

SITE INFORMATION

Report Type: Closure Report 1RP-5362

General Site Information:

Site:	Macho State #001H				
Company:	COG Operating LLC				
Section, Township and Range	Unit D	Sec. 02	T 24S	R 33E	
Lease Number:	API No. 30-025-39884				
County:	Lea County				
GPS:	32.25163			-103.55052	
Surface Owner:	State				
Directions:	From the intersection of Delaware Basin Rd (HWY 21) and X-L Road, turn west on X-L Road and travel approximately 3.9 miles to the end of the lease road. Turn south onto lease road and travel approximately 1.3 miles. Turn east onto lease road and travel approximately 1.1 miles to the end of the lease road. Site is adjacent south to the pad location.				

Release Data:

Date Released:	1/28/2019
Type Release:	Produced Water
Source of Contamination:	Flow Line Fitting
Fluid Released:	10 bbls
Fluids Recovered:	0 bbls

Official Communication:

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

Site Characterization

Depth to Groundwater:	80' below surface
Karst Potential:	Low

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	10,000 mg/kg



April 25, 2019

Oil Conservation Division, District 1
1625 North French Drive
Hobbs, New Mexico 88240

Re: Closure Report for the COG Operating, LLC, Macho State #001H, Unit D, Section 02, Township 24 South, Range 33 East, Lea County, New Mexico. 1RP-5362

To Whom it May Concern:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating, LLC (COG) to remediate a release that occurred at the Macho State #001H, Unit D, Section 02, Township 24 South, Range 33 East, Lea County, New Mexico (Site). The spill site coordinates are 32.25163°, -103.55052°. 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 January 28, 2019. Approximately 10 barrels of produced water were released due to a fitting failure on a flow line. A vacuum truck was dispatched to remove all free-standing fluids; however, none were recovered. The release impacted the pad south of the pad, measuring approximately 30' X 100'. The initial C-141 Form is 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. The site is in a low karst potential area. Two wells in close proximity to the site are listed in the New Mexico Office of the State Engineers website. The nearest well (C 02308) is listed in Section 10, Township 24 South, Range 33 East, approximately 1.55 miles southwest of the site, and has a reported depth to groundwater of 20 feet below ground surface. It was completed in 1920. The other well (C 04014 POD4) is listed in Section 01, Township 24 South, Range 33 East, approximately 1.75 miles east of the site, and has a reported depth to groundwater of 86 feet below ground surface. The well was installed in February 2017. The groundwater data is shown in Appendix B.

Tetra Tech

901 W. Wall Street, Suite 100, Midland, TX 79701

Tel 432.682.4559 www.tetrattech.com

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 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 1,000 mg/kg (GRO + DRO) and 2,500 mg/kg (GRO + DRO + MRO). Additionally, based on the site characterization, the proposed RRAL for chlorides is 10,000 mg/kg.

Soil Assessment and Analytical Results

On March 15, 2019, Tetra Tech personnel were onsite to sample the release area. A total of four (4) trenches (Trench 1, Trench 2, Trench 3, and Trench 4) were installed until refusal to total depths of 2.0 – 3.0' below surface. Soil samples were collected and submitted to the laboratory for TPH analysis by EPA method 8015 modified, BTEX by EPA Method 8021B, and chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The results of the sampling are summarized in Table 1. The sample locations are shown on Figure 3.

Referring to Table 1, the area of Trench 1 did not have benzene, total BTEX, TPH, or chlorides above their respective RRALs. Trench 2, Trench 3, and Trench 4 had reported chloride concentrations above 600 mg/kg from the assessment data. The chlorides ranged from 736 mg/kg (Trench 3 at 3.0') to 4,400 mg/kg (Trench 2 at 2.0').

Remediation Activities

Tetra Tech personnel were onsite from March 18 - 20, 2019 to supervise the remediation activities. The release area was excavated to total depths between 4.0' to 4.5' below surface. A 20-mil liner was installed in the bottom hole areas of 5 and 6 to prevent further chloride migration in the subsurface. Eight (8) bottom hole and four (4) sidewall composite samples were collected every 400 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, all collected confirmation samples showed benzene, total BTEX, TPH, and chloride concentrations below the RRAL's.

Approximately 180 cubic yards of material was excavated and transported offsite for proper disposal. The area was then backfilled with clean material to surface grade.



Revegetation Plan

The area will be seeded with a Bureau of Land Management (BLM) seed mixture for loamy sites in June 2019 in order to coincide with the rainy season in Southeastern New Mexico to aid in revegetation. Based on the soils at the site, the Bureau of Land Management (BLM) Seed Mixture 1 will be used for seeding and will be planted in the amount specified in the pounds pure live seed (PLS) per acre. The seed mixture will be spread by a drill equipped with a depth regulator or a hand-held broadcaster and raked. If a hand-held broadcaster is used for dispersal, the pounds pure live seed per acre will be doubled.

Site inspections will be performed to assess the revegetation progress and evaluate the site for the presence of primary or secondary noxious weeds. If noxious weeds are identified, the BLM will be contacted to determine an effective method for eradication. If the site does not show revegetation after one growing season, the area will be reseeded as appropriate. The BLM seed mixture details and corresponding pounds pure live seed per acre are included in Appendix D.

Conclusion

Based on the laboratory results and remediation activities performed COG requests closure of this spill issue. 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

Handwritten signature of Clair Gonzales in blue ink.

Clair Gonzales,
Project Manager

Handwritten signature of Kayla Taylor in blue ink.

Kayla Taylor,
Geologist

cc: Ike Tavarez – COG
Dakota Neel - COG
Rebecca Haskell - COG
Sheldon Hitchcock - COG
DeAnn Grant - COG

Figures



1 inch = 20,833 feet



FIGURE 1

MACHO STATE #001
(32.25163°, -103.55052°)

