3R – 386

2012 AGWMR

JAN 2013

2012 ANNUAL GROUNDWATER REPORT

OH Randel #007

3RP-386

Unit D, Section 15, Township 26N, Range 11W
San Juan County, New Mexico

PREPARED FOR:

Mr. Steve Austin
Navajo Nation Environmental Protection Agency
Post Office Box 1999
Shiprock, New Mexico 87420

January 2013

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2012 XTO GROUNDWATER REPORT

OH RANDEL #007
3RP-386

SITE DETAILS

LEGALS – TWN: 26N	**RNG**: 11W	**SEC**: 15	**UNIT**: D
OCD HAZARD RANKING: 20		**LAND TYPE**: NAVAJO	
LATITUDE: 36.49194		**LONGITUDE**: -107.99572	

INTRODUCTION

XTO Energy, Inc. (XTO) acquired the OH Randel #007 natural gas production well (Site) from Amoco Production Company (Amoco) in January of 1998. The Site produces natural gas from the Dakota Sandstone and is currently active. An irrigated field owned and operated by Navajo Agricultural Products, Inc. is located immediately north of the Site. A topographic map is depicted in ***Figure 1***.

HISTORY

While upgrading equipment in March of 2002, XTO encountered petroleum hydrocarbon impacted soil assumed to be the result of an abandoned earthen separator pit. A *Pit Closure Report* is included as ***Attachment 1*** documenting subsequent soil sampling and installation of groundwater monitoring well MW-1 to investigate potential impact to groundwater. The Completion Diagram and Borehole Log are included as ***Attachment 2***. Groundwater was encountered at approximately 16 feet below ground surface (bgs) and phase-separated hydrocarbons (PSH) were detected. Additional monitoring wells MW-2, MW-3, MW-4, MW-5, and MW-6 were installed near upgradient, downgradient, and cross-gradient of the source area in April of 2002. Completion Diagrams and Borehole Logs are included in ***Attachment 2***.

From 2002 through 2004, PSH was regularly detected in monitoring wells MW-1 and MW-2, and PSH was detected in monitoring well MW-6 from 2002 through 2006. XTO recovered approximately 22 gallons of PSH by hand bailing monitoring wells MW-1, MW-2, and MW-6 from 2004 through January of 2006.

XTO submitted the 2005 annual groundwater report to the New Mexico Oil Conservation Division (OCD) in January of 2006 and proposed excavation of soil impacted by the former separator pit and installation of additional groundwater monitoring wells to further delineate petroleum hydrocarbon impact to groundwater. Additionally, XTO submitted a remediation work plan to Mr. Steve Austin of the Navajo Nation Environmental Protection Agency (NNEPA) and the United States Environmental Protection Agency Region 9 (Region 9) in August of 2006. A copy of the work plan, written by Lodestar Services, Inc. (Lodestar) is included as ***Attachment 3***. The work plan was approved by the NNEPA in October of 2006. The first phase of the work plan, which was completed in November of 2006, included

excavation of the earthen separator pit to a depth beneath the water table and backfilling with clean soil. Approximately 9,000 cubic yards of petroleum hydrocarbon impacted soil were removed and transported offsite to an OCD-permitted landfarm. No PSH was observed on the water table during the excavation. Monitoring wells MW-1, MW-2, and MW-6 were removed during the excavation. The NNEPA and Region 9 approved the closure of the excavation as described in the *Report of Excavation and Sampling* by Lodestar dated January 29, 2007 and attached as ***Attachment 4***. Following excavation, groundwater sampled from monitoring wells MW-3, MW-4, and MW-5 contained no detectable concentrations or only trace concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX).

XTO submitted the 2006 annual groundwater report to the OCD in February of 2007 proposing installation of additional groundwater monitoring wells (MW-7 and MW-8) to the north and east of the former source area and quarterly sampling of monitoring wells MW-7 and MW-8 to monitor BTEX concentrations. Monitoring wells MW-7 and MW-8 were installed in May of 2007. Completion Diagrams and Borehole Logs are presented in ***Attachment 2***. Groundwater sampling indicated MW-7 contained BTEX exceeding New Mexico Water Quality Control Commission (WQCC) standards. Downgradient well MW-8 did not contain detectable concentrations of BTEX. XTO proposed to evaluate additional potential sources of groundwater impact in the area of MW-7 and screen appropriate remediation methods.

XTO submitted the 2007 annual groundwater report to the OCD in February of 2008 proposing to discontinue sampling of monitoring wells MW-3, MW-4, and MW-5 and semi-annual sampling of monitoring wells MW-7 and MW-8.

XTO submitted the 2008 annual groundwater report to the OCD in April of 2009 proposing installation of two additional monitoring wells (MW-9 and MW-10) to delineate impacted groundwater near existing monitoring well MW-7. Additionally, XTO proposed addition of chemical oxygenate to monitoring well MW-7 to enhance bioremediation and quarterly sampling of monitoring wells. Monitoring wells MW-9 and MW-10 were installed in July of 2009. The water bearing unit supplying the existing groundwater monitoring wells was observed to be mostly dry. The existing monitoring wells were completed in a low hydraulically conducting clay. Monitoring wells MW-9 and MW-10 were completed in the same clay bed at similar depths to existing monitoring wells even though no saturated sediments were identified in soil samples. XTO did not attempt to penetrate the clay in an effort to avoid creating an open conduit to deeper aquifers. After allowing 24 hours for the new wells to fill in with groundwater, monitoring well MW-9 contained only 1.5 feet of groundwater and did not recharge after being purged dry. Monitoring well MW-10 never filled with groundwater and was ultimately plugged. The Completion Diagrams and Borehole Logs for monitoring wells MW-9 and MW-10 are included in ***Attachment 2***. Monitoring well MW-9 was sampled after well development and contained benzene exceeding WQCC standards.

2012 XTO GROUNDWATER REPORT

XTO submitted the 2009 annual groundwater report to Mr. Glenn Von Gonten with the OCD in March of 2010 recommending continued use of chemical oxygenate in monitoring well MW-7 and quarterly sampling of monitoring wells MW-7 and MW-9. XTO proposed to discontinue sampling of monitoring well MW-8 since four consecutive sampling events indicated BTEX concentrations were below WQCC standards.

XTO submitted the 2010 annual groundwater report to Mr. Glenn Von Gonten with the OCD and Mr. Steve Austin with NNEPA in March of 2011 recommending continued quarterly sampling of groundwater for BTEX constituents in monitoring well MW-7. Laboratory analytical results from four consecutive quarters of groundwater sampling from MW-9 indicated BTEX concentrations were below WQCC standards; therefore, XTO recommended discontinued sampling of monitoring well MW-9. Additionally, XTO proposed application of hydrogen peroxide to the groundwater at the Site using monitoring well MW-7 as an as an injection point to oxygenate the aquifer and enhance bioremediation at the Site. XTO met with Mr. Glenn Von Gonten at the OCD offices in October 2011 to present a brief history of the Site and the hydrogen peroxide work plan in person. OCD did not provide comments for the hydrogen peroxide work plan and XTO did not proceed with the action.

