

## SITE INFORMATION

Report Type: Work Plan      2RP-4154

### General Site Information:

<b>Site:</b>	White Oak State #1					
<b>Company:</b>	COG Operating LLC					
<b>Section, Township and Range</b>	Unit P	Sec. 23	T 27S	R 28E		
<b>Lease Number:</b>	API No. 30-015-29749					
<b>County:</b>	Eddy County					
<b>GPS:</b>	32.8147278° N			104.1394958° W		
<b>Surface Owner:</b>	Private					
<b>Mineral Owner:</b>						
<b>Directions:</b>	From the intersection of Lovington Hwy and Turkey Tract Rd, travel north on Turkey Tract Rd for approximately 1.10 mi, turn east onto lease road and continue for 0.50 mi, turn south for 0.10 mi to location.					

### Release Data:

<b>Date Released:</b>	3/23/2017
<b>Type Release:</b>	Produced Water
<b>Source of Contamination:</b>	Hammer Union
<b>Fluid Released:</b>	72.5 bbls
<b>Fluids Recovered:</b>	70 bbls

### Official Communication:

<b>Name:</b>	Rebecca Haskell		Ike Tavarez
<b>Company:</b>	COG Operating, LLC		Tetra Tech
<b>Address:</b>	One Concho Center		4000 N. Big Spring
	600 W. Illinois Ave.		Ste 401
<b>City:</b>	Midland Texas, 79701		Midland, Texas
<b>Phone number:</b>	(432) 686-3023		(432) 687-8110
<b>Fax:</b>	(432) 684-7137		
<b>Email:</b>	<a href="mailto:rhaskell@conchoresources.com">rhaskell@conchoresources.com</a>		<a href="mailto:Ike.Tavarez@tetratech.com">Ike.Tavarez@tetratech.com</a>

### Ranking Criteria

<b>Depth to Groundwater:</b>	<b>Ranking Score</b>	<b>Site Data</b>
<50 ft	20	
50-99 ft	10	80'
>100 ft.	0	
<b>WellHead Protection:</b>		
	<b>Ranking Score</b>	<b>Site Data</b>
Water Source <1,000 ft., Private <200 ft.	20	
Water Source >1,000 ft., Private >200 ft.	0	0
<b>Surface Body of Water:</b>		
	<b>Ranking Score</b>	<b>Site Data</b>
<200 ft.	20	
200 ft - 1,000 ft.	10	
>1,000 ft.	0	0
<b>Total Ranking Score:</b>		10

Acceptable Soil RRAL (mg/kg)		
Benzene	Total BTEX	TPH
10	50	1,000

June 8, 2018

Mike Bratcher  
Environmental Engineer Specialist  
Oil Conservation Division, District 2  
811 S. First Street  
Artesia, New Mexico 88210

**Re: Work Plan for the COG Operating LLC., White Oak State #1, Unit P, Section 23, Township 17 South, Ranch 28 East, Eddy County, New Mexico. 2RP-4154.**

Mr. Bratcher:

Tetra Tech, Inc. (Tetra Tech) was contacted by COG Operating LLC., (COG) to evaluate and assess a release that occurred at the White Oak State #1, Unit P, Section 23, Township 17 South, Ranch 28 East, Eddy County, New Mexico (Site). The spill site coordinates are N 32.8147278°, W 104.1394958°. 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 March 23, 2017, and released approximately 72.5 barrels of produced water due to a hammer union failure. Approximately 70 barrels of produced water was recovered. The release occurred on the pad area impacting an area measuring approximately 65' x 250'. Additionally, a portion of the release migrated onto a closed reserve pit located west off the pad. The initial C-141 form is included in Appendix A.

## **Groundwater**

No wells are listed within Section 23 in the New Mexico Office of the State Engineers database, the USGS National Water Information System, or the Geology and Ground-Water Resources of Eddy County, New Mexico (Report 3). The nearest water well is listed on the USGS National Water Information System and is located in Section 22; approximately 1.10 miles west of the site, and shows a reported depth to groundwater of 79' below surface. According to the Chevron Texaco Groundwater Trend map, the average depth to groundwater in the area is approximately 100 feet 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 1,000 mg/kg.

## **Soil Assessment and Analytical Results**

On April 23, 2018, Tetra Tech personnel were onsite to evaluate and sample the release area. Three (3) boreholes (BH-1, BH-2, and BH-3) were installed in the release footprint in order to evaluate the soils. 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 sampling results are summarized in Table 1. The borehole locations are shown on Figure 3.

Referring to Table 1, none of the samples analyzed for benzene, total BTEX or TPH showed concentrations above the RRALs.

However, a shallow chloride impact was detected in all areas. The area of borehole (BH-1) showed a chloride high of 30,900 mg/kg at 2-3', which declined with depth to 644 mg/kg at 9-10' and 244 mg/kg at 14'-15' below surface. The area of borehole (BH-2) showed a chloride concentration of 11,200 mg/kg at 0-1', which declined with depth to 306 mg/kg at 4-5' and 182 mg/kg at 6-7' below surface. The area of borehole (BH-3) showed a chloride high of 3,170 mg/kg at 0-1' which then declined to below the 600 mg/kg threshold at 2-3' below surface.

## **Work Plan**

COG proposes to remove the chloride concentrations that were identified in the shallow soils in the areas of boreholes (BH-1, BH-2 and BH-3). The areas of borehole (BH-2) will be excavated to approximately 2.0' to 3.0' and the area of borehole (BH-3) will be excavated to approximately 1.0' below surface. The area of borehole (BH-1) will be excavated to approximately 3.0' to 4.0' below surface and capped with a 20-mil liner to prevent vertical migration of the deeper impact. Once the areas are excavated to the appropriate depth, the excavation will be backfilled with clean material to surface grade. All of the excavated material will be transported offsite for proper disposal.

The reserve pit will not be assessed due to potential chlorides present in the closed pit and the assessment would not be representative to the impact encountered on the pad. COG request the impact on the reserve pit be closed.



The proposed excavation depths may not be reached due to wall cave ins and safety concerns for onsite personnel. In addition, impacted soil around oil and gas equipment, structures or lines may not be feasible or practicable to be removed due to safety concerns for onsite personnel. As such, COG will excavate the impacted soils to the maximum extent practicable.

### Conclusion

Upon completion, a final report detailing the remediation activities will be submitted to the NMOCD. If you have any questions or comments concerning the assessment or the proposed remediation activities for this site, please call at (432) 682-4559.

