SITE INFORMATION

Report Type: Closure Report 1RP-4760

General Site Information:						
Site:	**Battle Federal #4H**					
Company:	**Marathon Oil Company**					
Section, Township and Range	**Unit M**	**Sec. 27**	**T 21S**	**R 33E**		
Lease Number:	**API No. 30-025-42636**					
County:	**Lea County**					
GPS:	**32.4430715º N**			**103.565825º W**		
Surface Owner:	Merchant Livestock					
Mineral Owner:	State					
Directions:	From the major intersection of HWY 8 and HWY 176, go west for 13.4 miles, turn left onto lease road. In 1.5 miles, turn right onto lease roa. In 3 miles, turn right. Travel for 3 miles and destination will be on your left.					

Release Data:	
Date Released:	7/4/2017 - 7/5/2017
Type Release:	Produced Water
Source of Contamination:	Faulty discharge valve and manifold valve
Fluid Released:	23 bbls
Fluids Recovered:	23 bbls

Official Communication:			
Name:	Jennifer Van Curen		Ike Tavarez
Company:	Marathon Oil		Tetra Tech
Address:	5555 San Felipe Street		4000 N. Big Spring
Ste			Ste 401
City:	Houston, TX 77056		Midland, Texas
Phone number:	(713) 296-2862		(432) 687-8110
Fax:			
Email:	jvancuren@marathonoil.com		Ike.Tavarez@tetratech.com

Ranking Criteria		
Depth to Groundwater:	***Ranking Score***	***Site Data***
<50 ft	20	
50-99 ft	10	
>100 ft.	***0***	*175'-200'*
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

TETRA TECH

March 9, 2018

Ms. Olivia Yu
Environmental Engineer Specialist
Oil Conservation Division, District 1
1625 North French Drive
Hobbs, New Mexico 88240

REVIEWED
By Olivia Yu at 9:09 am, Nov 15, 2018

Re: Closure Report for the Marathon Oil, Battle Federal #4H, Unit M, Section 27, Township 21 South, Range 33 East, Lea County, New Mexico.
1RP-4760.

Ms. Yu:

Tetra Tech, Inc. (Tetra Tech) was contacted by Marathon Oil (Marathon) to remediate a spill from Battle Federal #4H, Unit M, Section 27, Township 21 South, Range 33 East, Lea County, New Mexico (site). The spill site coordinates are N 32.44307 º, W 103.56582 º. The site location is shown on Figures 1 and 2.

Background

According to the State of New Mexico C-141 Initial Report, the leak was discovered on July 5, 2017, and released approximately twenty-three (23) barrels of produced water due to faulty discharge and manifold valves. All of the fluids were recovered. Eleven (11) barrels were released to the well pad and twelve (12) barrels inside the containment, measuring approximately 20' x 75' and 10' x 40'. As a part of an emergency response, Marathon used a vacuum truck to remove the produced water and loose soil from the pad area, and then removed the standing fluid from the containment. The initial C-141 form is included in Appendix A.

Groundwater

The New Mexico Office of the State Engineer's database listed three wells in Section 27 with an average depth to groundwater of 577 feet below surface. The nearest well listed on the USGS Nation Water Information System is located in Section 28 with a reported depth to groundwater of 179 feet below surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in this area is between 175' and 200' below surface. The groundwater data is shown in Appendix B.

Regulatory

A risk-based evaluation was performed for the Site in accordance with the New Mexico Oil Conservation Division (NMOCD) Guidelines for Remediation of Leaks, Spills and 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 September 7, 2017, Terracon Consultants, Inc. (Terracon) personnel were onsite to evaluate and sample the release area. A total of fourteen (14) samples were collected from the release area and analyzed for TPH analysis by EPA method 8015, BTEX by EPA Method 8021B and chloride by EPA method 300.0. Based on the results, none of the samples collected exceeded the RRAL for total TPH or BTEX, but there were indications of chloride concentrations not defined in some of the samples. The complete site assessment and findings was submitted on October 20, 2017 in the Proposed Work Plan – Battle Federal #4H report by Terracon.

Remediation Activities

Tetra Tech was contacted to review the submitted work plan and implement the plan. On January 10-11, 2018, Tetra Tech personnel were onsite to supervise the excavation of the impacted areas. All of the areas were excavated to a total depth of 1.0' below surface. All of the excavated material was hauled for proper disposal. The excavation areas and depths are shown on Figure 3.

In order to ensure all of the impacted material was properly removed, bottom hole samples (AH-1, AH-2, AH-3, AH-4, AH-5, and AH-6) were collected as well as appropriate sidewall samples in each area. The samples were analyzed for chloride by EPA method 300.0. Copies of laboratory analysis and chain-of-custody documentation are included in Appendix C. The sampling results are summarized in Table 1. The sampling locations are shown on Figure 3.

Referring to Table 1, all of the bottom hole and sidewall samples showed chloride concentrations below the 600 mg/kg threshold, with the exception of sidewall samples (NSW-2 and SSW-2). Due to safety concerns, any additional excavation in these areas were not performed due to the proximity of an active gas meter and underground electrical line in the area. The impacted soils were excavated to the maximum extent practicable. In addition, sidewall samples (NSW-5 and ESW-5) reported chloride concentrations above the 600 mg/kg limit. As a result, excavation was extended 1.0' to remove the soil above 600 mg/kg. Once the excavation was completed, the areas were backfilled with clean material to surface grade.