OVERVIEW MAP

LEA COUNTY, NEW MEXICO

Project : 212C-MD-01658

Date : 04/19/2019

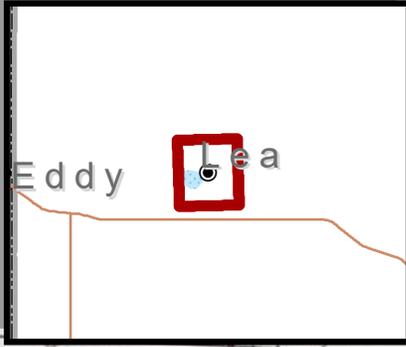
File : H:\GIS\212C-MD-01658



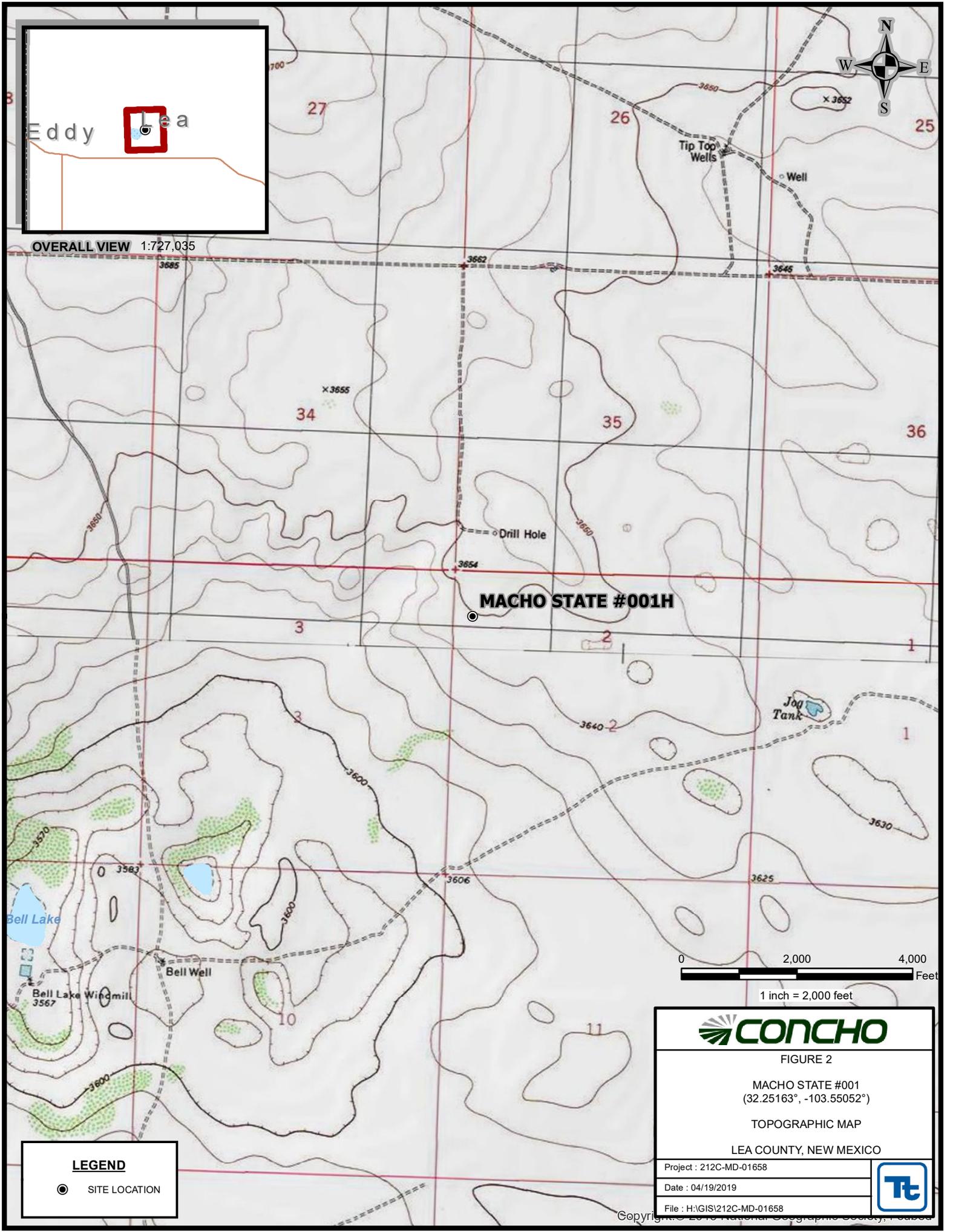
LEGEND

● SITE LOCATION

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



OVERALL VIEW 1:727,035



1 inch = 2,000 feet

LEGEND

● SITE LOCATION

CONCHO

FIGURE 2

MACHO STATE #001
(32.25163°, -103.55052°)

TOPOGRAPHIC MAP

LEA COUNTY, NEW MEXICO

Project : 212C-MD-01658	
Date : 04/19/2019	
File : H:\GIS\212C-MD-01658	



PAD

58'

PRODUCED WATER LINE

RELEASE SOURCE

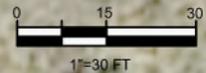
T-1

T-2

T-3

T-4

128'



LEGEND

-  TRENCH SAMPLE LOCATIONS
-  SPILL AREA
-  ABOVEGROUND POLY LINE



FIGURE 3

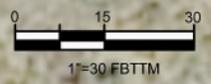
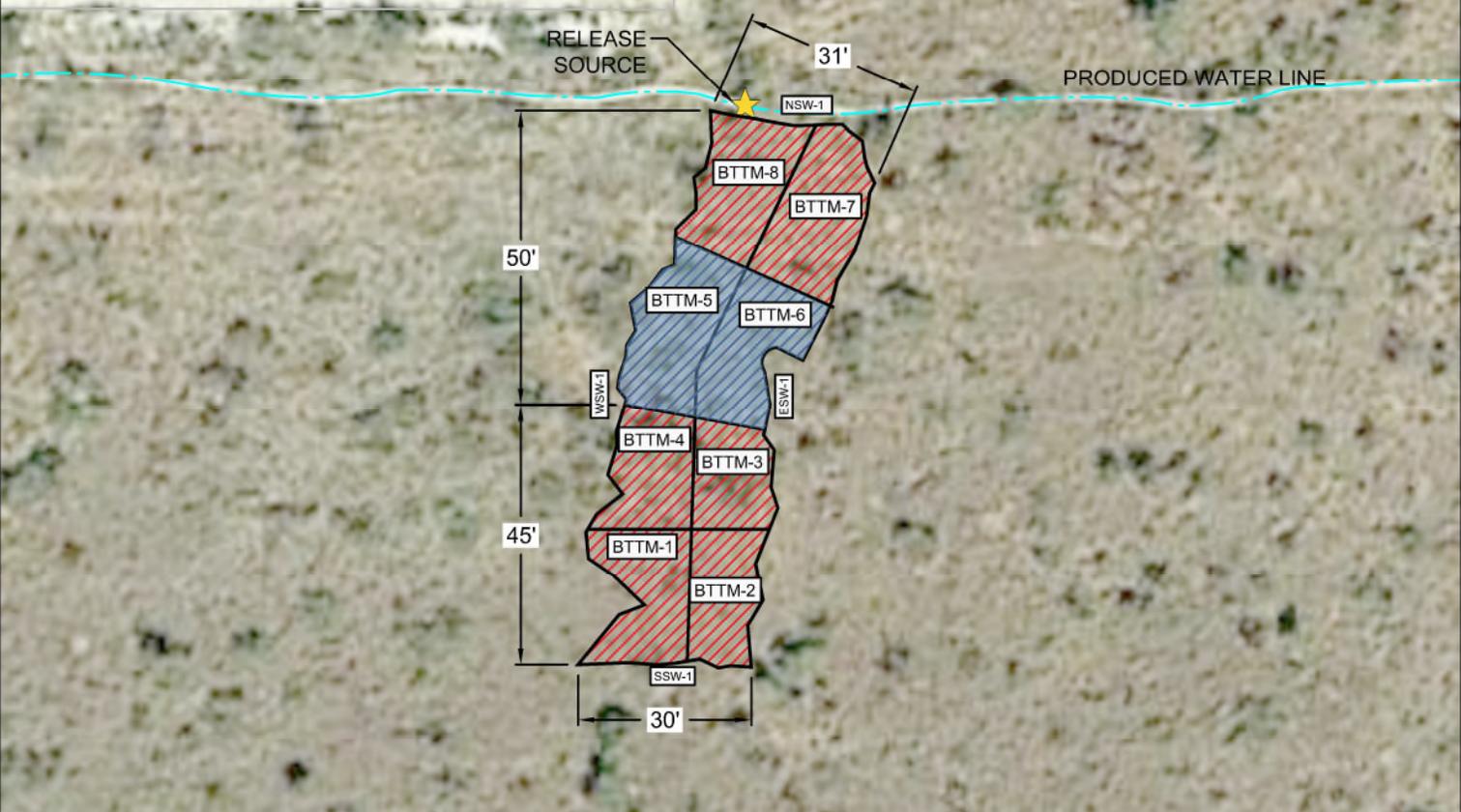
MACHO STATE #001
(32.25163°, -103.55052°)