Respectfully submitted,  
TETRA TECH

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

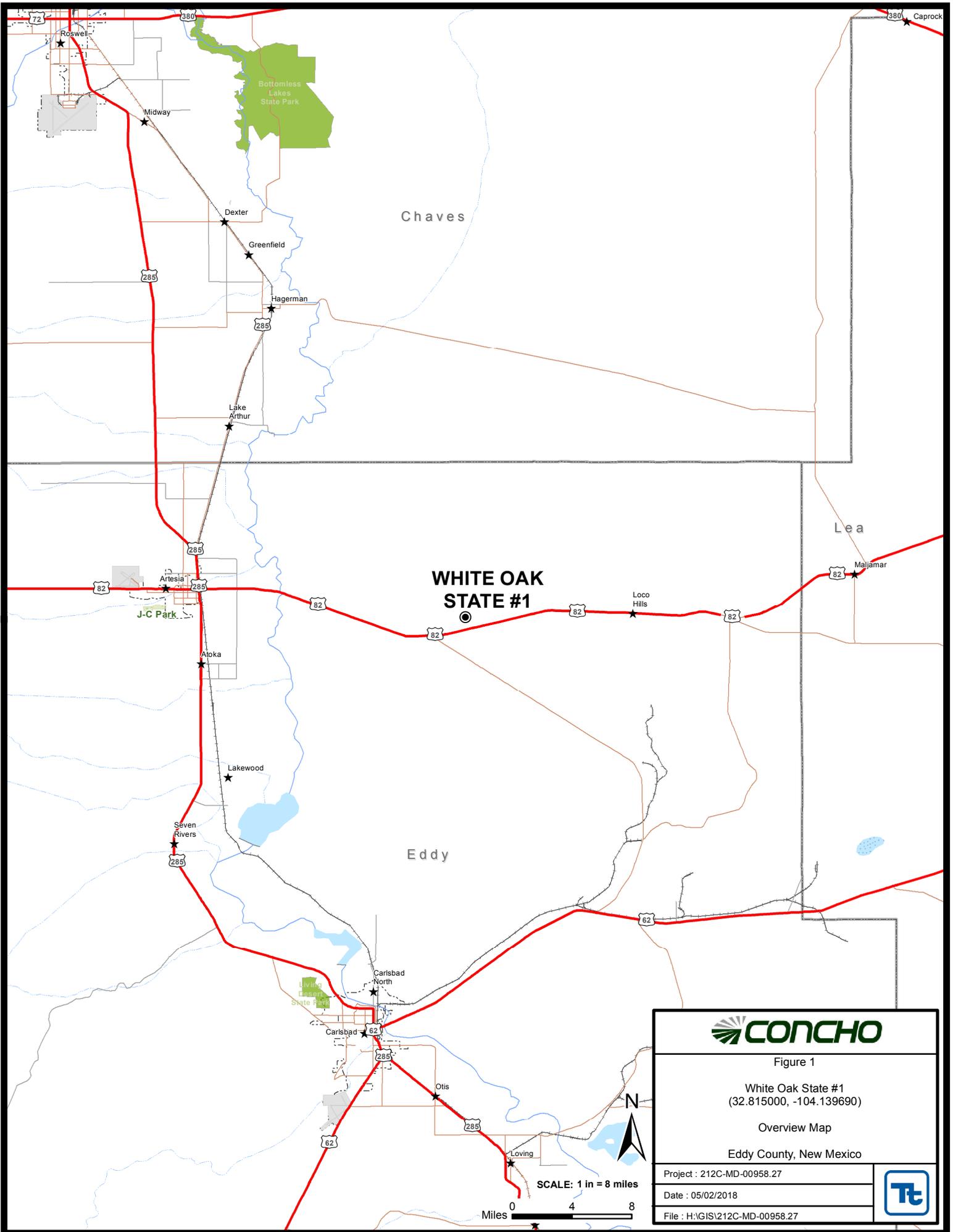
Clair Gonzales,  
Project Manager

A handwritten signature in blue ink that reads 'Ike Tavarez'.

Ike Tavarez,  
Senior Project Manager, P.G.

cc: Crystal Weaver - NMOCD  
Robert McNeill - COG  
Dakota Neel - COG  
Rebecca Haskell - COG

## Figures



**WHITE OAK  
STATE #1**



Figure 1

White Oak State #1  
(32.815000, -104.139690)