XTO submitted the 2011 annual report to Mr. Glenn Von Gonten with the OCD and Mr. Steve Austin with the NNEPA in January of 2012. The report included an analysis by LT Environmental, Inc. (LTE) of the beneficial use of groundwater at the Site. The analysis concluded the groundwater is not a current source of beneficial use and based on the poor background water quality of the aquifer, legal restrictions on its source for uses other than irrigation, and low productivity, the aquifer is not a viable source for any beneficial use in the future. Attenuation of residual BTEX in groundwater at the Site will continue through natural processes and migration of any BTEX will be restricted by the subsurface lithology and hydrologic properties of the aquifer. As such, XTO requested Site closure from the NNEPA and OCD based on the lack of present and reasonably foreseeable beneficial use of the impacted groundwater. Following NNEPA and OCD approval for closure, XTO planned to abandon all monitoring well locations in accordance with the monitoring well abandonment plan.

A summary of water level data and laboratory analytical results from historical groundwater monitoring is presented in ***Table 1*** and ***Table 2***.

METHODOLOGY

XTO was awaiting approval or comments from the NNEPA or OCD regarding the closure request and did not conduct monitoring at the Site during 2012.

CONCLUSIONS

Laboratory results from groundwater monitoring in 2011 indicate that benzene concentrations in monitoring well MW-7 exceed WQCC standards; however, toluene, ethylbenzene, and total xylenes concentrations were below the WQCC standards for three of the past four monitoring events. Historical sampling results indicate BTEX concentrations

in monitoring well MW-7 are declining steadily. Based on historical sampling results and the shallow groundwater gradient, elevated benzene concentrations appear confined to a small area surrounding monitoring well MW-7 and are not likely to migrate off site.

RECOMMENDATIONS

XTO proposes to install oxygen release compound (ORC) socks in groundwater monitoring well MW-7 to provide a consistent source of oxygen and enhance biodegradation of the groundwater and conduct semi-annual groundwater monitoring consisting of collection of depth to groundwater data from all wells and sampling groundwater monitoring well MW-7 for BTEX. Following NNEPA and OCD approval for closure, all monitoring well locations will be abandoned in accordance with the monitoring well abandonment plan.

TABLE 1
WATER LEVEL SUMMARY TABLE

TABLE 1

GROUNDWATER ELEVATION SUMMARY
O H RANDEL #007
XTO ENERGY, INC.

Well ID	Date	Depth to Product (feet BTOC)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-1	4/22/2002	16.30	16.63	No Survey Data
MW-1	4/24/2002	NM	NM	No Survey Data
MW-1	8/27/2002	16.19	16.49	No Survey Data
MW-1	10/08/2002	15.79	16.16	No Survey Data
MW-1	5/23/2003	15.73	16.04	No Survey Data
MW-1	5/28/2003	15.81	15.99	No Survey Data
MW-1	6/6/2003	15.93	16.04	No Survey Data
MW-1	6/18/2003	15.97	16.04	No Survey Data
MW-1	6/26/2003	17.85	17.93	No Survey Data
MW-1	7/31/2003	16.18	16.19	No Survey Data
MW-1	8/29/2003	NM	16.29	No Survey Data
MW-1	6/21/2004	16.28	17.09	No Survey Data
MW-1	9/20/2006	0.00	22.28	No Survey Data
MW-1	12/5/2006 *	NM	NM	No Survey Data
MW-2	4/22/2002	NM	18.32	No Survey Data
MW-2	4/24/2002	18.35	18.38	No Survey Data
MW-2	8/27/2002	18.92	19.86	No Survey Data
MW-2	10/08/2002	17.50	18.02	No Survey Data
MW-2	5/23/2003	17.30	17.83	No Survey Data
MW-2	5/28/2003	17.62	17.78	No Survey Data
MW-2	6/6/2003	17.71	17.83	No Survey Data
MW-2	6/18/2003	17.79	17.88	No Survey Data
MW-2	6/26/2003	16.05	16.09	No Survey Data
MW-2	7/31/2003	NM	15.86	No Survey Data
MW-2	8/29/2003	NM	15.99	No Survey Data
MW-2	6/21/2004	16.10	16.83	No Survey Data
MW-2	9/20/2006	0.00	17.15	No Survey Data
MW-2	12/5/2006 *	NM	NM	No Survey Data
MW-3	4/22/2002	0.00	16.26	6312.95
MW-3	4/24/2002	0.00	16.25	6312.96
MW-3	8/27/2002	0.00	15.28	6313.93

TABLE 1

GROUNDWATER ELEVATION SUMMARY
O H RANDEL #007
XTO ENERGY, INC.

Well ID	Date	Depth to Product (feet BTOC)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-3	10/8/2002	0.00	14.74	6314.47
MW-3	3/3/2003	0.00	15.17	6314.04
MW-3	6/18/2003	0.00	15.16	6314.05
MW-3	8/29/2003	0.00	15.39	6313.82
MW-3	9/20/2006	NM	NM	NM
MW-3	12/5/2006	0.00	13.85	6315.36
MW-3	3/8/2007	0.00	13.40	6315.81
MW-3	5/17/2007	0.00	12.87	6316.34
MW-3	8/9/2007	0.00	12.37	6316.84
MW-3	5/12/2008	0.00	14.83	6314.38
MW-3	11/7/2008	0.00	13.92	6315.29
MW-3	7/8/2009	0.00	14.14	6315.07
MW-3	11/5/2009	0.00	14.53	6314.68
MW-3	5/25/2010	0.00	14.21	6315.00
MW-3	8/12/2010	0.00	NM	NM
MW-3	11/17/2010	0.00	15.30	6313.91
MW-3	2/14/2011	NM	NM	NM
MW-3	5/17/2011	0.00	15.74	6313.47
MW-3	8/9/2011	0.00	15.87	6313.34
MW-3	11/9/2011	0.00	16.21	6313.00
MW-4	4/22/2002	0.00	16.63	6311.45
MW-4	4/24/2002	0.00	16.66	6311.42
MW-4	8/27/2002	0.00	16.47	6311.61
MW-4	10/8/2002	0.00	16.03	6312.05
MW-4	3/3/2003	0.00	15.94	6312.14
MW-4	6/18/2003	0.00	16.03	6312.05
MW-4	8/29/2003	0.00	16.29	6311.79
MW-4	9/20/2006	NM	NM	NM
MW-4	12/5/2006	0.00	13.75	6314.33
MW-4	3/8/2007	0.00	12.55	6315.53
MW-4	5/17/2007	0.00	13.03	6315.05
MW-4	8/9/2007	0.00	12.59	6315.49

TABLE 1

GROUNDWATER ELEVATION SUMMARY
O H RANDEL #007
XTO ENERGY, INC.