SPILL ASSESSMENT MAP
LEA COUNTY, NEW MEXICO

Project: 212C-MD-01658	
Date: 04/19/2019	
File: H:\GIS\212C-MD-01658	



PAD



LEGEND

- BTTM BOTTOM HOLE SAMPLE LOCATIONS
-  4.0' -4.5' EXCAVATED DEPTH AREA
-  4.0' -4.5' EXCAVATED DEPTH AREA w/LINER
-  ABOVEGROUND POLY LINE

CONCHO

FIGURE 4

MACHO STATE #001
(32.25163°, -103.55052°)

EXCAVATION AREA & DEPTH MAP

LEA COUNTY, NEW MEXICO

ProjecBTTM: 212C-MD-01658	
DaBTTMe: 04/19/2019	
File: H:\GIS\212C-MD-01658	

Tables

Table 1
COG
Macho State #1H
Lea County, New Mexico

Sample ID	Sample Date	Sample Depth (ft)	BEB (ft)	Soil Status		TPH (mg/kg)				Benzene (mg/kg)	Toluene (mg/kg)	Ethlybenzene (mg/kg)	Xylene (mg/kg)	Total BTEX (mg/kg)	Chloride (mg/kg)
				In-Situ	Removed	GRO	DRO	ORO	Total						
Trench 1	3/15/2019	0-1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0
	"	1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0
	"	2	-		X	-	-	-	-	-	-	-	-	-	32.0
Trench 2	3/15/2019	0-1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	5,840
	"	1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	6,320
	"	2	-		X	-	-	-	-	-	-	-	-	-	4,400
Trench 3	3/15/2019	0-1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	64.0
	"	1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	1,390
	"	2	-		X	-	-	-	-	-	-	-	-	-	2,480
	"	3	-		X	-	-	-	-	-	-	-	-	-	736
Trench 4	3/15/2019	0-1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	464
	"	1	-		X	<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	1,010
	"	2	-		X	-	-	-	-	-	-	-	-	-	2,440
South Sidewall 1	3/19/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0
North Sidewall 1	3/20/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	96.0
East Sidewall 1	3/20/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0
West Sidewall 1	3/20/2019	-	-	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	48.0
Bottom Hole #1	3/19/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0
Bottom Hole #2	3/19/2019	-	4-4.5	X		<10.0	12.1	<10.0	12.1	<0.050	<0.050	<0.050	<0.150	<0.300	48.0
Bottom Hole #3	3/19/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	48.0
Bottom Hole #4	3/19/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	560
Bottom Hole #5	3/20/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	2,160
Bottom Hole #6	3/20/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	896
Bottom Hole #7	3/20/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	16.0
Bottom Hole #8	3/20/2019	-	4-4.5	X		<10.0	<10.0	<10.0	<10.0	<0.050	<0.050	<0.050	<0.150	<0.300	32.0

(-) Not Analyzed

 Excavation Depths

Photos

COG
Macho State #001H
Lea County, New Mexico



TETRA TECH



View Southwest – View of excavation area



View South – View of excavation area

COG
Macho State #001H
Lea County, New Mexico



TETRA TECH



View Southwest – View of excavation and liner installation at Bottom Hole 5 and 6



View North – View of excavation and liner installation at Bottom Hole 5 and 6

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

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

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

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 Opreant</u> Date: _____ email: _____ Telephone: _____
<u>OCD Only</u> Received by: <u>Anabela Portamunte</u> Date: _____

Incident ID	
District RP	
Facility ID	
Application ID	

Closure

The responsible party must attach information demonstrating they have complied with all applicable closure requirements and any conditions or directives of the OCD. This demonstration should be in the form of a comprehensive report (electronic submittals in .pdf format are preferred) including a scaled site map, sampling diagrams, relevant field notes, photographs of any excavation prior to backfilling, laboratory data including chain of custody documents of final sampling, and a narrative of the remedial activities. Refer to 19.15.29.12 NMAC.

Closure Report Attachment Checklist: *Each of the following items must be included in the closure report.*

- A scaled site and sampling diagram as described in 19.15.29.11 NMAC
- Photographs of the remediated site prior to backfill or photos of the liner integrity if applicable (Note: appropriate OCD District office must be notified 2 days prior to liner inspection)
- Laboratory analyses of final sampling (Note: appropriate ODC District office must be notified 2 days prior to final sampling)
- Description of remediation activities

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. The responsible party acknowledges they must substantially restore, reclaim, and re-vegetate the impacted surface area to the conditions that existed prior to the release or their final land use in accordance with 19.15.29.13 NMAC including notification to the OCD when reclamation and re-vegetation are complete.

Printed Name: _____ Title: _____

Signature:  _____ Date: _____

email: _____ Telephone: _____

OCD Only

Received by: _____ Date: _____

Closure approval by the OCD does not relieve the responsible party of liability should their operations have failed to adequately investigate and remediate contamination that poses a threat to groundwater, surface water, human health, or the environment nor does not relieve the responsible party of compliance with any other federal, state, or local laws and/or regulations.

Closure Approved by:  _____ Date: _____

Printed Name: _____ Title: _____

Appendix B

Water Well Data
Average Depth to Groundwater (ft)
COG Macho State #001H
Lea County, New Mexico

23 South 32 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	34	35	36

23 South 33 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	34	35	36

23 South 34 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	34	35	36

24 South 32 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	34	35	36

24 South 33 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	34	35	36

24 South 34 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	34	35	36

25 South 32 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	34	35	36

25 South 33 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	34	35	36

25 South 34 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	34	35	36

- 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

New Mexico Office of the State Engineer

Water Column/Average Depth to Water

(A CLW##### in the POD suffix indicates the POD has been replaced & no longer serves a water right file.)

(R=POD has been replaced,
O=orphaned,
C=the file is closed)

(quarters are 1=NW 2=NE 3=SW 4=SE)

(quarters are smallest to largest)

(NAD83 UTM in meters)

(In feet)

