

SITE INFORMATION

Report Type: Closure Report 1RP-4692

General Site Information:

Site:	West Grama Ridge 6 Federal #4H				
Company:	Cimarex Energy				
Section, Township and Range	Unit A	Sec. 06	T 22S	R 34E	
Lease Number:	API No. 30-025-41173				
County:	Lea County				
GPS:	32.42714° N			103.50269° W	
Surface Owner:	Federal				
Mineral Owner:					
Directions:	From intersection of Co Rd 27-A and HWY 176 in rural Lea County, travel east on HWY 176 for 6.70 mi, turn south onto lease road and continue for 8.75 mi, turn north onto lease road for 1.40 mi to location.				

Release Data:

Date Released:	5/5/2017
Type Release:	Oil & Produced Water
Source of Contamination:	3" Buried Steel Line
Fluid Released:	10 bbls oil & 10 bbls water
Fluids Recovered:	5 bbls oil & 2 bbls water

Official Communication:

Name:	Christine Alderman		Ike Tavaréz
Company:	Cimarex Energy		Tetra Tech
Address:	600 N. Marienfield St. Ste 600		4000 N. Big Spring Ste 401
City:	Midland Texas, 79701		Midland, Texas
Phone number:	(432) 853-7059		(432) 687-8110
Fax:			
Email:	calderman@cimarex.com		Ike.Tavaréz@tetrattech.com

Ranking Criteria

Depth to Groundwater:	Ranking Score	Site Data
<50 ft	20	
50-99 ft	10	
>100 ft.	0	100' - 125'
WellHead Protection:		
	Ranking Score	Site Data
Water Source <1,000 ft., Private <200 ft.	20	
Water Source >1,000 ft., Private >200 ft.	0	0
Surface Body of Water:		
	Ranking Score	Site Data
<200 ft.	20	
200 ft - 1,000 ft.	10	
>1,000 ft.	0	0
Total Ranking Score:		0

Acceptable Soil RRAL (mg/kg)		
Benzene	Total BTEX	TPH
10	50	5,000



April 25, 2018

Christine Alderman
ESH Supervisor – Permian Basin
Cimarex Energy
600 N. Marienfeld St.
Midland, Texas 79701

Re: Closure Report for the Cimarex Energy, West Grama Ridge 6 Federal #4H, Unit A, Section 06, Township 22 South, Range 34 East, Lea County, New Mexico. 1RP-4692.

Ms. Alderman:

Tetra Tech, Inc. (Tetra Tech) was contacted by Cimarex Energy (Cimarex) to evaluate a release that occurred at the West Grama Ridge 6 Federal #4H, Unit A, Section 06, Township 22 South, Range 34 East, Lea County, New Mexico (site). The spill site coordinates are N 32.42714°, W 103.50269°. 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 May 5, 201, and released approximately ten (10) barrels of oil and ten (10) barrels of produced water due to a leak that developed on a 3" buried steel line. Approximately five (5) barrels of oil and two (2) barrels of produced water was recovered. According to Cimarex, the spill area was immediately scraped around the wellhead and measured approximately 40' x 70'. The initial C-141 Form is included in Appendix A.

Groundwater

No water wells were listed within Section 06 on the New Mexico Office of the State Engineer's website, the USGS National Water Information System, or the Geology and Groundwater Conditions in Southern Lea, County, NM (Report 6). The nearest well listed is in Section 08 and has a reported depth to groundwater of 30 feet below surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in this area is approximately 100' below surface. The surface elevation difference between the site (3650') and the 30' water well located in Section 08 (3573') is approximately 77'. 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 Releases, dated August 13, 1993. 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 depth to groundwater, the proposed RRAL for TPH is 5,000 mg/kg.

Soil Assessment and Analytical Results

On November 9, 2017, Tetra Tech personnel were onsite to evaluate and sample the release area. Two (2) backhoe trenches (T-1 and T-2) were installed in the spill footprint to total depths of 9.0' and 8.0' below surface, respectively. Selected samples were analyzed 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 in Figure 3.

Referring to Table 1, none of the samples analyzed showed benzene or total BTEX concentrations above the laboratory reporting limits. Additionally, no TPH concentrations above the RRAL were detected, with TPH highs at 0-1' below surface on 259 mg/kg (T-1) and <15.0 mg/kg (T-2).

The area of trench (T-1) did show slight chloride concentrations in the shallow soils, with a chloride of 853 mg/kg at 2.0' below surface. The chloride concentrations then declined with depth to 214 mg/kg at 5.0' and then spiked to 719 mg/kg at 6.0' below surface. The chloride concentrations decline again showing a bottom trench concentration of 77.4 mg/kg at 9.0' below surface. The area of trench (T-2) did not show any significant chloride concentrations, with a high of 191 mg/kg at 0-1' below surface and a bottom trench concentration of 57.8 mg/kg at 8.0' below surface.

Conclusion and Recommendations

All of the soil samples were below the RRALs for TPH, benzene, and total BTEX. Additionally, the chloride concentrations were not significant in the subsurface soils and do not appear to be an imminent threat to groundwater. Based on the results, Cimarex 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 activities for this site, please call at (432) 682-4559.

Respectfully submitted,
TETRA TECH

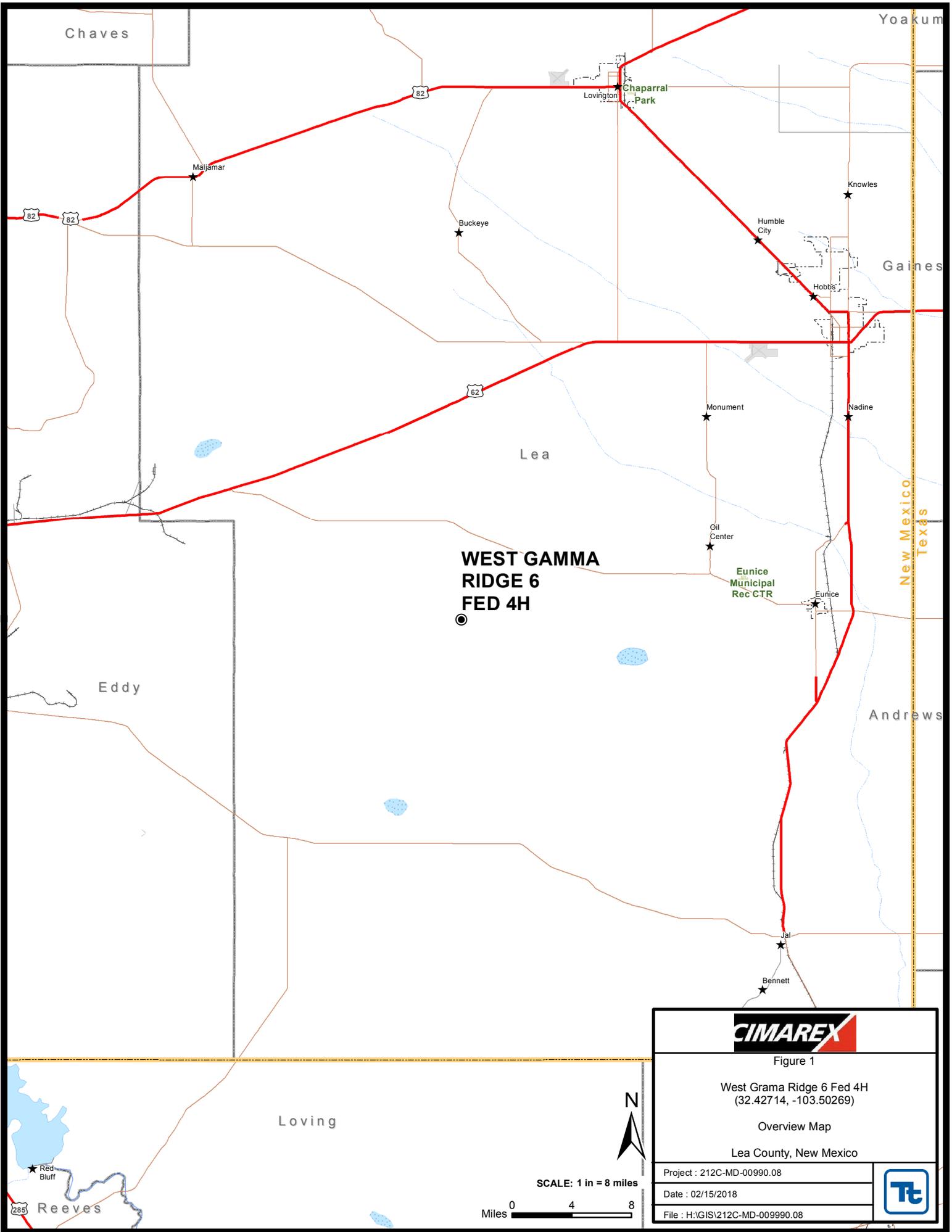
A handwritten signature in blue ink, appearing to read 'Ike Tavarez'.

