	
Total TPH C6-C28	356	10.0	mg/kg	400		89.1	78-132	6.81	18	
<i>Surrogate: 1-Chlorooctane</i>	42.5		mg/kg	50.0		85.0	41-142			
<i>Surrogate: 1-Chlorooctadecane</i>	42.3		mg/kg	50.0		84.6	37.6-147			

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Celey D. Keene, Lab Director/Quality Manager

**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, Lab Director/Quality Manager

101 East Marland, Hobbs, NM 88240  
 (575) 393-2326 FAX (575) 393-2476

**CHAIN-OF-CUSTODY AND ANALYSIS REQUEST**

<b>Company Name:</b> TETRA TECH <b>Project Manager:</b> CLAIR COVATES <b>Address:</b> 8901 W. WALL ST. STE 100 <b>City:</b> MIDLAND <b>State:</b> TX <b>Zip:</b> 79705 <b>Phone #:</b> <b>Fax #:</b> <b>Project #:</b> 212-L-00-01678 <b>Project Owner:</b> <b>Project Name:</b> BLUE THUNDER 5 FED-1A (COG) <b>Project Location:</b> Eddy Co, NM <b>Sampler Name:</b> CORNER MOENRZING / TONY LEVADA <small>FOR LAB USE ONLY</small>		<b>P.O. #:</b> <b>Company:</b> COG <b>Attn:</b> ILE TRAVREY <b>Address:</b> <b>City:</b> <b>State:</b> <b>Zip:</b> <b>Phone #:</b> <b>Fax #:</b>	
<b>Lab I.D.</b>		<b>Sample I.D.</b>	
HQD/279	Bottom Hole # 2 (1.5 BEB)	(G)RAB OR (C)OMP.	
1	WEST 2 Sidewalk	# CONTAINERS	
2	NORTH 2 Sidewalk	GROUNDWATER	
3	EAST 2 Sidewalk	WASTEWATER	
4	SOUTH 2 Sidewalk	SOIL	
5	EAST 2 Sidewalk *	OIL	
6	SOUTH 1	SLUDGE	
		OTHER:	
		ACID/BASE:	
		ICE / COOL	
		OTHER:	
		DATE	
		TIME	
		BTEY 80213	BTEY 82603
		TPH 8015M (GRD-DRO-ORO-MRO)	
		chloride.	

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**Relinquished By:** *Cornel Moyer*  
**Relinquished By:** *Cornel Moyer*  
**Time:** 7:05  
**Date:** 4/8/19  
**Received By:** *Jawana Clark*  
**Time:**  
**Date:**  
**Sample Condition:** Cool  Yes  No Intact  Yes  No  
**Delivered By:** (Circle One)  UPS  Bus  Other: 3.7c #49  
**Checked By:** *ye.*  
**REMARKS:** 24 hr. RUSH  
 \* Sample ID revised as per Corner. 04/23/19  
*ck*