TETRA TECH

Conclusions and Recommendations

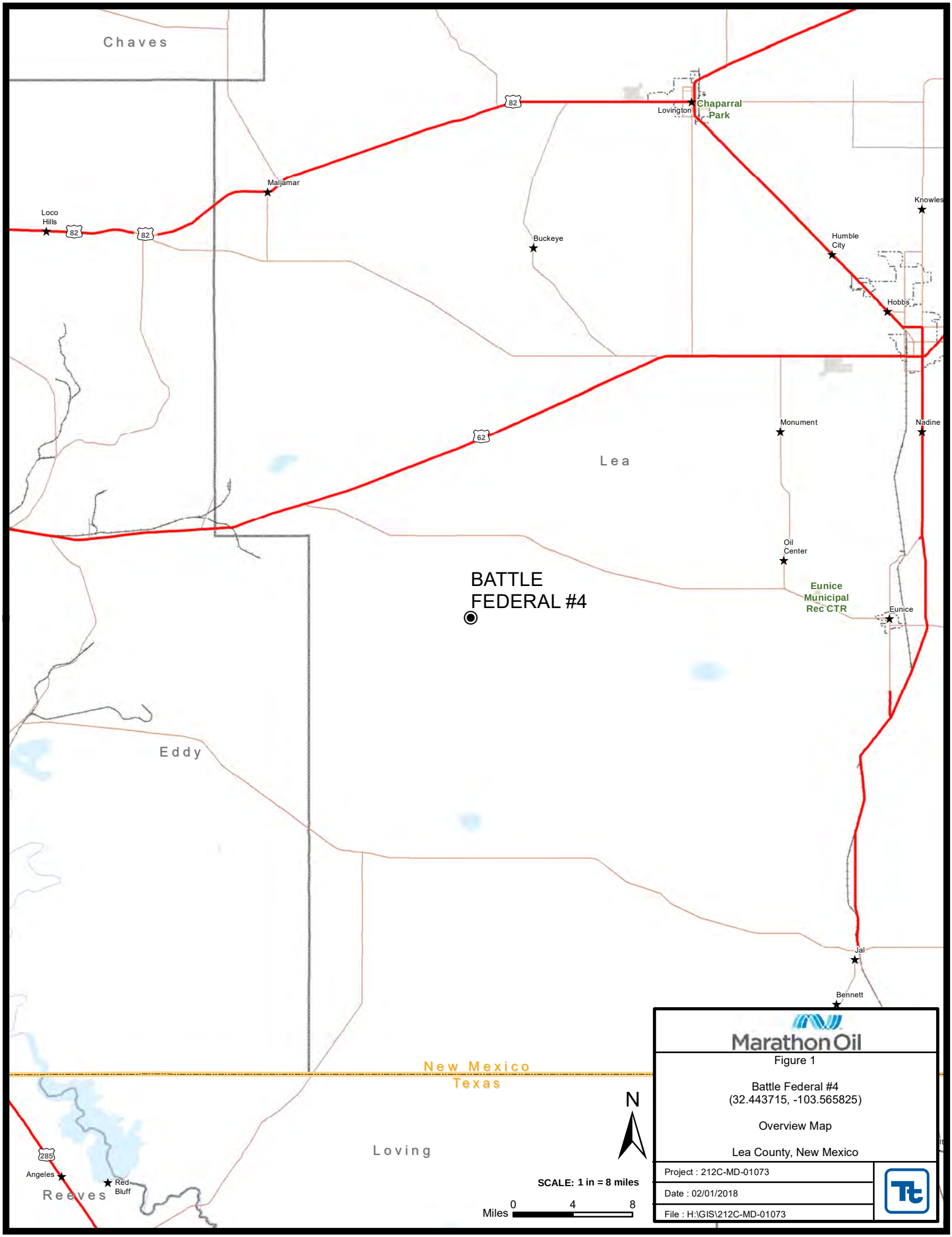
Based on the soil assessment and remediation work performed at the site, Marathon requests closure of this spill. The final C-141 is enclosed in Appendix A. If you have any questions or comments concerning the assessment or the remediation activities for this site, please call me at (432) 682-4559.

Respectfully submitted,
TETRA TECH

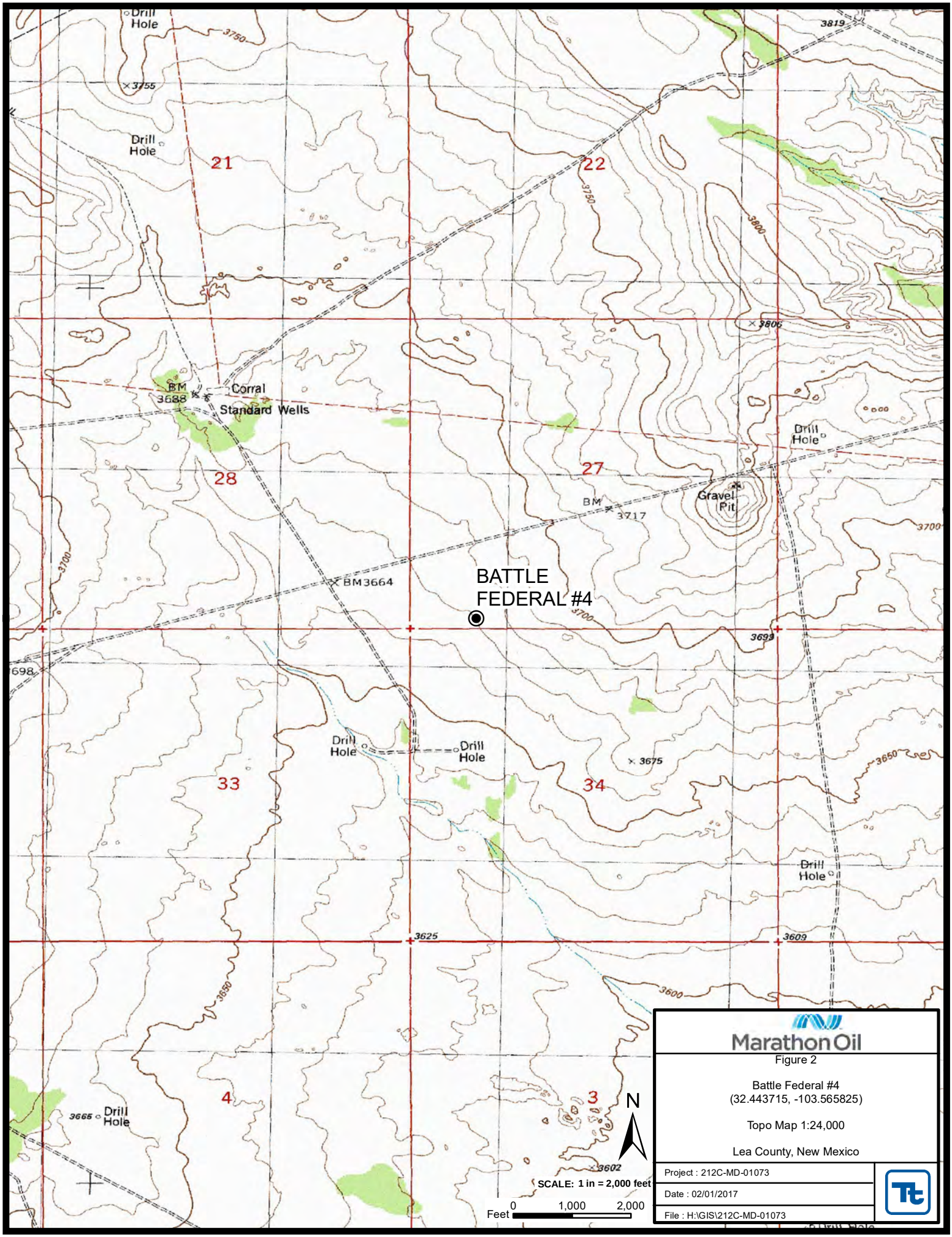
Ike Tavarez, PG
Senior Project Manager

cc: Callie Karrigan - Marathon
Jennifer Van Curen - Marathon

Figures



Mapped By: Isabel Marmolejo



Marathon Oil

Figure 2

Battle Federal #4
(32.443715, -103.565825)