Ike Tavarez, PG
Senior Project Manager

A handwritten signature in blue ink, appearing to read 'Clair Gonzales'.

Clair Gonzales,
Project Manager

Figures



**WEST GAMMA
RIDGE 6
FED 4H**



Figure 1

West Grama Ridge 6 Fed 4H
(32.42714, -103.50269)

Overview Map

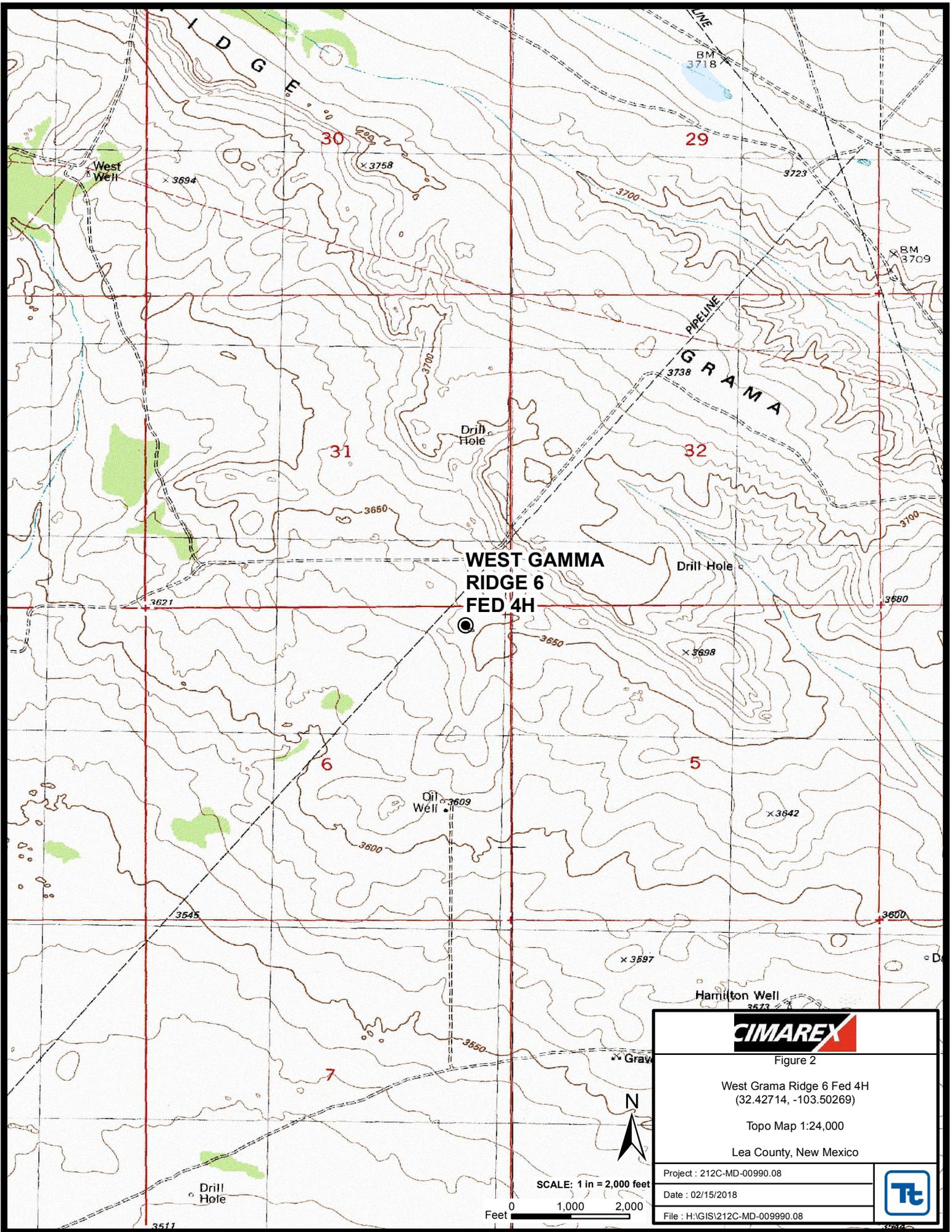
Lea County, New Mexico

Project : 212C-MD-00990.08

Date : 02/15/2018

File : H:\GIS\212C-MD-009990.08





**WEST GAMMA
RIDGE 6
FED 4H**



Figure 2

West Gama Ridge 6 Fed 4H
(32.42714, -103.50269)

Topo Map 1:24,000

Lea County, New Mexico

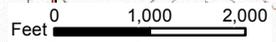
Project : 212C-MD-00990.08

Date : 02/15/2018

File : H:\GIS\212C-MD-009990.08

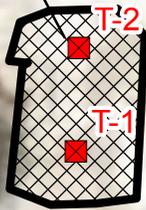


SCALE: 1 in = 2,000 feet





SPILL AREA
40'x70'



T-2

T-1

LEGEND

-  TRENCH SAMPLE LOCATION
-  SPILL AREA



Figure 3

West Grama Ridge 6 Fed 4H
(32.42714, -103.50269)

Spill Assessment Map

Lea County, New Mexico

Project : 212C-MD-00990.08

Date : 02/15/2018

File : H:\GIS\212C-MD-009990.08



Esri, HERE, DeLorme, Mapmy
 HERE, DeLorme, Mapmy, India
 SCALE: 1 IN = 70 FEET
 0 35 70
 Feet