Overview Map

Eddy County, New Mexico

Project : 212C-MD-00958.27

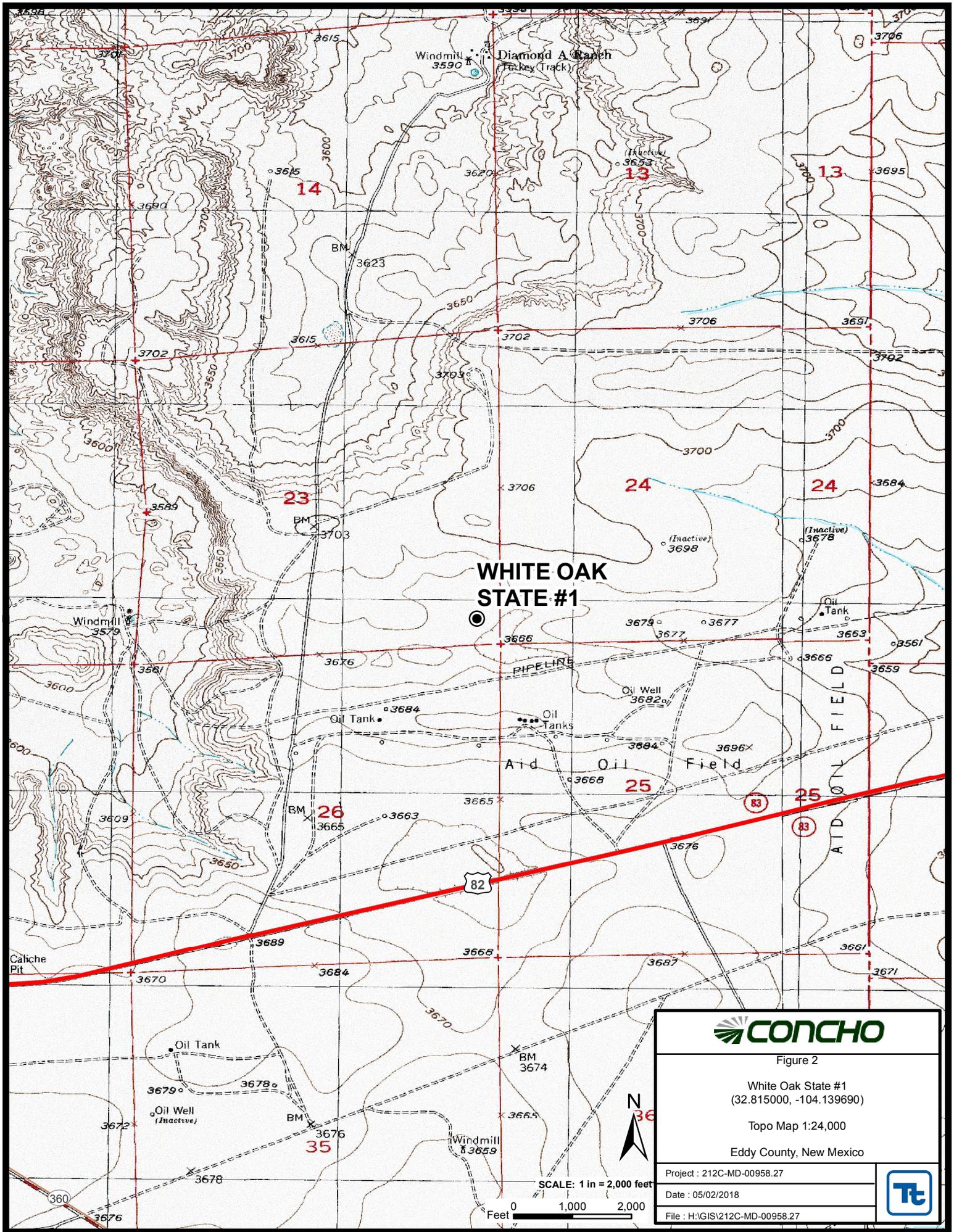
Date : 05/02/2018

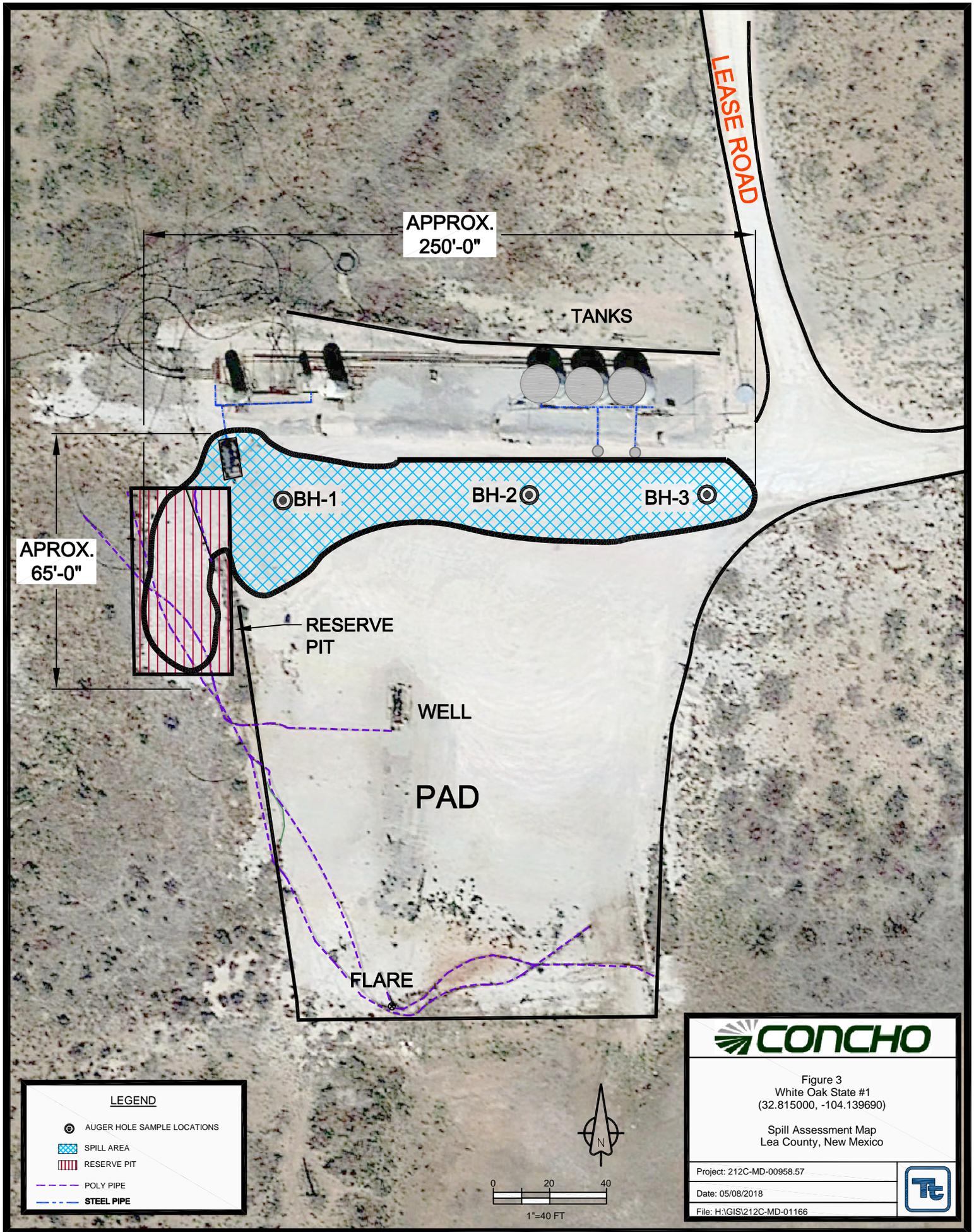
File : H:\GIS\212C-MD-00958.27



SCALE: 1 in = 8 miles







LEASE ROAD

APPROX.  
250'-0"

TANKS

BH-1

BH-2

BH-3

APROX.  
65'-0"

RESERVE  
PIT

WELL

PAD

FLARE

**LEGEND**

-  AUGER HOLE SAMPLE LOCATIONS
-  SPILL AREA
-  RESERVE PIT
-  POLY PIPE
-  STEEL PIPE

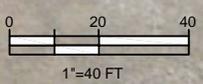


Figure 3  
White Oak State #1  
(32.815000, -104.139690)

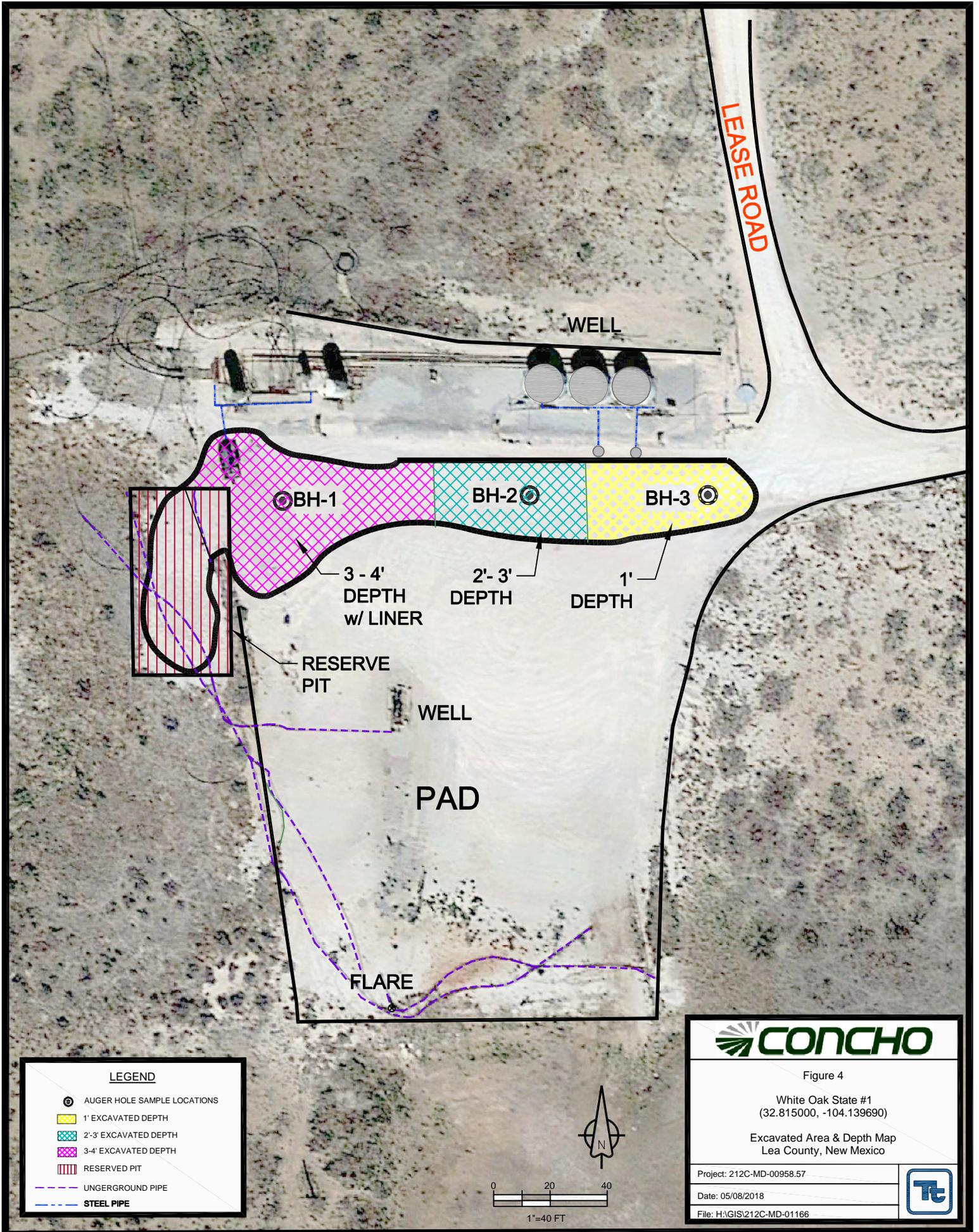
Spill Assessment Map  
Lea County, New Mexico

Project: 212C-MD-00958.57

Date: 05/08/2018

File: H:\GIS\212C-MD-01166





LEASE ROAD

WELL

BH-1

BH-2

BH-3

3 - 4'  
DEPTH  
w/ LINER

2'- 3'  
DEPTH

1'  
DEPTH

RESERVE  
PIT

WELL

PAD

FLARE

**LEGEND**

- AUGER HOLE SAMPLE LOCATIONS
- 1' EXCAVATED DEPTH
- 2'-3' EXCAVATED DEPTH
- 3-4' EXCAVATED DEPTH
- RESERVED PIT
- UNDERGROUND PIPE
- STEEL PIPE

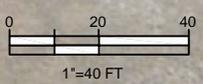


Figure 4

White Oak State #1  
(32.815000, -104.139690)

