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 August 8, 2011

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: XTO Energy, Inc.	Contact: James McDaniel
Address: 382 Road 3100, Aztec, New Mexico 87410	Telephone No.: (505) 333-3701
Facility Name: OH Randel #5	Facility Type: Gas Well (Basin Dakota)

Surface Owner: Tribal	Mineral Owner	API No.: 30-045-05964

LOCATION OF RELEASE

Unit Letter	Section	Township	Range	Feet from the	North/South Line	Feet from the	East/West Line	County
D	10	26N	11W	990	FNL	990	FWL	San Juan

Latitude 36.5065753 **Longitude** -107.996552

NATURE OF RELEASE

Type of Release: Produced Oil / Produced Water	Volume of Release: 32.5 BBL's	Volume Recovered: 0 BBL's
Source of Release: 2" Drain Valve on Production Tank	Date and Hour of Occurrence: Unknown Time: Unknown	Date and Hour of Discovery: 1/18/2016 2:56pm
Was Immediate Notice Given? ☒ Yes ☐ No ☐ Not Required	If YES, To Whom? Cory Smith (NMOCD)	
By Whom? Rex Farnsworth (EH&S Technician)	Date and Hour: 1/19/2016 @ 7:53am	
Was a Watercourse Reached? ☐ Yes ☒ No	If YES, Volume Impacting the Watercourse.	

OIL CONS. DIV DIST. 3
APR 17 2017

If a Watercourse was Impacted, Describe Fully.*

Describe Cause of Problem and Remedial Action Taken.*
On Monday, 1-18-2016 an XTO Lease Operator discovered a release at the OH Randel #5. The 2" drain valve on the 100 bbl production tank froze, splitting the valve body and releasing fluid on the ground. An estimated 27 bbls of produced oil and 5.5 bbls of produced water leaked onto the ground with no fluids being recovered. The 2" drain valve has been replaced. The site was then ranked according to the NMOCD Guidelines for the Remediation of Leaks, Spills and Releases. The site was ranked a 0 due to an estimated depth to groundwater is greater than 100 feet and an arroyo over 1000 feet. This set the closure standard to 5000 ppm TPH, 10 ppm benzene, and 50 ppm total BTEX. XTO has utilized a soil vapor extraction system for the remediation of this release, and will begin collecting confirmation samples on Wednesday, April 19th.

Describe Area Affected and Cleanup Action Taken. *
Please reference the attached *Confirmation Sampling Plan* for the methods to be used during confirmation sampling.

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 "Initial 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: James McDaniel	Approved by Environmental Specialist:
Title: EH&S Supervisor	Approval Date: 4/18/17 Expiration Date:
E-mail Address: james_mcdaniel@xtoenergy.com	Conditions of Approval: Closure Samples to Be Collected within 30 Day Attached ☒ Email
Date: 4/14/2017 Phone: 505-333-3701	

* Attach Additional Sheets If Necessary #nDF1602039091

(34)

Smith, Cory, EMNRD

From: Smith, Cory, EMNRD
Sent: Friday, April 7, 2017 1:35 PM
To: 'McDaniel, James'; Devin Hencmann
Cc: Powell, Brandon, EMNRD; Fields, Vanessa, EMNRD
Subject: RE: OH Randel #5 Confirmation Sampling COA
Attachments: RE: OH Randel #5 Confirmation Sampling Plan

James,

Please send me the Sampling Plan and a C-141 before close of business on Friday April 14. 2017 as previously requested in the attached Email. If possible on the C-141 If XTO could include a reasonable time frame in which they think they can commence the sampling event would be helpful.

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

From: McDaniel, James [mailto:James_McDaniel@xtoenergy.com]
Sent: Friday, April 7, 2017 1:22 PM
To: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>; Devin Hencmann <dhencmann@ltenv.com>
Cc: Powell, Brandon, EMNRD <Brandon.Powell@state.nm.us>; Fields, Vanessa, EMNRD <Vanessa.Fields@state.nm.us>
Subject: RE: OH Randel #5 Confirmation Sampling COA

Cory,
I apologize for not getting back sooner. We have gotten quotes for completion of the sampling plan as discussed with NMOCD and are awaiting management approval to pull the trigger. I am hoping for approval by next week. Thank you for your patience with this project.

James McDaniel
EH&S Supervisor
CHMM #15676
CSP #30009
XTO Energy Inc.
382 Road 3100
Aztec, New Mexico 87410
Phone: 505.333.3701 | Mobile: 505.787.0519
james_mcdaniel@xtoenergy.com

From: Smith, Cory, EMNRD [mailto:Cory.Smith@state.nm.us]
Sent: Tuesday, April 04, 2017 11:13 AM
To: Devin Hencmann; McDaniel, James

Cc: Powell, Brandon, EMNRD; Fields, Vanessa, EMNRD
Subject: RE: OH Randel #5 Confirmation Sampling COA
Importance: High

Hello All,

I haven't heard back from Devon in terms of XTO planning to start the work at the OH Randel #5 closure needs to start soon.

Can anyone give me a status update?

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

From: Smith, Cory, EMNRD
Sent: Monday, March 6, 2017 8:59 AM
To: 'Devin Hencmann' <dhencmann@ltenv.com>
Cc: Powell, Brandon, EMNRD <Brandon.Powell@state.nm.us>; McDaniel, James <James_McDaniel@xtoenergy.com>; Fields, Vanessa, EMNRD <Vanessa.Fields@state.nm.us>
Subject: RE: OH Randel #5 Confirmation Sampling COA

Devon,

OCD has reviewed XTO request and have approved the following:

- "*Impact will be defined by OVM (PID) measurements exceeding 100 ppm. "
  - Impacts will also be defined by stained or wet soils that are obvious signs of hydrocarbon impacts.
- XTO still must drill each bore hole to ATLEAST a depth of 25' or to the depth of the deepest impacts (Whichever is greater).
- If an XTO Borehole shows no signs of hydrocarbon impacts, (No staining, no OVM, uniform lithology) an alternative sampling rate may be proposed and approved prior to submitting the samples to the lab.

When is XTO planning to start the closure sampling? The original plan indicated that the SVE would run for 6 months which was signed on 5/31/16. I would like to give XTO enough time to organize contractors and equipment.

Thanks,

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

From: Devin Hencmann [mailto:dhencmann@ltenv.com]
Sent: Tuesday, February 21, 2017 8:10 AM
To: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>
Cc: Powell, Brandon, EMNRD <Brandon.Powell@state.nm.us>; McDaniel, James <James_McDaniel@xtoenergy.com>
Subject: OH Randel #5 Confirmation Sampling COA

Cory,

XTO has reviewed the conditions of approval sent in your email dated January 26, 2017 for LTE's Confirmation Sampling Plan dated December 30, 2016. In response to the conditions of approval, LTE, on behalf of XTO, proposes using field headspace screening as a tool for delineation and to assist in determining which samples be submitted to the laboratory for analysis. See the asterisks below:

- Each Bore hole:
  - Must be drilled to ATLEAST a depth of 25' or to the same depth of the deepest impacts (Whichever is greater).
    *Impact will be defined by OVM (PID) measurements exceeding 100 ppm.
- Soil sampling will be one composite sample over the first 10' and additional composite samples every 5' thereafter.
  - Each composite sample will be analyzed for TPH (GRO-DRO-MRO/ORO), and Total BTEX.
    *Soil samples will be collected for laboratory analysis when OVM (PID) readings exceed 100 ppm.
- XTO will provide the OCD with at least 72 hour notice but no more than one week prior to the start of drilling.

Please review these proposals and let us know if you approve.