Well ID	Date	Depth to Product (feet BTOC)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-4	5/12/2008	0.00	12.57	6315.51
MW-4	11/7/2008	0.00	13.68	6314.40
MW-4	7/8/2009	0.00	13.72	6314.36
MW-4	11/5/2009	0.00	14.12	6313.96
MW-4	5/25/2010	0.00	13.86	6314.22
MW-4	8/12/2010	0.00	14.39	6313.69
MW-4	11/17/2010	0.00	14.60	6313.48
MW-4	2/14/2011	0.00	15.55	6312.53
MW-4	5/17/2011	0.00	14.95	6313.13
MW-4	8/9/2011	0.00	15.11	6312.97
MW-4	11/9/2011	0.00	15.38	6312.70
MW-5	4/22/2002	0.00	19.11	6314.12
MW-5	4/24/2002	0.00	19.14	6314.09
MW-5	8/10/2002	0.00	19.10	6314.13
MW-5	6/18/2003	0.00	18.86	6314.37
MW-5	6/21/2004	0.00	19.64	6313.59
MW-5	6/28/2005	0.00	17.30	6315.93
MW-5	9/20/2006	NM	NM	NM
MW-5	12/5/2006	0.00	18.65	6314.58
MW-5	3/8/2007	0.00	18.15	6315.08
MW-5	5/17/2007	0.00	17.78	6315.45
MW-5	8/9/2007	0.00	NM	NM
MW-5	5/12/2008	0.00	18.82	6314.41
MW-5	11/7/2008	0.00	18.90	6314.33
MW-5	7/8/2009	0.00	20.08	6313.15
MW-5	11/5/2009	0.00	20.44	6312.79
MW-5	5/25/2010	0.00	20.33	6312.90
MW-5	8/12/2010	0.00	20.51	6312.72
MW-5	11/17/2010	0.00	20.93	6312.30
MW-5	2/14/2011	0.00	20.97	6312.26
MW-5	5/17/2011	0.00	21.20	6312.03
MW-5	8/9/2011	0.00	21.47	6311.76

TABLE 1

GROUNDWATER ELEVATION SUMMARY
O H RANDEL #007
XTO ENERGY, INC.

Well ID	Date	Depth to Product (feet BTOC)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-5	11/9/2011	0.00	21.69	6311.54
MW-6	4/22/2002	0.00	18.31	No Survey Data
MW-6	4/24/2002	0.00	18.32	No Survey Data
MW-6	8/27/2002	NM	NM	No Survey Data
MW-6	10/8/2002	16.84	18.13	No Survey Data
MW-6	5/23/2003	16.62	17.95	No Survey Data
MW-6	5/28/2003	16.68	17.90	No Survey Data
MW-6	6/6/2003	16.80	18.00	No Survey Data
MW-6	6/18/2003	16.78	18.02	No Survey Data
MW-6	6/26/2003	16.88	18.10	No Survey Data
MW-6	7/31/2003	17.77	19.13	No Survey Data
MW-6	8/29/2003	16.88	18.34	No Survey Data
MW-6	6/21/2004	17.78	18.95	No Survey Data
MW-6	9/20/2006	15.79	16.87	No Survey Data
MW-6	12/5/2006 *	NM	NM	No Survey Data
MW-7	5/17/2007	0.00	15.46	6315.90
MW-7	8/9/2007	0.00	14.72	6316.64
MW-7	11/27/2007	0.00	14.91	6316.45
MW-7	5/12/2008	0.00	15.12	6316.24
MW-7	11/7/2008	0.00	15.82	6315.54
MW-7	7/8/2009	0.00	16.44	6314.92
MW-7	11/5/2009	0.00	16.76	6314.60
MW-7	5/25/2010	0.00	16.63	6314.73
MW-7	8/12/2010	0.00	16.82	6314.54
MW-7	11/17/2010	0.00	17.65	6313.71
MW-7	2/14/2011	0.00	17.74	6313.62
MW-7	5/17/2011	0.00	17.92	6313.44
MW-7	8/9/2011	0.00	18.11	6313.25
MW-7	11/9/2011	0.00	18.46	6312.90
MW-8	5/17/2007	0.00	19.64	6314.86

TABLE 1

GROUNDWATER ELEVATION SUMMARY
O H RANDEL #007
XTO ENERGY, INC.

Well ID	Date	Depth to Product (feet BTOC)	Depth to Water (feet BTOC)	Groundwater Elevation (feet AMSL)
MW-8	8/9/2007	0.00	18.94	6315.56
MW-8	11/27/2007	0.00	19.20	6315.30
MW-8	5/12/2008	0.00	19.97	6314.53
MW-8	11/7/2008	0.00	19.55	6314.95
MW-8	7/8/2009	0.00	20.01	6314.49
MW-8	11/5/2009	0.00	20.41	6314.09
MW-8	5/25/2010	0.00	20.31	6314.19
MW-8	8/12/2010	0.00	20.41	6314.09
MW-8	11/17/2010	0.00	20.63	6313.87
MW-8	2/14/2011	0.00	20.35	6314.15
MW-8	5/17/2011	0.00	20.30	6314.20
MW-8	8/9/2011	0.00	20.83	6313.67
MW-8	11/9/2011	0.00	21.00	6313.50
MW-9	7/8/2009	0.00	35.26	6295.10
MW-9	11/5/2009	0.00	33.08	6297.28
MW-9	5/25/2010	0.00	29.28	6301.08
MW-9	8/12/2010	0.00	31.12	6299.24
MW-9	5/25/2010	0.00	20.31	6310.05
MW-9	8/12/2010	0.00	20.41	6309.95
MW-9	11/17/2010	0.00	30.49	6299.87
MW-9	2/14/2011	0.00	31.60	6298.76
MW-9	5/17/2011	0.00	30.39	6299.97
MW-9	8/9/2011	0.00	29.84	6300.52
MW-9	11/9/2011	0.00	28.76	6301.60

Notes:

BTOC - Below Top of Casing

NM - Not Measured

AMSL - Above Mean Sea Level

* - Well was destroyed

TABLE 2
GROUNDWATER RESULTS SUMMARY TABLE

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
O H RANDEL #007
XTO ENERGY, INC.

