TIMBERWOLF ENVIRONMENTAL

1920 W. Villa Maria, Ste. 305
Bryan, Texas 77807
979.324.2139
www.teamtimberwolf.com

APPROVED
By Olivia Yu at 10:27 am, Jul 03, 2017

June 22, 2017

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

NMOCD approves of the proposed additional delineation for 1RP-4703 with one condition. One sample location must be established in the impacted area south of the lease road. Permissible chloride levels of 250 mg/kg must be obtained and maintained for 10 ft. further in depth. Permissible TPH levels must be obtained and maintained for minimum 2 ft. further in depth. All laboratory analyses must have accompanying field data.

Re: Work Plan for Site Characterization
State OG SWD No. 2 Release
Bagley North Oil Field, Lea County, New Mexico
NW1/4 SW1/4, Sec. 9, T11S, R33E
NMOCD Case No. 1R-4703

Dear Ms. Yu:

On behalf of Jay Management, LLC (Jay Management), Timberwolf Environmental, LLC (Timberwolf) prepared this work plan for site characterization at the State OG SWD No. 2 Facility (Site) to assess impacts related to a recent release. The Site is located in the Bagley North Oil Field approximately 5.1 miles east-southeast of Caprock, Lea County, New Mexico (Figures 1 through 3). The release response actions, initial site assessment, and the site characterization work plan are discussed below.

Site Setting

The Site consists of a saltwater disposal (SWD) wellhead, three above-ground produced water tank, and one injection pump.

The surrounding area is characterized as flat to slightly sloping rural land used for cattle grazing and oil and gas production. According the United States Department of Agriculture – Natural Resources Conservation Service web soil survey of Lea County, New Mexico, soils at the Site are mapped as the Kimbrough – Lea complex, 0 to 3 percent slopes (KU). This soil type consists of gravelly loam in the upper 3 inches, loam from 3 to 10 inches, and underlain by cemented material to a depth of 80 inches.

Release Response Actions

The release occurred from nipple failure on the wellhead. Approximately 5 barrels (bbl) of produced water were released. Jay Management replaced the faulty nipple, recovered free fluids from the ground surface, and tilled most of the spill area. Written notification of the release was made to the New Mexico Oil Conservation Division (NMOCD) on 05/16/17; a copy of Form C-141 is attached.

Initial Assessment

On 05/22/17, Timberwolf personnel mobilized to the Site to map the apparent release impact area and obtain soil samples to assess the magnitude of the impacts (Figure 4). The release traveled east and south crossing the lease road at two locations. The portions of the release area on the lease road were not tilled. Three tilled areas were noted within the release area and encompassed an irregularly shaped area of approximately 0.16 total acres. Site conditions are documented in the attached Photographic Log (Photographs 1 through 4).

Soil Sampling

On 05/22/17, Timberwolf personnel collected soil samples from three locations. The sample locations are shown on the Sample Location and Release Area Map (Figure 4) and summarized in Table 1.

Table 1. Soil Sample Locations and Purpose

Soil Boring	Location – Purpose
SB1	Collected near the point of release to evaluate remediation efforts
SB2 and SB3	Collected within the tilled portion of the release area to further evaluate remediation efforts within the main body of release

All samples were collected using a pick-ax and shovel from 0 to 1 foot below ground surface (ft bgs). Deeper samples were unobtainable with hand tools due to refusal from the rocky/cemented soils.

The soil samples were placed in laboratory-provided sample containers, stored on ice, and transported under proper chain-of-custody protocol to the TestAmerica Laboratories in Denver, Colorado. The laboratory reports and chain-of-custody documents are attached.

Site-Specific Cleanup Criteria

The New Mexico Oil Conservation Division (NMOCD) has established remediation action levels for soils impacted by oilfield products or wastes, which are documented in the *Guidelines for Remediation of Leaks, Spills and Releases*. The closure criteria utilize a ranking system that scores the potential to contaminate based upon a site's distance to water resources. The ranking system is summarized in Table 2.

Table 2. NMOCD Ranking System

Category	Distance to Resource (feet)	Score
Depth to groundwater	< 50	20
	50 to 99	10
	> 100	0
Water wellhead protection	< 200	20
	> 200	0
Surface water protection	< 200	20
	200 to 1,000	10
	> 1,000	0

Sites receive a score from each category. The three (3) scores are summed to reach a total ranking score, which provides site-specific remediation action levels.

Based on prior environmental drilling activities in the Bagley Field, the upper groundwater-bearing unit is expected to be encountered at approximately 40 ft bgs, which results in a score of 20. No surface water bodies were identified within 1,000 ft of the Site, which results in a score of zero (0). No water wellheads are located within 200 ft of the Site, which results in a score of zero (0). Therefore, the total ranking score at the Site is 20. Based on the NMOCD criteria, the site-specific cleanup criteria are presented in Table 3.

Table 3. OCD Cleanup Criteria by Total Ranking Score

Constituent	Total Ranking Score		
	> 19	**10-19**	**0-9**
	Corresponding Cleanup Criteria (mg/kg)		
Benzene	**10**	10	10
Total BTEX	**50**	50	50
TPH	**100**	1,000	5,000
Chlorides	**250**	500	1,000

BTEX – benzene, toluene, ethylbenzene and xylenes
TPH – total petroleum hydrocarbons
mg/kg – milligrams per kilogram
Bold - scores utilized for the Site

Analysis of Soil Samples

The soil samples were analyzed for total petroleum hydrocarbons (TPH), benzene, toluene, ethylbenzene and xylenes (BTEX), and chloride. Analytical methods are documented in the attached laboratory reports. Soil analytical results are shown in Table 4.

Table 4. Soil Analytical Results – 05/22/17

Sample ID	TPH (mg/kg)	Volatile Organic Compounds (mg/kg)					Chloride (mg/kg)
		B	T	E	X	Total BTEX	
SB1 0-1'	2,000[H]	< 0.00076	< 0.0017	< 0.0012	< 0.0014	<0.0051	8,300
SB2 0-1'	< 4.1[H]	< 0.00068	< 0.0015	< 0.0011	< 0.0012	<0.0045	9,100
SB3 0-1'	300[H]	< 0.00070	< 0.0015	< 0.0011	< 0.0013	<0.0046	14,000
NMOCD Site-Specific Criteria	**100**	**10**	**--**	**--**	**--**	**50**	**250**

mg/kg – milligrams per kilogram
TPH – total petroleum hydrocarbons
BTEX – benzene, toluene, ethylbenzene, xylenes
[H] – sample analyzed beyond holding time
-- – regulatory limit not established
- exceeds regulatory limit

Conclusions

Based on Timberwolf's field investigation, the NMOCD site-specific cleanup criteria, and analytical results, the following is concluded:

- The main body of the produced water spill area encompasses three separate areas which totals approximately 0.16 acres (Figure 4). The release traveled mostly east and south. Jay Management has tilled the majority of the spill area.
- Concentrations of TPH exceeded the NMOCD site-specific cleanup criteria in two soil samples (i.e., SB1 0-1' and SB3 0-1'). SB1 was situated adjacent to the SWD well and point of release. SB3 was situated 140 ft southeast of the point of release. The TPH concentration in SB2 0-1' was below laboratory detection limits.
- Concentrations of benzene and Total BTEX were below laboratory detection limits in all samples. NMOCD site-specific cleanup criteria was not exceeded.
- Concentrations of chlorides exceeded the NMOCD site-specific cleanup criteria in each of the three soil samples.
  - SB3 0-1' contained the highest concentration of chloride at 14,000 milligrams per kilogram (mg/kg).
  - SB1 0-1' and SB2 0-1 ft had lower chloride concentrations at 8,300 mg/kg and 9,100 mg/kg, respectively.
- Constituents of concern at the Site are TPH and chloride.

Site Characterization Work Plan

The following scope of work will be conducted within 60 days from the date of this work plan to characterize impacts at the Site:

Task 1: Site Characterization

The goals of the site characterization activities are as follows:

- Delineate the horizontal and vertical extents of hydrocarbon and salinity impacts in soil
- Assess soil characteristics to evaluate potential remedial options
- Verify that neither groundwater nor surface water have been affected by the release.

Soil samples will be collected from approximately eight sampling locations to obtain horizontal and vertical delineation. Also, deeper sample intervals will be collected from the three initial sample locations (i.e., SB1 through SB3) to evaluate the vertical extent of impacts. A minimum of 11 soil samples will be analyzed at an environmental laboratory for the following: TPH by Method 8015 extended range; and chlorides by Method 300.

Due to the surface soil characteristics, soil samples will be obtained from test pits installed with an excavator or backhoe. Each test pit will be logged to describe soil lithology and continuously field screened for volatile organic compounds (VOCs) with a photoionization detector (PID). In addition, certain samples will be field screened for salinity with an electrical conductivity meter to assist with sampling selection for delineation.

In addition, a field reconnaissance will be performed to verify that no water wells or surface water bodies are located within a 1,000 ft radius of the release area.

Task 2: Site Characterization Report and Remedial Action Plan

Upon completion of Task 1, a Site Characterization Report and Remedial Action Plan will be submitted to the NMOCD. The report will document investigation methodology and results with associated figures, tables, and laboratory data. Based on site characterization results, the document will include the selected remedial approach to address soil impacts.

If you have any questions regarding this work plan, please call us at 979-324-2139.