Excavated Area & Depth Map  
Lea County, New Mexico

Project: 212C-MD-00958.57

Date: 05/08/2018

File: H:\GIS\212C-MD-01166



# Tables

**Table 1**  
**COG Operating LLC.**  
**White Oak State #1**  
**Eddy 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	GRO	DRO	ORO	Total						
BH-1	4/23/2018	0-1	X		<25.0	60.4	<5.0	60.4	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	15,600
	"	2-3	X		<24.9	<24.9	<24.9	<24.9	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	30,900
	"	4-5	X		-	-	-	-	-	-	-	-	-	1,620
	"	6-7	X		-	-	-	-	-	-	-	-	-	1,240
	"	9-10	X		-	-	-	-	-	-	-	-	-	644
	"	14-15	X		-	-	-	-	-	-	-	-	-	244
BH-2	4/23/2018	0-1	X		<25.0	<25.0	<25.0	<25.0	<0.00202	<0.00202	<0.00202	<0.00202	<0.00202	11,200
	"	2-3	X		<24.9	<24.9	<24.9	<24.9	<0.00199	<0.00199	<0.00199	<0.00199	<0.00199	3,520
	"	4-5	X		-	-	-	-	-	-	-	-	-	306
	"	6-7	X		-	-	-	-	-	-	-	-	-	182
BH-3	4/23/2018	0-1	X		<25.0	<25.0	<25.0	<25.0	<0.00200	<0.00200	<0.00200	<0.00200	<0.00200	3,170
	"	2-3	X		<24.9	<24.9	<24.9	<24.9	<0.00201	<0.00201	<0.00201	<0.00201	<0.00201	198
	"	4-5	X		-	-	-	-	-	-	-	-	-	131
	"	6-7	X		-	-	-	-	-	-	-	-	-	75.6

(-) Not Analyzed  
 Proposed Excavation Depths  
 Proposed Liner Depth

Photos

COG Operating LLC  
White Oak State #1  
Eddy County, New Mexico



TETRA TECH



View West – Area of BH-1



View Northeast – Area of BH-2

COG Operating LLC  
White Oak State #1  
Eddy County, New Mexico



TETRA TECH



View North – Area of BH-3

# 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: COG Operating LLC OGRID# [229137]	Contact: Robert McNeill
Address: 600 West Illinois Avenue, Midland TX 79701	Telephone No. 432-683-7443
Facility Name: WHITE OAK STATE #001	Facility Type: Tank Battery

Surface Owner: Private	Mineral Owner:	API No. 30-015-29749
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**LOCATION OF RELEASE**

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
P	23	17S	28E	330;	South	330'	East	Eddy

Latitude 32.8147278 Longitude 104.1394958

**NATURE OF RELEASE**

Type of Release: Produced Water	Volume of Release: 72.5bbls	Volume Recovered: 70bbls
Source of Release: Hammer Union	Date and Hour of Occurrence: 3/23/2017 10:00 AM	Date and Hour of Discovery: 3/23/2017 10:00 AM
Was Immediate Notice Given? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Not Required	If YES, To Whom? Ms. Weaver - NMOCD / Ms. Groves - SLO	
By Whom? Robert Grubbs Jr.	Date and Hour: Thu 3/23/2017 2:53 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.\*

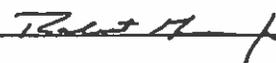
Describe Cause of Problem and Remedial Action Taken.\*

A hammer union that failed on a 4" steel line. Replaced the hammer union with a new one.

Describe Area Affected and Cleanup Action Taken.\*

This release occurred on the pad and along the edge of location. Concho will have the spill site sampled to delineate any possible contamination from the release and we will present a remediation work plan to the NMOCD for approval prior to any significant remediation work.

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: 	<b>OIL CONSERVATION DIVISION</b>	
Printed Name: Robert Grubbs Jr.	Approved by Environmental Specialist:	
Title: Senior HSE Coordinator	Approval Date:	Expiration Date:
E-mail Address: rgrubbs@concho.com	Conditions of Approval:	Attached <input type="checkbox"/>
Date: March 24, 2017 Phone: 432-683-7443		

\* Attach Additional Sheets If Necessary

## Appendix B

**Water Well Data**  
**Average Depth to Groundwater (ft)**  
**COG - White Oak State #1**  
**Eddy County, New Mexico**

16 South			27 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

16 South			28 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	61	27	26	25
31	32	33	34	35	36

16 South			29 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14 220	13
19	20	21	22	23 dry	24
30	29	28	27	26	25
31	32	33	34	35	36

17 South			27 East		
6	5	4	3	2	1
7	30	9	10	11 54	12
14	8	16	15	14 50	13
18	17	16	15	14	13
111	90	175	22	23	24
19	20	21	22	23	24
30	29	28	27	26	25
31	32	33	34	35	36

17 South			28 East		
6	5	4	3	2 28	1
7	8	9	10	11	12
18	17	16	15	14 58	13
19	20	21	22 45	23	24
224	29	28	27	26	25
30	29	28	27	26	25
31	32	33	34	35	36

17 South			29 East		
6	5	4	3	2	1
7	8	9	10	11	12
18	17	16	15	14	13
19	20	21	22 76	23	24
30	29 210	28	27	26	25
31	32	33	34	35	36

18 South			27 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
18	17	100	34	35	36
31	65	32	33 145	34	35

18 South			28 East		
6	5	4	3	2 55	1
7	49	8 81	9	10	12
18	17	16	15 80	14	13
19	20	21	22	23	24
30	137	29	28	27	25
31	32	33	34	35	36

18 South			29 East		
6	5	4	3	2	1
7	8	9	10 95	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	Sub-basin	County	Q	Q	Q	Sec	Tws	Rng	X	Y	DepthWell	DepthWater	Water Column
<a href="#">RA 12307 POD1</a>			ED	4	2	2	14	17S	28E	580495	3633981	140	58	82

Average Depth to Water: **58 feet**

Minimum Depth: **58 feet**

Maximum Depth: **58 feet**

**Record Count:** 1

**PLSS Search:**

**Township:** 17S

**Range:** 28E

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.

5/1/18 8:29 AM

WATER COLUMN/ AVERAGE DEPTH TO WATER



USGS Home  
Contact USGS  
Search USGS

## National Water Information System: Web Interface

USGS Water Resources

Data Category:

Groundwater

Geographic Area:

New Mexico

GO

Click to hide News Bulletins

- **Scheduled maintenance May 8, 2018, starting at 9:00am Eastern.**

System maintenance will be performed to migrate time-series applications to another platform. The duration of the outage is not expected to exceed 3 hours. During the maintenance period, some real-time data may fall behind on NWISWeb. Updates will be posted when the planned maintenance has been completed.

- [Please see news on new formats](#)
- [Full News](#) 

Groundwater levels for New Mexico

Click to hide state-specific text

## Search Results -- 1 sites found

**site\_no list =**

- 324855104093101

**Minimum number of levels = 1**

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

## USGS 324855104093101 17S.28E.22.34242

Available data for this site

Groundwater: Field measurements

GO

Eddy County, New Mexico

Hydrologic Unit Code 13060011

Latitude 32°48'55", Longitude 104°09'31" NAD27

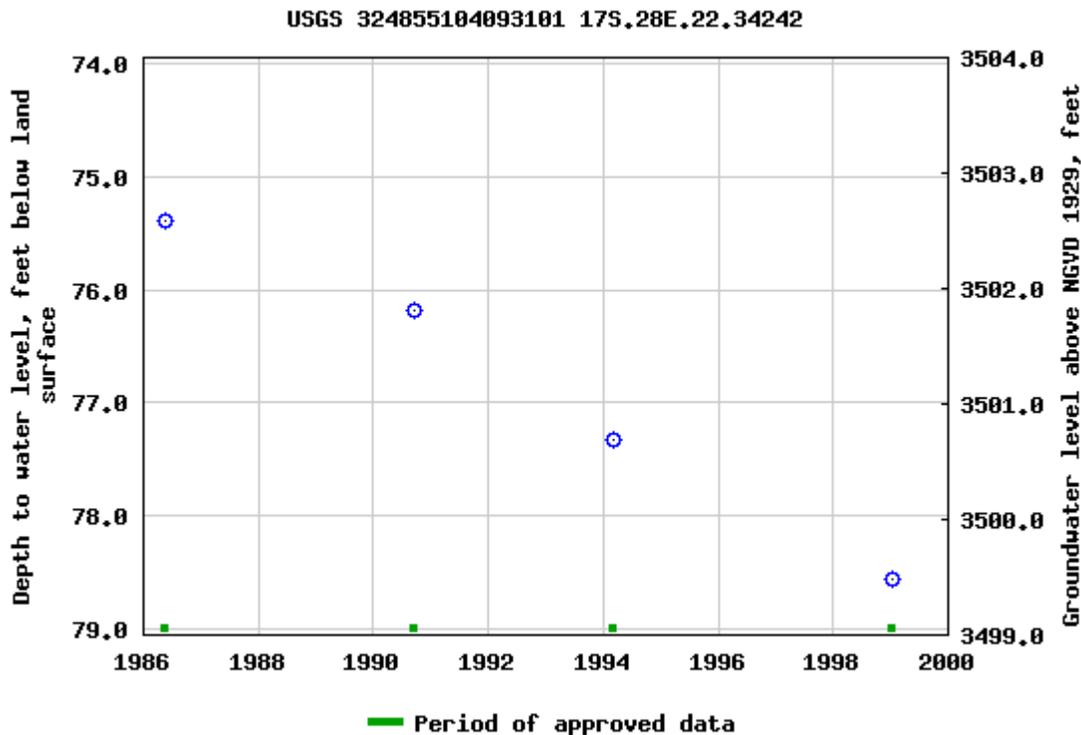
Land-surface elevation 3,578 feet above NGVD29

The depth of the well is 95.00 feet below land surface.