Well ID	Date	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)
NMWQCC Groundwater Standard		**10 ug/L**	**750 ug/L**	**750 ug/L**	**620 ug/L**
MW-3	4/24/2002	24	2.4	0.58	200
MW-3	8/27/2002	9.4	ND	ND	150
MW-3	10/8/2002	NA	NA	NA	NA
MW-3	3/3/2003	5.5	ND	ND	43
MW-3	6/18/2003	6.1	0.97	ND	43
MW-3	8/29/2003	3.2	0.53	ND	24
MW-3	12/5/2006	<1	<1	<1	<3
MW-3	5/17/2007	<1	<1	<1	<2
MW-3	8/9/2007	<1	<1	<1	<2
MW-4	4/24/2002	ND	0.59	ND	2.1
MW-4	8/27/2002	1.3	ND	ND	3.5
MW-4	3/3/2003	4.2	ND	ND	5
MW-4	6/18/2003	6.2	ND	ND	4.5
MW-4	8/29/2003	8.3	ND	ND	4.3
MW-4	12/5/2006	<1	<1	<1	<3
MW-4	5/17/2007	<1	<1	<1	<2
MW-4	8/9/2007	<1	<1	<1	<2
MW-5	4/24/2002	**510**	0.64	8.9	240.0
MW-5	8/10/2002	NA	NA	NA	NA
MW-5	6/18/2003	**1,100**	20	ND	**660.0**
MW-5	6/21/2004	**2,000**	ND	ND	260.0
MW-5	6/28/2005	**1,100**	15	ND	160.0
MW-5	12/5/2006	**37**	<1	<1	4.1
MW-5	5/17/2007	<1	<1	<1	<2
MW-6	4/24/2002	**6,100**	**4,800**	**920**	**6,600**
MW-7	5/17/2007	**8,500**	**17,000**	**980**	**16,000**
MW-7	8/9/2007	**9,800**	**11,000**	**770**	**12,000**
MW-7	11/27/2007	**12,000**	**9,000**	**940**	**13,000**
MW-7	5/12/2008	**7,900**	**11,000**	**830**	**12,000**
MW-7	11/7/2008	**12,000**	**16,000**	**1,100**	**17,000**

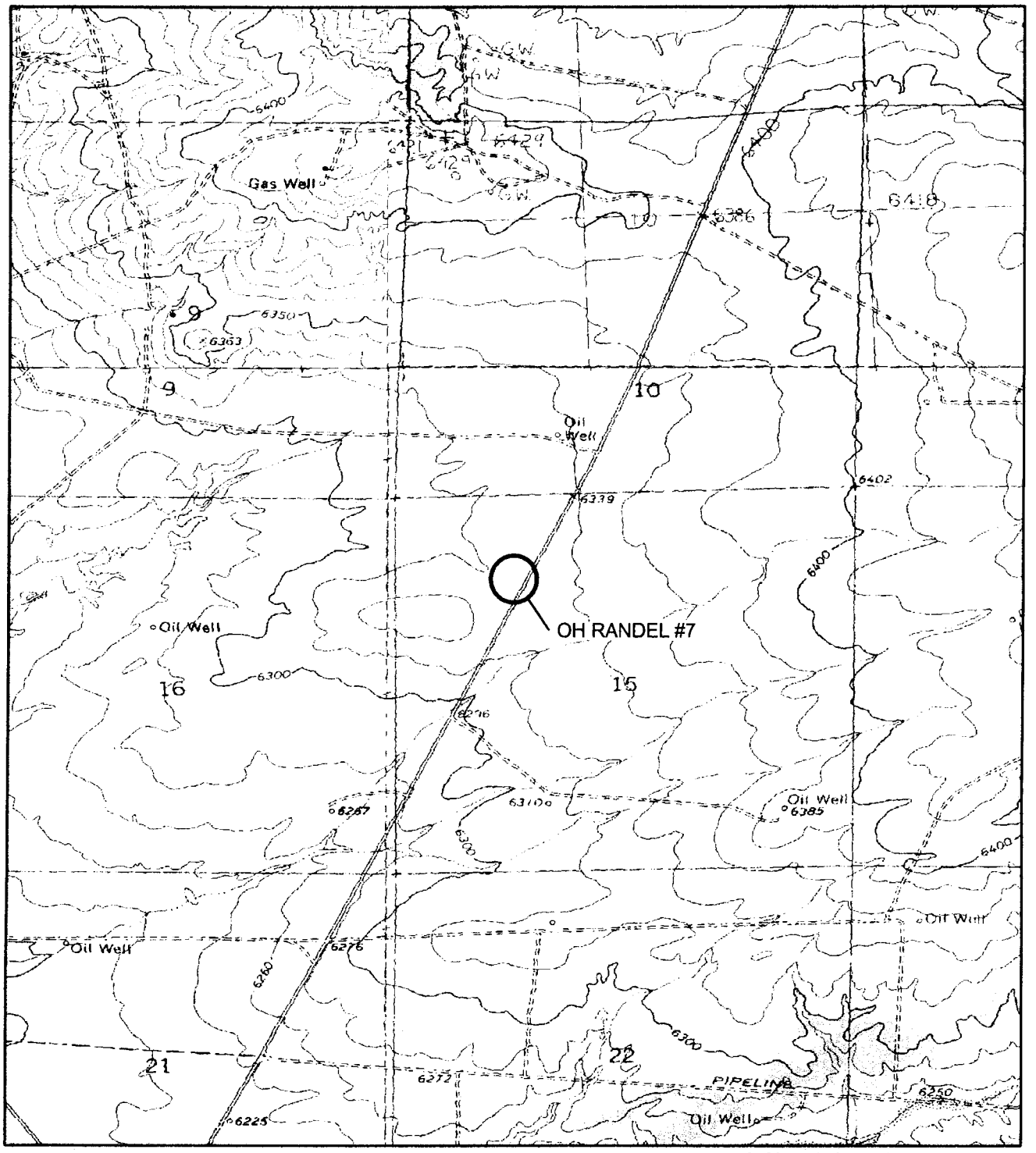
TABLE 2

GROUNDWATER ANALYTICAL RESULTS
O H RANDEL #007
XTO ENERGY, INC.

Well ID	Date	Benzene (ug/L)	Toluene (ug/L)	Ethylbenzene (ug/L)	Total Xylenes (ug/L)
NMWQCC Groundwater Standard		**10 ug/L**	**750 ug/L**	**750 ug/L**	**620 ug/L**
MW-7	7/8/2009	**9,800**	**8,200**	<100	**12,000**
MW-7	11/5/2009	**9,800**	**7,900**	570	**13,000**
MW-7	5/25/2010	**7,200**	**3,800**	440	**11,000**
MW-7	8/12/2010	**82**	58	9.2	200
MW-7	11/17/2010	**5,200**	**5,500**	76.0	**3,400**
MW-7	2/14/2011	**2,200**	**1,000**	<120	**1,800**
MW-7	5/17/2011	**500**	190	16	180
MW-7	8/9/2011	**81.3**	36.9	5.3	39.4
MW-7	11/9/2011	**26**	16	2.3	20
MW-8	5/17/2007	<1.0	1.9	<1.0	3.7
MW-8	8/9/2007	<1.0	<1.0	<1.0	<2.0
MW-8	11/27/2007	**21.0**	<1.0	<1.0	<2.0
MW-8	5/12/2008	1.4	<1.0	<1.0	<2.0
MW-8	11/7/2008	1.2	<1.0	<1.0	<2.0
MW-8	7/8/2009	<1.0	<1.0	<1.0	<2.0
MW-8	11/5/2009	1.1	<1.0	<1.0	<2.0
MW-9	7/8/2009	**91**	160	6.9	100
MW-9	11/30/2009	<1	<1	<1	<2
MW-9	5/25/2010	<1.0	<1.0	<1.0	<2.0
MW-9	8/12/2010	<0.5	<5.0	<0.5	<1.5
MW-9	11/17/2010	2.4	<5.0	<0.5	<1.5