Sincerely,
Timberwolf Environmental, LLC

Ryan S. Mersmann, P.G., CPSS
Vice President of Operations

Jim Foster
President

Attachments: Figures
Form C-141
Photographic Log
Laboratory Report and Chain-of-Custody Documents

Cc: Amir Sanker, Jay Management

FIGURES

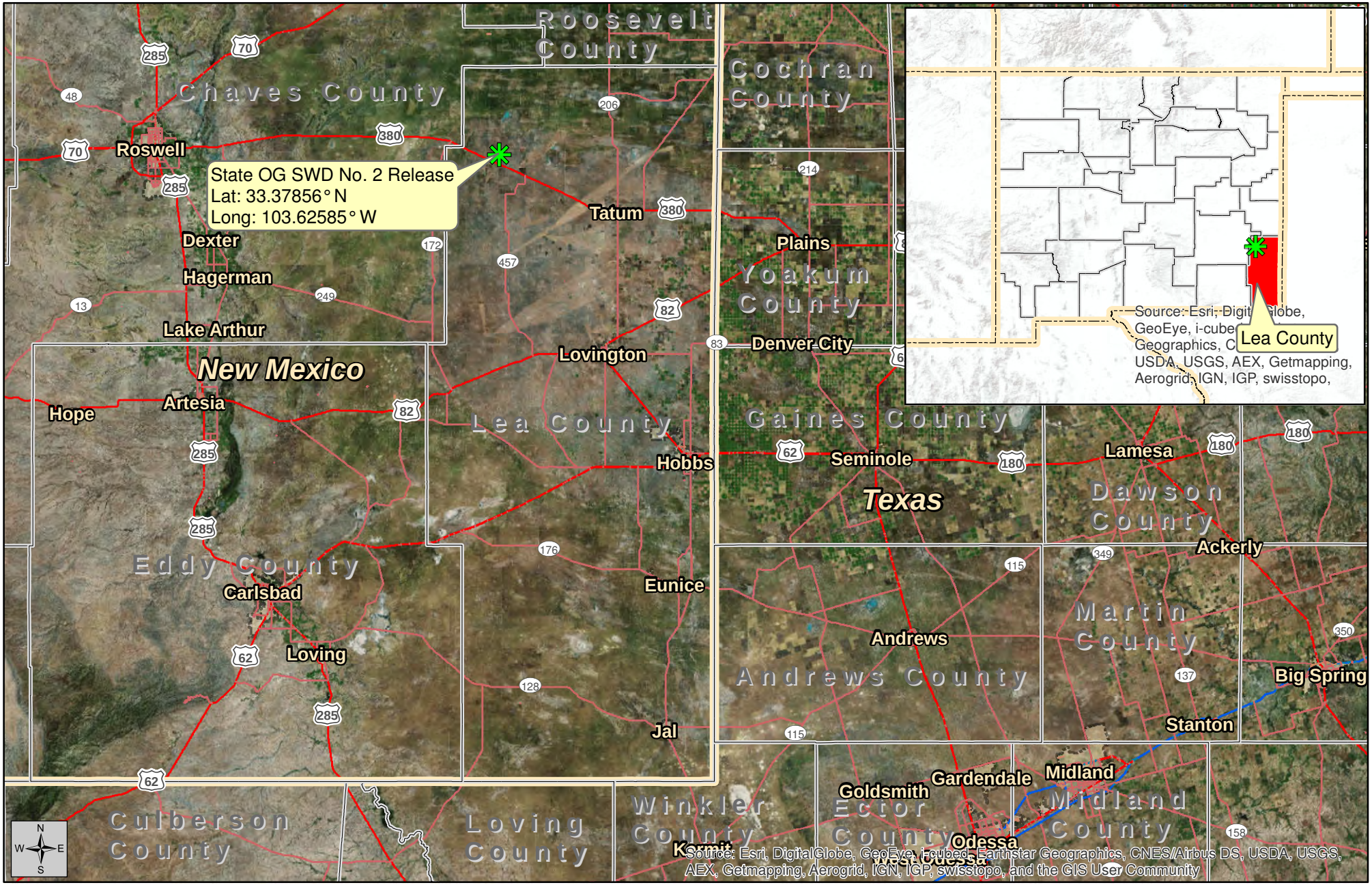


Figure 1
Site Location Map

Proposed Work Plan for Site Characterization

Sample Date:
May 22, 2017

TIMBERWOLF ENVIRONMENTAL

1:1,500,000

0 25 50 75 100 125 150 Miles

Created By:
Austin Russell
June 12, 2017
TE Project No.: ISR-170052

State OG SWD No. 2 Release
Jay Management, LLC
Bagley North Oil Field, Lea County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: ESRI and TE

Site

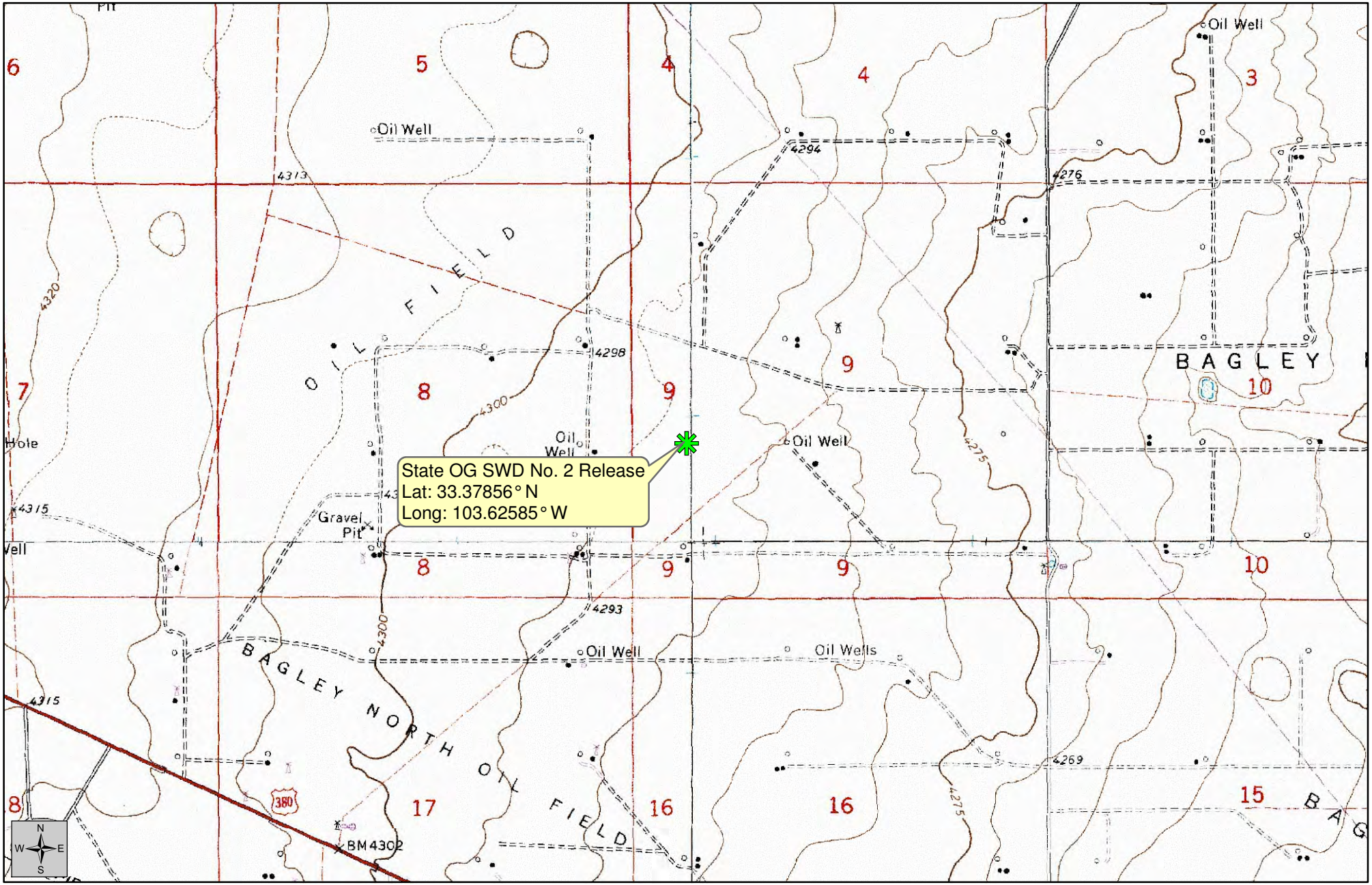


Figure 2
Topographic Map

Proposed Work Plan for Site Characterization

Sample Date:
May 22, 2017

1:24,000

0 0.5 1 1.5 2 2.5 Miles

Created By:
Austin Russell
June 12, 2017
TE Project No.: ISR-170052

State OG SWD No. 2 Release
Jay Management, LLC
Bagley North Oil Field, Lea County, New Mexico

Datum: NAD83
Imagery Source: USGS
Quads: Caprock, Lane Salt Lake, Soldier Hill, and Dallas Store
Vector Source: TE

Site

TIMBERWOLF ENVIRONMENTAL

Figure 3
2015 Aerial Map

Proposed Work Plan for Site Characterization

Sample Date:
May 22, 2017

TIMBERWOLF ENVIRONMENTAL

1:5,000

0 500 1,000 1,500 2,000 2,500 Feet

Created By:
Austin Russell
June 12, 2017
TE Project No.: ISR-170052

State OG SWD No. 2 Release
Jay Management, LLC
Bagley North Oil Field, Lea County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

Site

Sample ID	TPH (mg/kg)	Volatile Organic Compounds (mg/kg)				Chloride (mg/kg)
		B	T	E	X	
SB1 0-1'	2,000[H]	< 0.00076	< 0.0017	< 0.0012	< 0.0014	8,300
SB2 0-1'	< 4.1[H]	< 0.00068	< 0.0015	< 0.0011	< 0.0012	9,100
SB3 0-1'	300[H]	< 0.00070	< 0.0015	< 0.0011	< 0.0013	14,000
NMOCD Site-Specific Criteria	**100**	**10**	**--**	**--**	**--**	**250**