Thank you,

Devin

Devin Hencmann
Project Geologist

COMPLIANCE / ENGINEERING / REMEDIATION
LT Environmental, Inc.
848 East 2nd Avenue
Durango, CO 81301
(970) 385-1096 office
(970) 403-6023 cell
(303) 433-1432 fax
www.ltenv.com
dhencmann@ltenv.com

Join us on: 

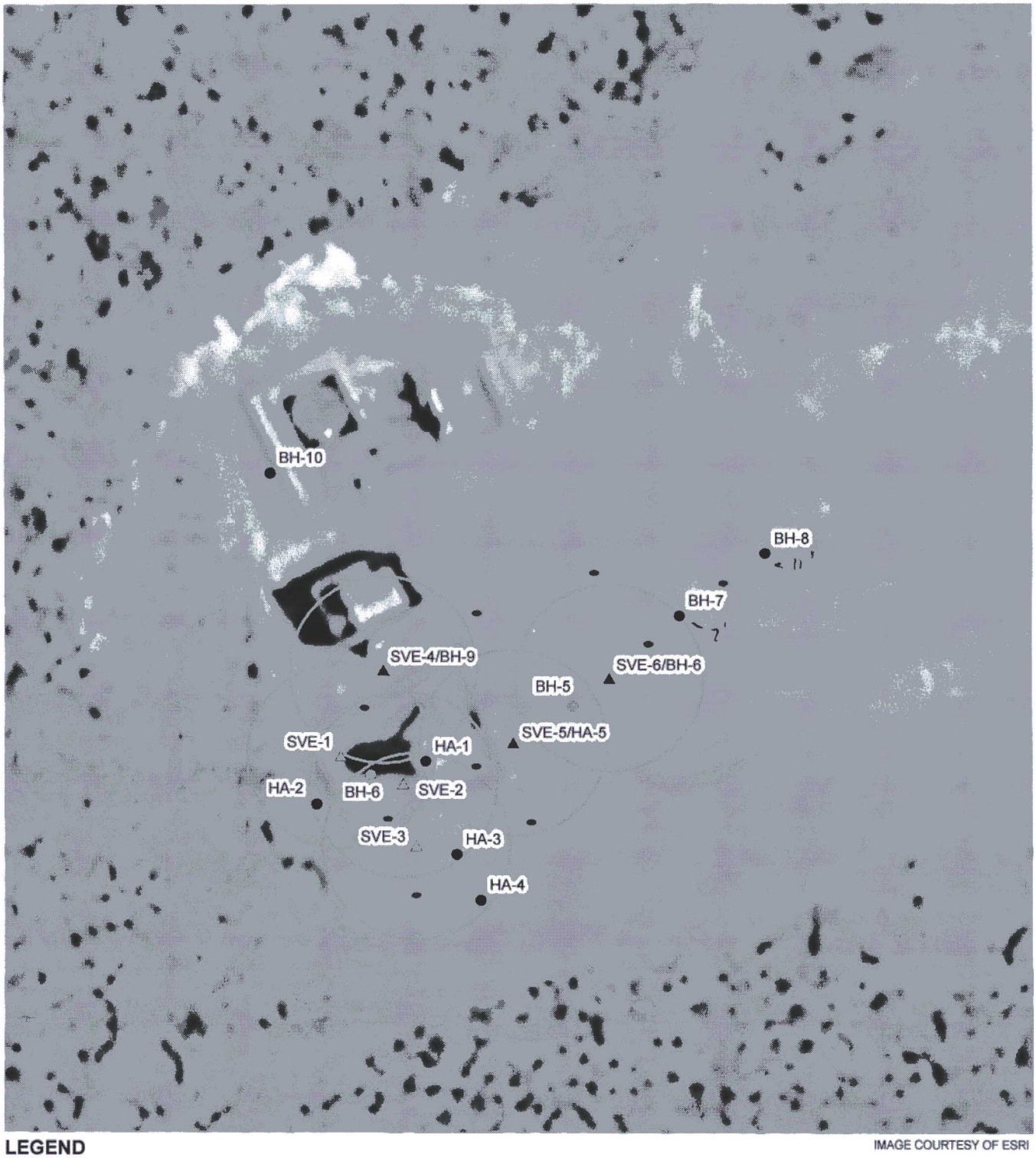

IMAGE COURTESY OF ESRI

LEGEND

- BOREHOLE
- DELINEATION BOREHOLE DRILLED BY XTO ON 11/18/2016
- SOIL VAPOR EXTRACTION (SVE) WELL
- SOIL VAPOR EXTRACTION (SVE) WELL AND DELINEATION BOREHOLE
- 20 FOOT RADIUS OF INFLUENCE

0 30 60
Feet

N

FIGURE 1
SITE MAP
OH RANDEL #5 SITE INVESTIGATION
NWNW SEC 10 T26N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\012914002_OH RANDEL #5\012914002_OH RANDEL #5_SITE.mxd

Smith, Cory, EMNRD

From: Smith, Cory, EMNRD
Sent: Wednesday, January 25, 2017 9:57 AM
To: McDaniel, James (James_McDaniel@xtoenergy.com)
Subject: RE: OH Randel #5 Confirmation Sampling Plan

James,

Can you please send the plan that Devon sent Via email hardcopy with a C-141 so that I may scan it into the well files.

Thank you,

Cory Smith
Environmental Specialist
Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

From: Smith, Cory, EMNRD
Sent: Wednesday, January 25, 2017 9:56 AM
To: McDaniel, James <James_McDaniel@xtoenergy.com>
Cc: Hixon, Logan <Logan_Hixon@xtoenergy.com>; 'Devin Hencmann' <dhencmann@ltenv.com>; Fields, Vanessa, EMNRD <Vanessa.Fields@state.nm.us>
Subject: RE: OH Randel #5 Confirmation Sampling Plan

Good Morning James,

Please see the attached location of OCD closure boreholes for the insitu remediation at the OH Randel #5 and below conditions of approval.

- Each Bore hole:
  - Must be drilled to ATLEAST a depth of 25' or to the same depth of the deepest impacts (Whichever is greater).
- Soil sampling will be one composite sample over the first 10' and additional composite samples every 5' thereafter.
  - Each composite sample will be analyzed for TPH (GRO-DRO-MRO/ORO), and Total BTEX.
- XTO will provide the OCD with at least 72 hour notice but no more than one week prior to the start of drilling.

If you have any additional questions please give me a call.

Cory Smith
Environmental Specialist

Oil Conservation Division
Energy, Minerals, & Natural Resources
1000 Rio Brazos, Aztec, NM 87410
(505)334-6178 ext 115
cory.smith@state.nm.us

From: Devin Hencmann [mailto:dhencmann@ltenv.com]
Sent: Friday, December 30, 2016 3:41 PM
To: Smith, Cory, EMNRD <Cory.Smith@state.nm.us>
Cc: McDaniel, James <James_McDaniel@xtoenergy.com>; Hixon, Logan <Logan_Hixon@xtoenergy.com>
Subject: OH Randel #5 Confirmation Sampling Plan

Cory,

Attached is the confirmation sampling plan for the OH Randel #5. Please review the plan and get back to us with comments or concerns. We would like to conduct the sampling as soon as the OCD grants approval.

Have a good New Year!