Notes:
ug/l - micrograms per liter
< indicates result is less than the stated laboratory method detection limit
NMWQCC - New Mexico Water Quality Control Commission
NS - Not Sampled
* - Well was Destroyed
BOLD indicates the result exceeds the NMWQCC Standard
Benzene, toluene, ethylbenzene, and total xylenes analyzed by EPA Method 8021B

FIGURE 1
TOPOGRAPHIC MAP



LEGEND

SITE LOCATION

IMAGE COURTESY OF USDA/NRCS, VARIOUS DATES

0 2,000 4,000

Feet

N

FIGURE 1
SITE LOCATION MAP
OH RANDEL #7
NWNW SEC 15 T26N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\XTO1002\XTO1002_OH_RANDEL_FIG01_SL.mxd

ATTACHMENT 1
BLAGG ENGINEERING, INC. PIT CLOSURE REPORT (2002)

3004524749 36.49193/107.99632

CLIENT: XTO	BLAGG ENGINEERING, INC. P.O. BOX 87, BLOOMFIELD, NM 87413 (505) 632-1199	LOCATION NO: _____ C.O.C NO: 7796

FIELD REPORT: PIT CLOSURE VERIFICATION

PAGE No: 1 of 1

LOCATION: NAME: O.H. RANDEL WELL #: 7 TYPE: ABAN. SEP.
QUAD/UNIT: D SEC: 15 TWP: 26N RNG: 11W PM: NM CNTY: SJ ST: NM
QTR/FOOTAGE: 1150'N/1150'W NW/NW CONTRACTOR:

DATE STARTED: 3/12/02
DATE FINISHED: _____
ENVIRONMENTAL SPECIALIST: NV

EXCAVATION APPROX. NA FT. x NA FT. x NA FT. DEEP CUBIC YARDAGE: NA
DISPOSAL FACILITY: ON-SITE REMEDIATION METHOD: _____
LAND USE: RANGE - DUNE LEASE: _____ FORMATION: DK

FIELD NOTES & REMARKS: PIT LOCATED APPROXIMATELY 239 FT. S75E FROM WELLHEAD
DEPTH TO GROUNDWATER: >100' NEAREST WATER SOURCE: >1000' NEAREST SURFACE WATER: >1000'
NMOCD RANKING SCORE: 0 NMOCD TPH CLOSURE STD: 5000 PPM

OVM CALIB. READ. 52.7 ppm
OVM CALIB. GAS = 100 ppm RF = 1.52
TIME: 11:48 (am)/pm DATE 3/12/02

SOIL AND EXCAVATION DESCRIPTION:

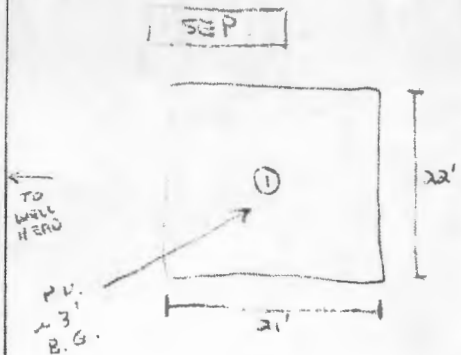
SOIL TYPE: (SAND) / SILTY SAND / SILT / SILTY CLAY / CLAY / GRAVEL / OTHER _____
SOIL COLOR: MED. GRAY
COHESION (ALL OTHERS): (NON COHESIVE) / SLIGHTLY COHESIVE / COHESIVE / HIGHLY COHESIVE
CONSISTENCY (NON COHESIVE SOILS): (LOOSE) / (FIRM) / DENSE / VERY DENSE
~~PLASTICITY (CLAYS)~~: NON PLASTIC / SLIGHTLY PLASTIC / COHESIVE / MEDIUM PLASTIC / HIGHLY PLASTIC
~~DENSITY (COHESIVE CLAYS & SILTS)~~: SOFT / FIRM / STIFF / VERY STIFF / HARD
MOISTURE: DRY / SLIGHTLY MOIST / (MOIST) / WET / SATURATED / SUPER SATURATED
DISCOLORATION/STAINING OBSERVED: (YES) / NO EXPLANATION - WET. 4-6' BELOW GRADE
HC ODOR DETECTED: (YES) / NO EXPLANATION - MED. GRAY SAND (STRONG)
SAMPLE TYPE: (GRAB) / COMPOSITE - # OF PTS. -
ADDITIONAL COMMENTS: CONDUCTED SAMPLING WITH HAND SHOVEL.

FIELD 418.1 CALCULATIONS

SAMP. TIME	SAMPLE I.D.	LAB No:	WEIGHT (g)	mL. FREON	DILUTION	READING	CALC. ppm

SCALE 0 FT

PIT PERIMETER



PIT PROFILE

OVM RESULTS

SAMPLE ID	FIELD HEADSPACE PID (ppm)
1 @ 6'	1,315
2 @	
3 @	
4 @	
5 @	

LAB SAMPLES

SAMPLE ID	ANALYSIS	TIME
①@6'	TPH (8015B)	1137
"	BTEX (8021B)	"

P.D = PIT DEPRESSION; B.G. = BELOW GRADE
T.H. = TEST HOLE; ~ = APPROX.; B = BELOW

TRAVEL NOTES: CALLOUT: 3/12/02 - MORN. ONSITE: 3/12/02 - MORN.

revised: 02/27/02 bei1005C.skd

ATTACHMENT 2
COMPLETION DIAGRAMS AND BOREHOLE LOGS

FIGURE 8

BLAGG ENGINEERING, INC.

P.O. BOX 87

BLOOMFIELD, NM 87413

(505) 632-1199

BORE / TEST HOLE REPORT

BORING #.....	BH - 1
MW #.....	1
PAGE #.....	1
DATE STARTED	3/22/02
DATE FINISHED	3/22/02
OPERATOR.....	JCB
PREPARED BY	NJV

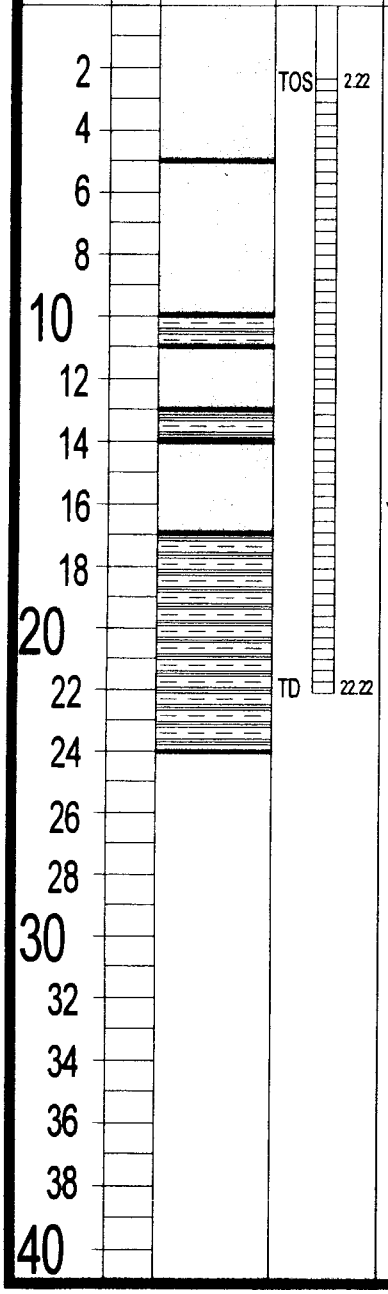
CLIENT: XTO ENERGY INC.

