APPROVED
By Olivia Yu at 10:40 am, Jul 24, 2018

NMOCD approves of the proposed delineation for 1RP-4978. Depth to groundwater is < 100 ft. bgs. RRALs modified accordingly. Permissible chloride levels are <= 600 mg/kg.

1RP-4978
DELINEATION PLAN
Christmas C#9
Lea County, New Mexico

Latitude: 32.394472° North
Longitude: -103.200521° West

LAI Project No. 18-0144-01

June 17, 2018

Prepared for:
XTO Energy, Inc.
6401 Holiday Hill Road, Building 5
Midland, Texas 79707

Prepared by:
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Midland, Texas 79701

Mark J. Larson, P.G.
Certified Professional Geologist #10490

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Appendices

1.0 INTRODUCTION

Larson & Associates, Inc., (LAI) has prepared this delineation plan on behalf of XTO Energy, Inc. (XTO) for submittal to the New Mexico Oil Conservation Division (OCD) District 1 for a produced water spill at the Christmas C Well #9 (Site) located in Unit E (SW/4, NW/4), Section 18, Township 22 South, Range 37 East in Lea County, New Mexico. The surface and mineral ownership is private. The geodetic position is North 32.393011° and West -103.207336°. Figure 1 presents a topographic map.

1.1 Background

The spill occurred on February 9, 2018, due to a split in the steel flow line releasing approximately 0.19 barrels (bbl) of oil and 12.29 bbl of produced water. Approximately 0.14 bbl of oil and 8.87 bbl of produced water were recovered. The spill occurred about 2,100 feet southwest of the well. Released fluids migrated approximately 140 feet northeast before terminating in the pasture. The affected area measures approximately 1,667 square feet. The initial C-141 was submitted to OCD District 1 on February 27, 2018; however GPS coordinates presented on the initial C-141 were incorrect. The initial C-141 was approved on February 27, 2018. OCD assigned the release remediation permit number 1RP-4978. Appendix A presents the amended initial C-141.

1.2 Physical Setting

The Physical Setting is as follows:

- The surface elevation is approximately 3,435 feet above mean sea level (msl);
- The topography slopes to the southeast;
- The nearest surface water feature is greater than 1,000 feet east of the Site
- The soils are designated as “Tonuco loamy fine sand, 0 to 3 percent slopes”, consisting of loamy fine sand about 12 inches thick and underlain by loamy sand to about 17 inches below ground surface (bgs) and cemented material (caliche) below about 17 inches bgs;
- The surface geology is designated as eolian and piedmont deposits (Holocene to middle Pleistocene) interbedded eolian sands and piedmont-slope deposits;
- The average depth to groundwater based on State of New Mexico Office of the State Engineer (OSE) records is approximately 190 feet bgs;
- The nearest freshwater well based on OSE records is located in Unit C (NE/4, NW/4), Section 18, Township 22 South, Range 37 East.

1.3 Recommended Remediation Action Levels

Recommended remediation action levels (RRAL) were calculated for benzene, BTEX and TPH based on the following criteria established by the OCD in *“Guidelines for Remediation of Leaks, Spills and Releases, pp. 6-7, August 13, 1993”:*

Criteria	***Result***	***Score***
Depth-to-Groundwater	>100 Feet	0
Wellhead Protection Area	No	0
Distance to Surface Water Body	>1,000 Horizontal Feet	0

The following RRAL apply to the release for ranking score: 0

- Benzene 10 mg/Kg
- BTEX 50 mg/Kg

- TPH 5,000 mg/Kg

Depth to groundwater greater than 100 feet bgs requires vertical delineation for chloride to 600 milligrams per kilogram (mg/Kg) and maintained for at least 5 feet farther in depth.