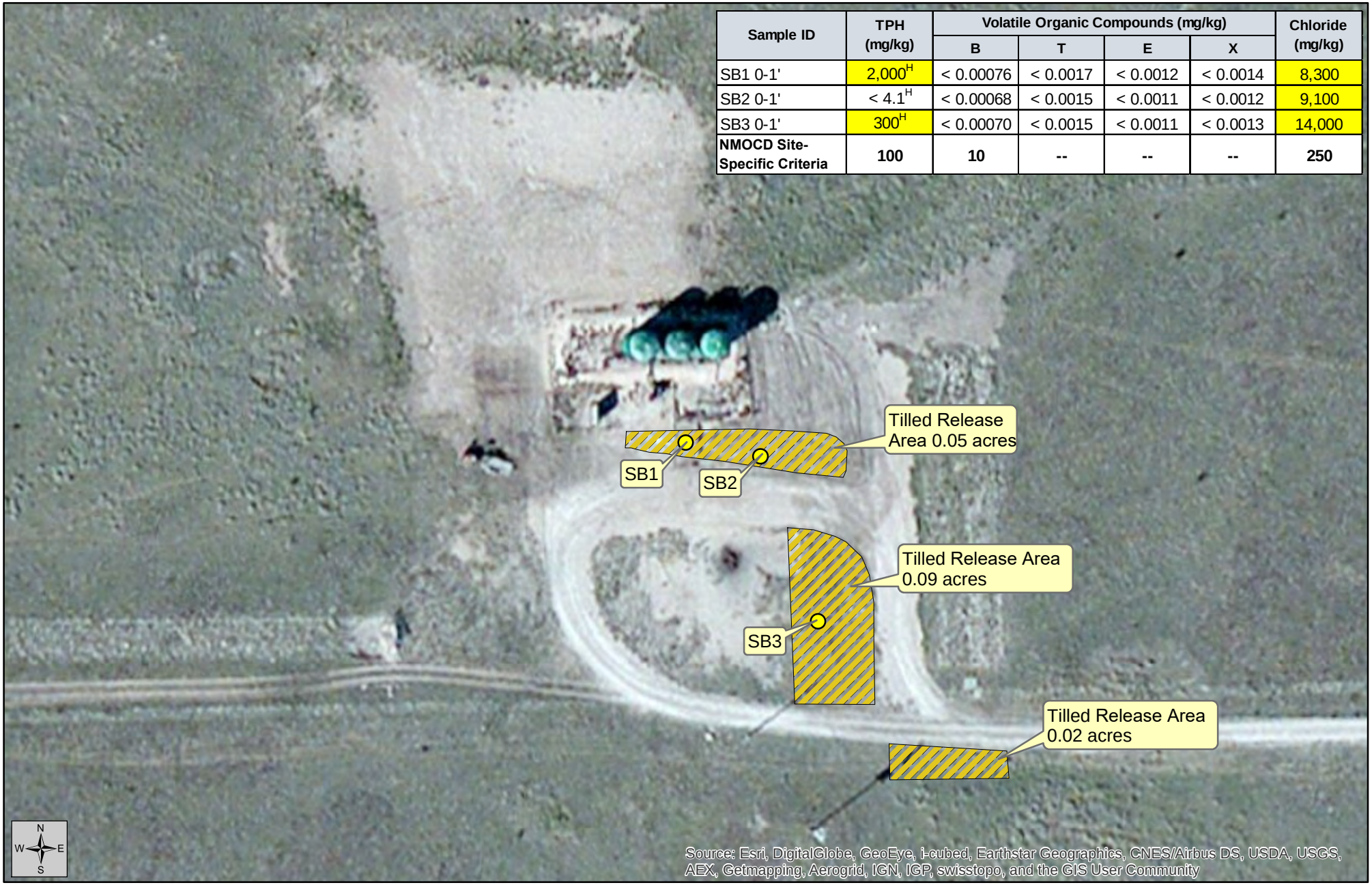


Figure 4
Sample Location and Release Area Map

Proposed Work Plan for Site Characterization

Sample Date:
May 22, 2017

TIMBERWOLF ENVIRONMENTAL

1:1,000

0 100 200 300 400 500 Feet

Created By:
Austin Russell
June 12, 2017
TE Project No.: ISR-170052

State OG SWD No. 2 Release
Jay Management, LLC
Bagley North Oil Field, Lea County, New Mexico

Datum: NAD83
Imagery Source: ESRI
Vector Source: TE

Sample Location
Release Area

Form C-141

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: Jay Management Company	Contact: Jim Foster
Address: 2425 W Loop South, Ste. 810, Houston, Texas 77027	Telephone No.: 979-324-2139
Facility Name: State OG SWD No. 2	Facility Type: SWD Tank Battery

Surface Owner: State of New Mexico	Mineral Owner: State of New Mexico	API No.: 30-025-31381

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
L	9	11S	33E	1,980	South	660	West	Lea

Latitude 33.378526° N **Longitude** 103.625848° W NAD83

NATURE OF RELEASE

Type of Release: Produced Water	Volume of Release: >5	Volume Recovered: Approx. 99%
Source of Release: Faulty nipple at well head	Date and Hour of Oc	Date and Hour of Discovery
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.*
No watercourse was impacted.

RECEIVED
By Olivia Yu at 9:41 am, May 18, 2017

Describe Cause of Problem and Remedial Action Taken.*
Failure of a nipple where flowline from well head goes underground. Faulty nipple has been replaced.

Describe Area Affected and Cleanup Action Taken.*
Release occurred adjacent to wellhead. Impacted soils have been excavated and replaced with clean soil.

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: Jim Foster	Approved by Environmental Specialist:
Title: Consultant	Approval Date: 5/18/2017 Expiration Date:
E-mail Address: jim@teamtimberwolf.com	Conditions of Approval: see attached directive Attached ☑
Date: 0516/17 Phone: 979-324-2139	

* Attach Additional Sheets If Necessary

1RP-4703 nOY1713835168 pOY1713835343

Operator/Responsible Party,

The OCD has received the form C-141 you provided on _5/16/2017_ regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number __1R-_4703_ has been assigned. **Please refer to this case number in all future correspondence.**

It is the Division's obligation under both the Oil & Gas Act and Water Quality Act to provide for the protection of public health and the environment. Our regulations (19.15.29.11 NMAC) state the following,

> *The responsible person shall complete division-approved corrective action for releases that endanger public health or the environment. The responsible person shall address releases in accordance with a remediation plan submitted to and approved by the division or with an abatement plan submitted in accordance with 19.15.30 NMAC.* [emphasis added]

Release characterization is the first phase of corrective action unless the release is ongoing or is of limited volume and all impacts can be immediately addressed. Proper and cost-effective remediation typically cannot occur without adequate characterization of the impacts of any release. Furthermore, the Division has the ability to impose reasonable conditions upon the efforts it oversees. **As such, the Division is requiring a workplan for the characterization of impacts associated with this release be submitted to the OCD District _1_ office in __Hobbs____ on or before _6/18/2017__. If and when the release characterization workplan is approved, there will be an associated deadline for submittal of the resultant investigation report. Modest extensions of time to these deadlines may be granted, but only with acceptable justification.**

The goals of a characterization effort are: 1) determination of the lateral and vertical extents along with the magnitude of soil contamination. 2) determine if groundwater or surface waters have been impacted. 3) If groundwater or surface waters have been impacted, what are the extents and magnitude of that impact. 4) The characterization of any other adverse impacts that may have occurred (examples: impacts on vegetation, impacts on wildlife, air quality, loss of use of property, etc.). To meet these goals as quickly as possible, the following items must, at a minimum, be addressed in the release characterization workplan and subsequent reporting:

● Horizontal delineation of soil impacts in each of the four cardinal compass directions. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C_6 thru C_{36}), and for chloride by Method 300. This is not an exclusive list of potential contaminants. Analyzed parameters should be modified based on the nature of the released substance(s). Soil sampling must be both within the impacted area and beyond.

● Vertical delineation of soil impacts. Adsorbed soil contamination must be characterized for the following constituents using the associated laboratory methods: benzene, toluene, ethylbenzene, and total xylenes by either Method 8260 or 8021, total petroleum hydrocarbons by Method 8015 extended range (GRO+DRO+MRO; C_6 thru C_{36}), and for chloride by Method 300. As above, this is not an exclusive list of potential contaminants and can be modified. Vertical characterization samples should be taken at depth intervals no greater than five feet apart. Lithologic description of encountered soils must also be provided. At least ten vertical feet of soils with contaminant concentrations at or below these values must be demonstrated as existing above the water table.

● Nominal detection limits for field and laboratory analyses must be provided.

● Composite sampling is not generally allowed.

● Field screening and assessment techniques are acceptable (headspace, titration, EC [include algorithm for validation purposes], EM, etc.), but the sampling and assay procedures must be clearly defined. Copies of field notes are highly desirable. A statistically significant set of split samples must be submitted for confirmatory laboratory analysis, including the laterally farthest and vertically deepest sets of soil samples. Make sure there are at least two soil samples submitted

for laboratory analysis from each borehole or test pit (highest observed contamination and deepest depth investigated). Copies of the actual laboratory results must be provided including chain of custody documentation.

●Probable depth to shallowest protectable groundwater and lateral distance to nearest surface water. If there is an estimate of groundwater depth, the information used to arrive at that estimate must be provided. If there is a reasonable assumption that the depth to protectable water is 50 feet or less, the responsible party should anticipate the need for at least one groundwater monitoring well to be installed in the area of likely maximum contamination.

● If groundwater contamination is encountered, an additional investigation workplan may be required to determine the extents of that contamination. Groundwater and/or surface water samples, if any, must be analyzed by a competent laboratory for volatile organic hydrocarbons (typically Method 8260 full list), total dissolved solids, pH, major anions and cations including chloride and sulfate, dissolved iron, and dissolved manganese. The investigation workplan must provide the groundwater sampling method(s) and sample handling protocols. To the fullest extent possible, aqueous analyses must be undertaken using nominal method detection limits. As with the soil analyses, copies of the actual laboratory results must be provided including chain of custody documentation.