Thank you,
Devin

Devin Hencmann
Project Geologist

COMPLIANCE / ENGINEERING / REMEDIATION
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Durango, CO 81301
(970) 385-1096 office
(970) 403-6023 cell
(303) 433-1432 fax
www.ltenv.com
dhencmann@ltenv.com

Join us on:

COMPLIANCE / ENGINEERING / REMEDIATION

LT Environmental, Inc.
848 2nd Avenue
Durango, Colorado 81301
T 970.385.1096 / F 970.385.1873

April 14, 2017

Mr. Cory Smith
New Mexico Oil Conservation Division
1000 Rio Brazos Road
Aztec, NM 87410

RE: Confirmation Sampling Plan
XTO Energy, Inc.
OH Randel #5, API # 30-045-05964
San Juan County, New Mexico

Dear Mr. Smith:

LT Environmental, Inc. (LTE), on behalf of XTO Energy, Inc. (XTO), presents the following confirmation sampling plan to evaluate remediation of petroleum hydrocarbon impacted soil and consider closure at the OH Randel #5 natural gas production well (Site). The Site is located west of Highway 550 near Huerfano, New Mexico in Unit D of Section 10 of Township 26 North and Range 11 West.

Background

On January 18, 2016, XTO discovered a frozen valve on a 100-barrel (bbl) production tank that resulted in approximately 27 bbl of condensate and 5.5 bbl of produced water draining onto the ground and infiltrating into the subsurface. The release was contained within the bermed area and no liquids were recovered. The Site was ranked a zero pursuant to the New Mexico Oil Conservation Division's (NMOCD) 1993 *Guidelines for Remediation of Leaks, Spills and Releases*. As such, the remediation action levels applied to the Site are 5,000 parts per million (ppm) total petroleum hydrocarbons (TPH), 10 ppm benzene, and 50 ppm total for the sum of benzene, toluene, ethylbenzene, and total xylenes (BTEX).

On January 19, 2016, XTO conducted a subsurface assessment using a hand auger. During the assessment, a photo-ionization detector (PID) was utilized to field screen for volatile organic compounds (VOCs) in soil samples collected from within the release footprint. Samples were collected at the surface and intermittently to 9.5 feet below ground surface (bgs). Samples were collected from four different borehole locations and field screened. Samples from two boreholes were submitted for laboratory analysis of BTEX according to United States Environmental Protection Agency (USEPA) Method 8021 and TPH according to USEPA Method 8015. Field screening and laboratory analytical results indicated that impacted soil potentially exceeding NMOCD standards at the release location extended from the ground surface to 9.5 feet bgs vertically, then thinned out to 2 feet bgs south of the release point. The lateral extent appeared to be approximately 300 square feet. XTO described the subsurface soil type as sandy.

On August 3, through August 8, 2016, LTE conducted delineation and concurrently installed a soil vapor extraction (SVE) system for remediation. LTE advanced ten delineation boreholes (HA 1 through HA 5, and BH-6 through BH-10) to depths ranging from 10 feet to 20 feet bgs: one borehole was placed in each cardinal direction from the source area, then additional boreholes were installed outward as impacted soil was encountered (Figure 1). The soil from the delineation boreholes was described and field screened with a PID at one-foot intervals (Attachment A). Soil samples were collected from the highest Organic Vapor Measurement (OVM) measured and from the bottom of each borehole to confirm the vertical impact to the soil has been delineated. Soil samples were analyzed for BTEX using EPA Method 8021 and TPH using EPA Method 8015. If field screening results indicated that no impacted soil was present, no laboratory analysis was conducted (HA 2, HA 3, HA 4, and BH-10).

Based on the preliminary field screening and laboratory analytical results obtained by XTO and additional delineation data collected by LTE, six SVE wells were installed (Figure 1). SVE wells were screened at intervals spanning the impacted zones and placed so their radius of influence would affect the impacted soil encountered during delineation.

Delineation Results

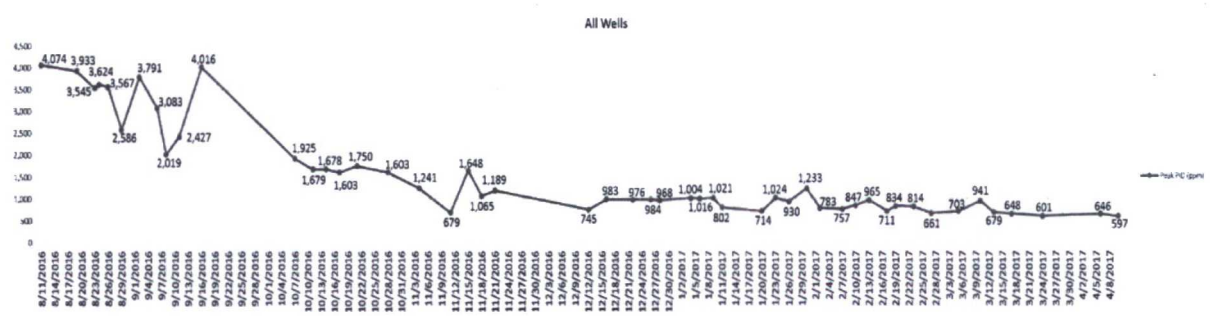
Impacted soil was encountered in HA-1 in the source area to BH-7 laterally and reached a maximum of 20 feet bgs in HA-1. Impact tapered out to the west, with 2 feet of thickness observed in BH-7. Laboratory results indicated the most significant impact occurred at HA-1 with 142 milligrams per kilogram (mg/kg) of BTEX. Toward the edge of the soil plume values of 112 mg/kg BTEX were observed in BH-7.

SVE Installation

SVE well locations and screening intervals were based on impacted soil encountered during delineation and a calculated radius of influence of 20 feet that LTE estimated based on subsurface lithological observations. Two SVE wells are located within the source area, two SVE wells are located northeast of the source area, one SVE well is located northwest of the source area, and one SVE well is located south of the source area. Installation of the wells was designed to ensure the 20-foot radius of influence reached all impacted soil encountered (Figure 1).

SVE Performance

The SVE system has been in operation since August 11, 2016, with greater than 90 percent (%) run time. XTO monitored OVM at each SVE well periodically to assess system performance and effectiveness. Below is a graph presenting OVM readings from the main line where vapors from all 6 SVE wells merge. The graph presents data spanning the course of operation.



At start up, OVM readings exceeded 4,000 ppm and have steadily declined during system operation. The average OVM reading between November 17, 2016 and December 11, 2016 was just over 1,000 ppm and the most recent OVM reading was 597 ppm. The decline in OVM readings measured from the combined wells indicate that hydrocarbon impacts have been reduced and soil sampling is prudent to assess residual impacts.

On November 18, 2016, XTO utilized a hand auger to advance two boreholes, one in the original source area (BH-6) and one to the northeast of the source area (BH-5), to assess decline in TPH and BTEX concentrations in soil. Soil samples were collected from each borehole where elevated OVM readings were encountered and from the bottom of the boring. Soil samples were analyzed for BTEX using EPA Method 8021 and TPH using EPA Method 8015 (Table 1). Soil analyzed from these borings was below NMOCD closure standards for this Site. These preliminary results combined with reduced OVM readings from the SVE system prompted further evaluation as proposed in this sampling plan.

Proposed Confirmation Sampling Plan

LTE will utilize a hollow-stem auger soil boring and sampling program using a CME 75 drill rig to advance 9 boreholes to 25 feet below ground surface (bgs) or to the depth of impact, whichever is greater. Boreholes will be located in areas where impacted soil was encountered during delineation and within the radius of influence of the SVE wells. Additional boreholes will be drilled outside of the SVE wells' radius of influence to confirm the subsurface impact was fully delineated during previous investigations (Figure 2).