POD Number	Code	POD Sub-basin	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	DepthWell	DepthWater	Water Column	
C 02308		CUB	LE	1	3	1	10	24S	33E	634953	3567364*	<input type="checkbox"/>	40	20	20
C 02309		CUB	LE	2	2	2	25	24S	33E	639638	3562994*	<input type="checkbox"/>	60	30	30
C 02310		CUB	LE	2	3	2	33	24S	33E	634437	3560918*	<input type="checkbox"/>	120	70	50
C 02311		CUB	LE	2	3	2	33	24S	33E	634437	3560918*	<input type="checkbox"/>	120	70	50
C 02430		CUB	LE	3	3	3	16	24S	33E	633377	3564732*	<input type="checkbox"/>	643	415	228
C 02431		CUB	LE	4	4	4	17	24S	33E	633175	3564728*	<input type="checkbox"/>	525	415	110
C 02432		CUB	LE	4	4	4	17	24S	33E	633175	3564728*	<input type="checkbox"/>	640	415	225
C 02563		CUB	LE	1	4	2	33	24S	33E	634639	3560923*	<input type="checkbox"/>	120		
C 02564		CUB	LE	2	4	2	33	24S	33E	634839	3560923*	<input type="checkbox"/>	120		
C 02890		C	LE	2	4	29	24S	33E		633114	3562012*	<input type="checkbox"/>	500		
C 03565 POD3		CUB	LE	3	4	08	24S	33E		632763	3566546	<input type="checkbox"/>		1533	
C 03591 POD1		CUB	LE	2	1	4	05	24S	33E	632731	3568518	<input type="checkbox"/>			
C 03600 POD1		CUB	LE	2	2	1	26	24S	33E	637275	3563023	<input type="checkbox"/>			
C 03600 POD2		CUB	LE	4	4	1	25	24S	33E	638824	3562329	<input type="checkbox"/>			
C 03600 POD3		CUB	LE	3	4	2	26	24S	33E	637784	3562340	<input type="checkbox"/>			
C 03600 POD4		CUB	LE	3	3	1	26	24S	33E	636617	3562293	<input type="checkbox"/>			
C 03600 POD5		CUB	LE	3	2	4	26	24S	33E	637857	3562020	<input type="checkbox"/>			
C 03600 POD6		CUB	LE	3	1	4	26	24S	33E	637383	3562026	<input type="checkbox"/>			
C 03600 POD7		CUB	LE	3	1	3	26	24S	33E	636726	3561968	<input type="checkbox"/>			
C 03601 POD1		CUB	LE	4	4	2	23	24S	33E	638124	3563937	<input type="checkbox"/>			
C 03601 POD2		CUB	LE	3	2	4	23	24S	33E	637846	3563588	<input type="checkbox"/>			
C 03601 POD3		CUB	LE	1	3	3	24	24S	33E	638142	3563413	<input type="checkbox"/>			
C 03601 POD4		CUB	LE	3	3	3	24	24S	33E	638162	3561375	<input type="checkbox"/>			
C 03601 POD5		CUB	LE	2	4	4	23	24S	33E	637988	3563334	<input type="checkbox"/>			
C 03601 POD6		CUB	LE	1	4	4	23	24S	33E	637834	3563338	<input type="checkbox"/>			
C 03601 POD7		CUB	LE	4	4	4	23	24S	33E	637946	3563170	<input type="checkbox"/>			
C 03602 POD2		CUB	LE	4	4	1	25	24S	33E	638824	3562329	<input type="checkbox"/>			
C 03603 POD1		CUB	LE	3	2	2	35	24S	33E	637805	3561225	<input type="checkbox"/>			
C 03603 POD2		CUB	LE	3	1	2	35	24S	33E	637384	3561167	<input type="checkbox"/>			
C 03603 POD3		CUB	LE	4	1	1	35	24S	33E	636890	3561092	<input type="checkbox"/>			
C 03603 POD4		CUB	LE	3	2	4	35	24S	33E	637789	3560461	<input type="checkbox"/>			
C 03603 POD5		CUB	LE	3	3	2	35	24S	33E	636745	3560767	<input type="checkbox"/>			
C 03603 POD6		CUB	LE	3	1	3	35	24S	33E	636749	3560447	<input type="checkbox"/>			
C 03662 POD1		C	LE	3	1	2	23	24S	33E	637342	3564428	<input type="checkbox"/>	550	110	440
C 03666 POD1		C	LE	2	3	4	13	24S	33E	639132	3565078	<input type="checkbox"/>	650	390	260
C 03679 POD1		C	ED	1	4	2	14	24S	33E	603567	3581547	<input type="checkbox"/>	700	575	125
C 03917 POD1		C	LE	4	1	3	13	24S	33E	638374	3565212	<input type="checkbox"/>	600	420	180
C 04014 POD2		CUB	LE	4	4	2	01	24S	33E	639656	3568917	<input type="checkbox"/>	95	81	14
C 04014 POD3		CUB	LE	2	4	2	01	24S	33E	639497	3569007	<input type="checkbox"/>	95	87	8
C 04014 POD4		CUB	LE	3	4	2	01	24S	33E	639295	3568859	<input type="checkbox"/>	96	86	10
C 04014 POD5		CUB	LE	1	4	2	01	24S	33E	639284	3569086	<input type="checkbox"/>	95	85	10

Average Depth to Water: **300 feet**
 Minimum Depth: **20 feet**
 Maximum Depth: **1533 feet**

Record Count: 41

PLSS Search:

Township: 24S Range: 33E

*UTM location was derived from PLSS - see Help

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.

3/13/19 7:27 AM

WATER COLUMN/ AVERAGE DEPTH
TO WATER

COG Macho State #001 H

Karst Potential

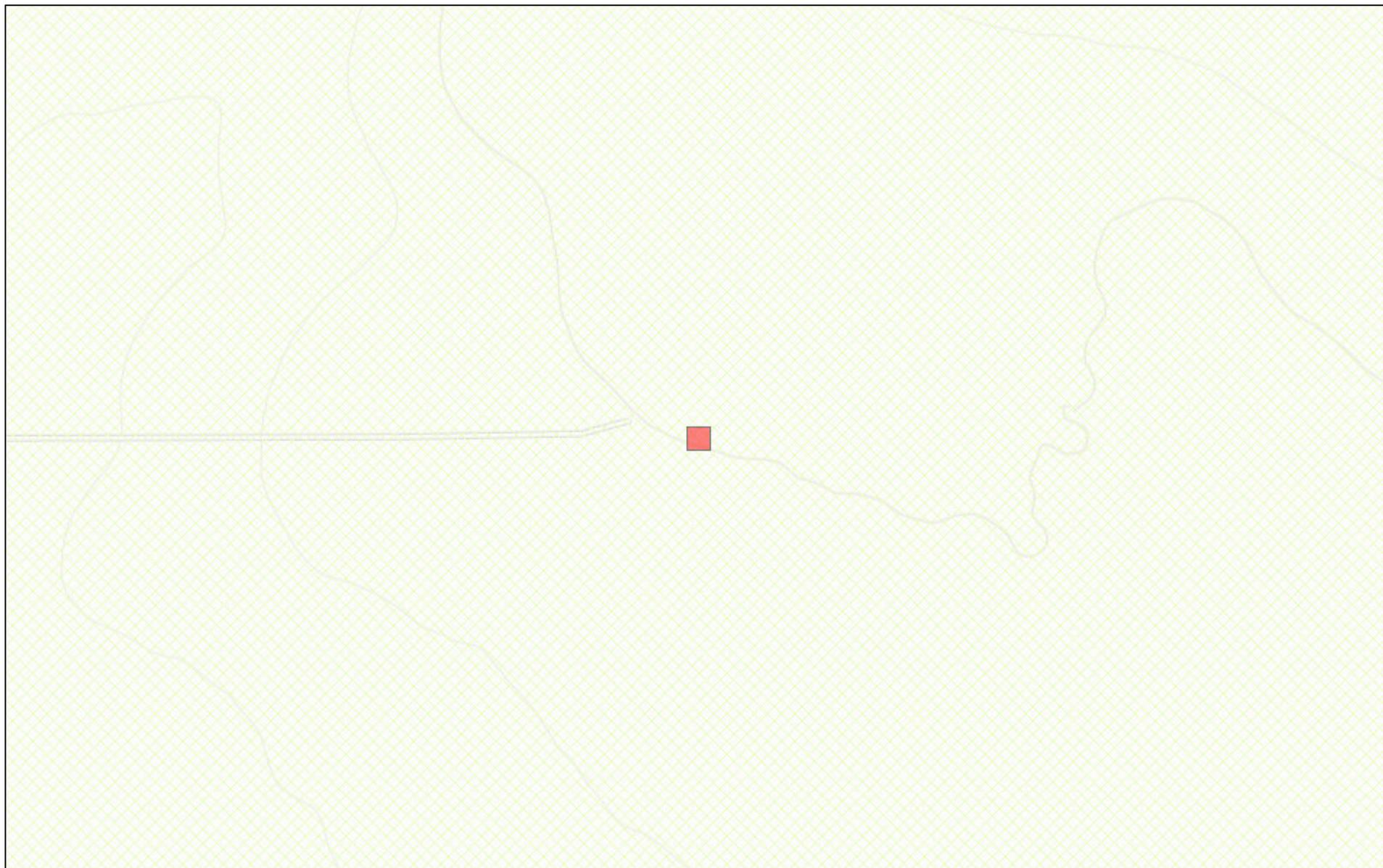
Legend

-  32.25163, -103.55052
-  High
-  Low
-  Medium

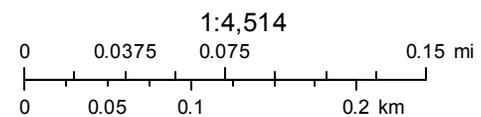
 32.25163, -103.55052



New Mexico NFHL Data



March 13, 2019



FEMA
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS,

Appendix C



March 20, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: MACHO STATE 1H

Enclosed are the results of analyses for samples received by the laboratory on 03/15/19 14:50.