● Accurately scaled and well-drafted site maps must be provided providing the location of borings, test pits, monitoring wells, potentially impacted areas, and significant surface features including roads and site infrastructure that might limit either the release characterization or remedial efforts. Field sketches may be included in subsequent reporting, but should not be considered stand-alone documentation of the site's layout. Digital photographic documentation of the location and fieldwork is recommended, especially if unusual circumstances are encountered.

Nothing herein should be interpreted to preclude emergency response actions or to imply immediate remediation by removal cannot proceed as warranted. Nonetheless, characterization of impacts and confirmation of the effectiveness of remedial efforts must still be provided to the OCD before any release incident will be closed.

Jim Griswold
OCD Environmental Bureau Chief
1220 South St. Francis Drive
Santa Fe, New Mexico 87505
505-476-3465
jim.griswold@state.nm.us

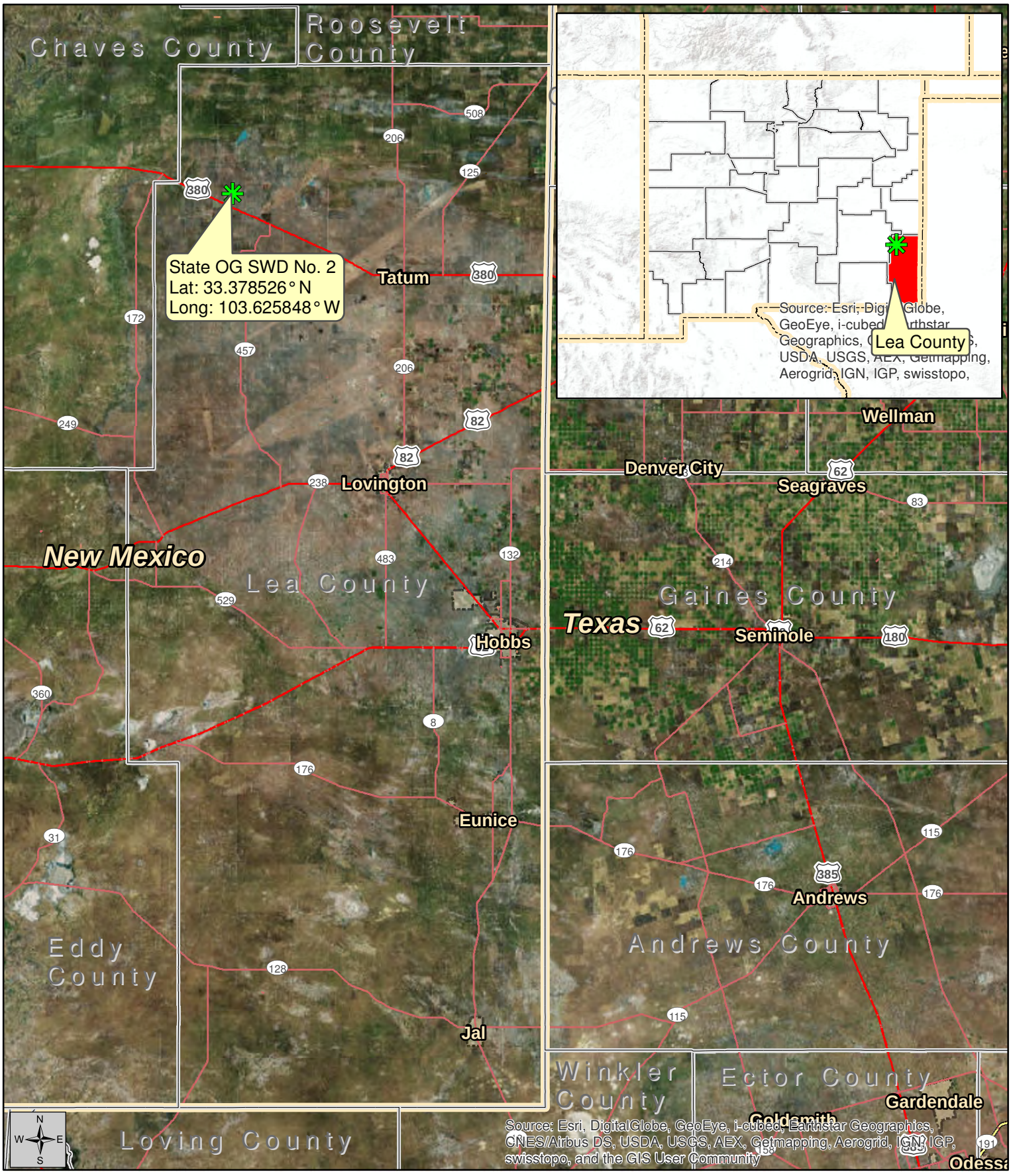


Figure 1 **Site Location Map**	**State OG SWD No. 2**	**May 15, 2017**
TIMBERWOLF ENVIRONMENTAL	1:1,000,000 0 10 20 30 40 50 Miles **Jay Management, LLC** **Bagley Field, Lea County, New Mexico** Created By: Austin Russell TE Project No.: ISR-170037 Datum: NAD83 Imagery Source: ESRI Vector Source: TE & ESRI	✳ Site

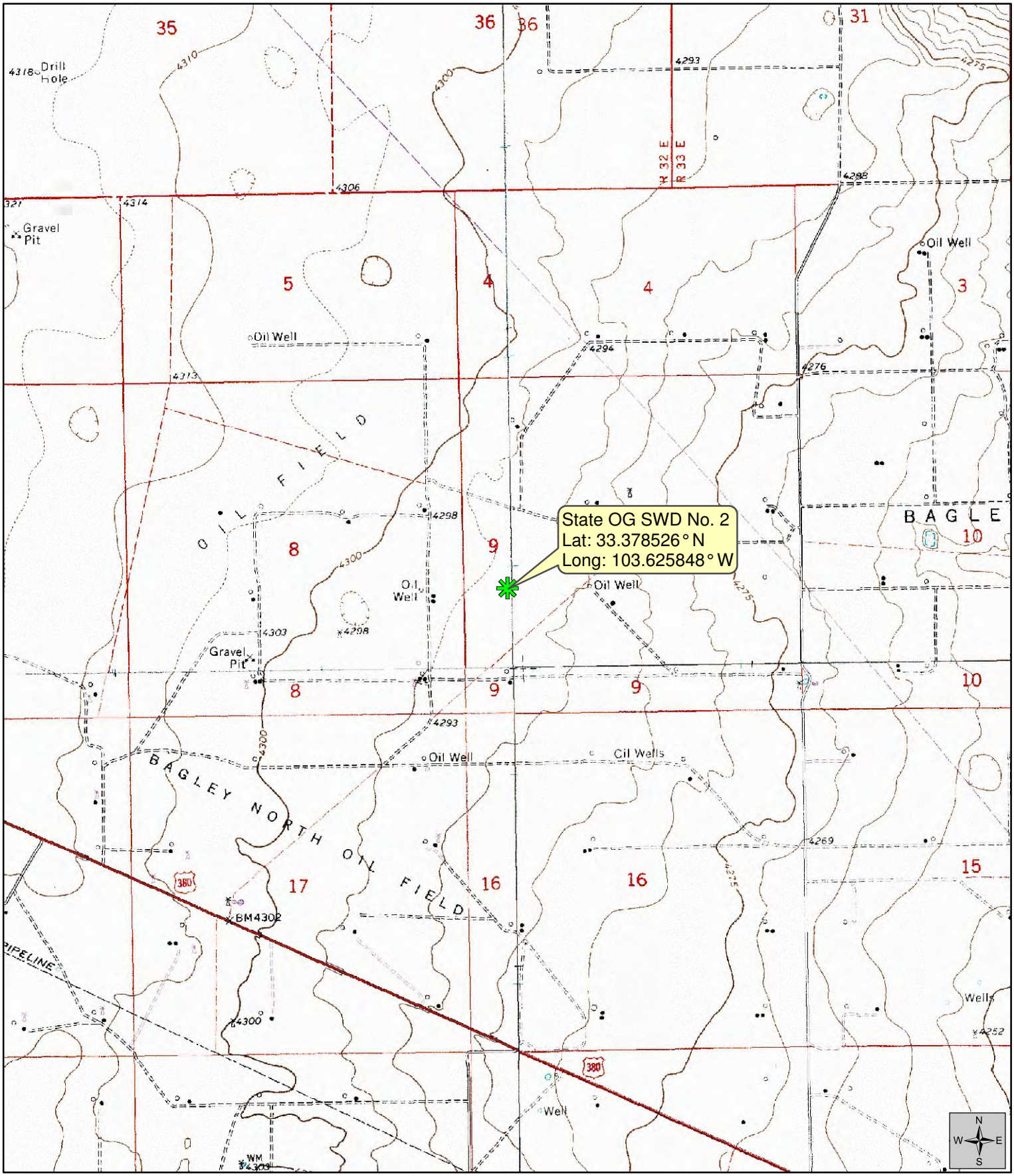


Figure 3 **2015 Aerial Map**	**State OG SWD No. 2**	**May 15, 2017**
TIMBERWOLF ENVIRONMENTAL	1:24,000 0 1,000 2,000 3,000 4,000 5,000 Feet **Jay Management, LLC** **Bagley Field, Lea County, New Mexico** Created By: Austin Russell TE Project No.: ISR-170050 Datum: NAD83 Imagery Source: USGS Quad: Caprock Vector Source: TE	* Site

Figure 3 **2015 Aerial Map**	**State OG SWD No. 2**	**May 15, 2017**
TIMBERWOLF ENVIRONMENTAL	1:1,000 0 50 100 150 200 250 Feet **Jay Management, LLC** **Bagley Field, Lea County, New Mexico** Created By: Austin Russell TE Project No.: ISR-170050 Datum: NAD83 Imagery Source: ESRI Vector Source: TE	* Site