Continuous soil samples will be logged by an LTE geologist and described using the Unified Soil Classification System (USCS). The intervals from immediately beneath the ground surface to 10 feet bgs and then every five foot interval thereafter will be composited and screened for volatile aromatic hydrocarbons. Screening will be conducted with a PID in accordance with the NMOCD *Guidelines for Remediation of Leaks, Spills and Releases*. Soil with field screening results exceeding 100 ppm or that is stained or wet will be collected for laboratory analysis of BTEX, TPH (GRO, DRO, and MRO).

Reporting

Upon positive evaluation of confirmation soil sampling results, XTO will provide NMOCD with a closure request. SVE remediation activities will continue until the NMOCD approves this plan and any subsequent closure request. Should any of the proposed confirmation soil samples exceed NMOCD standards for TPH or BTEX, XTO will continue to operate the SVE system and resample at those locations until results indicate parameters are compliant with NMOCD standards.

LTE appreciates the opportunity to provide this remediation work plan to the NMOCD. If you have any questions or comments regarding this work plan, do not hesitate to contact me at (970) 385-1096 or via email at dhencmann@ltenv.com or James McDaniel at (505) 419-0915 or at james_mcdaniel@xtoenergy.com.

Sincerely,

LT ENVIRONMENTAL, INC.

Devin Hencmann
Project Geologist

Ashley L. Ager, M.S., P.G.
Senior Geologist

Attachments:

Figure 1 – Site Map
Figure 2 – Proposed Sample Location Map
Table 1 – Borehole Soil Analytical Results
Appendix A – Soil Borehole Logs

FIGURES

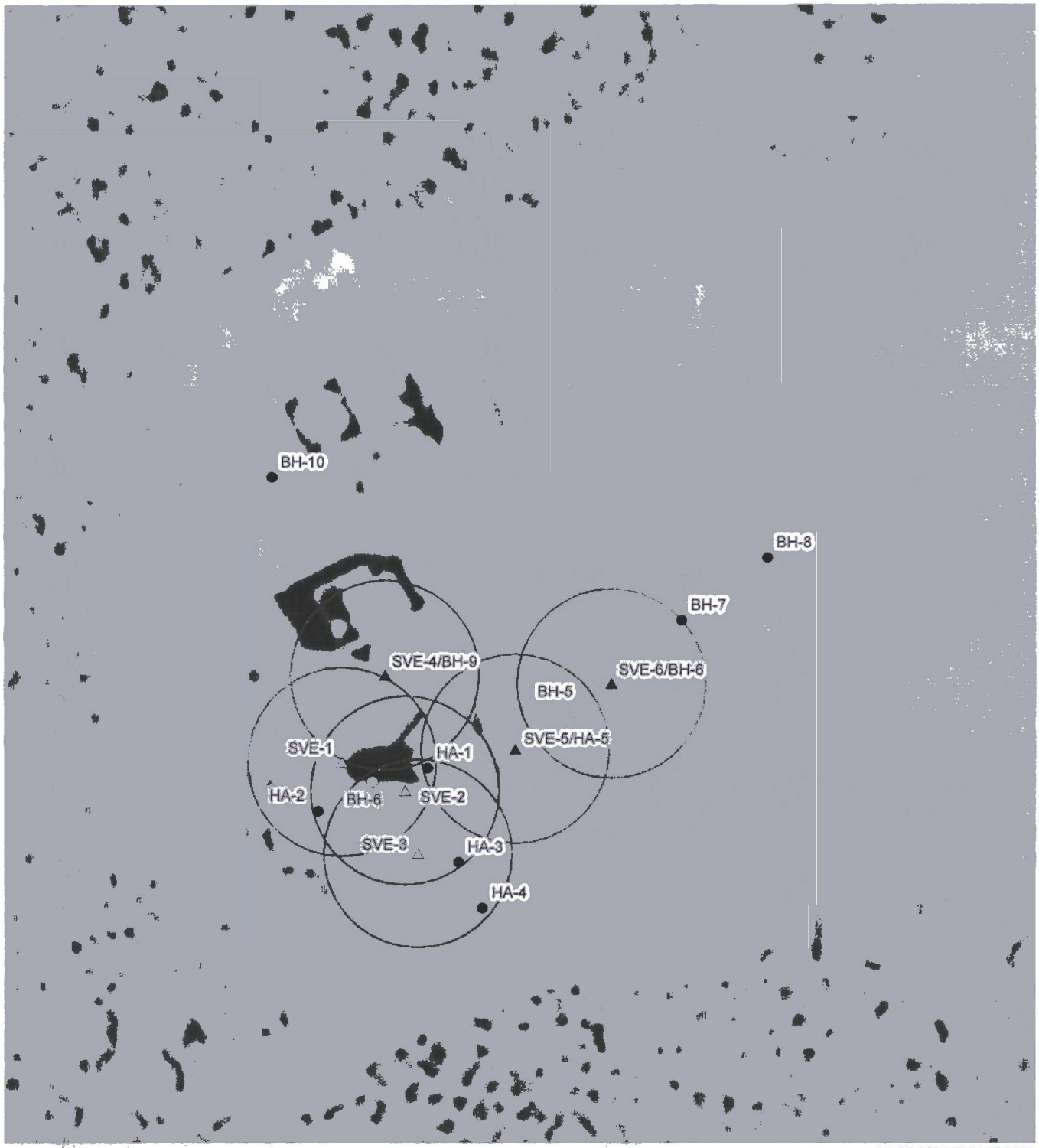


IMAGE COURTESY OF ESRI

LEGEND

- BOREHOLE
- DELINEATION BOREHOLE DRILLED BY XTO ON 11/18/2016
- SOIL VAPOR EXTRACTION (SVE) WELL
- SOIL VAPOR EXTRACTION (SVE) WELL AND DELINEATION BOREHOLE
- 20 FOOT RADIUS OF INFLUENCE