Topo Map 1:24,000

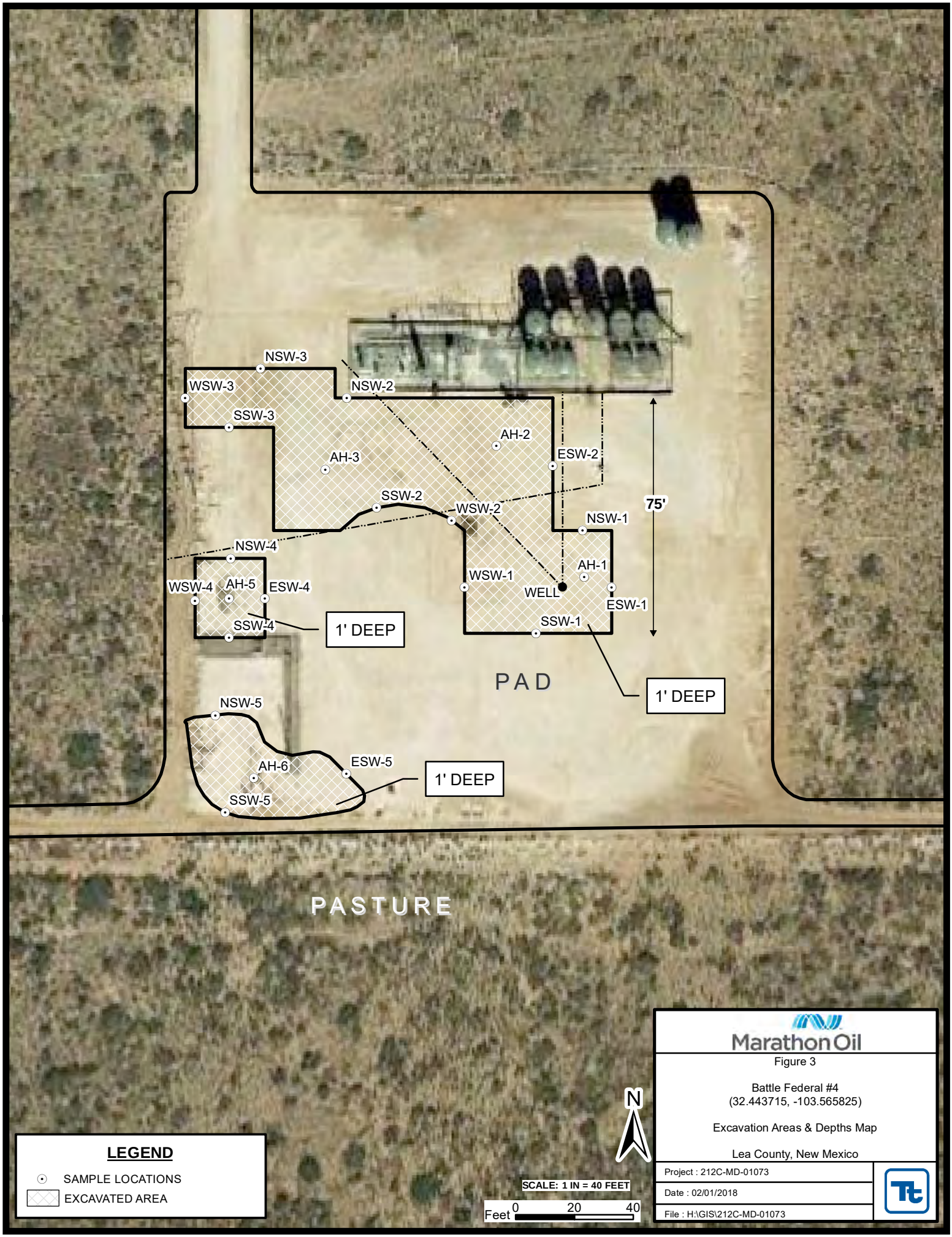
Lea County, New Mexico

Project : 212C-MD-01073

Date : 02/01/2017

File : H:\GIS\212C-MD-01073

Mapped By: Isabel Marmolejo



Mapped By: Isabel Marmolejo

Tables

Table 1
Marathon
Battle Federal #4
Lea County, New Mexico

Sample ID	Sample Date	Sample Depth (ft)	Excavation Depth (ft)	Soil Status		Chloride (mg/kg)
				In-Situ	Removed	
AH#1	1/19/2018	0-1	1	X		353
NSW -1 (1.0')	1/19/2018	-	-	X		553
SSW-1	1/19/2018	-	-	X		383
ESW-1	1/19/2018	-	-	X		297
WSW-1	1/19/2018	-	-	X		365
AH-2	1/19/2018	0-1	1	X		23.2
NSW-2	1/22/2018	-	-	X		**1540**
SSW-2	1/22/2018	-	-	X		**635**
ESW-2	1/19/2018	-	-	X		342
WSW-2	1/19/2018	-	-	X		193
AH-3	1/22/2018	0-1	1	X		361
AH-4	1/22/2018	0-1	1	X		<4.96
NSW-3	1/22/2018	-	-	X		34.2
SSW-3	1/22/2018	-	-	X		166
WSW-3	1/22/2018	-	-	X		<4.93
AH-5	1/22/2018	0-1	1	X		<4.93
NSW-4	1/22/2018	-	-	X		30.6
SSW-4	1/22/2018	-	-	X		209
ESW-4	1/22/2018	-	-	X		13.6
AH-6	1/22/2018	0-1	1	X		71.9
NSW-5	1/22/2018	-	-		X	**1030**
NSW-5 (1.0')	1/22/2018	-	-	X		288
SSW-5	1/22/2018	-	-	X		399
SSW-5 (1.0')	1/22/2018	-	-	X		253
ESW-5	1/22/2018	-	1		X	**2190**
ESW-5 (1.0')	1/22/2018	-	-	X		354

Not Excavated Due to Active Lines in Areas
Areas Excavated and Removed

Photos

Marathon Oil Company
Battle Federal #4H
Lea County, New Mexico

View of area containing sample locations AH-1, NWS-1, ESW-1, SSW-1, and WSW-1

View of area containing sample locations AH-2, ESW-2, WSW-2.