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.

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 with a large, flowing "C" and "K".

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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 1 (0-1') (H901021-01)

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	03/18/2019	ND	2.06	103	2.00	1.38	
Toluene*	<0.050	0.050	03/18/2019	ND	1.87	93.7	2.00	0.598	
Ethylbenzene*	<0.050	0.050	03/18/2019	ND	1.93	96.7	2.00	0.318	
Total Xylenes*	<0.150	0.150	03/18/2019	ND	6.08	101	6.00	0.282	
Total BTEX	<0.300	0.300	03/18/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 99.9 % 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
Chloride	32.0	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3	
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0	
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND					

Surrogate: 1-Chlorooctane 89.2 % 41-142

Surrogate: 1-Chlorooctadecane 92.1 % 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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 1 (1') (H901021-02)

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	03/18/2019	ND	2.06	103	2.00	1.38		
Toluene*	<0.050	0.050	03/18/2019	ND	1.87	93.7	2.00	0.598		
Ethylbenzene*	<0.050	0.050	03/18/2019	ND	1.93	96.7	2.00	0.318		
Total Xylenes*	<0.150	0.150	03/18/2019	ND	6.08	101	6.00	0.282		
Total BTEX	<0.300	0.300	03/18/2019	ND						

Surrogate: 4-Bromofluorobenzene (PID) 96.9 % 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	32.0	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3		
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0		
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND						

Surrogate: 1-Chlorooctane 101 % 41-142

Surrogate: 1-Chlorooctadecane 105 % 37.6-147

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 1 (2') (H901021-03)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	32.0	16.0	03/18/2019	ND	416	104	400	3.77	

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 2 (0-1') (H901021-04)

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	03/18/2019	ND	2.06	103	2.00	1.38	
Toluene*	<0.050	0.050	03/18/2019	ND	1.87	93.7	2.00	0.598	
Ethylbenzene*	<0.050	0.050	03/18/2019	ND	1.93	96.7	2.00	0.318	
Total Xylenes*	<0.150	0.150	03/18/2019	ND	6.08	101	6.00	0.282	
Total BTEX	<0.300	0.300	03/18/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 96.2 % 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	5840	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3	
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0	
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND					

Surrogate: 1-Chlorooctane 98.2 % 41-142

Surrogate: 1-Chlorooctadecane 102 % 37.6-147

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 2 (1') (H901021-05)

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	03/18/2019	ND	2.06	103	2.00	1.38	
Toluene*	<0.050	0.050	03/18/2019	ND	1.87	93.7	2.00	0.598	
Ethylbenzene*	<0.050	0.050	03/18/2019	ND	1.93	96.7	2.00	0.318	
Total Xylenes*	<0.150	0.150	03/18/2019	ND	6.08	101	6.00	0.282	
Total BTEX	<0.300	0.300	03/18/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 98.6 % 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	6320	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3	
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0	
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND					

Surrogate: 1-Chlorooctane 94.8 % 41-142

Surrogate: 1-Chlorooctadecane 99.0 % 37.6-147

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 2 (2') (H901021-06)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	4400	16.0	03/18/2019	ND	416	104	400	3.77	

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 3 (0-1') (H901021-07)

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	03/18/2019	ND	2.06	103	2.00	1.38	
Toluene*	<0.050	0.050	03/18/2019	ND	1.87	93.7	2.00	0.598	
Ethylbenzene*	<0.050	0.050	03/18/2019	ND	1.93	96.7	2.00	0.318	
Total Xylenes*	<0.150	0.150	03/18/2019	ND	6.08	101	6.00	0.282	
Total BTEX	<0.300	0.300	03/18/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 96.0 % 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
Chloride	64.0	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3	
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0	
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND					

Surrogate: 1-Chlorooctane 95.7 % 41-142

Surrogate: 1-Chlorooctadecane 101 % 37.6-147

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 3 (1') (H901021-08)

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	03/18/2019	ND	2.06	103	2.00	1.38	
Toluene*	<0.050	0.050	03/18/2019	ND	1.87	93.7	2.00	0.598	
Ethylbenzene*	<0.050	0.050	03/18/2019	ND	1.93	96.7	2.00	0.318	
Total Xylenes*	<0.150	0.150	03/18/2019	ND	6.08	101	6.00	0.282	
Total BTEX	<0.300	0.300	03/18/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 97.7 % 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	1390	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3	
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0	
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND					

Surrogate: 1-Chlorooctane 89.0 % 41-142

Surrogate: 1-Chlorooctadecane 92.6 % 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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 3 (2') (H901021-09)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2480	16.0	03/18/2019	ND	416	104	400	3.77	

Sample ID: TRENCH 3 (3') (H901021-10)

Chloride, SM4500CI-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	736	16.0	03/18/2019	ND	416	104	400	3.77	

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 4 (0-1') (H901021-11)

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	03/19/2019	ND	2.08	104	2.00	0.400	
Toluene*	<0.050	0.050	03/19/2019	ND	1.92	95.9	2.00	1.25	
Ethylbenzene*	<0.050	0.050	03/19/2019	ND	1.97	98.4	2.00	1.39	
Total Xylenes*	<0.150	0.150	03/19/2019	ND	5.99	99.8	6.00	0.300	
Total BTEX	<0.300	0.300	03/19/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 97.0 % 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	464	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3	
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0	
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND					

Surrogate: 1-Chlorooctane 94.0 % 41-142

Surrogate: 1-Chlorooctadecane 96.8 % 37.6-147

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 4 (1') (H901021-12)

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	03/19/2019	ND	2.08	104	2.00	0.400		
Toluene*	<0.050	0.050	03/19/2019	ND	1.92	95.9	2.00	1.25		
Ethylbenzene*	<0.050	0.050	03/19/2019	ND	1.97	98.4	2.00	1.39		
Total Xylenes*	<0.150	0.150	03/19/2019	ND	5.99	99.8	6.00	0.300		
Total BTEX	<0.300	0.300	03/19/2019	ND						

Surrogate: 4-Bromofluorobenzene (PID) 94.2 % 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	1010	16.0	03/18/2019	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	03/16/2019	ND	186	92.8	200	20.3		
DRO >C10-C28*	<10.0	10.0	03/16/2019	ND	212	106	200	18.0		
EXT DRO >C28-C36	<10.0	10.0	03/16/2019	ND						

Surrogate: 1-Chlorooctane 97.3 % 41-142

Surrogate: 1-Chlorooctadecane 101 % 37.6-147

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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:	03/15/2019	Sampling Date:	03/15/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: TRENCH 4 (2') (H901021-13)