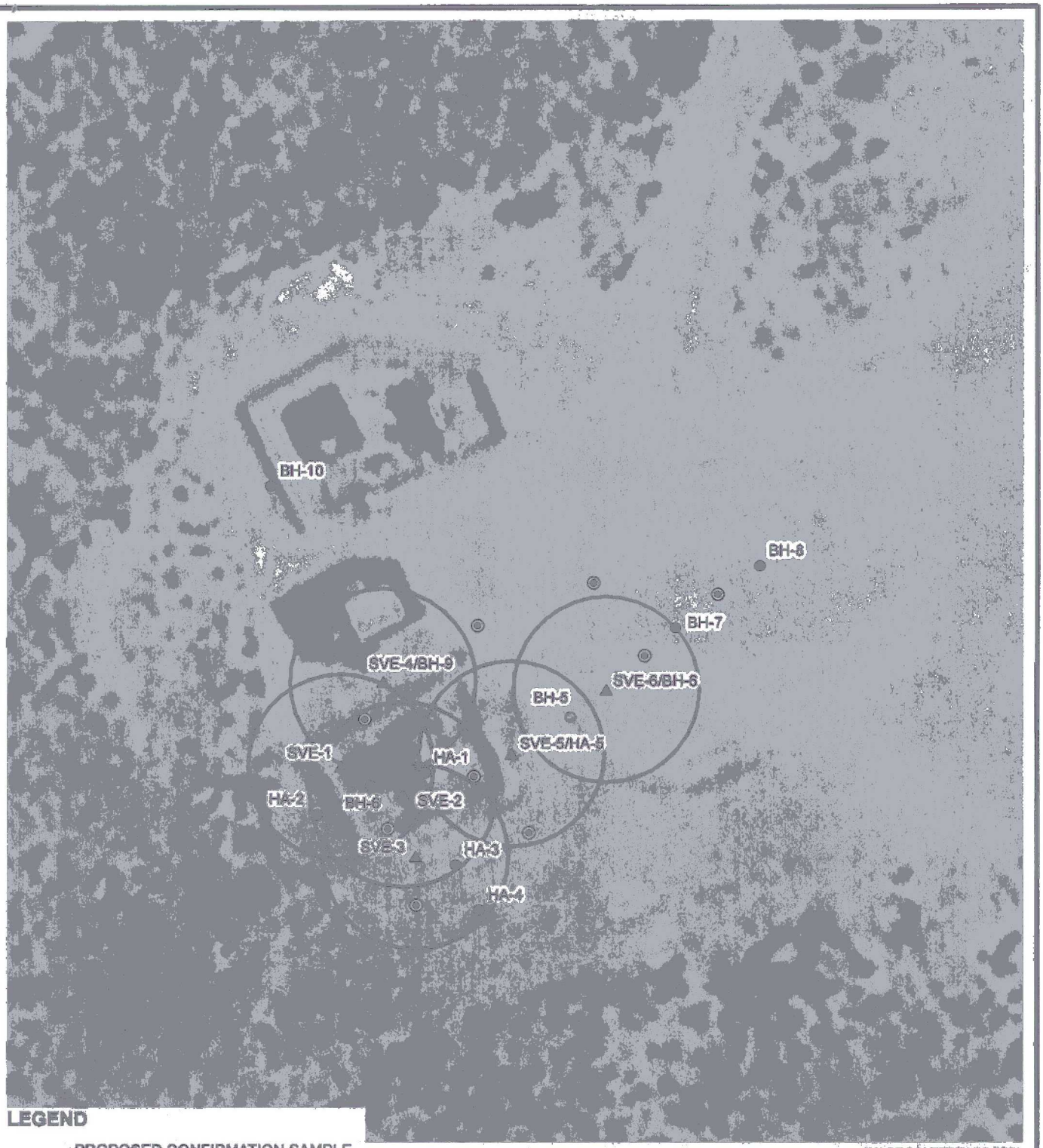
0 30 60

Feet

N

FIGURE 1
SITE MAP
OH RANDEL #5 SITE INVESTIGATION
NWNW SEC 10 T26N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\012014002_OH RANDEL #5\012014002_OH RANDEL #5_SITE.mxd



LEGEND

- PROPOSED CONFIRMATION SAMPLE LOCATION
- BOREHOLE
- DELINIATION BOREHOLE DRILLED BY XTO ON 11/18/2016
- SOIL VAPOR EXTRACTION (SVE) WELL
- SOIL VAPOR EXTRACTION (SVE) WELL AND DELINIATION BOREHOLE
- 20 FOOT RADIUS OF INFLUENCE

IMAGE COURTESY OF ESRI

0 30 60

Feet

N

FIGURE 2
PROPOSED SAMPLE LOCATION
OH RANDEL #5 SITE INVESTIGATION
NWNW SEC 10 T26N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\01291-003_OH RANDEL #5\01291-003_OH RANDEL #5_FIG02_SITE.mxd

TABLES

TABLE 1

BOREHOLE SOIL ANALYTICAL RESULTS
OH RANDEL #5
XTO ENERGY, INC

Soil Sample ID	Sample Date	Laboratory	Depth (feet)	Vapor (ppm)	Benzene (mg/kg)	Toluene (mg/kg)	Ethylbenzene (mg/kg)	Total Xylenes (mg/kg)	Total BTEX (mg/kg)	GRO (mg/kg)	DRO (mg/kg)	TPH (mg/kg)
BH-6	8/2/2016	Hall	9	3,128	<0.49	1.8	1.7	20	23.5	840	140	980
	8/2/2016	Hall	18	1,922	<0.49	7.3	2.4	27	36.7	1,000	120	1,120
BH-7	8/2/2016	Hall	11	3,159	<0.42	2.6	3.6	39	45.2	1,700	400	2,100
	8/2/2016	Hall	12	3,128	<0.42	9.4	8.3	94	**111.7**	2,600	350	2,950
BH-8	8/2/2016	Hall	16	3,125	<0.47	<0.94	1.3	12	13.3	560	340	900
BH-9	8/2/2016	Hall	16	2,413	<1.0	23	8.7	100	**131.7**	2,200	240	2,440
HA 1	7/5/2016	Hall	20	2,886	5.1	56	7.3	74	**142.4**	810	17	827
HA 5	7/5/2016	Hall	16	2,356	0.21	3.5	1.3	15	20.01	310	150	460
HA 5	7/5/2016	Hall	21.5	1,922	<0.10	2.4	1.0	12	15.4	260	66	326
*BH-5 @ 9.2'	11/18/2016	ESC	9.2	2,494	<0.121	<1.21	<0.121	9.2	9.2	783	137	920
*BH-5 @ 13'	11/18/2016	ESC	13	3,172	0.314	<2.45	1.28	25.9	27.494	633	54.1	687.1
*BH-6 @ 9'	11/18/2016	ESC	9	2,197	<0.0495	<0.495	<0.0495	<0.148	<0.148	51.1	17.9	69
*BH-6 @10'	11/18/2016	ESC	10	2,980	0.0218	<0.00500	0.188	0.0413	0.2511	138	9.27	147.27
*BH-6 @12.6'	11/18/2016	ESC	12.6	2,347	<0.0122	<0.122	<0.0122	<0.0368	<0.122	53.9	5.81	59.71
NMOCD Closure Criteria					**10**	**NE**	**NE**	**NE**	**50**	**NE**	**NE**	**5,000**

NOTES:

< - indicates result is less than the stated laboratory reporting limit

* - Boreholes drilled by XTO

Bold - indicates value exceeds stated NMOCD standard

BTEX - Benzene, Toluene, Ethylbenzene, Total Xylenes analyzed by EPA method 8021

DRO - diesel range organics analyzed by EPA Modified Method 8015

ESC - ESC Laboratory Sciences

GRO - gasoline range organics analyzed by EPA Modified Method 8015

Hall- Hall Environmental Analysis Laboratory

mg/kg - milligrams per kilogram

NE - Not established

NMOCD - New Mexico Oil Conservation Division

ppm - parts per million

TPH- total petroleum hydrocarbons

ATTACHMENTS

Compliance » Engineering » Remediation
LT Environmental, Inc.
848 E. 2nd Ave
Durango, Colorado 81301

BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: HA-1		Project: OH Randel #5	
Date: 6/29/2016		Project Number: 12916007	
Logged By: Josh Adams/Devin Hencmann		Drilled By: Josh Adams/Devin Hencmann	
Elevation:	Detector: Mini Rae Lite	Drilling Method: Hand Auger	Sampling Method: Hand Auger
Gravel Pack: NA		Seal: NA	Grout: NA
Casing Type: NA		Diameter: NA / Length: NA	Hole Diameter: 3-inch / Depth to Liquid:
Screen Type: NA	Slot: NA	Diameter: NA / Length: NA	Total Depth: 19.5' / Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
	dry	4187	yes		1	0-1'		SM	silty sand, 40% silt, 40% sand 10% mud brown, hc oder , HC stains 10YR7/4	
		2822	yes		2	1-2'				
		483	yes		3	2-3'				
		859	yes		4	3-4'				
		473	yes		5	4-5'				
		564	no		6	5-6'				
		273	yes		7	6-7'				
		785	yes		8	7-8'				
		999	yes		9	8-9'				
	dry	3066	yes		10	9-10'		ML	silty sand 35% silt, 40% fine sand 10% med sand, 5% course grey color, HC oder and stains seems to be historic, becoming more consolidated 10YR 7/1	
		3746	yes		11	10-11'				
		3584	yes		12	11-12'				
	dry	2655	yes		13	12-13'		SM	grey, stained, mc clay compact 10YR 6/1	
		3384	yes		14	13-14'				
	dry	3441	yes		15	14-15'		ML	transition to a silty clay	