JAY MANAGEMENT COMPANY, LLC
STATE OG SWD #2
660' FWL & 1980' FSL
UNIT L, SEC. 9-T11S-R33E
API #30-025-31381
LEA COUNTY, NEW MEXICO

04/27/2017


04/27/2017


04/27/2017


04/27/2017

PHOTOGRAPHIC DOCUMENTATION

1920 W Villa Maria, Ste. 305
Bryan, TX 77807
(979) 324-2139
www.teamtimberwolf.com

PHOTOGRAPHIC LOG

Project No.:	ISR-170052	**Client:**	Jay Management
Project Name:	State OG SWD No. 2 Release	**Site Location:**	Lea County, New Mexico
Task Description:	Initial Site Assessment	**Date:**	05/22/17

Photo No.:
1

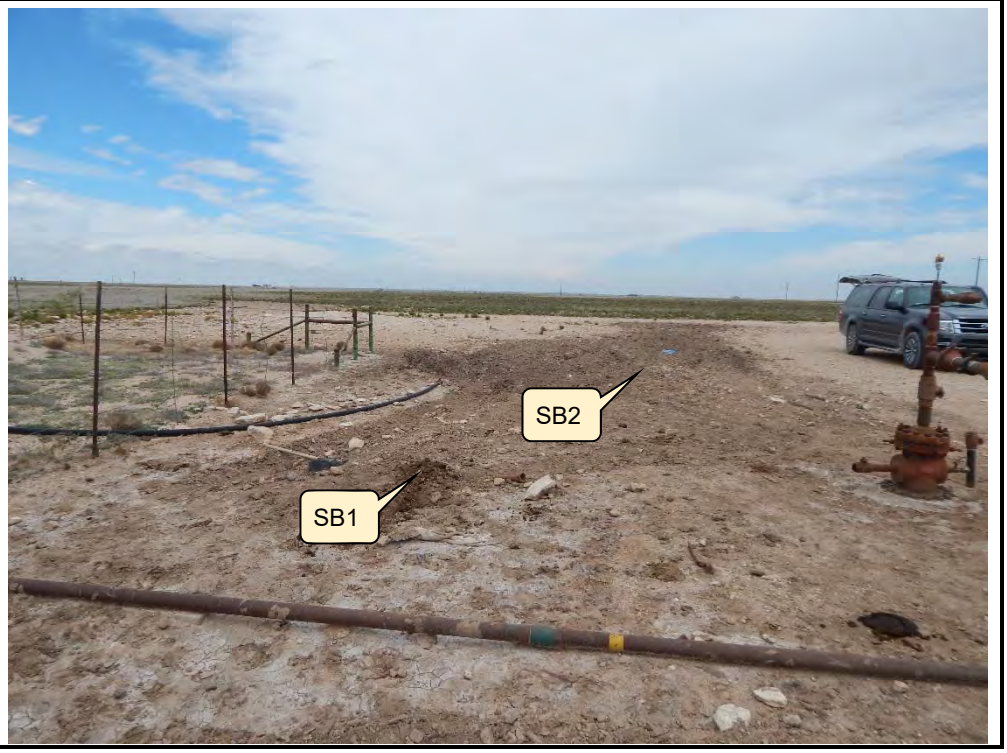
Direction:
N

Comments:
View of the State OG SWD No. 2 well, tank battery, and injection pump.

Photo No.:
2

Direction:
E

Comments:
View of tilled impacted soils within the spill area. Note SB1 and SB2 sample locations.



1920 W Villa Maria, Ste. 305
Bryan, TX 77807
(979) 324-2139
www.teamtimberwolf.com

PHOTOGRAPHIC LOG

Project No.:	ISR-170052	**Client:**	Jay Management
Project Name:	State OG SWD No. 2 Release	**Site Location:**	Lea County, New Mexico
Task Description:	Initial Site Assessment	**Date:**	05/22/17

Photo No.: 3

Direction: N

Comments: View of tilled impacted soils within the spill area. Note SB3 sample location.

Photo No.: 4

Direction: E

Comments: View along the lease road and tilled impacted soils within the spill area.

LABORATORY REPORT AND CHAIN OF CUSTODY DOCUMENTS

TestAmerica

THE LEADER IN ENVIRONMENTAL TESTING

ANALYTICAL REPORT

TestAmerica Laboratories, Inc.
TestAmerica Houston
6310 Rothway Street
Houston, TX 77040
Tel: (713)690-4444

TestAmerica Job ID: 600-148745-1
Client Project/Site: State OG No.2 SWD

For:
Timberwolf Environmental LLC
1920 W. Vill Maria
Suite 305-2 Box 205
Bryan, Texas 77807

Attn: James Foster

Authorized for release by:
6/7/2017 4:01:49 PM
Donnie Combs, Project Management Assistant I
(713)690-4444
donnie.combs@testamericainc.com

Designee for

Dean Joiner, Project Manager II
(713)690-4444
dean.joiner@testamericainc.com

Table of Contents

Job ID: 600-148745-1

Laboratory: TestAmerica Houston

Narrative

Job Narrative
600-148745-1

Comments
No additional comments.

Receipt
The samples were received on 5/26/2017 10:04 AM; the samples arrived in good condition, properly preserved and, where required, on ice. The temperature of the cooler at receipt was 0.2º C.

Receipt Exceptions
The following samples was received outside of holding time: SB1 0-1' (600-148745-1), SB2 0-1' (600-148745-2) and SB3 0-1' (600-148745-3). Out of hold for TPH freezing

GC/MS VOA
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

GC Semi VOA
Method(s) TX 1005: The following sample(s) was analyzed outside of analytical holding time. The samples were not frozen within the 48 hours required by the method.
SB1 0-1' (600-148745-1), SB2 0-1' (600-148745-2) and SB3 0-1' (600-148745-3).

No additional analytical or quality issues were noted, other than those described above or in the Definitions/Glossary page.

General Chemistry
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Industrial Hygiene
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Organic Prep
No analytical or quality issues were noted, other than those described in the Definitions/Glossary page.

Method Summary

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Method	Method Description	Protocol	Laboratory
8260B	Volatile Organic Compounds (GC/MS)	SW846	TAL HOU
TX 1005	Texas - Total Petroleum Hydrocarbon (GC)	TCEQ	TAL HOU
9056	Anions, Ion Chromatography	SW846	TAL HOU
Moisture	Percent Moisture	EPA	TAL HOU

Protocol References:

EPA = US Environmental Protection Agency

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

TCEQ = Texas Commission of Environmental Quality

Laboratory References:

TAL HOU = TestAmerica Houston, 6310 Rothway Street, Houston, TX 77040, TEL (713)690-4444

Sample Summary

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Lab Sample ID	Client Sample ID	Matrix	Collected	Received
600-148745-1	SB1 0-1'	Solid	05/22/17 14:20	05/26/17 10:04
600-148745-2	SB2 0-1'	Solid	05/22/17 14:30	05/26/17 10:04
600-148745-3	SB3 0-1'	Solid	05/22/17 14:40	05/26/17 10:04

Client Sample ID: SB1 0-1'

Lab Sample ID: 600-148745-1

Date Collected: 05/22/17 14:20
Matrix: Solid
Date Received: 05/26/17 10:04
Percent Solids: 84.5

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.00076	U	0.0060	0.00076	mg/Kg	☼	05/30/17 12:50	05/31/17 02:45	1
Ethylbenzene	0.0012	U	0.0060	0.0012	mg/Kg	☼	05/30/17 12:50	05/31/17 02:45	1
Toluene	0.0017	U	0.0060	0.0017	mg/Kg	☼	05/30/17 12:50	05/31/17 02:45	1
Xylenes, Total	0.0014	U	0.0060	0.0014	mg/Kg	☼	05/30/17 12:50	05/31/17 02:45	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 130*	*05/30/17 12:50*	*05/31/17 02:45*	*1*
Dibromofluoromethane	*83*		*68 - 140*	*05/30/17 12:50*	*05/31/17 02:45*	*1*
Toluene-d8 (Surr)	*91*		*50 - 130*	*05/30/17 12:50*	*05/31/17 02:45*	*1*
4-Bromofluorobenzene	*117*		*57 - 140*	*05/30/17 12:50*	*05/31/17 02:45*	*1*

Method: TX 1005 - Texas - Total Petroleum Hydrocarbon (GC)

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
C6-C12	**22**	**H**	12	4.5	mg/Kg	☼	05/30/17 14:02	05/30/17 21:52	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*94*		*70 - 130*	*05/30/17 14:02*	*05/30/17 21:52*	*1*

Method: TX 1005 - Texas - Total Petroleum Hydrocarbon (GC) - DL

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
>C12-C28	**1500**	**H**	24	9.5	mg/Kg	☼	05/30/17 14:02	05/31/17 08:25	2
>C28-C35	**440**	**H**	24	9.5	mg/Kg	☼	05/30/17 14:02	05/31/17 08:25	2
C6-C35	**2000**	**H**	24	8.9	mg/Kg	☼	05/30/17 14:02	05/31/17 08:25	2

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*104*		*70 - 130*	*05/30/17 14:02*	*05/31/17 08:25*	*2*

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**8300**		470	63	mg/Kg	☼		06/05/17 15:53	100

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**15.5**		1.0	1.0	%			05/26/17 17:27	1
Percent Solids	**84.5**		1.0	1.0	%			05/26/17 17:27	1

Client Sample ID: SB2 0-1'

Lab Sample ID: 600-148745-2

Date Collected: 05/22/17 14:30
Matrix: Solid
Date Received: 05/26/17 10:04
Percent Solids: 93.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.00068	U	0.0054	0.00068	mg/Kg	☼	05/30/17 12:50	05/31/17 03:10	1
Ethylbenzene	0.0011	U	0.0054	0.0011	mg/Kg	☼	05/30/17 12:50	05/31/17 03:10	1
Toluene	0.0015	U	0.0054	0.0015	mg/Kg	☼	05/30/17 12:50	05/31/17 03:10	1
Xylenes, Total	0.0012	U	0.0054	0.0012	mg/Kg	☼	05/30/17 12:50	05/31/17 03:10	1