2.0 DELINEATION PLAN

LAI proposes to collect soil samples at four (4) locations in the spill for vertical delineation and eight (8) locations outside the spill for horizontal delineation including each cardinal direction (north, south, east and west) of the spill. The samples will be collected at 1 foot intervals to a depth of approximately 4 feet bgs and at 2 foot intervals to a depth of approximately 8 feet bgs with direct push technology (DPT) depending on subsurface conditions. The soil samples will be delivered under chain of custody and preservation to a National Environmental Laboratory Accreditation Program (NLAP) accredited laboratory. The laboratory will analyze the upper soil sample (0 to 1 foot) from each location for benzene, toluene, ethylbenzene and xylenes (BTEX) and the upper three (3) samples (0 to 1, 1 to 2 and 2 to 3 feet) for total petroleum hydrocarbons (TPH), including gasoline range organics (C6-C12), diesel range organics (>C12-C28) and oil range organics (>C28-C35) EPA SW-846 Methods 8021B and 8015M, respectively. All samples will be analyzed for chloride by EPA Method E300. Pending laboratory results, further delineation may be required to achieve the RRAAL for benzene, BTEX and TPH or delineation limit. Figure 2 presents an aerial map showing the proposed soil sample locations. Appendix B presents photographs.

3.0 REMEDIATION PLAN

XTO will submit a remediation plan to the OCD upon completion of the delineation.