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Boring/Well #	
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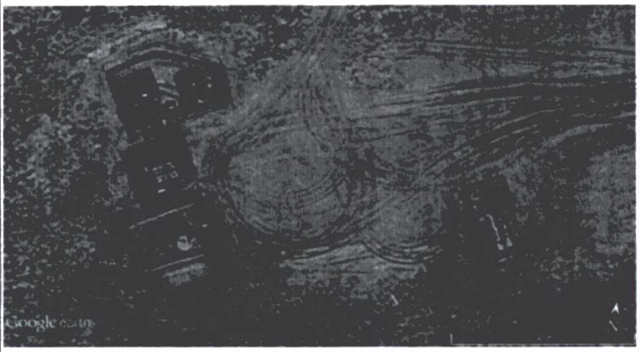
Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	dry							ML	Light brown silty clay, ml compact 10YR 7/4	
		2886	yes		16	15-16'				
		2322	yes		17	16-17'				
	dry	1977	yes		18	17-18'		ML	light brown silty sand, loose, ml 10YR 7/4	
		2886	yes		19	18-19.5'				
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30					
					31					
					32					
					33					
					34					
					35					
					36					
					37					



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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: HA-2		Project: OH Randel #5	
Date: 6/29/2016		Project Number: 12916007	
Logged By: Josh Adams/Devin Hencmann		Drilled By: Josh Adams/Devin Hencmann	
Elevation:	Detector: Mini Rae Lite	Drilling Method: Hand Auger	Sampling Method: Hand Auger
Gravel Pack: NA		Seal: NA	Grout: NA
Casing Type: NA	Diameter: NA Length: NA	Hole Diameter: 3-inch	Depth to Liquid:
Screen Type: NA Slot: NA	Diameter: NA Length: NA	Total Depth: 17.5	Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
		0	no		1	0-1'				
	dry	0	no		2	1-2'		SM	silty sand, 40% silt, 60% sand light brown 10YR7/4	
		0	no		3	2-3'				
		0	no		4	3-4'				
		0	no		5	4-5'				
	dry	0	no		6	5-6'		SM	silty sand, 40%silt, 50% clean sand, 10% lithics, light brown to pale red color, reduced 5YR 6/6	
		0	no		7	6-7'				
		0	no		8	7-8'				
	dry	0	no		9	8-9'				
		0	no		10	9-10'		SM	silty sand, 60% sand 40% silt, light grey color 10YR 7/1	
	moist	0	no		11	10-11'				
					12	11-12'				
		1.3	no		13	12-13'				
	moist	324	no		14	13-14'		SM	same lith as above, orange staining/stringers, slight HC oder 10YR 7/1 and 5YR 7/8	
		34.8	no		15	14-15'				

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Boring/Well #	
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Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	moist	3.2	no		16	15-16'		SM	same lith as above, orange staining/stringers, slight HC oder 10YR 7/1 and 5YR 7/8	
		0	no		17	16-17'				
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
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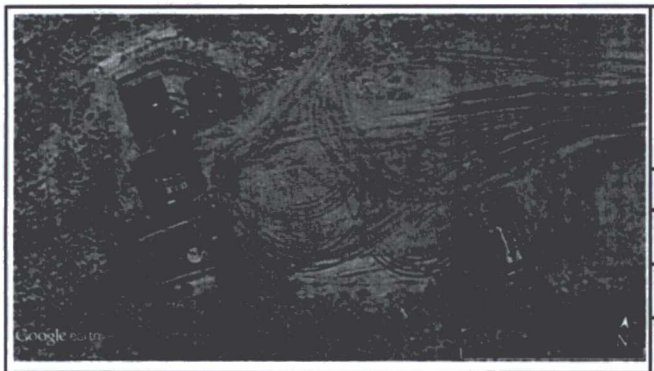
					30					
					31					
					32					
					33					
					34					
					35					
					36					
					37					



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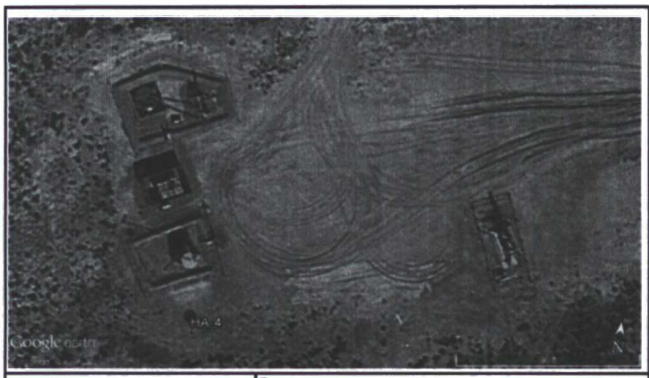
BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: HA-3	Project: OH Randel #5
Date: 6/29/2016	Project Number: 12916007
Logged By: Josh Adams/Devin Hencmann	Drilled By: Josh Adams/Devin Hencmann
Elevation:	Detector: Mini Rae Lite
Drilling Method: Hand Auger	Sampling Method: Hand Auger
Gravel Pack: NA	Seal: NA
Grout: NA	
Casing Type: NA	Diameter: NA Length: NA
Hole Diameter: 3-inch	Depth to Liquid:
Screen Type: NA	Slot: NA
Diameter: NA Length: NA	Total Depth: 10
Depth to Water:	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
		0	no		1	0-1'				
		0	no		2	1-2'				
		0	no		3	2-3'				
		0	no		4	3-4'				
	dry	0	no		5	4-5'		SM	silty sand, 40% silt, 50% clean sand 10% lithics light brown 10YR 7/4	
		0	no		6	5-6'				
		0	no		7	6-7'				
		65	no		8	7-8'				
		907	no		9	8-9'				
		3062	yes		10	9-10'				
									rock encountered, drilling advanced stopped	



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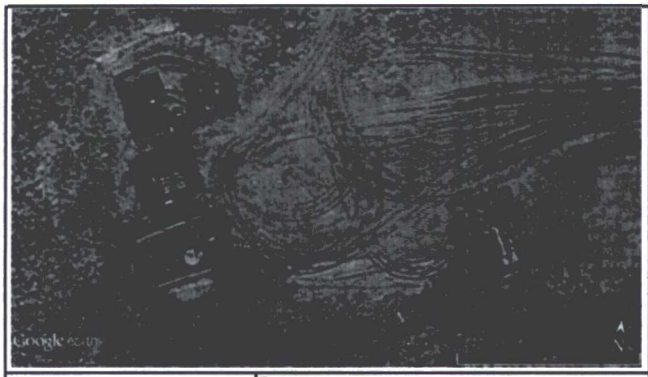
BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: HA-4	Project: OH Randel #5
Date: 6/29/2016	Project Number: 12916007
Logged By: Josh Adams/Devin Hencmann	Drilled By: Josh Adams/Devin Hencmann
Elevation:	Detector: Mini Rae Lite
Drilling Method: Hand Auger	Sampling Method: Hand Auger
Gravel Pack: NA	Seal: NA
Grout: NA	
Casing Type: NA	Diameter: NA Length: NA
Hole Diameter: 3-inch	Depth to Liquid:
Screen Type: NA Slot: NA	Diameter: NA Length: NA
Total Depth: 13	Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
	dry	0	no		1	0-1'		SM	silty sand, 40% silt, 50% clean sand 10% lithics light brown 10YR 7/4	
		0	no		2	1-2'				
		0	no		3	2-3'				
		0	no		4	3-4'				
		0	no		5	4-5'				
		0	no		6	5-6'				
		0	no		7	6-7'				
		0	no		8	7-8'				
		0	no		9	8-9'				
		0	no		10	9-10'				
	moist	0	no		11			ML	silty/clay rich sand, cohesive, light brown 10YR 7/4	
		0	no		12					
	moist	0	no		13			SM	silty sand, 40% silt, 50% clean sand 10% lithics light brown 10YR 7/4	
					14					
					15					