Marathon Oil Company
Battle Federal #4H
Lea County, New Mexico

View of area containing samples AH-3, NSW-2, and SSW-2.

View of area containing samples AH-4, NSW-3, WSW-3, and SSW- 3.

Marathon Oil Company
Battle Federal #4H
Lea County, New Mexico

TETRA TECH

View of area containing samples AH-5, NSW-4, ESW-4, SSW-4, and WSW-4.

View of area containing samples AH-6, NSW-5, ESW-5, and SSW-5.

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

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

Form C-141
Revised April 3, 2017

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 Marathon Oil Company	Contact Wendy Gram
Address 5555 San Felipe Street, Houston, Texas 77056	Telephone No. 701-690-6519 (cell) 713-296-2862 (office)
Facility Name Battle Federal #4H	Facility Type Oil well

Surface Owner Merchant Livestock	Mineral Owner State	API No.30-025-42636

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Lin	Feet from the	East/West Line	County
M	27	21S	33E	191	South	960	West	Lea

Latitude 32.44307153692 **Longitude** -103.565825723177 NAD83

NATURE OF RELEASE

Type of Release Produced water	Volume of Release 23 barrels	Volume Recovered 23 barrels
Source of Release Well completions equipment	Date and Hour of Occurrence 7/4/2017 – 7/5/2017	Date and Hour of Discovery 7/5/2017 12:45 AM
Was Immediate Notice Given? ☐ Yes ☐ No ☒ Not Required	If YES, To Whom?	
By Whom?	Date and Hour	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*
Not applicable.

RECEIVED
By Olivia Yu at 3:53 pm, Jul 21, 2017

Describe Cause of Problem and Remedial Action Taken.*
As part of a routine site inspection during hydraulic fracturing activities at the location, fluid was noticed between the secondary blender and a frac pump. Further investigation revealed that the 4" discharge valves were faulty or not closed. The 4" valves located at the manifold were found to be faulty as well. The release resulted in approximately 23 barrels of produced water (20'x75'x.50") 11 barrels to the pad and (10'x40'x2") 12 barrels to containment.

Describe Area Affected and Cleanup Action Taken.*
A vacuum truck was utilized to cleanup and dispose of both spill locations. All the fluids that could be removed as well as the loose soil on the affected area of location were cleaned up first and then the containment was vacuumed out.

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.

Wendy Gram
Signature:

Printed Name: Wendy Gram

Title: Sr. HES Professional

E-mail Address: wwgram@marathonoil.com

Date: July 18, 2017
Phone: 701-690-6519 (cell) 713-296-2862 (office)

OIL CONSERVATION DIVISION

Approved by Environmental Specialist:

Approval Date: 7/21/2017 Expiration Date:

Conditions of Approval: see attached directive

Please inspect liner in question. Provide NMOCD with a concise report of the inspection with affirmation the liner has and will continue to contain liquids.

Attached ☑
1RP-4760
nOY1720257038
pOY1720258053

* Attach Additional Sheets If Necessary

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 **Marathon Oil Permian, LLC.**	Contact **Wendy Gram**
Address **5555 San Felipe Street, Houston, Texas 77056**	Telephone No. **701-690-6519 (cell) 713-296-2862 (office)**
Facility Name **Battle Federal #4H**	Facility Type **Oil Well**

Surface Owner: Merchant Livestock	Mineral Owner: State	API No. 30-025-42636

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
M	27	21S	33E	191	South	960	West	Lea

Latitude 32.44307153692 **Longitude** -103.56825723177 NAD83

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release 23 bbls	Volume Recovered: 23 bbls
Source of Release: Well completions equipment	Date and Hour of Occurrence 7/4/2017 – 7/5/2017	Date and Hour of Discovery 7/5/2017 12:45 AM
Was Immediate Notice Given? ☐ Yes ☐ No ☒ Not Required	If YES, To Whom?	
By Whom? Jennifer Van Curen	Date and Hour 11/02/17 1:00 p.m.	
Was a Watercourse Reached? ☐ Yes ☒ 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.*

As part of a routine site inspection during hydraulic fracturing activities at the location, fluid was noticed between the secondary blender and a frac pump. Further investigation revealed that the 4" discharge valves were faulty or not closed. The 4" valves located at the manifold were found to be faulty as well. The release resulted in approximately 23 barrels of produced water (20'x75'x50") 11 barrels to the pad and (10'x40'x2") 12 barrels to containment. A subsurface assessment in the release area revealed TPH and BTEX concentrations below target levels, but elevated chloride concentrations. NMOCD approved work plan included removal of soil with chloride levels >600 mg/kg within the top 1 foot below surface grade. NMOCD required the collection of excavation confirmation wall samples.

Describe Area Affected and Cleanup Action Taken.*

Tetra Tech supervised the remediation of the impacted soils. Soils that exceeded the 600 mg/kg chloride threshold were removed and hauled for proper disposal. The site was then brought up to surface grade with clean backfill material. Tetra Tech prepared a closure report and submitted to the 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.