LOCATION NAME: RANDEL, O.H. #7 - SEP. PIT, UNIT D, SEC. 15, T26N, R11W

CONTRACTOR: BLAGG ENGINEERING, INC.

EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)

BORING LOCATION: 240 FT., S76.5E FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 0.15 FT. ABOVE GROUND SURFACE.

MODERATE TO DARK YELLOWISH BROWN SAND & ROCK AGGREGATE, NON COHESIVE, SLIGHTLY MOIST, LOOSE TO FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTINGS (0.0 - 5.0 FT. BELOW GRADE).

LIGHT TO MEDIUM GRAY SAND, NON COHESIVE, SLIGHTLY MOIST TO MOIST, FIRM, STRONG HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTING (5.0 - 10.0 FT. BELOW GRADE).

LIGHT MEDIUM GRAY SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, SLIGHTLY MOIST, APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (10.0 - 11.0 FT. BELOW GRADE).

SAME AS 5.0 - 10.0 FT. INTERVAL (11.0 - 13.0 FT. BELOW GRADE).

SAME AS 10.0 - 11.0 FT. INTERVAL (13.0 - 14.0 FT. BELOW GRADE).

SAME AS 5.0 - 10.0 FT. INTERVAL EXCEPT MOIST TO WET (14.0 - 17.0 FT. BELOW GRADE).

▼ GW DEPTH ON 3/25/02 = 16.68 FT. (APPROX.) FROM GROUND SURFACE.

LIGHT DUSKY BROWN SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, WET TO SATURATED, APPARENT STRONG HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (17.0 - 24.0 FT. BELOW GRADE).

NOTE: ▭ - SAND.

▭ - SILTY CLAY TO CLAY.

TOS - TOP OF SCREEN FROM GROUND SURFACE.

TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.

GW - GROUND WATER.

Monitor well consist of 2 inch PVC piping - casing from 0.15 ft. above grade to 2.22 ft. below grade, 0.010 slotted screen between 2.22 to 22.22 feet below grade, sand packed annular to grade.

DRAWING: RANDEL-7-MW1.SKF | DATE: 10/19/05 | DWN BY: NJV

FIGURE 9

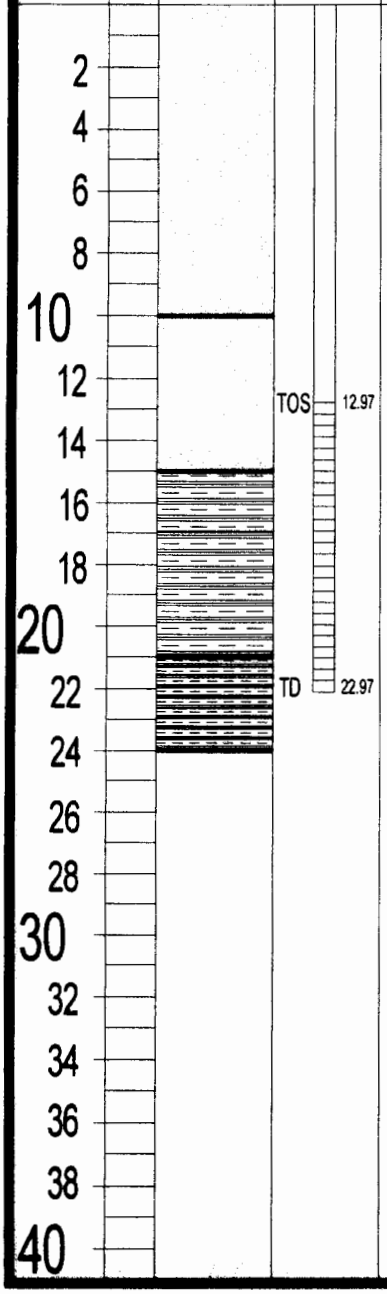
BLAGG ENGINEERING, INC.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #.....	BH - 2
MW #.....	2
PAGE #.....	2
DATE STARTED	4/09/02
DATE FINISHED	4/09/02
OPERATOR.....	JCB
PREPARED BY	NJV

CLIENT: XTO ENERGY INC.
LOCATION NAME: RANDEL, O.H. #7 - SEP. PIT, UNIT D, SEC. 15, T26N, R11W
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: 274 FT., S87.5E FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 1.63 FT. ABOVE GROUND SURFACE.

MODERATE TO DARK YELLOWISH BROWN SAND, NON COHESIVE, SLIGHTLY MOIST, LOOSE TO FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTINGS (0.0 - 10.0 FT. BELOW GRADE).

LIGHT TO MEDIUM GRAY SILTY SAND, NON COHESIVE, DRY TO SLIGHTLY MOIST, DENSE, STRONG HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTING (10.0 - 15.0 FT. BELOW GRADE).

▼ GW DEPTH ON 4/22/02 = 16.69 FT. (APPROX.) FROM GROUND SURFACE.

LIGHT MEDIUM GRAY SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, SLIGHTLY MOIST, APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (15.0 - 21.0 FT. BELOW GRADE).

LIGHT DUSKY BROWN SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, DRY, SLIGHT APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (21.0 - 24.0 FT. BELOW GRADE).

NOTE:
- SAND.
- SILTY SAND (HC IMPACTED).
- SILTY CLAY TO CLAY.

TOS - TOP OF SCREEN FROM GROUND SURFACE.
TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
GW - GROUND WATER.

Monitor well consist of 2 inch PVC piping - casing from 1.63 ft. above grade to 12.97 ft. below grade, 0.010 slotted screen between 12.97 to 22.97 feet below grade, sand packed annular to 10 ft. below grade, then filled with clean native soil to surface.