Tables

Table 1
Cimarex Energy
West Grama Ridge 6 Fed #4H
Lea County, New Mexico

Sample ID	Sample Date	Sample Depth (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	C6-C10	C10-C28	C28-C35	Total						
T-1	11/9/2017	0-1	X		<15.0	259	<15.0	259	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	369
	"	2	X		-	-	-	-	-	-	-	-	-	853
	"	3	X		-	-	-	-	-	-	-	-	-	416
	"	4	X		-	-	-	-	-	-	-	-	-	436
	"	5	X		-	-	-	-	-	-	-	-	-	214
	"	6	X		-	-	-	-	-	-	-	-	-	719
	"	7	X		-	-	-	-	-	-	-	-	-	77.1
	"	8	X		-	-	-	-	-	-	-	-	-	117
	"	9	X			<15.0	<15.0	<15.0	<15.0	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201
T-2	11/9/2017	0-1	X		<15.0	<15.0	<15.0	<15.0	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	191
	"	2	X		-	-	-	-	-	-	-	-	-	31.9
	"	3	X		-	-	-	-	-	-	-	-	-	53.5
	"	4	X		-	-	-	-	-	-	-	-	-	78.5
	"	5	X		-	-	-	-	-	-	-	-	-	66.8
	"	6	X		-	-	-	-	-	-	-	-	-	57.1
	"	7	X		-	-	-	-	-	-	-	-	-	44.7
	"	8	X			<15.0	<15.0	<15.0	<15.0	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199

(-) Not Analyzed

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

Form C-141
Revised August 8, 2011

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

Submit 1 Copy to appropriate District Office in
accordance with 19.15.29 NMAC.

Release Notification and Corrective Action

OPERATOR

Initial Report Final Report

Name of Company: Cimarex Energy Co. of Colorado		Contact: Gloria Garza
Address: 600 N Marienfeld Ste 600 Midland TX		Telephone No. 432-234-3204
Facility Name: West Grama Ridge 6 Federal #4H		Facility Type: Well
Surface Owner:	Mineral Owner	API No. 30-025-41173

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
A	6	22S	34E	330	N	660	E	LEA

Latitude 32.42714 Longitude -103.50269

NATURE OF RELEASE

Type of Release : Crude Oil and Produced water	Volume of Release: 20 BBLS	Volume Recovered: 7 BBLS
Source of Release : 3" buried steel pipe	Date and Hour of Occurrence: 5/5/2017 PM	Date and Hour of Discovery: 5/6/2017 8:00 AM
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Olivia Yu	
By Whom? Gloria Garza	Date and Hour: 5/7/2017 12:10 PM	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*

A 3" buried steel line developed a hole due to external corrosion.
10 barrels of crude oil were released and we recovered 5 of the 10 barrels.
10 barrels of produced water were released and we recovered 2 of those 10 barrels.
Impacted soil was picked up.

Describe Area Affected and Cleanup Action Taken.*

The spill occurred on location around the well head.
An environmental consulting company has been contacted and a work plan will be submitted.

I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD 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 NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD 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.

Signature: 	OIL CONSERVATION DIVISION	
Printed Name: Gloria Garza	Approved by Environmental Specialist:	
Title: ESH Specialist	Approval Date:	Expiration Date:
E-mail Address: ggarza@cimarex.com	Conditions of Approval:	Attached <input type="checkbox"/>
Date: 5.8.2017	Phone: 432-234-3204	

* Attach Additional Sheets If Necessary

Jaime Castillo 575-200-4885

District I
1625 N. French Dr., Hobbs, NM 88240
District II
1301 W. Grand Avenue, 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

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

Form C-141
Revised October 10, 2003

Submit 2 Copies to appropriate
District Office in accordance
with Rule 116 on back
side of form

Release Notification and Corrective Action

OPERATOR

Initial Report Final Report

Name of Company Cimarex Energy	Contact Gloria Garza
Address 600 N. Marienfeld Ste 600, Midland, TX	Telephone No. (432) 234-3204
Facility Name: West Grama Ridge 6 Federal #4H	Facility Type Well
Surface Owner: Federal	Mineral Owner:
API No. 30-025-41173	

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
A	06	22S	34E	330	FNL	660	FEL	Lea

Latitude N 32.42714° Longitude W 103.50269°

NATURE OF RELEASE

Type of Release: Oil & Produced Water	Volume of Release 10 bbls oil 10 bbls produced water	Volume Recovered: 5 bbls oil 2 bbls produced water
Source of Release: 3" buried steel line	Date and Hour of Occurrence 05/05/17	Date and Hour of Discovery 05/06/17 8:00AM
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Olivia Yu	
By Whom? Gloria Garza	Date and Hour 05/07/17 12:10 PM	
Was a Watercourse Reached? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	If YES, Volume Impacting the Watercourse. N/A	
If a Watercourse was Impacted, Describe Fully.* N/A		
Describe Cause of Problem and Remedial Action Taken.* A 3" buried steel line developed a hole due to external corrosion. The impacted soil was picked up.		
Describe Area Affected and Cleanup Action Taken.* The site was inspected and soil samples were collected to define the spills extent. None of the samples collected showed elevated benzene, total BTEX, TPH, or chloride concentrations. Tetra Tech prepared a closure report and submitted to NMOCD for review.		
I hereby certify that the information given above is true and complete to the best of my knowledge and understand that pursuant to NMOCD 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 NMOCD marked as "Final Report" does not relieve the operator of liability should their operations have failed to adequately investigate and remediate contamination that pose a threat to ground water, surface water, human health or the environment. In addition, NMOCD 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.		

OIL CONSERVATION DIVISION

Signature: 	Approved by District Supervisor: 	
Printed Name: Ike Tavarez	Approval Date: 09/16/2022	Expiration Date:
Title: Project Manager	Conditions of Approval:	
E-mail Address: Ike.Tavarez@TetraTech.com	Attached <input type="checkbox"/>	
Date: 02/13/18	Phone: (432) 682-4559	

* Attach Additional Sheets If Necessary

Appendix B

Water Well Data
Average Depth to Groundwater (ft)
Cimarex - West Grama Ridge 6 Fed #4H
Lea County, New Mexico

21 South			33 East		
6	5	4	3	2 79	1
7	8	9	10	11 150	12
18	17	16	15	14	13
143	20	21	22	23	24
30	29	28	27	26	25
31	32	33 180	34	35	36
		179			

21 South			34 East		
6	5	4 95	3	2	1
7	8 120	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28 140	27	26	25
31	32	33 67	34	35	36

21 South			35 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

22 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
					391

22 South			34 East		
6	5	4	3	2	1
7	8 30	9	10	11 30	12 50
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

22 South			35 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
				225	

23 South			34 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	225	16	15	14	13
19	20	21	22 430	23 318	24
30	29	28	27 295	26 265	25
31	130	33	34	35	36

23 South			35 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 Q Q				Sec	Tws	Rng	X	Y	DepthWell	DepthWater	Water Column
				64	16	4	4								
CP 00380		CP	LE	4	2	11	22S	34E		647245	3586739*	45	30	15	
CP 00596 POD1		CP	LE	4	2	11	22S	34E		647245	3586739*	50			
CP 00597 POD1		CP	LE	2	2	08	22S	34E		642410	3587074*	35			
CP 00598 POD1		CP	LE	4	1	23	22S	34E		646480	3583511*	70			
CP 00599 POD1		CP	LE	1	1	12	22S	34E		647642	3587147*	62	50	12	
CP 00604		CP	LE	1	4	4	01	22S	34E	648743	3587666*	135			
CP 00622		CP	LE	3	4	2	14	22S	34E	647164	3585030*				
CP 00704		CP	LE	2	4	22	22S	34E		645681	3583097*	600			
CP 00744		CP	LE	1	2	09	22S	34E		643618	3587091*	460			
CP 00751		CP	LE	4	2	11	22S	34E		647245	3586739*		45		
CP 00865 POD1		CP	LE	2	2	3	20	22S	34E	641845	3583118	885	605	280	
CP 00933		CP	LE	1	1	1	12	22S	34E	647541	3587246*	60			
CP 00934		CP	LE	2	1	2	01	22S	34E	648682	3588822	60	42	18	
CP 00944 POD1		CP	LE	3	1	03	22S	34E		644531	3588351	109	70	39	
CP 01362 POD1		CP	LE	3	4	4	18	22S	34E	640809	3584182	1032	613	419	
CP 01455 POD1		CP	LE	4	1	4	18	22S	34E	640574	3584515	1033	615	418	

Average Depth to Water: **258 feet**

Minimum Depth: **30 feet**

Maximum Depth: **615 feet**

Record Count: 16

PLSS Search:

Township: 22S **Range:** 34E

*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.