Signature:	OIL CONSERVATION DIVISION	
Printed Name: Ike Tavarez (agent for Marathon)	Approved by District Supervisor:	
Title: Project Manager	Approval Date:	Expiration Date:
E-mail Address: Ike.Tavarez@TetraTech.com	Conditions of Approval:	Attached ☐
Date: 2/20/18 Phone: (432) 682-4559		

* Attach Additional Sheets If Necessary

Appendix B

Water Well Data
Average Depth to Groundwater (ft)
Marathon - Battle Federal #4H
Lea County, New Mexico

20 South 33 East

6	5 325 278	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22	23	24 +300
30	29	28	27	26	25
31	32	33	34	35	36

20 South 34 East

6	5	4 125	3	2	1
7	8	9	10	11	12
18	17 128 140	16	15	14 150	13
19	20	21	22	23	24 270
30	29	28	27	26	25
31	32	33	34 82	35	36

20 South 35 East

6 56 64	5 64	4	3	2	1
7	8	9	10	11	12 49
18	17	16	15	14	13
19	20	21	22	23	24
30	29	28	27	26	25
31 65	32	33 89	34	35	36

21 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

21 South 33 East

6	5	4	3	2 79 107	1
7	8	9	10	11 150	12
18 143	17	16	15	14	13
19	20	21	22	23	24
30	29	28 179	27 572	26	25
31	32	33 180	34	35	36

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	34	35	36

22 South 32 East

6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14 382 350	13
19 (S) 280	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	13 391
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

22 South 34 East

6	5	4	3	2	1
7	8	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

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	POD Sub-basin Code	County	Q 64	Q 16	Q 4	Sec	Tws	Rng	X	Y	Depth Well	Depth Water	Water Column
CP 01349 POD1	CP	LE	2	3	1	27	21S	33E	635304	3591576	1188	572	616
CP 01355 POD1	CP	LE	2	1	3	27	21S	33E	634773	3591061	1192	582	610
CP 01357 POD1	CP	LE	4	3	1	27	21S	33E	634782	3591347	1286	578	708

Average Depth to Water: **577 feet**

Minimum Depth: **572 feet**

Maximum Depth: **582 feet**

Record Count: 3

PLSS Search:

Section(s): 27 **Township:** 21S **Range:** 33E

Appendix C

Analytical Report 574604

for

Tetra Tech- Midland

Project Manager: Ike Tavarez

Marathon Oil-Battle Fed #4

212C-MD-01073

01-FEB-18

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)

01-FEB-18

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

Reference: XENCO Report No(s): **574604**
Marathon Oil-Battle Fed #4
Project Address: Lea Co, NM

Ike Tavarez:

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) 574604. 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. 574604 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,

Kelsey Brooks
Project Manager

Sample Cross Reference 574604

Tetra Tech- Midland, Midland, TX

Marathon Oil-Battle Fed #4

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
ESW-1	S	01-19-18 09:00		574604-001
WSW-1	S	01-19-18 09:05		574604-002
SSW-1	S	01-19-18 09:10		574604-003
AH-1 (0-1')	S	01-19-18 09:30		574604-004
NSW-1 (1')	S	01-19-18 10:00		574604-005
ESW- 2	S	01-19-18 11:00		574604-006
WSW- 2	S	01-19-18 11:05		574604-007
AH-2 (0-1')	S	01-19-18 11:15		574604-008

CASE NARRATIVE

Client Name: Tetra Tech- Midland

Project Name: Marathon Oil-Battle Fed #4

Project ID: *212C-MD-01073*
Work Order Number(s): *574604*

Report Date: *01-FEB-18*
Date Received: *01/25/2018*

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Certificate of Analysis Summary 574604

Tetra Tech- Midland, Midland, TX

Project Name: Marathon Oil-Battle Fed #4

Project Id: 212C-MD-01073
Contact: Ike Tavarez
Project Location: Lea Co, NM

Date Received in Lab: Thu Jan-25-18 04:00 pm
Report Date: 01-FEB-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	574604-001		574604-002		574604-003		574604-004		574604-005		574604-006	
	Field Id:	ESW-1		WSW-1		SSW-1		AH-1 (0-1')		NSW-1 (1')		ESW- 2	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jan-19-18 09:00		Jan-19-18 09:05		Jan-19-18 09:10		Jan-19-18 09:30		Jan-19-18 10:00		Jan-19-18 11:00	
Inorganic Anions by EPA 300/300.1	***Extracted:***	Jan-30-18 09:00		Jan-30-18 09:00		Jan-30-18 09:00		Jan-30-18 09:00		Jan-30-18 09:00		Jan-30-18 09:00	
	Analyzed:	Jan-30-18 12:43		Jan-30-18 12:50		Jan-30-18 13:11		Jan-30-18 13:18		Jan-30-18 13:39		Jan-30-18 13:46	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		297	4.96	365	5.00	383	4.96	353	4.97	553	4.95	342	5.00

Kelsey Brooks
Project Manager

Certificate of Analysis Summary 574604

Tetra Tech- Midland, Midland, TX

Project Name: Marathon Oil-Battle Fed #4

Project Id: 212C-MD-01073
Contact: Ike Tavarez
Project Location: Lea Co, NM

Date Received in Lab: Thu Jan-25-18 04:00 pm
Report Date: 01-FEB-18
Project Manager: Kelsey Brooks

Analysis Requested									
	Lab Id:	574604-007		574604-008					
	Field Id:	WSW- 2		AH-2 (0-1')					
	Depth:								
	Matrix:	SOIL		SOIL					
	Sampled:	Jan-19-18 11:05		Jan-19-18 11:15					
Inorganic Anions by EPA 300/300.1	***Extracted:***	Jan-30-18 09:00		Jan-30-18 09:00					
	Analyzed:	Jan-30-18 13:53		Jan-30-18 14:00					
	Units/RL:	mg/kg	RL	mg/kg	RL				
Chloride		193	4.93	23.2	4.97				

Kelsey Brooks
Project Manager

Flagging Criteria

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

BS / BSD Recoveries

Project Name: Marathon Oil-Battle Fed #4

Work Order #: 574604 **Project ID:** 212C-MD-01073

Analyst: OJS **Date Prepared:** 01/30/2018 **Date Analyzed:** 01/30/2018

Lab Batch ID: 3039647 **Sample:** 7638275-1-BKS **Batch #:** 1 **Matrix:** Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	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
Chloride	<5.00	250	273	109	250	274	110	0	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

Form 3 - MS / MSD Recoveries

Project Name: Marathon Oil-Battle Fed #4

Work Order # : 574604 **Project ID:** 212C-MD-01073

Lab Batch ID: 3039647 **QC- Sample ID:** 573785-001 S **Batch #:** 1 **Matrix:** Sludge

Date Analyzed: 01/30/2018 **Date Prepared:** 01/30/2018 **Analyst:** OJS

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	822	248	1020	80	248	1050	92	3	90-110	20	X

Lab Batch ID: 3039647 **QC- Sample ID:** 574604-002 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 01/30/2018 **Date Prepared:** 01/30/2018 **Analyst:** OJS

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	365	250	619	102	250	634	108	2	90-110	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B

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

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

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.

574604

Analysis Request of Chain of Custody Record

Tetra Tech, Inc.