DRAWING: RANDEL-7-MW2.SKF | DATE: 10/19/05 | DWN BY: NJV

FIGURE 10

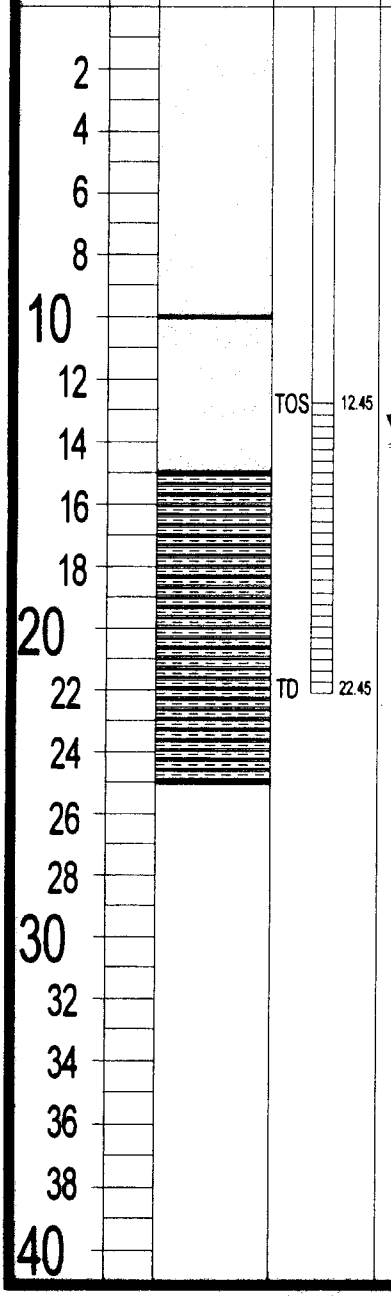
BLAGG ENGINEERING, INC.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #.....	BH - 3
MW #.....	3
PAGE #.....	3
DATE STARTED	4/09/02
DATE FINISHED	4/09/02
OPERATOR.....	JCB
PREPARED BY	NJV

CLIENT: XTO ENERGY INC.
LOCATION NAME: RANDEL, O.H. #7 - SEP. PIT, UNIT D, SEC. 15, T26N, R11W
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: 158 FT., S80.5E FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 2.15 FT. ABOVE GROUND SURFACE.

MODERATE TO DARK YELLOWISH BROWN SAND, NON COHESIVE, SLIGHTLY MOIST, LOOSE TO FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTINGS (0.0 - 10.0 FT. BELOW GRADE).

MODERATE TO DARK YELLOWISH BROWN SILTY SAND, COHESIVE, SLIGHTLY MOIST TO WET, FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTING (10.0 - 15.0 FT. BELOW GRADE).

▼ GW DEPTH ON 4/22/02 = 14.11 FT. (APPROX.) FROM GROUND SURFACE.

LIGHT DUSKY BROWN SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, WET TO SATURATED, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (15.0 - 25.0 FT. BELOW GRADE).

NOTE:
- SAND.
- SILTY SAND.
- SILTY CLAY TO CLAY.

TOS - TOP OF SCREEN FROM GROUND SURFACE.
TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
GW - GROUND WATER.

Monitor well consist of 2 inch PVC piping - casing from 2.15 ft. above grade to 12.45 ft. below grade, 0.010 slotted screen between 12.45 to 22.45 feet below grade, sand packed annular to 10 ft. below grade, then filled with clean native soil to surface.

DRAWING: RANDEL-7-MW3.SKF | DATE: 10/19/05 | DWN BY: NJV

FIGURE 11

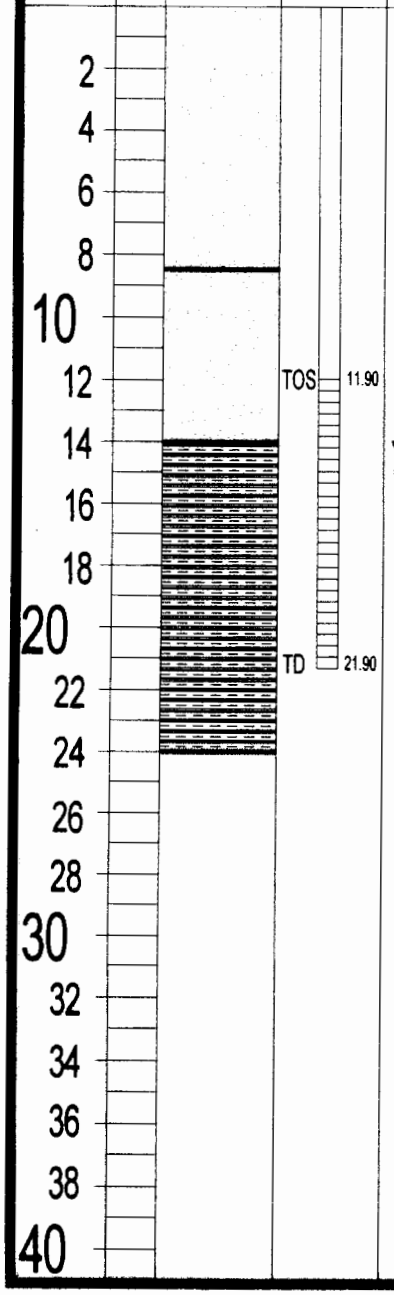
BLAGG ENGINEERING, INC.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #.....	BH - 4
MW #.....	4
PAGE #.....	4
DATE STARTED	4/09/02
DATE FINISHED	4/09/02
OPERATOR.....	JCB
PREPARED BY	NJV

CLIENT: XTO ENERGY INC.
LOCATION NAME: RANDEL, O.H. #7 - SEP. PIT, UNIT D, SEC. 15, T26N, R11W
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: 210 FT., S56E FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 1.60 FT. ABOVE GROUND SURFACE.

MODERATE TO DARK YELLOWISH BROWN SAND, NON COHESIVE, SLIGHTLY MOIST, LOOSE TO FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTINGS (0.0 - 8.5 FT. BELOW GRADE).

MODERATE TO DARK YELLOWISH BROWN SILTY SAND, COHESIVE, SLIGHTLY MOIST TO WET, FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTING (8.5 - 14.0 FT. BELOW GRADE).

▼ GW DEPTH ON 4/22/02 = 15.03 FT. (APPROX.) FROM GROUND SURFACE.

LIGHT DUSKY BROWN SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, WET TO SATURATED, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (14.0 - 24.0 FT. BELOW GRADE).

NOTE:
- SAND.
- SILTY SAND.
- SILTY CLAY TO CLAY.

TOS - TOP OF SCREEN FROM GROUND SURFACE.
TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
GW - GROUND WATER.

Monitor well consist of 2 inch PVC piping - casing from 1.60 ft. above grade to 11.90 ft. below grade, 0.010 slotted screen between 11.90 to 21.90 feet below grade, sand packed annular to 8 ft. below grade, then filled with clean native soil to surface.