Figures

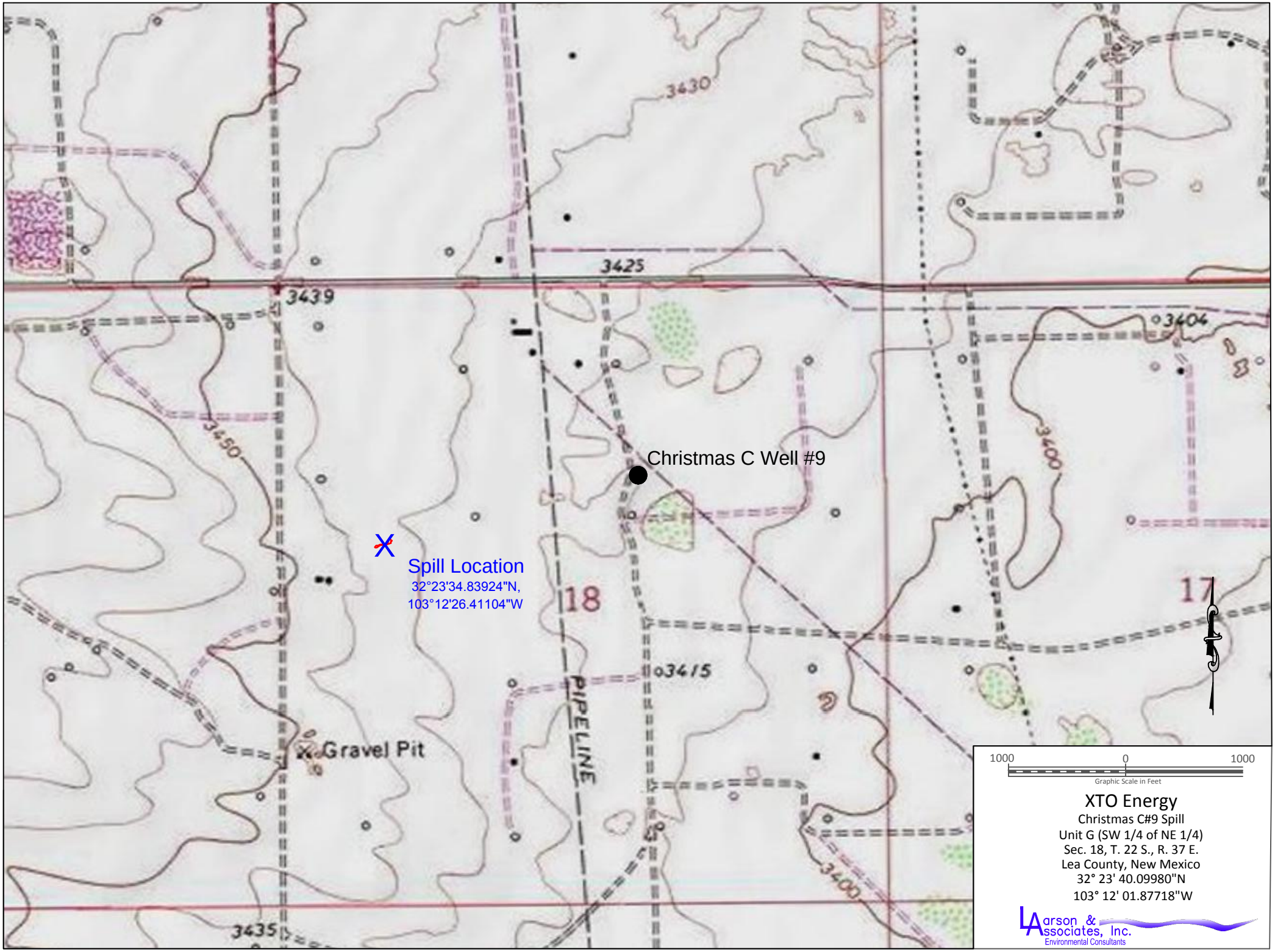

Figure 1 - Topographic Map

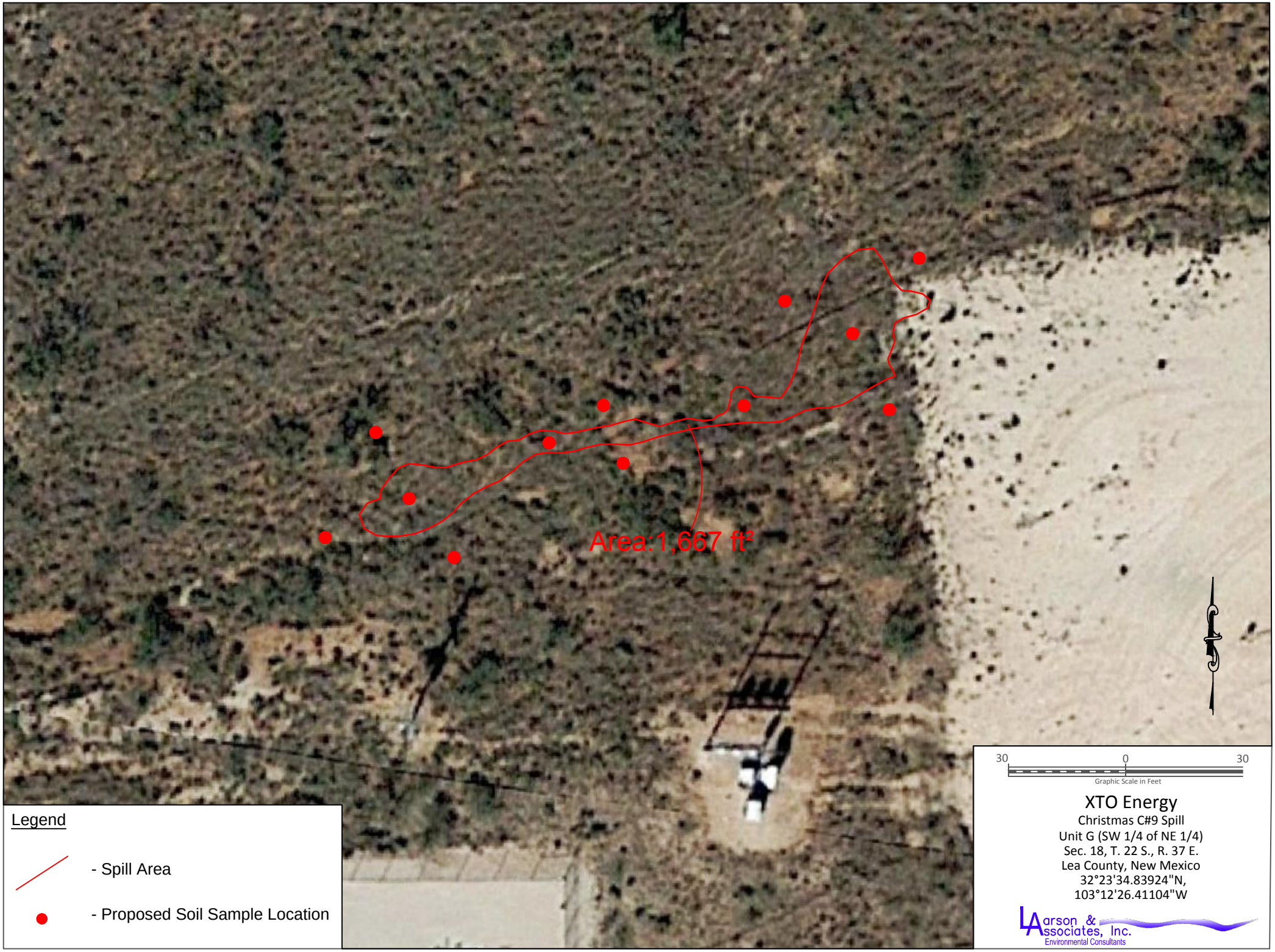

Figure 3 - Aerial Map Showing Proposed Soil Sample Locations

Appendix A

Initial 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

X Initial Report ☐ Final Report

Name of Company XTO Energy	Contact Scott Kaufman
Address 500 W. Illinois Suite 100 Midland TX 79701	Telephone No. 432-234-3054
Facility Name Christmas C #9	Facility Type Between Location & Battery

Surface Owner Private	Mineral Owner Private	API No. 3002525499

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
E	18	22 S	37 E					Lea

Latitude 32.392778 Longitude -103.207778 NAD83

NATURE OF RELEASE

Type of Release Produced Oil and Water	Volume of Release 0.19 bbls oil, 12.29 bbls water	Volume Recovered 0.14 bbls oil, 8.87 bbls water
Source of Release Flowline	Date and Hour of Occurrence 2/9/2018 Time Unknown	Date and Hour of Discovery 2/9/2018 Time 1:30pm MT
Was Immediate Notice Given? X Yes ☐ No ☐ Not Required	If YES, To Whom? Land owner verbal & E-mail Olivia Yu, NMOCD	
By Whom? Scott Kaufman	Date and Hour 2/9/2018 @ 7:00 pm MT	
Was a Watercourse Reached? ☐ Yes X No	If YES, Volume Impacting the Watercourse.	

If a Watercourse was Impacted, Describe Fully.*

N/A

RECEIVED
By Olivia Yu at 7:35 am, Feb 27, 2018

Describe Cause of Problem and Remedial Action Taken.*