This well is completed in the Alluvium, Bolson Deposits and Other Surface Deposits (110AVMB) local aquifer.

**Output formats**

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



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

[Download a presentation-quality graph](#)

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

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



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

Page Last Modified: 2018-05-01 10:30:48 EDT

1.06 0.93 nadww01

## Appendix D

# Analytical Report 583452

for  
**Tetra Tech- Midland**

**Project Manager: Ike Tavarez**

**White Oak State #1-COG**

**212C-MD-00958 Task #27**

**30-APR-18**

Collected By: Client



**1211 W. Florida Ave, Midland TX 79701**

Xenco-Houston (EPA Lab Code: TX00122):  
Texas (T104704215-18-24), Arizona (AZ0765), Florida (E871002-24), Louisiana (03054)  
Oklahoma (2017-142)

Xenco-Dallas (EPA Lab Code: TX01468):  
Texas (T104704295-17-16), 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 (T104704400-18-14)  
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)  
Xenco-Atlanta (LELAP Lab ID #04176)  
Xenco-Tampa: Florida (E87429)  
Xenco-Lakeland: Florida (E84098)



30-APR-18

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

Reference: XENCO Report No(s): **583452**  
**White Oak State #1-COG**  
Project Address: Eddy County, New Mexico

**Ike Tavaréz:**

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) 583452. 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. 583452 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.*

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Tetra Tech- Midland, Midland, TX

White Oak State #1-COG

Sample Id	Matrix	Date Collected	Sample Depth	Lab Sample Id
BH-#1 (0.1')	S	04-23-18 00:00		583452-001
BH-#1 (2.3')	S	04-23-18 00:00		583452-002
BH-#1 (4.5')	S	04-23-18 00:00		583452-003
BH-#1 (6.7')	S	04-23-18 00:00		583452-004
BH-#1 (9.10')	S	04-23-18 00:00		583452-005
BH-#1 (14.15')	S	04-23-18 00:00		583452-006
BH-#2 (0.1')	S	04-23-18 00:00		583452-009
BH-#2 (2.3')	S	04-23-18 00:00		583452-010
BH-#2 (4.5')	S	04-23-18 00:00		583452-011
BH-#2 (6.7')	S	04-23-18 00:00		583452-012
BH-#3 (0.1')	S	04-23-18 00:00		583452-016
BH-#3 (2.3')	S	04-23-18 00:00		583452-017
BH-#3 (4.5')	S	04-23-18 00:00		583452-018
BH-#3 (6.7')	S	04-23-18 00:00		583452-019
BH-#1 (19.20')	S	04-23-18 00:00		Not Analyzed
BH-#1 (24.25')	S	04-23-18 00:00		Not Analyzed
BH-#2 (9.10')	S	04-23-18 00:00		Not Analyzed
BH-#2 (14.15')	S	04-23-18 00:00		Not Analyzed
BH-#2 (19.20')	S	04-23-18 00:00		Not Analyzed
BH-#3 (9.10')	S	04-23-18 00:00		Not Analyzed
BH-#3 (14.15')	S	04-23-18 00:00		Not Analyzed
BH-#3 (19.20')	S	04-23-18 00:00		Not Analyzed



## CASE NARRATIVE

*Client Name: Tetra Tech- Midland*

*Project Name: White Oak State #1-COG*

Project ID: 212C-MD-00958 Task #2:  
Work Order Number(s): 583452

Report Date: 30-APR-18  
Date Received: 04/24/2018

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**Sample receipt non conformances and comments:**

None

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**Sample receipt non conformances and comments per sample:**

None

**Analytical non conformances and comments:**

Batch: LBA-3047819 BTEX by EPA 8021B

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



# Certificate of Analysis Summary 583452



Tetra Tech- Midland, Midland, TX

Project Name: White Oak State #1-COG

Project Id: 212C-MD-00958 Task #27

Contact: Ike Tavarez

Project Location: Eddy County, New Mexico

Date Received in Lab: Tue Apr-24-18 11:38 am

Report Date: 30-APR-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	583452-001	583452-002	583452-003	583452-004	583452-005	583452-006
	<i>Field Id:</i>	BH-#1 (0.1')	BH-#1 (2.3')	BH-#1 (4.5')	BH-#1 (6.7')	BH-#1 (9.10')	BH-#1 (14.15')
	<i>Depth:</i>						
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00
<b>BTEX by EPA 8021B</b>	<i>Extracted:</i>	Apr-25-18 13:00	Apr-25-18 13:00				
	<i>Analyzed:</i>	Apr-25-18 18:55	Apr-25-18 19:14				
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL				
Benzene		<0.00200 0.00200	<0.00201 0.00201				
Toluene		<0.00200 0.00200	<0.00201 0.00201				
Ethylbenzene		<0.00200 0.00200	<0.00201 0.00201				
m,p-Xylenes		<0.00401 0.00401	<0.00402 0.00402				
o-Xylene		<0.00200 0.00200	<0.00201 0.00201				
Total Xylenes		<0.00200 0.00200	<0.00201 0.00201				
Total BTEX		<0.00200 0.00200	<0.00201 0.00201				
<b>Inorganic Anions by EPA 300/300.1</b>	<i>Extracted:</i>	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00
	<i>Analyzed:</i>	Apr-26-18 15:24	Apr-26-18 15:34	Apr-26-18 16:15	Apr-26-18 16:26	Apr-26-18 16:57	Apr-26-18 17:07
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		15600 245	30900 250	1620 24.6	1240 25.0	644 4.94	270 4.97
<b>TPH by Texas1005</b>	<i>Extracted:</i>	Apr-24-18 17:00	Apr-24-18 17:00				
	<i>Analyzed:</i>	Apr-24-18 22:13	Apr-24-18 23:16				
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL				
C6-C12 Range Hydrocarbons		<25.0 25.0	<24.9 24.9				
C12-C28 Range Hydrocarbons		60.4 25.0	<24.9 24.9				
C28-C35 Range Hydrocarbons		<25.0 25.0	<24.9 24.9				
Total TPH		60.4 25.0	<24.9 24.9				

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

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Mike Kimmel  
Client Services Manager