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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: HA-5	Project: OH Randel #5
Date: 7/5/2016	Project Number: 12916007
Logged By: Josh Adams/Alex Crooks	Drilled By: Josh Adams/Alex Crooks
Elevation:	Detector: Mini Rae Lite
Drilling Method: Hand Auger	Sampling Method: Hand Auger
Gravel Pack: NA	Seal: NA
Grout: NA	
Casing Type: NA	Diameter: NA Length: NA
Hole Diameter: 3-inch	Depth to Liquid:
Screen Type: NA Slot: NA	Diameter: NA Length: NA
Total Depth: 21.5	Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
	dry	0	no		1	0-1'		SM	silty sand with some gravel, 70% sand, 25% silt 5% gravel med-fine grained subrounded, pale red brown 2.5YR 6/8	
		0	no		2	1-2'				
	dry	0	no		3	2-3'		SM	Same as above except no gravel 70% sand 30% silt 2.5YR 6/8	
		0	no		4	3-4'				
		0	no		5	4-5'				
	dry	0	no		6	5-6'		SM	fine grained silty sand 60% sand 40% silt, subrounded, light golden tan 10YR 7/6	
		0	no		7	6-7'				
	dry	0	no		8	7-8'		SM	silty sand with clay 60% sand 30% silt 10% clay light tan grey 10YR 7/3	
		0	no		9	8-9'				
	dry	0	no		10	9-10'		SM	same lith as above, orange stainning/stringers 10YR 7/2 and 5YR7/8	
		0	no		11	10-11'				
		0	no		12	11-12'				
		164	no		13	12-13'				
	dry	427	no		14	13-14'		SM	silty sand with clay 60% sand 30% silt 10% clay very fine to fine grained sand, dark golden brown 10YR 6/8	
		2241	yes		15	14-15'				

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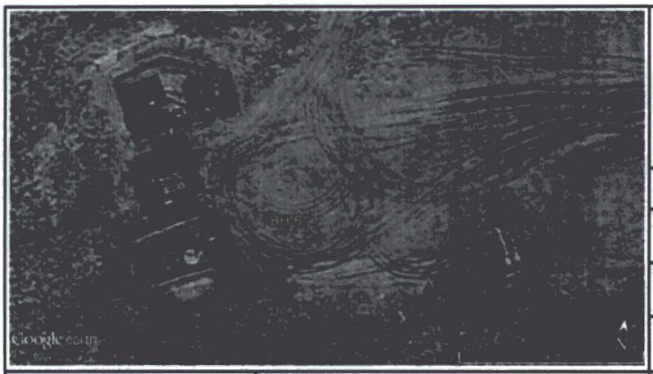
Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	dry	2356	yes		16	15-16'		ML	increase in clay content, silty sand with clay 55% sand 30% silt 15%clay, no staining	
		2017	yes		17	16-17'				
		1857	yes		18	17-18'				
		1993	yes		19	18-19'				
	dry	2168	yes		20	19-20'		SM	silty sand with clay 60% sand, 30% silt, 10% clay light tan grey 10YR7/2	
	dry	1922	yes		21	20-21.5'		SM	silty sand with gravel 55% sand 35% silt, 10% gravel well rounded, very fine to fine grainded sand light brown grey 10YR 7/2	
		1116	yes							
					22				rock encountered, drilling advance stopped	
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30					
					31					
					32					
					33					
					34					
					35					
					36					
					37					



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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH-6		Project: OH Randel #5	
Date: 8/2/2016		Project Number: 12916007	
Logged By: Josh Adams/Devin Hencmann		Drilled By: Louis Trujillo	
Elevation:	Detector: Mini Rae Lite	Drilling Method: Geo Probe	Sampling Method: Continuous
Gravel Pack: NA		Seal: NA	Grout: NA
Casing Type: NA		Diameter: NA / Length: NA	Hole Diameter: 3-inch / Depth to Liquid:
Screen Type: NA	Slot: NA	Diameter: NA / Length: NA	Total Depth: 18 / Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0			SM		
		0	no		1	0-1'				
		0	no		2	1-2'				
		0	no		3	2-3'				
	dry	0	no		4	3-4'			silty sand, 40% silt, 50% fine sand 10% lithics light brown 10YR 7/4	
		0	no		5	4-5'				
		0	no		6	5-6'				
		0	no		7	6-7'				
		1034	yes		8	7-8'				
		3128	yes		9	8-9'				
		2390	yes		10	9-10'				
	dry	3010	yes		11	10-11'			silty sand, 30% silt, 30% fine sand, 30%med sand 10% lithics light brown 10YR 7/4	
		2654	yes		12	11-12'				
		1884	yes		13	12-13'				
	dry	1927	yes		14	13-14'			silty sand 45% silt 50% fine sand 5%med sand light grey brown 10YR 7/2	
		3025	yes		15	14-15'				

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Boring/Well #	
Project:	
Project #	
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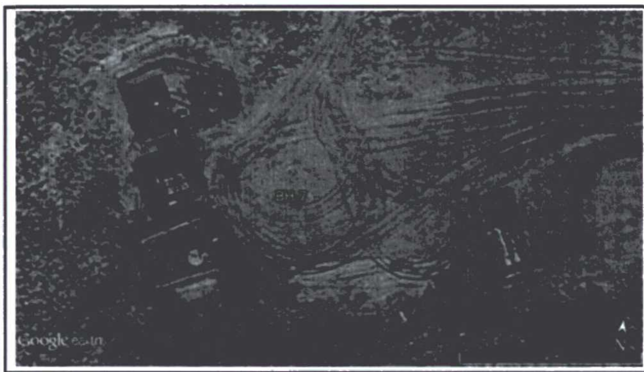
Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	dry	2390	yes		16	15-16'			silty sand 45% silt 50% fine sand 5%med sand light grey brown 10YR 7/2	
		2425	yes		17	16-17'				
		1922	yes		18	17-18'			refusal at 18'	
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
					27					
					28					
					29					
					30					
					31					
					32					
					33					
					34					
					35					
					36					
					37					



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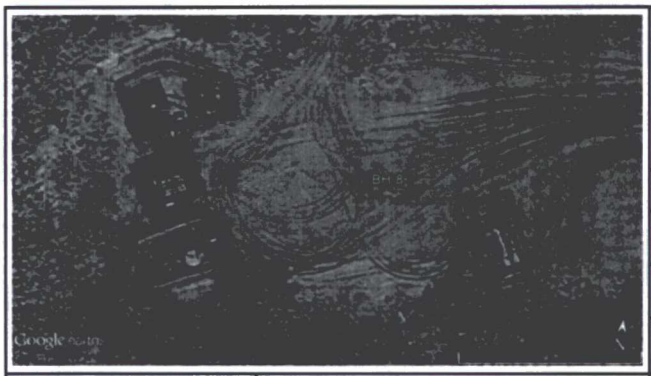
BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH-7		Project: OH Randel #5	
Date: 8/2/2016		Project Number: 12916007	
Logged By: Josh Adams/Devin Hencmann		Drilled By: Louis Trujillo	
Elevation:	Detector: Mini Rae Lite	Drilling Method: Geo probe	Sampling Method: Continuous
Gravel Pack: NA		Seal: NA	Grout: NA
Casing Type: NA	Diameter: NA Length: NA	Hole Diameter: 3-inch	Depth to Liquid:
Screen Type: NA	Slot: NA	Diameter: NA Length: NA	Total Depth: 12	Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
					1	0-1'	NR		no recovery	
					2	1-2'				
	dry	108	no		3	2-3'		SM	silty sand with gravel , 60%sand 30% silt 10% gravel light brown 10YR7/4	
		3.5	no		4	3-4'				
					5	4-5'	NR		no recovery	
					6	5-6'				
	dry	13.9	no		7	6-7'		SM	silty sand 40% silt, 30% fine sand 20% med sand minor course light brown 10YR 7/4	
		34	no		8	7-8'				
	dry				9	8-9'		SM	silty sand 30% silt 30% med sand 40% fine sand minor course, HC oder light grey brown 10YR 7/2	
		1805	yes		10	9-10'				
		3159	yes		11	10-11'				
		3128	yes		12	11-12'				
									refusal at 12'	