Surrogate	*%Recovery*	*Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*92*		*61 - 130*	*05/30/17 12:50*	*05/31/17 03:10*	*1*
Dibromofluoromethane	*86*		*68 - 140*	*05/30/17 12:50*	*05/31/17 03:10*	*1*
Toluene-d8 (Surr)	*93*		*50 - 130*	*05/30/17 12:50*	*05/31/17 03:10*	*1*

Client Sample ID: SB2 0-1'

Date Collected: 05/22/17 14:30
Date Received: 05/26/17 10:04

Lab Sample ID: 600-148745-2

Matrix: Solid
Percent Solids: 93.3

Method: 8260B - Volatile Organic Compounds (GC/MS) (Continued)

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
4-Bromofluorobenzene	*122*		*57 - 140*	*05/30/17 12:50*	*05/31/17 03:10*	*1*

Method: TX 1005 - Texas - Total Petroleum Hydrocarbon (GC)

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
C6-C12	4.1	U H	11	4.1	mg/Kg	☼	05/30/17 14:02	05/30/17 20:43	1
>C12-C28	4.3	U H	11	4.3	mg/Kg	☼	05/30/17 14:02	05/30/17 20:43	1
>C28-C35	4.3	U H	11	4.3	mg/Kg	☼	05/30/17 14:02	05/30/17 20:43	1
C6-C35	4.1	U H	11	4.1	mg/Kg	☼	05/30/17 14:02	05/30/17 20:43	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	*105*		*70 - 130*	*05/30/17 14:02*	*05/30/17 20:43*	*1*

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**9100**		430	58	mg/Kg	☼		06/05/17 16:53	100

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	**6.7**		1.0	1.0	%			05/26/17 17:27	1
Percent Solids	**93.3**		1.0	1.0	%			05/26/17 17:27	1

Client Sample ID: SB3 0-1'

Date Collected: 05/22/17 14:40
Date Received: 05/26/17 10:04

Lab Sample ID: 600-148745-3

Matrix: Solid
Percent Solids: 93.3

Method: 8260B - Volatile Organic Compounds (GC/MS)

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.00070	U	0.0056	0.00070	mg/Kg	☼	05/30/17 12:50	05/31/17 03:34	1
Ethylbenzene	0.0011	U	0.0056	0.0011	mg/Kg	☼	05/30/17 12:50	05/31/17 03:34	1
Toluene	0.0015	U	0.0056	0.0015	mg/Kg	☼	05/30/17 12:50	05/31/17 03:34	1
Xylenes, Total	0.0013	U	0.0056	0.0013	mg/Kg	☼	05/30/17 12:50	05/31/17 03:34	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 130*	*05/30/17 12:50*	*05/31/17 03:34*	*1*
Dibromofluoromethane	*87*		*68 - 140*	*05/30/17 12:50*	*05/31/17 03:34*	*1*
Toluene-d8 (Surr)	*92*		*50 - 130*	*05/30/17 12:50*	*05/31/17 03:34*	*1*
4-Bromofluorobenzene	*116*		*57 - 140*	*05/30/17 12:50*	*05/31/17 03:34*	*1*

Method: TX 1005 - Texas - Total Petroleum Hydrocarbon (GC)

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
C6-C12	4.0	U H	11	4.0	mg/Kg	☼	05/30/17 14:02	05/30/17 22:26	1
>C12-C28	**91**	**H**	11	4.3	mg/Kg	☼	05/30/17 14:02	05/30/17 22:26	1
>C28-C35	**210**	**H**	11	4.3	mg/Kg	☼	05/30/17 14:02	05/30/17 22:26	1
C6-C35	**300**	**H**	11	4.0	mg/Kg	☼	05/30/17 14:02	05/30/17 22:26	1

Surrogate	%Recovery	Qualifier	Limits	Prepared	Analyzed	Dil Fac
o-Terphenyl	*105*		*70 - 130*	*05/30/17 14:02*	*05/30/17 22:26*	*1*

Method: 9056 - Anions, Ion Chromatography - Soluble

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	**14000**		850	110	mg/Kg	☼		06/05/17 17:13	200

Client Sample Results

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Client Sample ID: SB3 0-1'
Date Collected: 05/22/17 14:40
Date Received: 05/26/17 10:04

Lab Sample ID: 600-148745-3
Matrix: Solid
Percent Solids: 93.3

General Chemistry

Analyte	Result	Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Percent Moisture	6.7		1.0	1.0	%			05/26/17 17:27	1
Percent Solids	93.3		1.0	1.0	%			05/26/17 17:27	1

Qualifiers

GC/MS VOA

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

GC Semi VOA

Qualifier	Qualifier Description
H	Sample was prepped or analyzed beyond the specified holding time
U	Indicates the analyte was analyzed for but not detected.

HPLC/IC

Qualifier	Qualifier Description
U	Indicates the analyte was analyzed for but not detected.

Glossary

Abbreviation	These commonly used abbreviations may or may not be present in this report.
¤	Listed under the "D" column to designate that the result is reported on a dry weight basis
%R	Percent Recovery
CFL	Contains Free Liquid
CNF	Contains No Free Liquid
DER	Duplicate Error Ratio (normalized absolute difference)
Dil Fac	Dilution Factor
DL	Detection Limit (DoD/DOE)
DL, RA, RE, IN	Indicates a Dilution, Re-analysis, Re-extraction, or additional Initial metals/anion analysis of the sample
DLC	Decision Level Concentration (Radiochemistry)
EDL	Estimated Detection Limit (Dioxin)
LOD	Limit of Detection (DoD/DOE)
LOQ	Limit of Quantitation (DoD/DOE)
MDA	Minimum Detectable Activity (Radiochemistry)
MDC	Minimum Detectable Concentration (Radiochemistry)
MDL	Method Detection Limit
ML	Minimum Level (Dioxin)
NC	Not Calculated
ND	Not Detected at the reporting limit (or MDL or EDL if shown)
PQL	Practical Quantitation Limit
QC	Quality Control
RER	Relative Error Ratio (Radiochemistry)
RL	Reporting Limit or Requested Limit (Radiochemistry)
RPD	Relative Percent Difference, a measure of the relative difference between two points
TEF	Toxicity Equivalent Factor (Dioxin)
TEQ	Toxicity Equivalent Quotient (Dioxin)

Surrogate Summary

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)			
		12DCE	DBFM	TOL	BFB
Lab Sample ID	Client Sample ID	(61-130)	(68-140)	(50-130)	(57-140)
600-148745-1	SB1 0-1'	94	83	91	117
600-148745-2	SB2 0-1'	92	86	93	122
600-148745-3	SB3 0-1'	94	87	92	116
LCS 600-214018/3	Lab Control Sample	102	98	99	123
LCSD 600-214018/4	Lab Control Sample Dup	94	94	99	127
MB 600-214018/6	Method Blank	105	86	95	124

Surrogate Legend

12DCE = 1,2-Dichloroethane-d4 (Surr)
DBFM = Dibromofluoromethane
TOL = Toluene-d8 (Surr)
BFB = 4-Bromofluorobenzene

Method: TX 1005 - Texas - Total Petroleum Hydrocarbon (GC)

Matrix: Solid **Prep Type: Total/NA**

		Percent Surrogate Recovery (Acceptance Limits)
		OTPH
Lab Sample ID	Client Sample ID	(70-130)
600-148745-1	SB1 0-1'	94
600-148745-1 - DL	SB1 0-1'	104
600-148745-2	SB2 0-1'	105
600-148745-3	SB3 0-1'	105
LCS 600-213984/2-A	Lab Control Sample	97
LCSD 600-213984/3-A	Lab Control Sample Dup	120
MB 600-213984/1-A	Method Blank	106

Surrogate Legend

OTPH = o-Terphenyl

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Lab Sample ID: MB 600-214018/6
Matrix: Solid
Analysis Batch: 214018

Client Sample ID: Method Blank
Prep Type: Total/NA

Analyte	MB Result	MB Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Benzene	0.00063	U	0.0050	0.00063	mg/Kg			05/30/17 23:03	1
Ethylbenzene	0.0010	U	0.0050	0.0010	mg/Kg			05/30/17 23:03	1
Toluene	0.0014	U	0.0050	0.0014	mg/Kg			05/30/17 23:03	1
Xylenes, Total	0.0011	U	0.0050	0.0011	mg/Kg			05/30/17 23:03	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
1,2-Dichloroethane-d4 (Surr)	*105*		*61 - 130*		*05/30/17 23:03*	*1*
Dibromofluoromethane	*86*		*68 - 140*		*05/30/17 23:03*	*1*
Toluene-d8 (Surr)	*95*		*50 - 130*		*05/30/17 23:03*	*1*
4-Bromofluorobenzene	*124*		*57 - 140*		*05/30/17 23:03*	*1*

Lab Sample ID: LCS 600-214018/3
Matrix: Solid
Analysis Batch: 214018

Client Sample ID: Lab Control Sample
Prep Type: Total/NA

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Benzene			0.0500	0.0532		mg/Kg		106	70 - 131		
Ethylbenzene			0.0500	0.0480		mg/Kg		96	66 - 130		
Toluene			0.0500	0.0499		mg/Kg		100	67 - 130		
Xylenes, Total			0.100	0.0931		mg/Kg		93	63 - 130		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*102*		*61 - 130*
Dibromofluoromethane	*98*		*68 - 140*
Toluene-d8 (Surr)	*99*		*50 - 130*
4-Bromofluorobenzene	*123*		*57 - 140*