1/4/18 9:32 AM

WATER COLUMN/ AVERAGE DEPTH TO WATER

Appendix C

Analytical Report 568803

for
Tetra Tech- Midland

Project Manager: Clair Gonzales

West Grama Ridge 6 Federal #4H

212C-MD-00990.08

29-NOV-17

Collected By: Client



1211 W. Florida Ave, Midland TX 79701

Xenco-Houston (EPA Lab code: TX00122):

Texas (T104704215-17-23), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)
Oklahoma (2017-142)

Xenco-Dallas (EPA Lab code: TX01468):

Texas (T104704295-17-15), Arizona (AZ0809), Arkansas (17-063-0)

Xenco-El Paso (EPA Lab code: TX00127): Texas (T104704221-17-12)

Xenco-Lubbock (EPA Lab code: TX00139): Texas (T104704219-17-16)

Xenco-Odessa (EPA Lab code: TX00158): Texas (T104704400-17-13)

Xenco-San Antonio (EPA Lab Code: TNI02385): Texas (T104704534-17-3)

Xenco Phoenix (EPA Lab Code: AZ00901): Arizona (AZ0757)

Xenco-Phoenix Mobile (EPA Lab code: AZ00901): Arizona (AZM757)



29-NOV-17

Project Manager: **Clair Gonzales**
Tetra Tech- Midland
4000 N. Big Spring Suite 401
Midland, TX 79705

Reference: XENCO Report No(s): **568803**
West Grama Ridge 6 Federal #4H
Project Address: Lea County, New Mexico

Clair Gonzales:

We are reporting to you the results of the analyses performed on the samples received under the project name referenced above and identified with the XENCO Report Number(s) 568803. All results being reported under this Report Number apply to the samples analyzed and properly identified with a Laboratory ID number. Subcontracted analyses are identified in this report with either the NELAC certification number of the subcontract lab in the analyst ID field, or the complete subcontracted report attached to this report.

Unless otherwise noted in a Case Narrative, all data reported in this Analytical Report are in compliance with NELAC standards. The uncertainty of measurement associated with the results of analysis reported is available upon request. Should insufficient sample be provided to the laboratory to meet the method and NELAC Matrix Duplicate and Matrix Spike requirements, then the data will be analyzed, evaluated and reported using all other available quality control measures.

The validity and integrity of this report will remain intact as long as it is accompanied by this letter and reproduced in full, unless written approval is granted by XENCO Laboratories. This report will be filed for at least 5 years in our archives after which time it will be destroyed without further notice, unless otherwise arranged with you. The samples received, and described as recorded in Report No. 568803 will be filed for 45 days, and after that time they will be properly disposed without further notice, unless otherwise arranged with you. We reserve the right to return to you any unused samples, extracts or solutions related to them if we consider so necessary (e.g., samples identified as hazardous waste, sample sizes exceeding analytical standard practices, controlled substances under regulated protocols, etc).

We thank you for selecting XENCO Laboratories to serve your analytical needs. If you have any questions concerning this report, please feel free to contact us at any time.

Respectfully,

Mike Kimmel

Client Services Manager

Recipient of the Prestigious Small Business Administration Award of Excellence in 1994.

Certified and approved by numerous States and Agencies.

A Small Business and Minority Status Company that delivers SERVICE and QUALITY

Houston - Dallas - Midland - San Antonio - Phoenix - Oklahoma - Latin America

Tetra Tech- Midland, Midland, TX

West Grama Ridge 6 Federal #4H

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
T-1 0-1'	S	11-09-17 00:00		568803-001
T-1 2'	S	11-09-17 00:00		568803-002
T-1 3'	S	11-09-17 00:00		568803-003
T-1 4'	S	11-09-17 00:00		568803-004
T-1 5'	S	11-09-17 00:00		568803-005
T-1 6'	S	11-09-17 00:00		568803-006
T-1 7'	S	11-09-17 00:00		568803-007
T-1 8'	S	11-09-17 00:00		568803-008
T-1 9'	S	11-09-17 00:00		568803-009
T-2 0-1'	S	11-10-17 00:00		568803-010
T-2 2'	S	11-11-17 00:00		568803-011
T-2 3'	S	11-12-17 00:00		568803-012
T-2 4'	S	11-13-17 00:00		568803-013
T-2 5'	S	11-14-17 00:00		568803-014
T-2 6'	S	11-15-17 00:00		568803-015
T-2 7'	S	11-16-17 00:00		568803-016
T-2 8'	S	11-17-17 00:00		568803-017



CASE NARRATIVE

Client Name: Tetra Tech- Midland

Project Name: West Grama Ridge 6 Federal #4H

Project ID: 212C-MD-00990.08
Work Order Number(s): 568803

Report Date: 29-NOV-17
Date Received: 11/17/2017

Sample receipt non conformances and comments:

T-1 and T-2 @1 ' not submitted.

Sample receipt non conformances and comments per sample:

None

Analytical non conformances and comments:

Batch: LBA-3034040 BTEX by EPA 8021B

Soil samples were not received in Terracore kits and therefore were prepared by method 5030.



Certificate of Analysis Summary 568803



Tetra Tech- Midland, Midland, TX

Project Name: West Grama Ridge 6 Federal #4H

Project Id: 212C-MD-00990.08
Contact: Clair Gonzales
Project Location: Lea County, New Mexico

Date Received in Lab: Fri Nov-17-17 09:00 am
Report Date: 29-NOV-17
Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	568803-001	568803-002	568803-003	568803-004	568803-005	568803-006
	<i>Field Id:</i>	T-1 0-1'	T-1 2'	T-1 3'	T-1 4'	T-1 5'	T-1 6'
	<i>Depth:</i>						
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-09-17 00:00	Nov-09-17 00:00	Nov-09-17 00:00	Nov-09-17 00:00	Nov-09-17 00:00	Nov-09-17 00:00
BTEX by EPA 8021B	<i>Extracted:</i>	Nov-21-17 09:30					
	<i>Analyzed:</i>	Nov-21-17 15:19					
	<i>Units/RL:</i>	mg/kg RL					
Benzene		<0.00202 0.00202					
Toluene		<0.00202 0.00202					
Ethylbenzene		<0.00202 0.00202					
m,p-Xylenes		<0.00403 0.00403					
o-Xylene		<0.00202 0.00202					
Total Xylenes		<0.00202 0.00202					
Total BTEX		<0.00202 0.00202					
Inorganic Anions by EPA 300/300.1	<i>Extracted:</i>	Nov-27-17 16:20	Nov-27-17 16:20	Nov-28-17 09:30	Nov-28-17 09:30	Nov-28-17 09:30	Nov-28-17 09:30
	<i>Analyzed:</i>	Nov-28-17 02:18	Nov-28-17 02:24	Nov-28-17 10:23	Nov-28-17 10:47	Nov-28-17 10:53	Nov-28-17 10:59
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		369 5.00	853 4.94	416 4.95	436 4.94	214 4.94	619 4.93
TPH By SW8015 Mod	<i>Extracted:</i>	Nov-17-17 13:00					
	<i>Analyzed:</i>	Nov-18-17 07:58					
	<i>Units/RL:</i>	mg/kg RL					
Gasoline Range Hydrocarbons (GRO)		<15.0 15.0					
Diesel Range Organics (DRO)		259 15.0					
Oil Range Hydrocarbons (ORO)		<15.0 15.0					
Total TPH		259 15.0					