# Certificate of Analysis Summary 583452



Tetra Tech- Midland, Midland, TX

Project Name: White Oak State #1-COG

Project Id: 212C-MD-00958 Task #27

Contact: Ike Tavarez

Project Location: Eddy County, New Mexico

Date Received in Lab: Tue Apr-24-18 11:38 am

Report Date: 30-APR-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<i>Lab Id:</i>	583452-009	583452-010	583452-011	583452-012	583452-016	583452-017
	<i>Field Id:</i>	BH-#2 (0.1')	BH-#2 (2.3')	BH-#2 (4.5')	BH-#2 (6.7')	BH-#3 (0.1')	BH-#3 (2.3')
	<i>Depth:</i>						
	<i>Matrix:</i>	SOIL	SOIL	SOIL	SOIL	SOIL	SOIL
	<i>Sampled:</i>	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00	Apr-23-18 00:00
<b>BTEX by EPA 8021B</b>	<i>Extracted:</i>	Apr-25-18 13:00	Apr-25-18 13:00			Apr-25-18 13:00	Apr-25-18 13:00
	<i>Analyzed:</i>	Apr-25-18 19:33	Apr-25-18 19:53			Apr-25-18 20:10	Apr-25-18 20:29
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL			mg/kg RL	mg/kg RL
Benzene		<0.00202 0.00202	<0.00199 0.00199			<0.00201 0.00201	<0.00200 0.00200
Toluene		<0.00202 0.00202	<0.00199 0.00199			<0.00201 0.00201	<0.00200 0.00200
Ethylbenzene		<0.00202 0.00202	<0.00199 0.00199			<0.00201 0.00201	<0.00200 0.00200
m,p-Xylenes		<0.00404 0.00404	<0.00398 0.00398			<0.00402 0.00402	<0.00399 0.00399
o-Xylene		<0.00202 0.00202	<0.00199 0.00199			<0.00201 0.00201	<0.00200 0.00200
Total Xylenes		<0.00202 0.00202	<0.00199 0.00199			<0.00201 0.00201	<0.00200 0.00200
Total BTEX		<0.00202 0.00202	<0.00199 0.00199			<0.00201 0.00201	<0.00200 0.00200
<b>Inorganic Anions by EPA 300/300.1</b>	<i>Extracted:</i>	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00	Apr-26-18 12:00
	<i>Analyzed:</i>	Apr-26-18 17:17	Apr-26-18 17:28	Apr-26-18 17:38	Apr-26-18 17:48	Apr-26-18 17:59	Apr-26-18 15:44
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL	mg/kg RL
Chloride		11200 99.8	3520 25.0	306 4.95	182 4.98	3170 24.7	198 4.97
<b>TPH by Texas1005</b>	<i>Extracted:</i>	Apr-24-18 17:00	Apr-24-18 17:00			Apr-24-18 17:00	Apr-24-18 17:00
	<i>Analyzed:</i>	Apr-24-18 23:38	Apr-24-18 23:59			Apr-25-18 00:20	Apr-25-18 00:42
	<i>Units/RL:</i>	mg/kg RL	mg/kg RL			mg/kg RL	mg/kg RL
C6-C12 Range Hydrocarbons		<25.0 25.0	<24.9 24.9			<25.0 25.0	<24.9 24.9
C12-C28 Range Hydrocarbons		<25.0 25.0	<24.9 24.9			<25.0 25.0	<24.9 24.9
C28-C35 Range Hydrocarbons		<25.0 25.0	<24.9 24.9			<25.0 25.0	<24.9 24.9
Total TPH		<25.0 25.0	<24.9 24.9			<25.0 25.0	<24.9 24.9

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Mike Kimmel  
Client Services Manager



# Certificate of Analysis Summary 583452



Tetra Tech- Midland, Midland, TX

Project Name: White Oak State #1-COG

Project Id: 212C-MD-00958 Task #27

Contact: Ike Tavarez

Project Location: Eddy County, New Mexico

Date Received in Lab: Tue Apr-24-18 11:38 am

Report Date: 30-APR-18

Project Manager: Kelsey Brooks

<i>Analysis Requested</i>	<b>Lab Id:</b>	583452-018	583452-019				
	<b>Field Id:</b>	BH-#3 (4.5')	BH-#3 (6.7')				
	<b>Depth:</b>						
	<b>Matrix:</b>	SOIL	SOIL				
	<b>Sampled:</b>	Apr-23-18 00:00	Apr-23-18 00:00				
<b>Inorganic Anions by EPA 300/300.1</b>	<b>Extracted:</b>	Apr-26-18 16:00	Apr-26-18 16:00				
	<b>Analyzed:</b>	Apr-26-18 19:01	Apr-26-18 19:32				
	<b>Units/RL:</b>	mg/kg RL	mg/kg RL				
Chloride		131 4.98	75.6 4.97				

This analytical report, and the entire data package it represents, has been made for your exclusive and confidential use. The interpretations and results expressed throughout this analytical report represent the best judgment of XENCO Laboratories. XENCO Laboratories assumes no responsibility and makes no warranty to the end use of the data hereby presented. Our liability is limited to the amount invoiced for this work order unless otherwise agreed to in writing.

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Mike Kimmel  
Client Services Manager





# Form 2 - Surrogate Recoveries

Project Name: White Oak State #1-COG

Work Orders : 583452,

Project ID: 212C-MD-00958 Task #27

Lab Batch #: 3047854

Sample: 583452-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/24/18 22:13

SURROGATE RECOVERY STUDY					
TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	49.5	50.0	99	70-130	
1-Chlorooctane	96.9	99.9	97	70-130	

Lab Batch #: 3047854

Sample: 583452-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/24/18 23:16

SURROGATE RECOVERY STUDY					
TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	49.6	49.9	99	70-130	
1-Chlorooctane	93.9	99.7	94	70-130	

Lab Batch #: 3047854

Sample: 583452-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/24/18 23:38

SURROGATE RECOVERY STUDY					
TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	49.7	50.0	99	70-130	
1-Chlorooctane	103	99.9	103	70-130	

Lab Batch #: 3047854

Sample: 583452-010 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/24/18 23:59

SURROGATE RECOVERY STUDY					
TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	51.2	49.8	103	70-130	
1-Chlorooctane	100	99.6	100	70-130	

Lab Batch #: 3047854

Sample: 583452-016 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 00:20

SURROGATE RECOVERY STUDY					
TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	54.7	49.9	110	70-130	
1-Chlorooctane	106	99.8	106	70-130	

\* 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: White Oak State #1-COG

Work Orders : 583452,

Project ID: 212C-MD-00958 Task #27

Lab Batch #: 3047854

Sample: 583452-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 00:42

## SURROGATE RECOVERY STUDY

TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	49.5	49.8	99	70-130	
1-Chlorooctane	95.7	99.6	96	70-130	

Lab Batch #: 3047819

Sample: 583452-001 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 18:55

## 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	70-130	
4-Bromofluorobenzene	0.0316	0.0300	105	70-130	

Lab Batch #: 3047819

Sample: 583452-002 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 19:14

## SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0276	0.0300	92	70-130	
4-Bromofluorobenzene	0.0299	0.0300	100	70-130	

Lab Batch #: 3047819

Sample: 583452-009 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 19:33

## SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0301	0.0300	100	70-130	
4-Bromofluorobenzene	0.0311	0.0300	104	70-130	

Lab Batch #: 3047819

Sample: 583452-010 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 19:53

## SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0297	0.0300	99	70-130	
4-Bromofluorobenzene	0.0303	0.0300	101	70-130	

\* 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: White Oak State #1-COG

Work Orders : 583452,

Project ID: 212C-MD-00958 Task #27

Lab Batch #: 3047819

Sample: 583452-016 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 20:10

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0290	0.0300	97	70-130	
4-Bromofluorobenzene	0.0285	0.0300	95	70-130	

Lab Batch #: 3047819

Sample: 583452-017 / SMP

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 20:29

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0272	0.0300	91	70-130	
4-Bromofluorobenzene	0.0260	0.0300	87	70-130	

Lab Batch #: 3047854

Sample: 7643387-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/24/18 21:10

SURROGATE RECOVERY STUDY					
TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	50.1	50.0	100	70-130	
1-Chlorooctane	94.0	100	94	70-130	

Lab Batch #: 3047819

Sample: 7643373-1-BLK / BLK

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/25/18 11:27

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0268	0.0300	89	70-130	
4-Bromofluorobenzene	0.0231	0.0300	77	70-130	

Lab Batch #: 3047854

Sample: 7643387-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/24/18 21:30

SURROGATE RECOVERY STUDY					
TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	49.2	50.0	98	70-130	
1-Chlorooctane	103	100	103	70-130	

\* 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: White Oak State #1-COG

Work Orders : 583452,

Project ID: 212C-MD-00958 Task #27

Lab Batch #: 3047819

Sample: 7643373-1-BKS / BKS

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/25/18 08:38

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0307	0.0300	102	70-130	
4-Bromofluorobenzene	0.0313	0.0300	104	70-130	

Lab Batch #: 3047854

Sample: 7643387-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/24/18 21:50