Chloride, SM4500Cl-B		mg/kg		Analyzed By: AC					
Analyte	Result	Reporting Limit	Analyzed	Method Blank	BS	% Recovery	True Value QC	RPD	Qualifier
Chloride	2440	16.0	03/18/2019	ND	416	104	400	3.77	

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Celey D. Keene, Lab Director/Quality Manager

Notes and Definitions

- QR-02 The RPD result exceeded the QC control limits; however, both percent recoveries were acceptable. Sample results for the QC batch were accepted based on percent recoveries and completeness of QC data.
- 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

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: **CLAIR GONZALES**

Project Name: **212-MO-01658 MACHO STATE 1M (1.28.19)**

Project Location: **LEA CO, NM** Project #: **212-MO-01658**

Invoice to: **COA - ICS TAVAREZ**

Receiving Laboratory: **CARDINAL** Sampler Signature: **CONNIE M. TONY L**

Comments:

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX		PRESERVATIVE METHOD		# CONTAINERS	FILTERED (Y/N)
		DATE	TIME	WATER	SOIL	HCL	HNO ₃		
1	TRENCH 1 (0-1')	3/15/14		X		X		X	1
2	TRENCH 1 (1')	3/15/14		X		X		X	2
3	TRENCH 1 (2')	3/15/14		X		X		X	2
4	TRENCH 2 (0-1')	3/15/14		X		X		X	2
5	TRENCH 2 (1')	3/15/14		X		X		X	2
6	TRENCH 2 (2')	3/15/14		X		X		X	2
7	TRENCH 3 (0-1')	3/15/14		X		X		X	2
8	TRENCH 3 (1')	3/15/14		X		X		X	2
9	TRENCH 3 (2')	3/15/14		X		X		X	2
10	TRENCH 3 (3')	3/15/14		X		X		X	2

Relinquished by: **Carmon M. Padron** Date: **3/15/14** Time: **14:47**
 Received by: **Maura Calderon** Date: **3-15-14** Time: **14:50**

Relinquished by: _____ Date: _____ Time: _____
 Received by: _____ Date: _____ Time: _____

ANALYSIS REQUEST
(Circle or Specify Method No.)

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

LAB USE ONLY
 Sample Temperature: **70. #97**
 REMARKS:
 STANDARD - BTEX + TPH
 RUSH: Same Day **24 hr** **OL only**
 Rush Charges Authorized
 Special Report Limits or TRRP Report

ORIGINAL COPY

(Circle) HAND DELIVERED FEDEX UPS Tracking #:



March 20, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: MACHO STATE 1H

Enclosed are the results of analyses for samples received by the laboratory on 03/19/19 16:50.

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.

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 with a large, flowing "C" at the beginning.

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:	03/19/2019	Sampling Date:	03/19/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #1 (4.0-4.5' BEB) (H901063-01)

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	03/20/2019	ND	2.07	103	2.00	0.276	
Toluene*	<0.050	0.050	03/20/2019	ND	1.89	94.7	2.00	0.0452	
Ethylbenzene*	<0.050	0.050	03/20/2019	ND	1.98	98.8	2.00	1.30	
Total Xylenes*	<0.150	0.150	03/20/2019	ND	6.02	100	6.00	1.85	
Total BTEX	<0.300	0.300	03/20/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 94.3 % 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
Chloride	32.0	16.0	03/20/2019	ND	448	112	400	3.64	

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	03/20/2019	ND	214	107	200	4.20	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	195	97.5	200	12.0	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 92.3 % 41-142

Surrogate: 1-Chlorooctadecane 87.1 % 37.6-147

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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:	03/19/2019	Sampling Date:	03/19/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #2 (4.0-4.5' BEB) (H901063-02)

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	03/20/2019	ND	2.07	103	2.00	0.276	
Toluene*	<0.050	0.050	03/20/2019	ND	1.89	94.7	2.00	0.0452	
Ethylbenzene*	<0.050	0.050	03/20/2019	ND	1.98	98.8	2.00	1.30	
Total Xylenes*	<0.150	0.150	03/20/2019	ND	6.02	100	6.00	1.85	
Total BTEX	<0.300	0.300	03/20/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 91.8 % 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	48.0	16.0	03/20/2019	ND	448	112	400	3.64	

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	03/20/2019	ND	214	107	200	4.20	
DRO >C10-C28*	12.1	10.0	03/20/2019	ND	195	97.5	200	12.0	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 80.4 % 41-142

Surrogate: 1-Chlorooctadecane 80.6 % 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:	03/19/2019	Sampling Date:	03/19/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #3 (4.0-4.5' BEB) (H901063-03)

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	03/20/2019	ND	2.07	103	2.00	0.276	
Toluene*	<0.050	0.050	03/20/2019	ND	1.89	94.7	2.00	0.0452	
Ethylbenzene*	<0.050	0.050	03/20/2019	ND	1.98	98.8	2.00	1.30	
Total Xylenes*	<0.150	0.150	03/20/2019	ND	6.02	100	6.00	1.85	
Total BTEX	<0.300	0.300	03/20/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 93.4 % 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	48.0	16.0	03/20/2019	ND	448	112	400	3.64	

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	03/20/2019	ND	214	107	200	4.20	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	195	97.5	200	12.0	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 87.8 % 41-142

Surrogate: 1-Chlorooctadecane 85.6 % 37.6-147

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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:	03/19/2019	Sampling Date:	03/19/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #4 (4.0-4.5' BEB) (H901063-04)

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	03/20/2019	ND	2.07	103	2.00	0.276	
Toluene*	<0.050	0.050	03/20/2019	ND	1.89	94.7	2.00	0.0452	
Ethylbenzene*	<0.050	0.050	03/20/2019	ND	1.98	98.8	2.00	1.30	
Total Xylenes*	<0.150	0.150	03/20/2019	ND	6.02	100	6.00	1.85	
Total BTEX	<0.300	0.300	03/20/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 92.6 % 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	560	16.0	03/20/2019	ND	448	112	400	3.64	

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	03/20/2019	ND	214	107	200	4.20	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	195	97.5	200	12.0	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 85.7 % 41-142

Surrogate: 1-Chlorooctadecane 83.0 % 37.6-147

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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:	03/19/2019	Sampling Date:	03/19/2019
Reported:	03/20/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: SOUTH # 1 SIDEWALL (H901063-05)

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	03/20/2019	ND	2.07	103	2.00	0.276	
Toluene*	<0.050	0.050	03/20/2019	ND	1.89	94.7	2.00	0.0452	
Ethylbenzene*	<0.050	0.050	03/20/2019	ND	1.98	98.8	2.00	1.30	
Total Xylenes*	<0.150	0.150	03/20/2019	ND	6.02	100	6.00	1.85	
Total BTEX	<0.300	0.300	03/20/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 91.1 % 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	32.0	16.0	03/20/2019	ND	448	112	400	3.64	

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	03/20/2019	ND	214	107	200	4.20	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	195	97.5	200	12.0	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 91.2 % 41-142

Surrogate: 1-Chlorooctadecane 88.5 % 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



Celey D. Keene, Lab Director/Quality Manager

Analysis Request of Custody Record



Tetra Tech, Inc.