Lab Sample ID: LCSD 600-214018/4
Matrix: Solid
Analysis Batch: 214018

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Benzene			0.0500	0.0502		mg/Kg		100	70 - 131	6	30
Ethylbenzene			0.0500	0.0503		mg/Kg		101	66 - 130	5	30
Toluene			0.0500	0.0502		mg/Kg		100	67 - 130	1	30
Xylenes, Total			0.100	0.101		mg/Kg		101	63 - 130	8	30

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
1,2-Dichloroethane-d4 (Surr)	*94*		*61 - 130*
Dibromofluoromethane	*94*		*68 - 140*
Toluene-d8 (Surr)	*99*		*50 - 130*
4-Bromofluorobenzene	*127*		*57 - 140*

Method: TX 1005 - Texas - Total Petroleum Hydrocarbon (GC)

Lab Sample ID: MB 600-213984/1-A
Matrix: Solid
Analysis Batch: 213948

Client Sample ID: Method Blank
Prep Type: Total/NA
Prep Batch: 213984

Analyte	MB Result	MB Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
C6-C12	3.8	U	10	3.8	mg/Kg		05/30/17 10:58	05/30/17 15:30	1
>C12-C28	4.1	U	10	4.1	mg/Kg		05/30/17 10:58	05/30/17 15:30	1
>C28-C35	4.1	U	10	4.1	mg/Kg		05/30/17 10:58	05/30/17 15:30	1
C6-C35	3.8	U	10	3.8	mg/Kg		05/30/17 10:58	05/30/17 15:30	1

Surrogate	*MB %Recovery*	*MB Qualifier*	*Limits*	*Prepared*	*Analyzed*	*Dil Fac*
o-Terphenyl	*106*		*70 - 130*	*05/30/17 10:58*	*05/30/17 15:30*	*1*

Lab Sample ID: LCS 600-213984/2-A
Matrix: Solid
Analysis Batch: 213948

Client Sample ID: Lab Control Sample
Prep Type: Total/NA
Prep Batch: 213984

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
C6-C12			250	207		mg/Kg		83	75 - 125		
>C12-C28			250	236		mg/Kg		94	75 - 125		
C6-C35			500	443		mg/Kg		89	75 - 125		

Surrogate	*LCS %Recovery*	*LCS Qualifier*	*Limits*
o-Terphenyl	*97*		*70 - 130*

Lab Sample ID: LCSD 600-213984/3-A
Matrix: Solid
Analysis Batch: 213948

Client Sample ID: Lab Control Sample Dup
Prep Type: Total/NA
Prep Batch: 213984

Analyte			Spike Added	LCSD Result	LCSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
C6-C12			250	228		mg/Kg		91	75 - 125	10	20
>C12-C28			250	248		mg/Kg		99	75 - 125	5	20
C6-C35			500	476		mg/Kg		95	75 - 125	7	20

Surrogate	*LCSD %Recovery*	*LCSD Qualifier*	*Limits*
o-Terphenyl	*120*		*70 - 130*

Method: 9056 - Anions, Ion Chromatography

Lab Sample ID: MB 600-214418/1-A
Matrix: Solid
Analysis Batch: 214382

Client Sample ID: Method Blank
Prep Type: Soluble

Analyte	MB Result	MB Qualifier	MQL (Adj)	SDL	Unit	D	Prepared	Analyzed	Dil Fac
Chloride	0.53	U	4.0	0.53	mg/Kg			06/05/17 14:46	1

Lab Sample ID: LCS 600-214418/2-A
Matrix: Solid
Analysis Batch: 214382

Client Sample ID: Lab Control Sample
Prep Type: Soluble

Analyte			Spike Added	LCS Result	LCS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride			200	185		mg/Kg		93	90 - 110		

Method: 9056 - Anions, Ion Chromatography (Continued)

Lab Sample ID: 600-148745-1 MS
Matrix: Solid
Analysis Batch: 214382

Client Sample ID: SB1 0-1'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MS Result	MS Qualifier	Unit	D	%Rec	%Rec. Limits		
Chloride	8300		11900	18100		mg/Kg	☼	83	80 - 120		

Lab Sample ID: 600-148745-1 MSD
Matrix: Solid
Analysis Batch: 214382

Client Sample ID: SB1 0-1'
Prep Type: Soluble

Analyte	Sample Result	Sample Qualifier	Spike Added	MSD Result	MSD Qualifier	Unit	D	%Rec	%Rec. Limits	RPD	RPD Limit
Chloride	8300		11900	18100		mg/Kg	☼	83	80 - 120	0	20

Unadjusted Detection Limits

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Method: 8260B - Volatile Organic Compounds (GC/MS)

Prep: 5030B

Analyte	MQL	MDL	Units	Method
Benzene	0.0050	0.00063	mg/Kg	8260B
Ethylbenzene	0.0050	0.0010	mg/Kg	8260B
Toluene	0.0050	0.0014	mg/Kg	8260B
Xylenes, Total	0.0050	0.0011	mg/Kg	8260B

Method: TX 1005 - Texas - Total Petroleum Hydrocarbon (GC)

Prep: TX_1005_S_Prep

Analyte	MQL	MDL	Units	Method
>C12-C28	10	4.1	mg/Kg	TX 1005
>C28-C35	10	4.1	mg/Kg	TX 1005
C6-C12	10	3.8	mg/Kg	TX 1005
C6-C35	10	3.8	mg/Kg	TX 1005

Method: 9056 - Anions, Ion Chromatography - Soluble

Leach: DI Leach

Analyte	MQL	MDL	Units	Method
Chloride	4.0	0.53	mg/Kg	9056

General Chemistry

Analyte	MQL	MDL	Units	Method
Percent Moisture	1.0	1.0	%	Moisture
Percent Solids	1.0	1.0	%	Moisture

GC/MS VOA

Prep Batch: 214003

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1	SB1 0-1'	Total/NA	Solid	5030B	
600-148745-2	SB2 0-1'	Total/NA	Solid	5030B	
600-148745-3	SB3 0-1'	Total/NA	Solid	5030B	

Analysis Batch: 214018

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1	SB1 0-1'	Total/NA	Solid	8260B	214003
600-148745-2	SB2 0-1'	Total/NA	Solid	8260B	214003
600-148745-3	SB3 0-1'	Total/NA	Solid	8260B	214003
MB 600-214018/6	Method Blank	Total/NA	Solid	8260B	
LCS 600-214018/3	Lab Control Sample	Total/NA	Solid	8260B	
LCSD 600-214018/4	Lab Control Sample Dup	Total/NA	Solid	8260B	

GC Semi VOA

Analysis Batch: 213948

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
MB 600-213984/1-A	Method Blank	Total/NA	Solid	TX 1005	213984
LCS 600-213984/2-A	Lab Control Sample	Total/NA	Solid	TX 1005	213984
LCSD 600-213984/3-A	Lab Control Sample Dup	Total/NA	Solid	TX 1005	213984

Analysis Batch: 213950

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1	SB1 0-1'	Total/NA	Solid	TX 1005	213984
600-148745-1 - DL	SB1 0-1'	Total/NA	Solid	TX 1005	213984
600-148745-2	SB2 0-1'	Total/NA	Solid	TX 1005	213984
600-148745-3	SB3 0-1'	Total/NA	Solid	TX 1005	213984

Pre Prep Batch: 213982

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1 - DL	SB1 0-1'	Total/NA	Solid	Frozen Preserve	
600-148745-1	SB1 0-1'	Total/NA	Solid	Frozen Preserve	
600-148745-2	SB2 0-1'	Total/NA	Solid	Frozen Preserve	
600-148745-3	SB3 0-1'	Total/NA	Solid	Frozen Preserve	

Prep Batch: 213984

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1	SB1 0-1'	Total/NA	Solid	TX_1005_S_Prep	213982
600-148745-1 - DL	SB1 0-1'	Total/NA	Solid	TX_1005_S_Prep	213982
600-148745-2	SB2 0-1'	Total/NA	Solid	TX_1005_S_Prep	213982
600-148745-3	SB3 0-1'	Total/NA	Solid	TX_1005_S_Prep	213982
MB 600-213984/1-A	Method Blank	Total/NA	Solid	TX_1005_S_Prep	
LCS 600-213984/2-A	Lab Control Sample	Total/NA	Solid	TX_1005_S_Prep	

GC Semi VOA (Continued)

Prep Batch: 213984 (Continued)

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
LCSD 600-213984/3-A	Lab Control Sample Dup	Total/NA	Solid	TX_1005_S_Prep	

HPLC/IC

Analysis Batch: 214382

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1	SB1 0-1'	Soluble	Solid	9056	214418
600-148745-2	SB2 0-1'	Soluble	Solid	9056	214418
600-148745-3	SB3 0-1'	Soluble	Solid	9056	214418
MB 600-214418/1-A	Method Blank	Soluble	Solid	9056	214418
LCS 600-214418/2-A	Lab Control Sample	Soluble	Solid	9056	214418
600-148745-1 MS	SB1 0-1'	Soluble	Solid	9056	214418
600-148745-1 MSD	SB1 0-1'	Soluble	Solid	9056	214418

Leach Batch: 214418

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1	SB1 0-1'	Soluble	Solid	DI Leach	
600-148745-2	SB2 0-1'	Soluble	Solid	DI Leach	
600-148745-3	SB3 0-1'	Soluble	Solid	DI Leach	
MB 600-214418/1-A	Method Blank	Soluble	Solid	DI Leach	
LCS 600-214418/2-A	Lab Control Sample	Soluble	Solid	DI Leach	
600-148745-1 MS	SB1 0-1'	Soluble	Solid	DI Leach	
600-148745-1 MSD	SB1 0-1'	Soluble	Solid	DI Leach	

General Chemistry

Analysis Batch: 213925

Lab Sample ID	Client Sample ID	Prep Type	Matrix	Method	Prep Batch
600-148745-1	SB1 0-1'	Total/NA	Solid	Moisture	
600-148745-2	SB2 0-1'	Total/NA	Solid	Moisture	
600-148745-3	SB3 0-1'	Total/NA	Solid	Moisture	