SURROGATE RECOVERY STUDY					
TPH by Texas1005	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
o-Terphenyl	52.8	50.0	106	70-130	
1-Chlorooctane	112	100	112	70-130	

Lab Batch #: 3047819

Sample: 7643373-1-BSD / BSD

Batch: 1 Matrix: Solid

Units: mg/kg

Date Analyzed: 04/25/18 08:55

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0312	0.0300	104	70-130	
4-Bromofluorobenzene	0.0310	0.0300	103	70-130	

Lab Batch #: 3047854

Sample: 583452-001 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/24/18 22:34

SURROGATE RECOVERY STUDY					
TPH by Texas1005	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
o-Terphenyl	54.5	49.9	109	70-130	
1-Chlorooctane	107	99.8	107	70-130	

Lab Batch #: 3047819

Sample: 583516-002 S / MS

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 09:52

SURROGATE RECOVERY STUDY					
BTEX by EPA 8021B	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
Analytes					
1,4-Difluorobenzene	0.0298	0.0300	99	70-130	
4-Bromofluorobenzene	0.0301	0.0300	100	70-130	

\* 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: White Oak State #1-COG

Work Orders : 583452,

Lab Batch #: 3047854

Sample: 583452-001 SD / MSD

Project ID: 212C-MD-00958 Task #27

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/24/18 22:55

## SURROGATE RECOVERY STUDY

TPH by Texas1005 Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
o-Terphenyl	55.6	49.9	111	70-130	
1-Chlorooctane	128	99.8	128	70-130	

Lab Batch #: 3047819

Sample: 583516-002 SD / MSD

Batch: 1 Matrix: Soil

Units: mg/kg

Date Analyzed: 04/25/18 10:12

## SURROGATE RECOVERY STUDY

BTEX by EPA 8021B Analytes	Amount Found [A]	True Amount [B]	Recovery %R [D]	Control Limits %R	Flags
1,4-Difluorobenzene	0.0330	0.0300	110	70-130	
4-Bromofluorobenzene	0.0313	0.0300	104	70-130	

\* 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: White Oak State #1-COG**

**Work Order #: 583452**

**Project ID: 212C-MD-00958 Task #27**

**Analyst: ALJ**

**Date Prepared: 04/25/2018**

**Date Analyzed: 04/25/2018**

**Lab Batch ID: 3047819**

**Sample: 7643373-1-BKS**

**Batch #: 1**

**Matrix: Solid**

**Units: mg/kg**

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

<b>BTEX by EPA 8021B</b>	<b>Blank Sample Result [A]</b>	<b>Spike Added [B]</b>	<b>Blank Spike Result [C]</b>	<b>Blank Spike %R [D]</b>	<b>Spike Added [E]</b>	<b>Blank Spike Duplicate Result [F]</b>	<b>Blk. Spk Dup. %R [G]</b>	<b>RPD %</b>	<b>Control Limits %R</b>	<b>Control Limits %RPD</b>	<b>Flag</b>
<b>Analytes</b>											
Benzene	<0.00200	0.0998	0.118	118	0.101	0.115	114	3	70-130	35	
Toluene	<0.00200	0.0998	0.113	113	0.101	0.111	110	2	70-130	35	
Ethylbenzene	<0.00200	0.0998	0.120	120	0.101	0.118	117	2	70-130	35	
m,p-Xylenes	<0.00399	0.200	0.248	124	0.201	0.243	121	2	70-130	35	
o-Xylene	<0.00200	0.0998	0.124	124	0.101	0.120	119	3	70-130	35	

**Analyst: SCM**

**Date Prepared: 04/26/2018**

**Date Analyzed: 04/26/2018**

**Lab Batch ID: 3048097**

**Sample: 7643501-1-BKS**

**Batch #: 1**

**Matrix: Solid**

**Units: mg/kg**

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

<b>Inorganic Anions by EPA 300/300.1</b>	<b>Blank Sample Result [A]</b>	<b>Spike Added [B]</b>	<b>Blank Spike Result [C]</b>	<b>Blank Spike %R [D]</b>	<b>Spike Added [E]</b>	<b>Blank Spike Duplicate Result [F]</b>	<b>Blk. Spk Dup. %R [G]</b>	<b>RPD %</b>	<b>Control Limits %R</b>	<b>Control Limits %RPD</b>	<b>Flag</b>
<b>Analytes</b>											
Chloride	<5.00	250	239	96	250	237	95	1	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: White Oak State #1-COG**

**Work Order #: 583452**

**Project ID: 212C-MD-00958 Task #27**

**Analyst: SCM**

**Date Prepared: 04/26/2018**

**Date Analyzed: 04/26/2018**

**Lab Batch ID: 3048105**

**Sample: 7643509-1-BKS**

**Batch #: 1**

**Matrix: Solid**

**Units: mg/kg**

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

<b>Inorganic Anions by EPA 300/300.1</b>	<b>Blank Sample Result [A]</b>	<b>Spike Added [B]</b>	<b>Blank Spike Result [C]</b>	<b>Blank Spike %R [D]</b>	<b>Spike Added [E]</b>	<b>Blank Spike Duplicate Result [F]</b>	<b>Blk. Spk Dup. %R [G]</b>	<b>RPD %</b>	<b>Control Limits %R</b>	<b>Control Limits %RPD</b>	<b>Flag</b>
<b>Analytes</b>											
Chloride	<5.00	250	235	94	250	235	94	0	90-110	20	

**Analyst: ARM**

**Date Prepared: 04/24/2018**

**Date Analyzed: 04/24/2018**

**Lab Batch ID: 3047854**

**Sample: 7643387-1-BKS**

**Batch #: 1**

**Matrix: Solid**

**Units: mg/kg**

**BLANK /BLANK SPIKE / BLANK SPIKE DUPLICATE RECOVERY STUDY**

<b>TPH by Texas1005</b>	<b>Blank Sample Result [A]</b>	<b>Spike Added [B]</b>	<b>Blank Spike Result [C]</b>	<b>Blank Spike %R [D]</b>	<b>Spike Added [E]</b>	<b>Blank Spike Duplicate Result [F]</b>	<b>Blk. Spk Dup. %R [G]</b>	<b>RPD %</b>	<b>Control Limits %R</b>	<b>Control Limits %RPD</b>	<b>Flag</b>
<b>Analytes</b>											
C6-C12 Range Hydrocarbons	<25.0	1000	935	94	1000	1020	102	9	75-125	20	
C12-C28 Range Hydrocarbons	<25.0	1000	1020	102	1000	1100	110	8	75-125	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: White Oak State #1-COG**

**Work Order # :** 583452

**Project ID:** 212C-MD-00958 Task #27

**Lab Batch ID:** 3047819

**QC- Sample ID:** 583516-002 S

**Batch #:** 1 **Matrix:** Soil

**Date Analyzed:** 04/25/2018

**Date Prepared:** 04/25/2018

**Analyst:** ALJ

**Reporting Units:** mg/kg

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY**

<b>BTEX by EPA 8021B</b> <b>Analytes</b>	<b>Parent Sample Result [A]</b>	<b>Spike Added [B]</b>	<b>Spiked Sample Result [C]</b>	<b>Spiked Sample %R [D]</b>	<b>Spike Added [E]</b>	<b>Duplicate Spiked Sample Result [F]</b>	<b>Spiked Dup. %R [G]</b>	<b>RPD %</b>	<b>Control Limits %R</b>	<b>Control Limits %RPD</b>	<b>Flag</b>
Benzene	<0.00200	0.100	0.0933	93	0.101	0.0971	96	4	70-130	35	
Toluene	0.00259	0.100	0.0851	83	0.101	0.0908	87	6	70-130	35	
Ethylbenzene	0.00366	0.100	0.0824	79	0.101	0.0911	87	10	70-130	35	
m,p-Xylenes	0.00920	0.200	0.167	79	0.202	0.187	88	11	70-130	35	
o-Xylene	0.00723	0.100	0.0856	78	0.101	0.0933	85	9	70-130	35	