4000 N. Big Spring Street, Ste
401 Midland,Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

Client Name: Marathon Oil	**Site Manager:** Ike Tavarez
Project Name: Battle Fed #4	
Project Location: (county, state) Lea Co, New Mexico	**Project #:** 212C-MD-01073
Invoice to:	
Receiving Laboratory:	**Sampler Signature:** Clint Merritt
Comments:	

ANALYSIS REQUEST
(Circle or Specify Method No.)

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	MATRIX	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE			# CONTAINERS	FILTERED (Y/N)	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
	ESW-1	1/19/2018	9:00		X				X																			X							
	WSW-1	1/19/2018	9:05		X				X																			X							
	SSW-1	1/19/2018	9:10		X				X																			X							
	AH-1 (0-1')	1/19/2018	9:30		X				X																			X							
	NSW-1 (1')	1/19/2018	10:00		X				X																			X							
	ESW-2	1/19/2018	11:00		X				X																			X							
	WSW-2	1/19/2018	11:05		X				X																			X							
	AH-2 (0-1')	1/19/2018	11:15		X				X																			X							

Relinquished by: Clint Merritt	Date: 1/25	Time: 16:00
Relinquished by:	Date:	Time:
Relinquished by:	Date:	Time:

Received by: [signature]	Date:	Time:
Received by:	Date:	Time:
Received by:	Date:	Time:

LAB USE ONLY

Sample Temperature

REMARKS:

☐ **RUSH:** Same Day 24 hr 48 hr 72 hr

☐ Rush Charges Authorized

☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #: _____

Temp: 1.9 IR ID:R-8
CF:(0-6: -0.2°C)
(6-23: +0.2°C)
Corrected Temp: 1.7

ORIGINAL COPY

Final 1.000

Page 10 of 11

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: Tetra Tech- Midland

Date/ Time Received: 01/25/2018 04:00:00 PM

Work Order #: 574604

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R8

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	1.7
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seals intact on shipping container/ cooler?	**N/A**
#5 Custody Seals intact on sample bottles?	**N/A**
#6*Custody Seals Signed and dated?	**N/A**
#7 *Chain of Custody present?	**Yes**
#8 Any missing/extra samples?	**No**
#9 Chain of Custody signed when relinquished/ received?	**Yes**
#10 Chain of Custody agrees with sample labels/matrix?	**Yes**
#11 Container label(s) legible and intact?	**Yes**
#12 Samples in proper container/ bottle?	**Yes**
#13 Samples properly preserved?	**Yes**
#14 Sample container(s) intact?	**Yes**
#15 Sufficient sample amount for indicated test(s)?	**Yes**
#16 All samples received within hold time?	**Yes**
#17 Subcontract of sample(s)?	**N/A**
#18 Water VOC samples have zero headspace?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: PH Device/Lot#:

Checklist completed by: Jessica Kramer Date: 01/26/2018
Jessica Kramer

Checklist reviewed by: Kelsey Brooks Date: 01/26/2018
Kelsey Brooks

Analytical Report 574606

for

Tetra Tech- Midland

Project Manager: Ike Tavarez

Marathon Oil-Battle Fed #4

212C-MD-01073

01-FEB-18

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)

01-FEB-18

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

Reference: XENCO Report No(s): **574606**
Marathon Oil-Battle Fed #4
Project Address: Lea Co, NM

Ike Tavarez:

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) 574606. 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. 574606 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,

Kelsey Brooks
Project Manager

Sample Cross Reference 574606

Tetra Tech- Midland, Midland, TX

Marathon Oil-Battle Fed #4

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
SSW-2	S	01-22-18 10:30		574606-001
NSW-2	S	01-22-18 10:35		574606-002
AH-3(0-1')	S	01-22-18 10:45		574606-003
NSW-3	S	01-22-18 13:50		574606-004
WSW-3	S	01-22-18 15:00		574606-005
SSW-3	S	01-22-18 14:15		574606-006
AH-4(0-1')	S	01-22-18 14:30		574606-007
NSW-4	S	01-23-18 10:05		574606-008
SSW-4	S	01-23-18 10:15		574606-010
ESW-4	S	01-23-18 10:20		574606-011
AH-5 (0-1')	S	01-23-18 11:00		574606-012
NSW-5	S	01-24-18 14:15		574606-013
SSW-5	S	01-24-18 14:20		574606-014
ESW-5	S	01-24-18 14:25		574606-015
AH-6 (0-1')	S	01-24-18 14:30		574606-016
NSW-5 (1')	S	01-24-18 15:00		574606-017
SSW-5 (1')	S	01-24-18 15:05		574606-018
ESW-5 (1')	S	01-24-18 15:10		574606-019
WSW-4	S	01-23-18 10:10		Not Analyzed

CASE NARRATIVE

Client Name: Tetra Tech- Midland

Project Name: Marathon Oil-Battle Fed #4

Project ID: *212C-MD-01073*
Work Order Number(s): *574606*

Report Date: *01-FEB-18*
Date Received: *01/25/2018*

Sample receipt non conformances and comments:

Sample receipt non conformances and comments per sample:

None

Certificate of Analysis Summary 574606

Tetra Tech- Midland, Midland, TX

Project Name: Marathon Oil-Battle Fed #4

Project Id: 212C-MD-01073
Contact: Ike Tavarez
Project Location: Lea Co, NM

Date Received in Lab: Thu Jan-25-18 04:00 pm
Report Date: 01-FEB-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	574606-001		574606-002		574606-003		574606-004		574606-005		574606-006	
	Field Id:	SSW-2		NSW-2		AH-3(0-1')		NSW-3		WSW-3		SSW-3	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jan-22-18 10:30		Jan-22-18 10:35		Jan-22-18 10:45		Jan-22-18 13:50		Jan-22-18 15:00		Jan-22-18 14:15	
Inorganic Anions by EPA 300/300.1	***Extracted:***	Jan-30-18 09:00		Jan-30-18 09:00		Jan-30-18 09:00		Jan-30-18 16:15		Jan-30-18 16:15		Jan-30-18 16:15	
	Analyzed:	Jan-30-18 14:07		Jan-30-18 14:14		Jan-30-18 14:21		Jan-30-18 16:27		Jan-30-18 17:50		Jan-30-18 17:57	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		635	5.00	1540	25.0	361	4.99	34.2	4.95	<4.93	4.93	166	4.98