Lab Chronicle

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Client Sample ID: SB1 0-1' — **Lab Sample ID: 600-148745-1**
Date Collected: 05/22/17 14:20 — **Matrix: Solid**
Date Received: 05/26/17 10:04

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			213925	05/26/17 17:27	B1K	TAL HOU

Client Sample ID: SB1 0-1' — **Lab Sample ID: 600-148745-1**
Date Collected: 05/22/17 14:20 — **Matrix: Solid**
Date Received: 05/26/17 10:04 — **Percent Solids: 84.5**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			4.91 g	5 mL	214003	05/30/17 12:50	WS1	TAL HOU
Total/NA	Analysis	8260B		1	5 g	5 g	214018	05/31/17 02:45	WS1	TAL HOU
Total/NA	Pre Prep	Frozen Preserve					213982	05/26/17 17:30	NVP	TAL HOU
Total/NA	Prep	TX_1005_S_Prep			10.07 g	10.00 mL	213984	05/30/17 14:02	NVP	TAL HOU
Total/NA	Analysis	TX 1005		1			213950	05/30/17 21:52	RJV	TAL HOU
Total/NA	Pre Prep	Frozen Preserve	DL				213982	05/26/17 17:30	NVP	TAL HOU
Total/NA	Prep	TX_1005_S_Prep	DL		10.07 g	10.00 mL	213984	05/30/17 14:02	NVP	TAL HOU
Total/NA	Analysis	TX 1005	DL	2			213950	05/31/17 08:25	RJV	TAL HOU
Soluble	Leach	DI Leach			4.99 g	50 mL	214418	06/05/17 15:27	DAW	TAL HOU
Soluble	Analysis	9056		100			214382	06/05/17 15:53	DAW	TAL HOU

Client Sample ID: SB2 0-1' — **Lab Sample ID: 600-148745-2**
Date Collected: 05/22/17 14:30 — **Matrix: Solid**
Date Received: 05/26/17 10:04

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			213925	05/26/17 17:27	B1K	TAL HOU

Client Sample ID: SB2 0-1' — **Lab Sample ID: 600-148745-2**
Date Collected: 05/22/17 14:30 — **Matrix: Solid**
Date Received: 05/26/17 10:04 — **Percent Solids: 93.3**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			4.94 g	5 mL	214003	05/30/17 12:50	WS1	TAL HOU
Total/NA	Analysis	8260B		1	5 g	5 g	214018	05/31/17 03:10	WS1	TAL HOU
Total/NA	Pre Prep	Frozen Preserve					213982	05/26/17 17:30	NVP	TAL HOU
Total/NA	Prep	TX_1005_S_Prep			10.02 g	10.00 mL	213984	05/30/17 14:02	NVP	TAL HOU
Total/NA	Analysis	TX 1005		1			213950	05/30/17 20:43	RJV	TAL HOU
Soluble	Leach	DI Leach			4.95 g	50 mL	214418	06/05/17 15:27	DAW	TAL HOU
Soluble	Analysis	9056		100			214382	06/05/17 16:53	DAW	TAL HOU

Lab Chronicle

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Client Sample ID: SB3 0-1' — **Lab Sample ID: 600-148745-3**
Date Collected: 05/22/17 14:40 — **Matrix: Solid**
Date Received: 05/26/17 10:04

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Analysis	Moisture		1			213925	05/26/17 17:27	B1K	TAL HOU

Client Sample ID: SB3 0-1' — **Lab Sample ID: 600-148745-3**
Date Collected: 05/22/17 14:40 — **Matrix: Solid**
Date Received: 05/26/17 10:04 — **Percent Solids: 93.3**

Prep Type	Batch Type	Batch Method	Run	Dil Factor	Initial Amount	Final Amount	Batch Number	Prepared or Analyzed	Analyst	Lab
Total/NA	Prep	5030B			4.79 g	5 mL	214003	05/30/17 12:50	WS1	TAL HOU
Total/NA	Analysis	8260B		1	5 g	5 g	214018	05/31/17 03:34	WS1	TAL HOU
Total/NA	Pre Prep	Frozen Preserve					213982	05/26/17 17:30	NVP	TAL HOU
Total/NA	Prep	TX_1005_S_Prep			10.06 g	10.00 mL	213984	05/30/17 14:02	NVP	TAL HOU
Total/NA	Analysis	TX 1005		1			213950	05/30/17 22:26	RJV	TAL HOU
Soluble	Leach	DI Leach			5.06 g	50 mL	214418	06/05/17 15:27	DAW	TAL HOU
Soluble	Analysis	9056		200			214382	06/05/17 17:13	DAW	TAL HOU

Laboratory References:

TAL HOU = TestAmerica Houston, 6310 Rothway Street, Houston, TX 77040, TEL (713)690-4444

Accreditation/Certification Summary

Client: Timberwolf Environmental LLC
Project/Site: State OG No.2 SWD

TestAmerica Job ID: 600-148745-1

Laboratory: TestAmerica Houston

Unless otherwise noted, all analytes for this laboratory were covered under each accreditation/certification below.

Authority	Program	EPA Region	Identification Number	Expiration Date
Texas	NELAP	6	T104704223-17-21	10-31-17

The following analytes are included in this report, but accreditation/certification is not offered by the governing authority:

Analysis Method	Prep Method	Matrix	Analyte
Moisture		Solid	Percent Moisture
Moisture		Solid	Percent Solids

Chain of Custody Record

Sampler ID _____

Temperature on Receipt _____

Drinking Water? Yes ☐ No ☐

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

TAL-4124-280 (0508)

Client	Project Manager	Date	Chain of Custody Number
Timberwolf Environmental, LLC	[redacted] Ryan Mersmann	05/23/17	180356
Address	**Telephone Number (Area Code)/Fax Number**	**Lab Number**	**Page 1 of 1**
1920 W Villa Maria, Ste 305-5	832-808-4049		
City / State / Zip Code	**Site Contact**	**Lab Contact**	
Bryan / TX / 77807		Dean Joiner	
Project Name and Location (State)	**Carrier/Waybill Number**		
State OG No. 2 SWD			
Contract/Purchase Order/Quote No.			
ESR-170052			

Sample I.D. No. and Description (Containers for each sample may be combined on one line)	Date	Time	Matrix: Air	Aqueous	Sed.	Soil	Containers & Preservatives: Unpres.	H2SO4	HNO3	HCl	NaOH	ZnAc/NaOH	Analysis: BTEX	TPH	Chloride
SB1 0-1'	05/22/17	1420				X	X						X	X	X
SB2 0-1'	↓	1430				X	X						X	X	X
SB3 0-1'	↓	1440				X	X						X	X	X

Special Instructions/ Conditions of Receipt

600-148745 Chain of Custody

Possible Hazard Identification
☒ Non-Hazard ☐ Flammable ☐ Skin Irritant ☐ Poison B ☐ Unknown

Sample Disposal
☐ Return To Client ☒ Disposal By Lab ☐ Archive For _____ Months
(A fee may be assessed if samples are retained longer than 1 month)

Turn Around Time Required
☐ 24 Hours ☐ 48 Hours ☐ 7 Days ☐ 14 Days ☐ 21 Days ☒ Other Standard

QC Requirements (Specify)

	Relinquished By	Date	Time	Received By	Date	Time
1.	[signature]	05/23/17	1630	[signature]	5-23-17	1630
2.	[signature]	5/23/17	11:35	[signature]	5-24-17	1004
3.						

Comments

5.1 IR# 7 0.c Transfer RP 5-23-17

DISTRIBUTION: WHITE - Returned to Client with Report; CANARY - Stays with the Sample; PINK - Field Copy

Loc: 600
148745

TestAmerica Houston

Sample Receipt Cl...

TestAmerica
THE LEADER IN ENVIRONMENTAL TESTING

'17 MAY 26 10:04

Date/Time Received: _____

JOB NUMBER: _____ CLIENT: Timberwolf

UNPACKED BY: _____ CARRIER/DRIVER: fed Ex

Custody Seal Present: ☐ YES ☑ NO Number of Coolers Received: 1

Cooler ID	Temp Blank	Trip Blank	Observed Temp (°C)	Therm ID	Them CF	Corrected Temp (°C)
R/W	Y / N	Y / N	0.4	675	-.2	0.2
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				
	Y / N	Y / N				

CF = correction factor

Samples received on ice? ☐ YES ☐ NO

LABORATORY PRESERVATION OF SAMPLES REQUIRED: ☒ NO ☐ YES

Base samples are>pH 12: ☐ YES ☐ NO Acid preserved are<pH 2: ☐ YES ☐ NO

pH paper Lot #_____

VOA headspace acceptable (5-6mm): ☒ YES ☐ NO ☐ NA

	YES	NO
Did samples meet the laboratory's standard conditions of sample acceptability upon receipt?	☒	☐

COMMENTS:

TPH out of hold

5/26/17

Login Sample Receipt Checklist

Client: Timberwolf Environmental LLC

Job Number: 600-148745-1

Login Number: 148745

List Source: TestAmerica Houston

List Number: 1

Creator: Crafton, Tommie S

Question	Answer	Comment
Radioactivity wasn't checked or is </= background as measured by a survey meter.	N/A	Lab does not accept radioactive samples.
The cooler's custody seal, if present, is intact.	True	
Sample custody seals, if present, are intact.	True	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	
Cooler Temperature is recorded.	True	0.2
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
Is the Field Sampler's name present on COC?	True	
There are no discrepancies between the containers received and the COC.	True	
Samples are received within Holding Time (excluding tests with immediate HTs)	False	Refer to Job Narrative for details.
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
Sample Preservation Verified.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
Containers requiring zero headspace have no headspace or bubble is <6mm (1/4").	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	
Residual Chlorine Checked.	N/A	Check done at department level as required.