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

Client Name: **COG** Site Manager: **Clair Gonzalez**

Project Name: **Macho State 4H (1.28.19)**

Project Location: **Lea County, NM** Project #: **212E-MD-01658**

Invoice to: **COG - Ike Tavaraz**

Receiving Laboratory: **Cardinal** Sampler Signature: **Conner Moeching Tony Legarda**

Comments:

LAB # **H901063**

LAB USE ONLY

SAMPLE IDENTIFICATION

LAB #	SAMPLE IDENTIFICATION	SAMPLING		MATRIX		PRESERVATIVE METHOD			# CONTAINERS	FILTERED (Y/N)
		DATE	TIME	WATER	SOIL	HCL	HNO ₃	ICE		
1	Bottom Hole #1 (4.0-4.5' beb)	3-19-19		X					X	N
2	Bottom Hole #2 (4.0-4.5' beb)	3-19-19		X					X	N
3	Bottom Hole #3 (4.0-4.5' beb)	3-19-19		X					X	N
4	Bottom Hole #4 (4.0-4.5' beb)	3-19-19		X					X	N
5	South #1 Sidewall	3-19-19		X					X	N

LAB USE ONLY	REMARKS:
<input type="checkbox"/> STANDARD	
<input checked="" type="checkbox"/> RUSH: Same Day (24 hr) 48 hr 72 hr	
<input type="checkbox"/> Rush Charges Authorized	
<input type="checkbox"/> Special Report Limits or TRRP Report	

Relinquished by: **Erin Muehling** Date: **3/19/19** Time: **1747**

Received by: **Juanita Rodriguez** Date: **3-19-19** Time: **16:50**

Relinquished by: _____ Date: _____ Time: _____

Received by: _____ Date: _____ Time: _____

ORIGINAL COPY

ANALYSIS REQUEST
(Circle or Specify Method No.)

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

LAB USE ONLY

Sample Temperature: **#97**

Temperature: **5.8°C**

Circle HAND DELIVERED FEDEX UPS Tracking # _____



March 21, 2019

CLAIR GONZALES

TETRA TECH

901 WEST WALL STREET , STE 100

MIDLAND, TX 79701

RE: MACHO STATE 1H

Enclosed are the results of analyses for samples received by the laboratory on 03/20/19 15:30.

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.

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:	03/20/2019	Sampling Date:	03/20/2019
Reported:	03/21/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: NORTH 1 SIDEWALL (H901079-01)

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	03/21/2019	ND	1.97	98.7	2.00	0.0700	
Toluene*	<0.050	0.050	03/21/2019	ND	1.85	92.6	2.00	0.776	
Ethylbenzene*	<0.050	0.050	03/21/2019	ND	1.89	94.6	2.00	1.76	
Total Xylenes*	<0.150	0.150	03/21/2019	ND	5.75	95.8	6.00	1.46	
Total BTEX	<0.300	0.300	03/21/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 92.8 % 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
Chloride	96.0	16.0	03/21/2019	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	03/20/2019	ND	208	104	200	2.86	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	206	103	200	3.94	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 111 % 41-142

Surrogate: 1-Chlorooctadecane 111 % 37.6-147

Cardinal Laboratories

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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:	03/20/2019	Sampling Date:	03/20/2019
Reported:	03/21/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: EAST 1 SIDEWALL (H901079-02)

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	03/21/2019	ND	1.97	98.7	2.00	0.0700	
Toluene*	<0.050	0.050	03/21/2019	ND	1.85	92.6	2.00	0.776	
Ethylbenzene*	<0.050	0.050	03/21/2019	ND	1.89	94.6	2.00	1.76	
Total Xylenes*	<0.150	0.150	03/21/2019	ND	5.75	95.8	6.00	1.46	
Total BTEX	<0.300	0.300	03/21/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 92.3 % 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
Chloride	32.0	16.0	03/21/2019	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	03/20/2019	ND	208	104	200	2.86	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	206	103	200	3.94	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 108 % 41-142

Surrogate: 1-Chlorooctadecane 105 % 37.6-147

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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:	03/20/2019	Sampling Date:	03/20/2019
Reported:	03/21/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: WEST 1 SIDEWALL (H901079-03)

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	03/21/2019	ND	1.97	98.7	2.00	0.0700	
Toluene*	<0.050	0.050	03/21/2019	ND	1.85	92.6	2.00	0.776	
Ethylbenzene*	<0.050	0.050	03/21/2019	ND	1.89	94.6	2.00	1.76	
Total Xylenes*	<0.150	0.150	03/21/2019	ND	5.75	95.8	6.00	1.46	
Total BTEX	<0.300	0.300	03/21/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 93.1 % 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	48.0	16.0	03/21/2019	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	03/20/2019	ND	208	104	200	2.86	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	206	103	200	3.94	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 113 % 41-142

Surrogate: 1-Chlorooctadecane 109 % 37.6-147

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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:	03/20/2019	Sampling Date:	03/20/2019
Reported:	03/21/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #5 (4.0-4.5' BEB) (H901079-04)

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	03/21/2019	ND	1.97	98.7	2.00	0.0700	
Toluene*	<0.050	0.050	03/21/2019	ND	1.85	92.6	2.00	0.776	
Ethylbenzene*	<0.050	0.050	03/21/2019	ND	1.89	94.6	2.00	1.76	
Total Xylenes*	<0.150	0.150	03/21/2019	ND	5.75	95.8	6.00	1.46	
Total BTEX	<0.300	0.300	03/21/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 92.7 % 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	2160	16.0	03/21/2019	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	03/20/2019	ND	208	104	200	2.86	
DRO >C10-C28*	<10.0	10.0	03/20/2019	ND	206	103	200	3.94	
EXT DRO >C28-C36	<10.0	10.0	03/20/2019	ND					

Surrogate: 1-Chlorooctane 105 % 41-142

Surrogate: 1-Chlorooctadecane 101 % 37.6-147

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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:	03/20/2019	Sampling Date:	03/20/2019
Reported:	03/21/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #6 (4.0-4.5' BEB) (H901079-05)

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	03/21/2019	ND	1.97	98.7	2.00	0.0700	
Toluene*	<0.050	0.050	03/21/2019	ND	1.85	92.6	2.00	0.776	
Ethylbenzene*	<0.050	0.050	03/21/2019	ND	1.89	94.6	2.00	1.76	
Total Xylenes*	<0.150	0.150	03/21/2019	ND	5.75	95.8	6.00	1.46	
Total BTEX	<0.300	0.300	03/21/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 92.4 % 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	896	16.0	03/21/2019	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	03/21/2019	ND	208	104	200	2.86	
DRO >C10-C28*	<10.0	10.0	03/21/2019	ND	206	103	200	3.94	
EXT DRO >C28-C36	<10.0	10.0	03/21/2019	ND					

Surrogate: 1-Chlorooctane 97.6 % 41-142

Surrogate: 1-Chlorooctadecane 93.3 % 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:	03/20/2019	Sampling Date:	03/20/2019
Reported:	03/21/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #7 (4.0-4.5' BEB) (H901079-06)

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	03/21/2019	ND	1.97	98.7	2.00	0.0700	
Toluene*	<0.050	0.050	03/21/2019	ND	1.85	92.6	2.00	0.776	
Ethylbenzene*	<0.050	0.050	03/21/2019	ND	1.89	94.6	2.00	1.76	
Total Xylenes*	<0.150	0.150	03/21/2019	ND	5.75	95.8	6.00	1.46	
Total BTEX	<0.300	0.300	03/21/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 93.8 % 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	16.0	16.0	03/21/2019	ND	432	108	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	03/21/2019	ND	208	104	200	2.86	
DRO >C10-C28*	<10.0	10.0	03/21/2019	ND	206	103	200	3.94	
EXT DRO >C28-C36	<10.0	10.0	03/21/2019	ND					

Surrogate: 1-Chlorooctane 110 % 41-142

Surrogate: 1-Chlorooctadecane 105 % 37.6-147

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Analytical Results For:

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

Received:	03/20/2019	Sampling Date:	03/20/2019
Reported:	03/21/2019	Sampling Type:	Soil
Project Name:	MACHO STATE 1H	Sampling Condition:	Cool & Intact
Project Number:	212C-MD-01658 (1/28/19)	Sample Received By:	Tamara Oldaker
Project Location:	COG - LEA CO NM		

Sample ID: BOTTOM HOLE #8 (4.0-4.5' BEB) (H901079-07)

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	03/21/2019	ND	1.97	98.7	2.00	0.0700	
Toluene*	<0.050	0.050	03/21/2019	ND	1.85	92.6	2.00	0.776	
Ethylbenzene*	<0.050	0.050	03/21/2019	ND	1.89	94.6	2.00	1.76	
Total Xylenes*	<0.150	0.150	03/21/2019	ND	5.75	95.8	6.00	1.46	
Total BTEX	<0.300	0.300	03/21/2019	ND					

Surrogate: 4-Bromofluorobenzene (PID) 95.0 % 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	32.0	16.0	03/21/2019	ND	432	108	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	03/21/2019	ND	208	104	200	2.86	
DRO >C10-C28*	<10.0	10.0	03/21/2019	ND	206	103	200	3.94	
EXT DRO >C28-C36	<10.0	10.0	03/21/2019	ND					

Surrogate: 1-Chlorooctane 106 % 41-142

Surrogate: 1-Chlorooctadecane 102 % 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

Analysis Request of Chain of Custody Record



Tetra Tech, Inc.

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

Client Name: COU		Site Manager: CLAIR CONZALES	
Project Name: MACHO ST. 1H (1.28.19)		Project #: 212C-WD-01658	
Project Location: LEA CO, WNM		Project #: 212C-WD-01658	
Invoice to: COU - ICE TAVEREZ		Sampler Signature: TONY LEONARDA	
Receiving Laboratory: CARDINAL		Sampler Signature: TONY LEONARDA	
Comments:			

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX		PRESERVATIVE METHOD				# CONTAINERS	FILTERED (Y/N)	LAB USE ONLY	
		DATE	TIME	WATER	SOIL	HCL	HNO ₃	ICE	None			REMARKS:	STANDARD
1	NOOZTH SIDEWALL	3/20/19		X		X					1	X	
2	EAST 1 SIDEWALL	3/20/19		X		X					2	X	
3	WEST 1 SIDEWALL	3/20/19		X		X					2	X	
4	Bottom Hole # 5 (4.0-4.5' BEB)	3/20/19		X		X					1	X	
5	Bottom Hole # 6 (4.0-4.5' BEB)	3/20/19		X		X					2	X	
6	Bottom Hole # 7 (4.0-4.5' BEB)	3/20/19		X		X					2	X	
7	Bottom Hole # 8 (4.0-4.5' BEB)	3/20/19		X		X					2	X	

Relinquished by: Garrett M. Jolley	Date: 3/20/19	Time: 1530	Received by: Claira Leonarda	Date: 3-20-19	Time: 15:30
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

LAB USE ONLY	REMARKS:
<input type="checkbox"/> STANDARD	
<input checked="" type="checkbox"/> RUSH: Same Day (24 hr)	
<input type="checkbox"/> Rush Charges Authorized	
<input type="checkbox"/> Special Report Limits or TRRP Report	

Sample Temperature: **1.9°C**

(Circle) HAND DELIVERED FEDEX UPS Tracking #:

ORIGINAL COPY

ANALYSIS REQUEST
(Circle or Specify Method No.)

Hold

Appendix D

Lea County, New Mexico

SE—Simona fine sandy loam, 0 to 3 percent slopes

Map Unit Setting

National map unit symbol: dmr2

Elevation: 3,000 to 4,200 feet

Mean annual precipitation: 10 to 15 inches

Mean annual air temperature: 58 to 62 degrees F

Frost-free period: 190 to 205 days

Farmland classification: Not prime farmland

Map Unit Composition

Simona and similar soils: 85 percent

Minor components: 15 percent

Estimates are based on observations, descriptions, and transects of the mapunit.

Description of Simona

Setting

Landform: Plains

Landform position (three-dimensional): Rise

Down-slope shape: Linear

Across-slope shape: Linear

Parent material: Calcareous eolian deposits derived from sedimentary rock

Typical profile

A - 0 to 8 inches: fine sandy loam

Bk - 8 to 16 inches: gravelly fine sandy loam

Bkm - 16 to 26 inches: cemented material

Properties and qualities

Slope: 0 to 3 percent

Depth to restrictive feature: 7 to 20 inches to petrocalcic

Natural drainage class: Well drained

Runoff class: Very high

Capacity of the most limiting layer to transmit water (Ksat): Very low to moderately low (0.00 to 0.06 in/hr)

Depth to water table: More than 80 inches

Frequency of flooding: None

Frequency of ponding: None

Calcium carbonate, maximum in profile: 35 percent

Gypsum, maximum in profile: 1 percent

Salinity, maximum in profile: Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)

Sodium adsorption ratio, maximum in profile: 2.0

Available water storage in profile: Very low (about 2.0 inches)

Interpretive groups

Land capability classification (irrigated): 6s

Land capability classification (nonirrigated): 7s
Hydrologic Soil Group: D
Ecological site: Shallow Sandy (R042XC002NM)
Hydric soil rating: No

Minor Components

Kimbrough

Percent of map unit: 8 percent
Ecological site: Very Shallow 16-21" PZ (R077CY037TX)
Hydric soil rating: No

Lea

Percent of map unit: 7 percent
Ecological site: Limy Upland 16-21" PZ (R077CY028TX)
Hydric soil rating: No

Data Source Information

Soil Survey Area: Lea County, New Mexico
Survey Area Data: Version 15, Sep 12, 2018

BLM SERIAL #:

COMPANY REFERENCE:

3.1 Seed Mixture 1, for Loamy Sites

The holder shall seed all disturbed areas with the seed mixture listed below. The seed mixture shall be planted in the amounts specified in pounds of pure live seed (PLS)* per acre. There shall be no primary or secondary noxious weeds in the seed mixture. Seed will be tested and the viability testing of seed will be done in accordance with State law(s) and within nine (9) months prior to purchase. Commercial seed will be either certified or registered seed. The seed container will be tagged in accordance with State law(s) and available for inspection by the authorized officer.

Seed will be planted using a drill equipped with a depth regulator to ensure proper depth regulator to ensure proper depth of planting where drilling is possible. The seed mixture will be evenly and uniformly planted over the disturbed area (small/heavier seeds have a tendency to drop the bottom of the drill and are planted first). The holder shall take appropriate measures to ensure this does not occur. Where drilling is not possible, seed will be broadcast and the area shall be raked or chained to cover the seed. When broadcasting the seed, the pounds per acre are to be doubled. The seeding will be repeated until a satisfactory stand is established as determined by the authorized officer. Evaluation of growth will not be made before completion of at least one full growing season after seeding.

Species to be planted in pounds of pure live seed* per acre:

<u>Species</u>	<u>lb/acre</u>
Plains lovegrass (<i>Eragrostis intermedia</i>)	0.5
Sand dropseed (<i>Sporobolus cryptandrus</i>)	1.0
Sideoats grama (<i>Bouteloua curtipendula</i>)	5.0
Plains bristlegrass (<i>Setaria macrostachya</i>)	2.0

*Pounds of pure live seed:

Pounds of seed x percent purity x percent germination = pounds pure live seed