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Mike Kimmel
Client Services Manager



Certificate of Analysis Summary 568803



Tetra Tech- Midland, Midland, TX

Project Name: West Grama Ridge 6 Federal #4H

Project Id: 212C-MD-00990.08
Contact: Clair Gonzales
Project Location: Lea County, New Mexico

Date Received in Lab: Fri Nov-17-17 09:00 am
Report Date: 29-NOV-17
Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	568803-007	568803-008	568803-009	568803-010	568803-011	568803-012
	<i>Field Id:</i>	T-1 7'	T-1 8'	T-1 9'	T-2 0-1'	T-2 2'	T-2 3'
	<i>Depth:</i>						
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-09-17 00:00	Nov-09-17 00:00	Nov-09-17 00:00	Nov-10-17 00:00	Nov-11-17 00:00	Nov-12-17 00:00
BTEX by EPA 8021B	<i>Extracted:</i>			Nov-21-17 09:30	Nov-21-17 09:30		
	<i>Analyzed:</i>			Nov-21-17 15:38	Nov-21-17 15:58		
	<i>Units/RL:</i>			mg/kg RL	mg/kg RL		
	Benzene			<0.00201 0.00201	<0.00199 0.00199		
	Toluene			<0.00201 0.00201	<0.00199 0.00199		
	Ethylbenzene			<0.00201 0.00201	<0.00199 0.00199		
	m,p-Xylenes			<0.00402 0.00402	<0.00398 0.00398		
	o-Xylene			<0.00201 0.00201	<0.00199 0.00199		
Total Xylenes			<0.00201 0.00201	<0.00199 0.00199			
Total BTEX			<0.00201 0.00201	<0.00199 0.00199			
Inorganic Anions by EPA 300/300.1	<i>Extracted:</i>	Nov-28-17 09:30	Nov-28-17 09:30	Nov-28-17 09:30	Nov-28-17 09:30	Nov-28-17 09:30	Nov-28-17 09:30
	<i>Analyzed:</i>	Nov-28-17 11:27	Nov-28-17 11:33	Nov-28-17 11:39	Nov-28-17 11:45	Nov-28-17 11:51	Nov-28-17 11:57
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		77.4 4.96	117 4.97	77.4 4.94	191 4.95	31.9 4.94	53.5 4.91

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Mike Kimmel
Client Services Manager



Certificate of Analysis Summary 568803



Tetra Tech- Midland, Midland, TX

Project Name: West Grama Ridge 6 Federal #4H

Project Id: 212C-MD-00990.08
Contact: Clair Gonzales
Project Location: Lea County, New Mexico

Date Received in Lab: Fri Nov-17-17 09:00 am
Report Date: 29-NOV-17
Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	568803-007	568803-008	568803-009	568803-010	568803-011	568803-012
	<i>Field Id:</i>	T-1 7'	T-1 8'	T-1 9'	T-2 0-1'	T-2 2'	T-2 3'
	<i>Depth:</i>						
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Nov-09-17 00:00	Nov-09-17 00:00	Nov-09-17 00:00	Nov-10-17 00:00	Nov-11-17 00:00	Nov-12-17 00:00
TPH By SW8015 Mod	<i>Extracted:</i>			Nov-17-17 13:00	Nov-17-17 13:00		
	<i>Analyzed:</i>			Nov-18-17 08:20	Nov-18-17 08:40		
	<i>Units/RL:</i>			mg/kg RL	mg/kg RL		
Gasoline Range Hydrocarbons (GRO)				<15.0 15.0	<15.0 15.0		
Diesel Range Organics (DRO)				<15.0 15.0	<15.0 15.0		
Oil Range Hydrocarbons (ORO)				<15.0 15.0	<15.0 15.0		
Total TPH				<15.0 15.0	<15.0 15.0		

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Mike Kimmel
Client Services Manager



Certificate of Analysis Summary 568803



Tetra Tech- Midland, Midland, TX

Project Name: West Grama Ridge 6 Federal #4H

Project Id: 212C-MD-00990.08
Contact: Clair Gonzales
Project Location: Lea County, New Mexico

Date Received in Lab: Fri Nov-17-17 09:00 am
Report Date: 29-NOV-17
Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	568803-013	568803-014	568803-015	568803-016	568803-017	
	<i>Field Id:</i>	T-2 4'	T-2 5'	T-2 6'	T-2 7'	T-2 8'	
	<i>Depth:</i>						
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	
	<i>Sampled:</i>	Nov-13-17 00:00	Nov-14-17 00:00	Nov-15-17 00:00	Nov-16-17 00:00	Nov-17-17 00:00	
BTEX by EPA 8021B	<i>Extracted:</i>					Nov-21-17 09:30	
	<i>Analyzed:</i>					Nov-21-17 16:17	
	<i>Units/RL:</i>					mg/kg RL	
Benzene						<0.00199	0.00199
Toluene						<0.00199	0.00199
Ethylbenzene						<0.00199	0.00199
m,p-Xylenes						<0.00398	0.00398
o-Xylene						<0.00199	0.00199
Total Xylenes						<0.00199	0.00199
Total BTEX						<0.00199	0.00199
Inorganic Anions by EPA 300/300.1	<i>Extracted:</i>	Nov-28-17 09:30					
	<i>Analyzed:</i>	Nov-28-17 12:15	Nov-28-17 12:21	Nov-28-17 12:39	Nov-28-17 12:44	Nov-28-17 12:50	
	<i>Units/RL:</i>	mg/kg RL					
Chloride		78.5 5.00	66.8 4.98	57.1 4.91	44.7 4.92	57.8 4.97	
TPH By SW8015 Mod	<i>Extracted:</i>					Nov-17-17 13:00	
	<i>Analyzed:</i>					Nov-18-17 09:02	
	<i>Units/RL:</i>					mg/kg RL	
Gasoline Range Hydrocarbons (GRO)						<15.0	15.0
Diesel Range Organics (DRO)						<15.0	15.0
Oil Range Hydrocarbons (ORO)						<15.0	15.0
Total TPH						<15.0	15.0

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Client Services Manager

- X** In our quality control review of the data a QC deficiency was observed and flagged as noted. MS/MSD recoveries were found to be outside of the laboratory control limits due to possible matrix /chemical interference, or a concentration of target analyte high enough to affect the recovery of the spike concentration. This condition could also affect the relative percent difference in the MS/MSD.
- B** A target analyte or common laboratory contaminant was identified in the method blank. Its presence indicates possible field or laboratory contamination.
- D** The sample(s) were diluted due to targets detected over the highest point of the calibration curve, or due to matrix interference. Dilution factors are included in the final results. The result is from a diluted sample.
- E** The data exceeds the upper calibration limit; therefore, the concentration is reported as estimated.
- F** RPD exceeded lab control limits.
- J** The target analyte was positively identified below the quantitation limit and above the detection limit.
- U** Analyte was not detected.
- L** The LCS data for this analytical batch was reported below the laboratory control limits for this analyte. The department supervisor and QA Director reviewed data. The samples were either reanalyzed or flagged as estimated concentrations.
- H** The LCS data for this analytical batch was reported above the laboratory control limits. Supporting QC Data were reviewed by the Department Supervisor and QA Director. Data were determined to be valid for reporting.
- K** Sample analyzed outside of recommended hold time.
- JN** A combination of the "N" and the "J" qualifier. The analysis indicates that the analyte is "tentatively identified" and the associated numerical value may not be consistent with the amount actually present in the environmental sample.