Kelsey Brooks
Project Manager

Certificate of Analysis Summary 574606

Tetra Tech- Midland, Midland, TX

Project Name: Marathon Oil-Battle Fed #4

Project Id: 212C-MD-01073
Contact: Ike Tavarez
Project Location: Lea Co, NM

Date Received in Lab: Thu Jan-25-18 04:00 pm
Report Date: 01-FEB-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	574606-007		574606-008		574606-010		574606-011		574606-012		574606-013	
	Field Id:	AH-4(0-1')		NSW-4		SSW-4		ESW-4		AH-5 (0-1')		NSW-5	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jan-22-18 14:30		Jan-23-18 10:05		Jan-23-18 10:15		Jan-23-18 10:20		Jan-23-18 11:00		Jan-24-18 14:15	
Inorganic Anions by EPA 300/300.1	***Extracted:***	Jan-30-18 16:15		Jan-30-18 16:15		Jan-30-18 16:15		Jan-30-18 16:15		Jan-30-18 16:15		Jan-30-18 16:15	
	Analyzed:	Jan-30-18 18:04		Jan-30-18 18:25		Jan-30-18 18:32		Jan-30-18 18:53		Jan-30-18 19:00		Jan-30-18 19:07	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		<4.96	4.96	30.6	4.93	209	5.00	13.6	4.96	<4.93	4.93	1030	5.00

Kelsey Brooks
Project Manager

Certificate of Analysis Summary 574606

Tetra Tech- Midland, Midland, TX

Project Name: Marathon Oil-Battle Fed #4

Project Id: 212C-MD-01073
Contact: Ike Tavarez
Project Location: Lea Co, NM

Date Received in Lab: Thu Jan-25-18 04:00 pm
Report Date: 01-FEB-18
Project Manager: Kelsey Brooks

Analysis Requested													
	Lab Id:	574606-014		574606-015		574606-016		574606-017		574606-018		574606-019	
	Field Id:	SSW-5		ESW-5		AH-6 (0-1')		NSW-5 (1')		SSW-5 (1')		ESW-5 (1')	
	Depth:												
	Matrix:	SOIL		SOIL		SOIL		SOIL		SOIL		SOIL	
	Sampled:	Jan-24-18 14:20		Jan-24-18 14:25		Jan-24-18 14:30		Jan-24-18 15:00		Jan-24-18 15:05		Jan-24-18 15:10	
Inorganic Anions by EPA 300/300.1	***Extracted:***	Jan-30-18 16:15		Jan-30-18 16:15		Jan-30-18 16:15		Jan-30-18 16:15		Jan-31-18 09:00		Jan-31-18 09:00	
	Analyzed:	Jan-30-18 19:14		Jan-30-18 19:21		Jan-30-18 19:28		Jan-30-18 19:35		Jan-31-18 11:29		Jan-31-18 11:36	
	Units/RL:	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL	mg/kg	RL
Chloride		399	4.93	2190	24.9	71.9	4.94	288	5.00	253	4.93	354	4.91

Kelsey Brooks
Project Manager

Flagging Criteria

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

	Phone	Fax
4147 Greenbriar Dr, Stafford, TX 77477	(281) 240-4200	(281) 240-4280
9701 Harry Hines Blvd , Dallas, TX 75220	(214) 902 0300	(214) 351-9139
5332 Blackberry Drive, San Antonio TX 78238	(210) 509-3334	(210) 509-3335
1211 W Florida Ave, Midland, TX 79701	(432) 563-1800	(432) 563-1713
2525 W. Huntington Dr. - Suite 102, Tempe AZ 85282	(602) 437-0330	

BS / BSD Recoveries

Project Name: Marathon Oil-Battle Fed #4

Work Order #: 574606 **Project ID:** 212C-MD-01073

Analyst: OJS **Date Prepared:** 01/30/2018 **Date Analyzed:** 01/30/2018

Lab Batch ID: 3039647 **Sample:** 7638275-1-BKS **Batch #:** 1 **Matrix:** Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	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
Chloride	<5.00	250	273	109	250	274	110	0	90-110	20	

Analyst: OJS **Date Prepared:** 01/30/2018 **Date Analyzed:** 01/30/2018

Lab Batch ID: 3039852 **Sample:** 7638303-1-BKS **Batch #:** 1 **Matrix:** Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	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
Chloride	<5.00	250	269	108	250	260	104	3	90-110	20	

Analyst: OJS **Date Prepared:** 01/31/2018 **Date Analyzed:** 01/31/2018

Lab Batch ID: 3039755 **Sample:** 7638306-1-BKS **Batch #:** 1 **Matrix:** Solid

Units: mg/kg

BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY

Inorganic Anions by EPA 300/300.1 Analytes	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
Chloride	<5.00	250	240	96	250	246	98	2	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

Form 3 - MS / MSD Recoveries

Project Name: Marathon Oil-Battle Fed #4

Work Order # : 574606 **Project ID:** 212C-MD-01073

Lab Batch ID: 3039647 **QC- Sample ID:** 573785-001 S **Batch #:** 1 **Matrix:** Sludge

Date Analyzed: 01/30/2018 **Date Prepared:** 01/30/2018 **Analyst:** OJS

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	822	248	1020	80	248	1050	92	3	90-110	20	X

Lab Batch ID: 3039647 **QC- Sample ID:** 574604-002 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 01/30/2018 **Date Prepared:** 01/30/2018 **Analyst:** OJS

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	365	250	619	102	250	634	108	2	90-110	20	

Lab Batch ID: 3039755 **QC- Sample ID:** 574947-002 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 01/31/2018 **Date Prepared:** 01/31/2018 **Analyst:** OJS

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	453	247	666	86	247	678	91	2	90-110	20	X

Matrix Spike Percent Recovery [D] = 100*(C-A)/B

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

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

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: Marathon Oil-Battle Fed #4

Work Order # : 574606 **Project ID:** 212C-MD-01073

Lab Batch ID: 3039755 **QC- Sample ID:** 574947-011 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 01/31/2018 **Date Prepared:** 01/31/2018 **Analyst:** OJS

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	521	248	800	113	248	777	103	3	90-110	20	X

Lab Batch ID: 3039852 **QC- Sample ID:** 574606-004 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 01/30/2018 **Date Prepared:** 01/30/2018 **Analyst:** OJS

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	34.2	248	291	104	248	295	105	1	90-110	20	

Lab Batch ID: 3039852 **QC- Sample ID:** 574606-007 S **Batch #:** 1 **Matrix:** Soil

Date Analyzed: 01/30/2018 **Date Prepared:** 01/30/2018 **Analyst:** OJS

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	<4.96	248	252	102	248	257	104	2	90-110	20	

Matrix Spike Percent Recovery [D] = 100*(C-A)/B

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

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

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.