**Lab Batch ID:** 3048097

**QC- Sample ID:** 583233-001 S

**Batch #:** 1 **Matrix:** Soil

**Date Analyzed:** 04/26/2018

**Date Prepared:** 04/26/2018

**Analyst:** SCM

**Reporting Units:** mg/kg

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY**

<b>Inorganic Anions by EPA 300/300.1</b> <b>Analytes</b>	<b>Parent Sample Result [A]</b>	<b>Spike Added [B]</b>	<b>Spiked Sample Result [C]</b>	<b>Spiked Sample %R [D]</b>	<b>Spike Added [E]</b>	<b>Duplicate Spiked Sample Result [F]</b>	<b>Spiked Dup. %R [G]</b>	<b>RPD %</b>	<b>Control Limits %R</b>	<b>Control Limits %RPD</b>	<b>Flag</b>
Chloride	31.8	250	257	90	250	255	89	1	90-110	20	X

**Lab Batch ID:** 3048097

**QC- Sample ID:** 583452-017 S

**Batch #:** 1 **Matrix:** Soil

**Date Analyzed:** 04/26/2018

**Date Prepared:** 04/26/2018

**Analyst:** SCM

**Reporting Units:** mg/kg

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY**

<b>Inorganic Anions by EPA 300/300.1</b> <b>Analytes</b>	<b>Parent Sample Result [A]</b>	<b>Spike Added [B]</b>	<b>Spiked Sample Result [C]</b>	<b>Spiked Sample %R [D]</b>	<b>Spike Added [E]</b>	<b>Duplicate Spiked Sample Result [F]</b>	<b>Spiked Dup. %R [G]</b>	<b>RPD %</b>	<b>Control Limits %R</b>	<b>Control Limits %RPD</b>	<b>Flag</b>
Chloride	198	249	440	97	249	440	97	0	90-110	20	

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: White Oak State #1-COG**

**Work Order # :** 583452

**Project ID:** 212C-MD-00958 Task #27

**Lab Batch ID:** 3048105

**QC- Sample ID:** 583288-001 S

**Batch #:** 1 **Matrix:** Soil

**Date Analyzed:** 04/26/2018

**Date Prepared:** 04/26/2018

**Analyst:** SCM

**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	25.2	250	247	89	250	247	89	0	90-110	20	X

**Lab Batch ID:** 3048105

**QC- Sample ID:** 583452-018 S

**Batch #:** 1 **Matrix:** Soil

**Date Analyzed:** 04/26/2018

**Date Prepared:** 04/26/2018

**Analyst:** SCM

**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	131	249	375	98	249	373	97	1	90-110	20	

**Lab Batch ID:** 3047854

**QC- Sample ID:** 583452-001 S

**Batch #:** 1 **Matrix:** Soil

**Date Analyzed:** 04/24/2018

**Date Prepared:** 04/24/2018

**Analyst:** ARM

**Reporting Units:** mg/kg

**MATRIX SPIKE / MATRIX SPIKE DUPLICATE RECOVERY STUDY**

TPH by Texas1005 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
C6-C12 Range Hydrocarbons	<25.0	998	967	97	998	961	96	1	75-125	20	
C12-C28 Range Hydrocarbons	60.4	998	1010	95	998	994	94	2	75-125	20	

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.

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

583452

Client Name: COG		Site Manager: Ike Tavaraz												
Project Name: White Oak State #1		Project #: 212C-MD-00958 Task#27												
Project Location: (county, state) Eddy County, New Mexico		Project #:												
Invoice to: COG-Becky Haskell		Sampler Signature: Mike Garmona												
Receiving Laboratory: Xenco Midland Tx		Sampler Signature: Mike Garmona												
Comments: Run deeper samples if TPH exceeds 1,000 mg/kg. Run deeper samples if benzene exceeds 10 mg/kg or Total BTEX exceeds 50 mg/kg.														
LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION	SAMPLING		MATRIX	PRESERVATIVE METHOD					# CONTAINERS	FILTERED (Y/N)	LAB USE ONLY	REMARKS:	
		YEAR: 2018	DATE		TIME	WATER	SOIL	HCL	HNO <sub>3</sub>					ICE
	BH #1 (0-1')		4/23/2018		X						1 N	X		
	BH #1 (2-3')		4/23/2018		X						1 N	X		
	BH #1 (4-5')		4/23/2018		X						1 N	X		
	BH #1 (6-7')		4/23/2018		X						1 N	X		
	BH #1 (9-10')		4/23/2018		X						1 N	X		
	BH #1 (14-15')		4/23/2018		X						1 N	X		
	BH #1 (19-20')		4/23/2018		X						1 N	X		
	BH #1 (24-25')		4/23/2018		X						1 N	X		
	BH #2 (0-1')		4/23/2018		X						1 N	X		
	BH #2 (2-3')		4/23/2018		X						1 N	X		
Relinquished by: Mike Camara		Date: 4-24-18	Time: 11:38	Received by: [Signature]		Date: 4/24/18	Time: 11:38							
Relinquished by:		Date:	Time:	Received by:		Date:	Time:							
Relinquished by:		Date:	Time:	Received by:		Date:	Time:							

ANALYSIS REQUEST  
(Circle or Specify Method No.)

REMARKS:  
 STANDARD  
 RUSH: Same Day 24 hr 48 hr 72 hr  
 Rush Charges Authorized  
 Special Report Limits or TRRP Report

ORIGINAL COPY

Temp: 24  
 CF: (0-6: -0.2°C)  
 (6-23: +0.2°C)  
 Corrected Temp: 24

IR ID: R-8

ND DELIVERED FEDEX UPS Tracking #:

Analysis Request of Custody Record



Tetra Tech, Inc.

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

583452

Client Name: COG  
 Project Name: White Oak State #1  
 Project Location: (county, state) Eddy County, New Mexico  
 Invoice to: COG-Becky Haskell  
 Receiving Laboratory: Xenco Midland Tx  
 Project #: 212C-MD-00958 Task#27  
 Sampler Signature: Mike Carmona  
 Site Manager: Ike Tavarez  
 Comments: Run deeper samples if TPH exceeds 1,000 mg/kg. Run deeper samples if benzene exceeds 10 mg/kg or Total BTEX exceeds 50 mg/kg

LAB # (LAB USE ONLY)	SAMPLE IDENTIFICATION		SAMPLING		MATRIX	PRESERVATIVE METHOD				# CONTAINERS	FILTERED (Y/N)	
	YEAR: 2018	DATE	TIME	DATE		TIME	WATER	SOIL	HCL			HNO <sub>3</sub>
	BH #2 (4-5)	4/23/2018			X		X					1 N
	BH #2 (6-7)	4/23/2018			X		X					1 N
	BH #2 (9-10)	4/23/2018			X		X					1 N
	BH #2 (14-15)	4/23/2018			X		X					1 N
	BH #2 (19-20)	4/23/2018			X		X					1 N
	BH #3 (0-1)	4/23/2018			X		X					1 N
	BH #3 (2-3)	4/23/2018			X		X					1 N
	BH #3 (4-5)	4/23/2018			X		X					1 N
	BH #3 (6-7)	4/23/2018			X		X					1 N
	BH #3 (9-10)	4/23/2018			X		X					1 N

Relinquished by: Mike Carmona Date: 4-24-18 Time: 11:38  
 Received by: Mike Carmona Date: 4/23/2018 Time: 11:38

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		X
Chloride Sulfate TDS		
General Water Chemistry (see attached list)		
Anion/Cation Balance		

LAB USE ONLY

REMARKS:  STANDARD

RUSH: Same Day 24 hr 48 hr 72 hr

Rush Charges Authorized

Special Report Limits or TRRP Report

Temp: 26  
 CF: (0-6: -0.2°C)  
 (6-23: +0.2°C)  
 Corrected Temp: 24

ORIGINAL CO IFR ID: R-8

Temp: 26  
 CF: (0-6: -0.2°C)  
 (6-23: +0.2°C)  
 Corrected Temp: 24



**Client:** Tetra Tech- Midland

**Date/ Time Received:** 04/24/2018 11:38:00 AM

**Work Order #:** 583452

**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)?	2.4
#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:** Brianna Teel Date: 04/24/2018  
 Brianna Teel

**Checklist reviewed by:** Kelsey Brooks Date: 04/30/2018  
 Kelsey Brooks