** Surrogate recovered outside laboratory control limit.

BRL Below Reporting Limit.

RL Reporting Limit

MDL Method Detection Limit **SDL** Sample Detection Limit **LOD** Limit of Detection

PQL Practical Quantitation Limit **MQL** Method Quantitation Limit **LOQ** Limit of Quantitation

DL Method Detection Limit

NC Non-Calculable

+ NELAC certification not offered for this compound.

* (Next to analyte name or method description) = Outside XENCO's scope of NELAC accreditation

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 1211 W Florida Ave, Midland, TX 79701
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(214) 902 0300	(214) 351-9139
(210) 509-3334	(210) 509-3335
(432) 563-1800	(432) 563-1713
(602) 437-0330	



Form 2 - Surrogate Recoveries

Project Name: West Grama Ridge 6 Federal #4H

Work Orders : 568803,

Project ID: 212C-MD-00990.08

Lab Batch #: 3033989

Sample: 568803-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/18/17 07:58

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	96.0	100	96	70-135	
o-Terphenyl	47.0	50.0	94	70-135	

Lab Batch #: 3033989

Sample: 568803-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/18/17 08:20

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	92.9	100	93	70-135	
o-Terphenyl	46.7	50.0	93	70-135	

Lab Batch #: 3033989

Sample: 568803-010 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/18/17 08:40

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	86.0	100	86	70-135	
o-Terphenyl	44.7	50.0	89	70-135	

Lab Batch #: 3033989

Sample: 568803-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/18/17 09:02

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	92.1	100	92	70-135	
o-Terphenyl	45.7	50.0	91	70-135	

Lab Batch #: 3034040

Sample: 568803-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/21/17 15:19

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0288	0.0300	96	80-120	
4-Bromofluorobenzene	0.0254	0.0300	85	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: West Grama Ridge 6 Federal #4H

Work Orders : 568803,

Project ID: 212C-MD-00990.08

Lab Batch #: 3034040

Sample: 568803-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/21/17 15:38

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0294	0.0300	98	80-120	
4-Bromofluorobenzene	0.0292	0.0300	97	80-120	

Lab Batch #: 3034040

Sample: 568803-010 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/21/17 15:58

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0306	0.0300	102	80-120	
4-Bromofluorobenzene	0.0294	0.0300	98	80-120	

Lab Batch #: 3034040

Sample: 568803-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/21/17 16:17

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0312	0.0300	104	80-120	
4-Bromofluorobenzene	0.0291	0.0300	97	80-120	

Lab Batch #: 3033989

Sample: 7634762-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 11/18/17 04:49

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	94.4	100	94	70-135	
o-Terphenyl	48.2	50.0	96	70-135	

Lab Batch #: 3034040

Sample: 7634836-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 11/21/17 13:44

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0303	0.0300	101	80-120	
4-Bromofluorobenzene	0.0291	0.0300	97	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: West Grama Ridge 6 Federal #4H

Work Orders : 568803,

Project ID: 212C-MD-00990.08

Lab Batch #: 3033989

Sample: 7634762-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 11/18/17 05:09

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	99.7	100	100	70-135	
o-Terphenyl	52.3	50.0	105	70-135	

Lab Batch #: 3034040

Sample: 7634836-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 11/21/17 11:51

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0287	0.0300	96	80-120	
4-Bromofluorobenzene	0.0296	0.0300	99	80-120	

Lab Batch #: 3033989

Sample: 7634762-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 11/18/17 05:32

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	95.7	100	96	70-135	
o-Terphenyl	51.9	50.0	104	70-135	

Lab Batch #: 3034040

Sample: 7634836-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 11/21/17 12:10

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0255	0.0300	85	80-120	
4-Bromofluorobenzene	0.0263	0.0300	88	80-120	

Lab Batch #: 3033989

Sample: 568546-001 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 11/18/17 06:13

SURROGATE RECOVERY STUDY					
TPH By SW8015 Mod Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1-Chlorooctane	113	100	113	70-135	
o-Terphenyl	50.9	50.0	102	70-135	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B

All results are based on MDL and validated for QC purposes.



Form 2 - Surrogate Recoveries

Project Name: West Grama Ridge 6 Federal #4H

Work Orders : 568803,

Project ID: 212C-MD-00990.08

Lab Batch #: 3034040

Sample: 568546-001 S / MS

Batch: 1 **Matrix:** Soil

Units: mg/kg

Date Analyzed: 11/21/17 12:29

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0283	0.0300	94	80-120	
4-Bromofluorobenzene	0.0277	0.0300	92	80-120	

Lab Batch #: 3033989

Sample: 568546-001 SD / MSD

Batch: 1 **Matrix:** Soil

Units: mg/kg

Date Analyzed: 11/18/17 06:34

SURROGATE RECOVERY STUDY

TPH By SW8015 Mod	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1-Chlorooctane	109	100	109	70-135	
o-Terphenyl	47.2	50.0	94	70-135	

Lab Batch #: 3034040

Sample: 568546-001 SD / MSD

Batch: 1 **Matrix:** Soil

Units: mg/kg

Date Analyzed: 11/21/17 12:48

SURROGATE RECOVERY STUDY

BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0322	0.0300	107	80-120	
4-Bromofluorobenzene	0.0328	0.0300	109	80-120	

* Surrogate outside of Laboratory QC limits

** Surrogates outside limits; data and surrogates confirmed by reanalysis

*** Poor recoveries due to dilution

Surrogate Recovery [D] = 100 * A / B

All results are based on MDL and validated for QC purposes.