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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH-8		Project: OH Randel #5	
Date: 8/2/2016		Project Number: 12916007	
Logged By: Josh Adams/Devin Hencmann		Drilled By: Louis Trujillo	
Elevation:	Detector: Mini Rae Lite	Drilling Method: Geo probe	Sampling Method: Continuous
Gravel Pack: NA		Seal: NA	Grout: NA
Casing Type: NA		Diameter: NA / Length: NA	Hole Diameter: 3-inch / Depth to Liquid:
Screen Type: NA	Slot: NA	Diameter: NA / Length: NA	Total Depth: 16 / Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
					1	0-1'	N R		no recovery	
					2	1-2'				
		0	no		3	2-3'				
	dry	3	no		4	3-4'		SM	silty sand with surface gravel light brown 10YR 7/4	
					5	4-5'	NR		no recovery	
					6	5-6'				
		5.3	no		7	6-7'				
	dry	1.5	no		8	7-8'		SM	silty sand 60% sand 40% silt light brown 10YR 7/4	
		2	no		9	8-9'				
		2.2	no		10	9-10'				
		468	no		11	10-11'				
		772	no		12	11-12'				
	moist				13	12-13'		ML	silty sand with clay 50% sand 40% silt 10% clay, light grey brown 10YR 7/2	
		88	no		14	13-14'				
					15	14-15'				

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Boring/Well #	
Project:	
Project #	
Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	moist							ML	silty sand with clay 50% sand 40% silt 10% clay	
		3125	yes		16	15-16'			, light grey brown 10YR 7/2	
									refusal at 16'	
					17					
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
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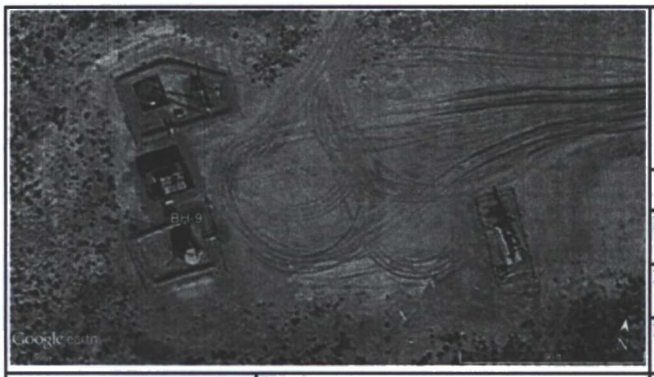

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH-9			Project: OH Randel #5
Date: 8/2/2016			Project Number: 12916007
Logged By: Josh Adams/Devin Hencmann			Drilled By: Louis Trujillo
Elevation:	Detector: Mini Rae Lite	Drilling Method: Geo probe	Sampling Method: Continuous
Gravel Pack: NA		Seal: NA	Grout: NA
Casing Type: NA		Diameter: NA / Length: NA	Hole Diameter: 3-inch / Depth to Liquid:
Screen Type: NA	Slot: NA	Diameter: NA / Length: NA	Total Depth: 16 / Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
					1	0-1'	N R		no recovery	
					2	1-2'				
					3	2-3'				
	dry	0	no		4	3-4'		SM	silty sand with surface gravel light brown 10YR 7/4	
		0	no		5	4-5'				
		0	no		6	5-6'				
		0.4	no		7	6-7'				
	dry	0.6	no		8	7-8'		SM	silty sand 40% silt 40% fine sand 20% med sand light brown 10YR7/4	
		0	no		9	8-9'				
		3.7	no		10	9-10'				
		13.5	no		11	10-11'				
		776	yes		12	11-12'				
		1927	yes		13	12-13'				
	dry	2355	yes		14	13-14'		SM	silty sand 50% med sand 20% fine sand 30% silt light grey 10YR7/2 hc oder and staining	
		2114	yes		15	14-15'				

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Boring/Well #	
Project:	
Project #	
Date	

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					15					
	dry							SM	silty sand 50% med sand 20% fine sand 30%	
		2413	yes		16	15-16'			silt light grey 10YR7/2 hc oder and staining	
									refusal at 16'	
					17					
					18					
					19					
					20					
					21					
					22					
					23					
					24					
					25					
					26					
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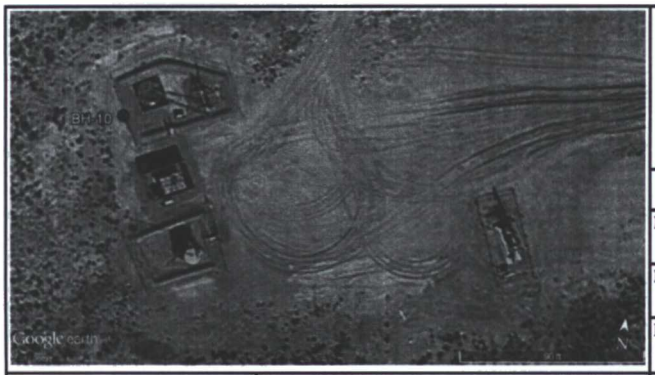

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BORING LOG/MONITORING WELL COMPLETION DIAGRAM

Boring/Well Number: BH-10			Project: OH Randel #5
Date: 8/2/2016			Project Number: 12916007
Logged By: Josh Adams/Devin Hencmann			Drilled By: Louis Trujillo
Elevation:	Detector: Mini Rae Lite	Drilling Method: Geo Probe	Sampling Method: Continuous
Gravel Pack: NA		Seal: NA	Grout: NA
Casing Type: NA		Diameter: NA / Length: NA	Hole Diameter: 3-inch / Depth to Liquid:
Screen Type: NA	Slot: NA	Diameter: NA / Length: NA	Total Depth: 12 / Depth to Water:

Penetration Resistance	Moisture Content	Vapor (ppm)	Staining	Sample #	Depth (ft. bgs.)	Sample Run	Recovery	Soil/Rock Type	Lithology/Remarks	Well Completion
					0					
		0	no		1	0-1'				
		0	no		2	1-2'				
		0	no		3	2-3'				
	dry	0	no		4	3-4'		SM	silty sand, 40% silt, 50% clean sand 10% surface gravel light brown 10YR 7/4	
		0	no		5	4-5'				
		0	no		6	5-6'				
		0	no		7	6-7'				
		0	no		8	7-8'				
		0	no		9	8-9'				
	dry	0	no		10	9-10'		ML	silty sand with clay 50% sand 40% silt 10% clay cohesive, light grey 10YR7/2	
		0	no		11	10-11'				
		0	no		12	11-12'				
									refusal at 12'	