Lease Operator found production low on Christmas C #9, and walked out flowline to discover rupture and a split due to possible weak spot in older flowline.

Describe Area Affected and Cleanup Action Taken.*

1,324 ft² was affected and picked up by Vac truck. Once RP# is given final clean up measures will be taken by XTO Energy to complete remediation.

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: Scott Kaufman

Printed Name: Scott Kaufman

Title: Oil Center Production Foreman

E-mail Address: scott_kaufman@xtoenergy.com

Date: 2/21/2018 Phone:432-234-3054

OIL CONSERVATION DIVISION

Approved by Environmental Specialist: OJ

Approval Date: 2/27/2018 Expiration Date:

Conditions of Approval: see attached directive

Attached ☑

* Attach Additional Sheets If Necessary

1RP-4978 nOY1805827904 pOY1805828402

Operator/Responsible Party,

The OCD has received the form C-141 you provided on _2/21/2018_ regarding an unauthorized release. The information contained on that form has been entered into our incident database and remediation case number _1RP-4978__ 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 _3/27/2018_. 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

Appendix B

Photographs

Christmas C Well #9 Viewing North, May 30, 2018

Spill Area Viewing Northeast, June 13, 2018

Spill Viewing West, June 13, 2018

Spill Area Viewing Northeast, June 13, 2018