BS / BSD Recoveries



Project Name: West Grama Ridge 6 Federal #4H

Work Order #: 568803

Project ID: 212C-MD-00990.08

Analyst: ALJ

Date Prepared: 11/21/2017

Date Analyzed: 11/21/2017

Lab Batch ID: 3034040

Sample: 7634836-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Benzene	<0.00198	0.0992	0.122	123	0.0996	0.104	104	16	70-130	35	
Toluene	<0.00198	0.0992	0.114	115	0.0996	0.0967	97	16	70-130	35	
Ethylbenzene	<0.00198	0.0992	0.117	118	0.0996	0.0994	100	16	71-129	35	
m,p-Xylenes	<0.00397	0.198	0.226	114	0.199	0.193	97	16	70-135	35	
o-Xylene	<0.00198	0.0992	0.112	113	0.0996	0.0973	98	14	71-133	35	

Analyst: MNV

Date Prepared: 11/27/2017

Date Analyzed: 11/28/2017

Lab Batch ID: 3034266

Sample: 7634981-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Chloride	<5.00	250	258	103	250	245	98	5	90-110	20	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Blank Spike Recovery [D] = 100*(C)/[B]

Blank Spike Duplicate Recovery [G] = 100*(F)/[E]

All results are based on MDL and Validated for QC Purposes



BS / BSD Recoveries



Project Name: West Grama Ridge 6 Federal #4H

Work Order #: 568803

Project ID: 212C-MD-00990.08

Analyst: MNV

Date Prepared: 11/28/2017

Date Analyzed: 11/28/2017

Lab Batch ID: 3034324

Sample: 7634996-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Chloride	<5.00	250	239	96	250	237	95	1	90-110	20	

Analyst: JUM

Date Prepared: 11/17/2017

Date Analyzed: 11/18/2017

Lab Batch ID: 3033989

Sample: 7634762-1-BKS

Batch #: 1

Matrix: Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

TPH By SW8015 Mod	Blank Sample Result [A]	Spike Added [B]	Blank Spike Result [C]	Blank Spike %R [D]	Spike Added [E]	Blank Spike Duplicate Result [F]	Blk. Spk Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Analytes											
Gasoline Range Hydrocarbons (GRO)	<15.0	1000	949	95	1000	909	91	4	70-135	35	
Diesel Range Organics (DRO)	<15.0	1000	973	97	1000	962	96	1	70-135	35	

Relative Percent Difference RPD = 200*|(C-F)/(C+F)|

Blank Spike Recovery [D] = 100*(C)/[B]

Blank Spike Duplicate Recovery [G] = 100*(F)/[E]

All results are based on MDL and Validated for QC Purposes



Form 3 - MS / MSD Recoveries



Project Name: West Grama Ridge 6 Federal #4H

Work Order # : 568803

Project ID: 212C-MD-00990.08

Lab Batch ID: 3034040

QC- Sample ID: 568546-001 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 11/21/2017

Date Prepared: 11/21/2017

Analyst: ALJ

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Benzene	<0.00200	0.100	0.0942	94	0.0996	0.0959	96	2	70-130	35	
Toluene	<0.00200	0.100	0.0852	85	0.0996	0.0883	89	4	70-130	35	
Ethylbenzene	<0.00200	0.100	0.0860	86	0.0996	0.0823	83	4	71-129	35	
m,p-Xylenes	0.00654	0.200	0.169	81	0.199	0.162	78	4	70-135	35	
o-Xylene	<0.00200	0.100	0.0870	87	0.0996	0.0821	82	6	71-133	35	

Lab Batch ID: 3034266

QC- Sample ID: 568780-041 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 11/28/2017

Date Prepared: 11/27/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	1130	246	1230	41	246	1250	49	2	90-110	20	X

Lab Batch ID: 3034266

QC- Sample ID: 568801-011 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 11/28/2017

Date Prepared: 11/27/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	664	249	874	84	249	905	97	3	90-110	20	X

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*(C-F)/(C+F)

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable
N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.



Form 3 - MS / MSD Recoveries



Project Name: West Grama Ridge 6 Federal #4H

Work Order # : 568803

Project ID: 212C-MD-00990.08

Lab Batch ID: 3034324

QC- Sample ID: 568803-003 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 11/28/2017

Date Prepared: 11/28/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	416	248	657	97	248	652	95	1	90-110	20	

Lab Batch ID: 3034324

QC- Sample ID: 568803-012 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 11/28/2017

Date Prepared: 11/28/2017

Analyst: MNV

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Chloride	53.5	246	306	103	246	300	100	2	90-110	20	

Lab Batch ID: 3033989

QC- Sample ID: 568546-001 S

Batch #: 1 **Matrix:** Soil

Date Analyzed: 11/18/2017

Date Prepared: 11/17/2017

Analyst: JUM

Reporting Units: mg/kg

MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY

TPH By SW8015 Mod Analytes	Parent Sample Result [A]	Spike Added [B]	Spiked Sample Result [C]	Spiked Sample %R [D]	Spike Added [E]	Duplicate Spiked Sample Result [F]	Spiked Dup. %R [G]	RPD %	Control Limits %R	Control Limits %RPD	Flag
Gasoline Range Hydrocarbons (GRO)	16.7	1000	967	95	1000	922	91	5	70-135	35	
Diesel Range Organics (DRO)	130	1000	1050	92	1000	1020	89	3	70-135	35	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B
Relative Percent Difference RPD = 200*(C-F)/(C+F)

Matrix Spike Duplicate Percent Recovery [G] = 100*(F-A)/E

ND = Not Detected, J = Present Below Reporting Limit, B = Present in Blank, NR = Not Requested, I = Interference, NA = Not Applicable
N = See Narrative, EQL = Estimated Quantitation Limit, NC = Non Calculable - Sample amount is > 4 times the amount spiked.



Tetra Tech, Inc.

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Midland, Texas 79705
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568803

ANALYSIS REQUEST

(Circle or Specify Method No.)

Client Name: Cinarrex		Site Manager: Clair Gonzales	
Project Name: West Grama Ridge 6 Federal #4H			
Project Location: Lea County, New Mexico		Project #: 212C-MD-00990.08	
Invoice to: Cinarrex		Sampler Signature: Mat McDaniel	
Receiving Laboratory: Xenco		Comments: Run deeper samples if benzene exceeds 10 mg/kg; total BTEX exceeds 50 mg/kg; or TPH exceeds 5,000 mg/kg.	

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX			PRESERVATIVE METHOD			# CONTAINERS	FILTERED (Y/N)	LAB USE ONLY	REMARKS:
		YEAR	DATE	TIME	WATER	SOIL	HCL	HNO ₃	ICE				
T-1	0-1'		11/9/2017		X				X			X	BTEX 8021B BTEX 8260B
T-1	1'		11/9/2017		X				X			X	TPH TX1005 (Ext to C35)
T-1	2'		11/9/2017		X				X			X	TPH 8015M (GRO - DRO - ORO - MRO)
T-1	3'		11/9/2017		X				X			X	PAH 8270C
T-1	4'		11/9/2017		X				X			X	Total Metals Ag As Ba Cd Cr Pb Se Hg
T-1	5'		11/9/2017		X				X			X	TCLP Metals Ag As Ba Cd Cr Pb Se Hg
T-1	6'		11/9/2017		X				X			X	TCLP Volatiles
T-1	7'		11/9/2017		X				X			X	TCLP Semi Volatiles
T-1	8'		11/9/2017		X				X			X	RCI
T-1	9'		11/9/2017		X				X			X	GC/MS Vol. 8260B / 624
													GC/MS Semi. Vol. 8270C/625
													PCB's 8082 / 608
													NORM
													PLM (Asbestos)
													Chloride
													Chloride Sulfate TDS
													General Water Chemistry (see attached list)
													Anion/Cation Balance
													Hold

Relinquished by: <i>[Signature]</i>	Date: _____	Time: _____	Received by: <i>[Signature]</i>	Date: 11/17/17	Time: 12:05
Relinquished by: _____	Date: _____	Time: _____	Received by: _____	Date: _____	Time: _____

Temp: _____	CF: (0-6: -0.2°C)	IR ID: R-8
Corrected Temp: _____	(6-23: +0.2°C)	

(Circle) HAND DELIVERED FEDEX UPS Tracking # _____



Tetra Tech, Inc.