Analysis Request of Chain of Custody Record

Tetra Tech, Inc.

4000 N. Big Spring Street, Ste
401 Midland,Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

5746006

Client Name: Marathon Oil	Site Manager: Ike Tavarez
Project Name: Battle Fed #4	
Project Location: (county, state) Lea Co, New Mexico	Project #: 212C-MD-01073
Invoice to:	
Receiving Laboratory:	Sampler Signature: Clint Merritt
Comments:	

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING DATE	SAMPLING TIME	MATRIX WATER	MATRIX SOIL	MATRIX	PRESERVATIVE METHOD HCL	PRESERVATIVE METHOD HNO_3	PRESERVATIVE METHOD ICE	PRESERVATIVE METHOD	PRESERVATIVE METHOD	# CONTAINERS	FILTERED (Y/N)
	SSW-2	1/22/2018	10:30		X				X			1	
	NSW-2	1/22/2018	10:35		X				X			1	
	AH-3 (0-1')	1/22/2018	10:45		X				X			1	
	NSW-3	1/22/2018	13:50		X				X			1	
	WSW-3	1/22/2018	15:00		X				X			1	
	SSW-3	1/22/2018	14:15		X				X			1	
	AH-4 (0-1')	1/22/2018	14:30		X				X			1	
	NSW-4	1/23/2018	10:05		X				X			1	
	WSW-4	1/23/2018	10:10		X				X			1	
	SSW-4	1/23/2018	10:15		X				X			1	

ANALYSIS REQUEST

(Circle or Specify Method No.)

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
														X							
														X							
														X							
														X							
														X							
														X							
														X							
														X							
														X							
														X							

Relinquished by: Date: 1/25 Time: 16:00 — Received by: Date: Time:

Relinquished by: Date: Time: — Received by: Date: Time:

Relinquished by: Date: Time: — Received by: Date: Time:

LAB USE ONLY

Sample Temperature

REMARKS:

☐ RUSH: Same Day 24 hr 48 hr 72 hr

☐ Rush Charges Authorized

☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #:

Temp: 1.9 IR ID:R-8
CF:(0-6: -0.2°C)
(6-23: +0.2°C)
Corrected Temp: 1.7

ORIGINAL COPY

Final 1.000

Analysis Request of Chain of Custody Record

574606 Page 1 of 2

Tetra Tech, Inc.

4000 N. Big Spring Street, Ste
401 Midland,Texas 79705
Tel (432) 682-4559
Fax (432) 682-3946

~~574605~~

Client Name: Marathon Oil	Site Manager: Ike Tavarez
Project Name: Battle Fed #4	
Project Location: (county, state) Lea Co, New Mexico	Project #: 212C-MD-01073
Invoice to:	
Receiving Laboratory:	Sampler Signature: Clint Merritt
Comments:	

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING YEAR: DATE	TIME	MATRIX: WATER	SOIL		PRESERVATIVE METHOD: HCL	HNO_3	ICE			# CONTAINERS	FILTERED (Y/N)
	ESW-4	1/23/2018	10:20		X				X			1	
	AH-5 (0-1')	1/23/2018	11:00		X				X			1	
	NSW-5	1/24/2018	14:15		X				X			1	
	SSW-5	1/24/2018	14:20		X				X			1	
	ESW-5	1/24/2018	14:25		X				X			1	
	AH-6 (0-1')	1/24/2018	14:30		X				X			1	
	NSW-5(1')	1/24/2018	15:00		X				X			1	
	SSW-5(1')	1/24/2018	15:05		X				X			1	
	ESW-5(1')	1/24/2018	15:10		X				X			1	

ANALYSIS REQUEST
(Circle or Specify Method No.)

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
														X						
														X						
														X						
														X						
														X						
														X						
														X						
														X						
														X						
														X						

Relinquished by: Date: 1/25 Time: 16:00 — Received by: Date: Time:

Relinquished by: Date: Time: — Received by: Date: Time:

Relinquished by: Date: Time: — Received by: Date: Time:

LAB USE ONLY

Sample Temperature

REMARKS:

☐ RUSH: Same Day 24 hr 48 hr 72 hr

☐ Rush Charges Authorized

☐ Special Report Limits or TRRP Report

(Circle) HAND DELIVERED FEDEX UPS Tracking #:

Temp: 1.9 IR ID:R-8
CF:(0-6: -0.2°C)
(6-23: +0.2°C)
Corrected Temp: 1.7

ORIGINAL COPY

Final 1.000

XENCO Laboratories

Prelogin/Nonconformance Report- Sample Log-In

Client: Tetra Tech- Midland

Date/ Time Received: 01/25/2018 04:00:00 PM

Work Order #: 574606

Acceptable Temperature Range: 0 - 6 degC
Air and Metal samples Acceptable Range: Ambient

Temperature Measuring device used : R8

Sample Receipt Checklist	Comments
#1 *Temperature of cooler(s)?	1.7
#2 *Shipping container in good condition?	**Yes**
#3 *Samples received on ice?	**Yes**
#4 *Custody Seals intact on shipping container/ cooler?	**N/A**
#5 Custody Seals intact on sample bottles?	**N/A**
#6*Custody Seals Signed and dated?	**N/A**
#7 *Chain of Custody present?	**Yes**
#8 Any missing/extra samples?	**No**
#9 Chain of Custody signed when relinquished/ received?	**Yes**
#10 Chain of Custody agrees with sample labels/matrix?	**Yes**
#11 Container label(s) legible and intact?	**Yes**
#12 Samples in proper container/ bottle?	**Yes**
#13 Samples properly preserved?	**Yes**
#14 Sample container(s) intact?	**Yes**
#15 Sufficient sample amount for indicated test(s)?	**Yes**
#16 All samples received within hold time?	**Yes**
#17 Subcontract of sample(s)?	**N/A**
#18 Water VOC samples have zero headspace?	**N/A**

*** Must be completed for after-hours delivery of samples prior to placing in the refrigerator**

Analyst: PH Device/Lot#:

Checklist completed by: Jessica Kramer Date: 01/26/2018
Jessica Kramer

Checklist reviewed by: Kelsey Brooks Date: 01/26/2018
Kelsey Brooks