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Client Name: Cimarex		Site Manager: Clair Gonzales	
Project Name: West Grama Ridge 6 Federal #4H			
Project Location: Lea County, New Mexico		Project #: 212C-MD-00990.08	
Invoice to: Cimarex		Receiving Laboratory: Xenco	
Receiving Laboratory: Cimarex		Sampler Signature: Mat McDaniel	
Comments: Run deeper samples if benzene exceeds 10 mg/kg, total BTEX exceeds 50 mg/kg, or TPH exceeds 5,000 mg/kg.			

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX		PRESERVATIVE METHOD			# CONTAINERS	FILTERED (Y/N)	ANALYSIS REQUEST (Circle or Specify Method No.)
		DATE	TIME	WATER	SOIL	HCL	HNO ₃	ICE			
T-2 0-1		11/9/2017		X					1		BTEX 8021B BTEX 8260B
T-2 1'		11/10/2017		X					1		TPH TX1005 (Ext to C35)
T-2 2'		11/11/2017		X					1		TPH 8015M (GRO - DRO - ORO - MRO)
T-2 3'		11/12/2017		X					1		PAH 8270C
T-2 4'		11/13/2017		X					1		Total Metals Ag As Ba Cd Cr Pb Se Hg
T-2 5'		11/14/2017		X					1		TCLP Metals Ag As Ba Cd Cr Pb Se Hg
T-2 6'		11/15/2017		X					1		TCLP Volatiles
T-2 7'		11/16/2017		X					1		TCLP Semi Volatiles
T-2 8'		11/17/2017		X					1		RCI
											GC/MS Vol. 8260B / 624
											GC/MS Semi. Vol. 8270C/625
											PCB's 8082 / 608
											NORM
											PLM (Asbestos)
											Chloride
											Chloride Sulfate TDS
											General Water Chemistry (see attached list)
											Anion/Cation Balance
											Hold

Relinquished by: <i>[Signature]</i>	Date: _____ Time: _____	Received by: <i>[Signature]</i>	Date: 11-17-17 Time: 9:00
Relinquished by: _____	Date: _____ Time: _____	Received by: _____	Date: _____ Time: _____

Temp: _____	IR ID: R-8
CF: (0-6: -0.2°C)	
(6-23: +0.2°C)	
Corrected Temp: _____	

LAB USE ONLY	REMARKS:
<input type="checkbox"/> RUSH: Same Day 24 hr <input type="checkbox"/> Rush Charges Authorized <input type="checkbox"/> Special Report Limits or TRRP Report	(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____



Tetra Tech, Inc.

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568803

Client Name: Cimarex		Site Manager: Clair Gonzales	
Project Name: West Grama Ridge 6 Federal #4H		Project #: 212C-MD-00990.08	
Project Location: Lea County, New Mexico		Invoice to: Cimarex	
Receiving Laboratory: Xenco		Sampler Signature: Mat McDaniel	
Comments: Run deeper samples if benzene exceeds 10 mg/kg, total BTEX exceeds 50 mg/kg, or TPH exceeds 5,000 mg/kg.			

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX				PRESERVATIVE METHOD			# CONTAINERS	FILTERED (Y/N)
		YEAR	DATE	WATER	SOIL	HCL	HNO ₃	ICE				
T-1	0-1'	11/9/2017		X				X			1	
T-1	1-1'	11/9/2017		X				X			1	
T-1	2'	11/9/2017		X				X			1	
T-1	3'	11/9/2017		X				X			1	
T-1	4'	11/9/2017		X				X			1	
T-1	5'	11/9/2017		X				X			1	
T-1	6'	11/9/2017		X				X			1	
T-1	7'	11/9/2017		X				X			1	
T-1	8'	11/9/2017		X				X			1	
T-1	9'	11/9/2017		X				X			1	

Relinquished by: <i>[Signature]</i> Date: _____ Time: _____ Relinquished by: _____ Date: _____ Time: _____ Relinquished by: _____ Date: _____ Time: _____	Received by: <i>[Signature]</i> Date: 11-7-17 Time: 12:05 Received by: _____ Date: _____ Time: _____ Received by: _____ Date: _____ Time: _____
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Temp: 2.3 CF:(0-6: -0.2°C) (6-23: +0.2°C) Corrected Temp: 2.5	IR ID:R-8
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(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____	ANALYSIS REQUEST (Circle or Specify Method No.)
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LAB USE ONLY Sample Temperature <input 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	REMARKS: BTEX 8021B BTEX 8260B TPH TX1005 (Ext to C35) TPH 8015M (GRO - DRO - ORO - MRO) PAH 8270C Total Metals Ag As Ba Cd Cr Pb Se Hg TCLP Metals Ag As Ba Cd Cr Pb Se Hg TCLP Volatiles TCLP Semi Volatiles RCI GC/MS Vol. 8260B / 624 GC/MS Semi. Vol. 8270C/625 PCB's 8082 / 608 NORM PLM (Asbestos) Chloride Chloride Sulfate TDS General Water Chemistry (see attached list) Anion/Cation Balance Hold
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Tetra Tech, Inc.

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568803

Client Name: Cimarex		Site Manager: Clair Gonzales	
Project Name: West Grama Ridge 6 Federal #4H		Project #: 212C-MD-00990.08	
Project Location: Lea County, New Mexico		Invoice to: Cimarex	
Receiving Laboratory: Xenco		Sampler Signature: Mat McDaniel	
Comments: Run deeper samples if benzene exceeds 10 mg/kg, total BTEX exceeds 50 mg/kg, or TPH exceeds 5,000 mg/kg.			

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX				PRESERVATIVE METHOD			# CONTAINERS	FILTERED (Y/N)	LAB USE ONLY
		YEAR	DATE	TIME	WATER	SOIL	HCL	HNO ₃	ICE				
T-2	0-1		11/9/2017		X						1	X	
T-2	1' <i>MS</i>		11/10/2017		X						1	X	
T-2	2'		11/11/2017		X						1	X	
T-2	3'		11/12/2017		X						1	X	
T-2	4'		11/13/2017		X						1	X	
T-2	5'		11/14/2017		X						1	X	
T-2	6'		11/15/2017		X						1	X	
T-2	7'		11/16/2017		X						1	X	
T-2	8'		11/17/2017		X						1	X	

Received by: <i>Matthew McDaniel</i> 11.17.17 9:00 Date: _____ Time: _____	Received by: _____ Date: _____ Time: _____
Relinquished by: _____ Date: _____ Time: _____	Relinquished by: _____ Date: _____ Time: _____

Temp: 2.3 CF:(0-6: -0.2°C) (6-23: +0.2°C) Corrected Temp: 2.5	IR ID:R-8 (Circle) HAND DELIVERED FEDEX UPS Tracking #: _____
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ANALYSIS REQUEST (Circle or Specify Method No.)	REMARKS: <input 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
BTEX 8021B BTEX 8260B TPH TX1005 (Ext to C35) TPH 8015M (GRO - DRO - ORO - MRO) PAH 8270C Total Metals Ag As Ba Cd Cr Pb Se Hg TCLP Metals Ag As Ba Cd Cr Pb Se Hg TCLP Volatiles TCLP Semi Volatiles RCI GC/MS Vol. 8260B / 624 GC/MS Semi. Vol. 8270C/625 PCB's 8082 / 608 NORM PLM (Asbestos) Chloride Chloride Sulfate TDS General Water Chemistry (see attached list) Anion/Cation Balance	