DRAWING: RANDEL-7-MW4.SKF | DATE: 10/19/05 | DWN BY: NJV

FIGURE 12

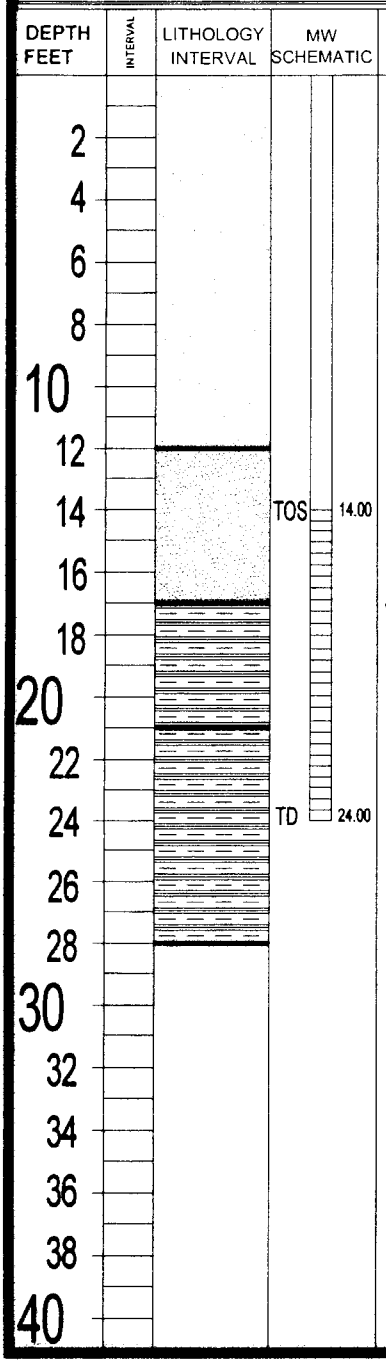
BLAGG ENGINEERING, INC.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #.....	BH - 5
MW #.....	5
PAGE #.....	5
DATE STARTED	4/19/02
DATE FINISHED	4/19/02
OPERATOR.....	JCB
PREPARED BY	NJV

CLIENT: XTO ENERGY INC.
LOCATION NAME: RANDEL, O.H. #7 - SEP. PIT, UNIT D, SEC. 15, T26N, R11W
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: 312 FT., N86E FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 1.00 FT. ABOVE GROUND SURFACE.

MODERATE TO DARK YELLOWISH BROWN SAND, NON COHESIVE, SLIGHTLY MOIST, LOOSE TO FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTINGS (0.0 - 12.0 FT. BELOW GRADE).

MODERATE BROWN SILTY SAND, NON COHESIVE, DRY TO SLIGHTLY MOIST, DENSE, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTING (12.0 - 17.0 FT. BELOW GRADE).

▼ GW DEPTH ON 4/22/02 = 18.11 FT. (APPROX.) FROM GROUND SURFACE.

MEDIUM BROWN TO LIGHT OLIVE GRAY SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, SLIGHTLY MOIST, APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (17.0 - 21.0 FT. BELOW GRADE).

LIGHT DUSKY BROWN SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, DRY, SLIGHT APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (21.0 - 28.0 FT. BELOW GRADE).

NOTE:
- SAND.
- SILTY SAND.
- SILTY CLAY TO CLAY.

TOS - TOP OF SCREEN FROM GROUND SURFACE.
TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
GW - GROUND WATER.

Monitor well consist of 2 inch PVC piping - casing from 1.0 ft. above grade to 14.00 ft. below grade, 0.010 slotted screen between 14.00 to 24.00 feet below grade, sand packed annular to 12 ft. below grade, then filled with clean native soil to surface.

DRAWING: RANDEL-7-MW5.SKF | DATE: 10/19/05 | DWN BY: NJV

FIGURE 13

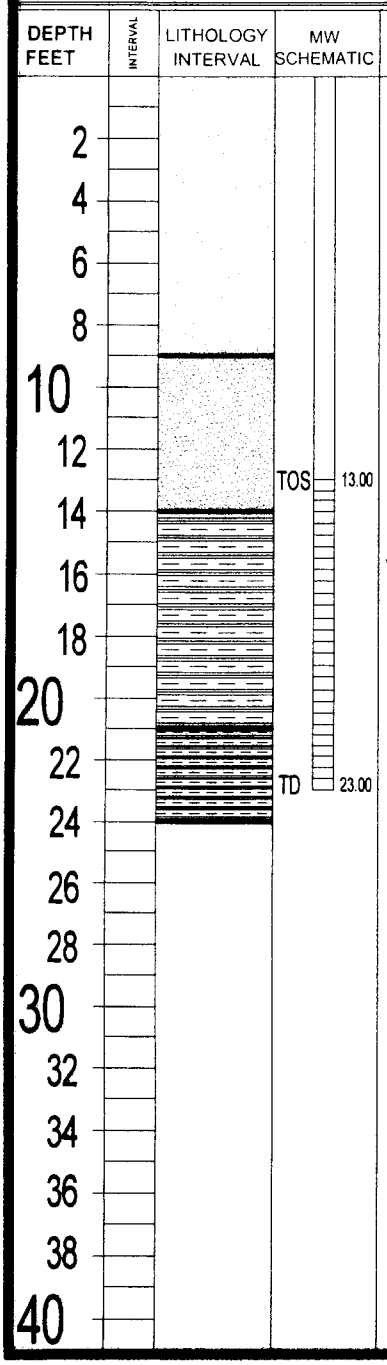
BLAGG ENGINEERING, INC.

P.O. BOX 87
BLOOMFIELD, NM 87413
(505) 632-1199

BORE / TEST HOLE REPORT

BORING #.....	BH - 6
MW #.....	6
PAGE #.....	6
DATE STARTED	4/19/02
DATE FINISHED	4/19/02
OPERATOR.....	JCB
PREPARED BY	NJV

CLIENT: XTO ENERGY INC.
LOCATION NAME: RANDEL, O.H. #7 - SEP. PIT, UNIT D, SEC. 15, T26N, R11W
CONTRACTOR: BLAGG ENGINEERING, INC.
EQUIPMENT USED: MOBILE DRILL RIG (EARTHPROBE)
BORING LOCATION: 266 FT., S65.5E FEET FROM WELL HEAD.



FIELD CLASSIFICATION AND REMARKS

GROUND SURFACE

TOP OF CASING APPROX. 2.00 FT. ABOVE GROUND SURFACE.

MODERATE TO DARK YELLOWISH BROWN SAND, NON COHESIVE, SLIGHTLY MOIST, LOOSE TO FIRM, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTINGS (0.0 - 9.0 FT. BELOW GRADE).

MODERATE BROWN TO LIGHT OLIVE GRAY SILTY SAND, NON COHESIVE, DRY TO SLIGHTLY MOIST, DENSE, NO APPARENT HC ODOR DETECTED PHYSICALLY WITHIN AUGER CUTTING (9.0 - 14.0 FT. BELOW GRADE).

▼ GW DEPTH ON 4/22/02 = 16.51 FT. (APPROX.) FROM GROUND SURFACE.

LIGHT OLIVE TO MEDIUM GRAY SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, SLIGHTLY MOIST, APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (14.0 - 21.0 FT. BELOW GRADE).

LIGHT DUSKY BROWN SILTY CLAY TO CLAY, MEDIUM PLASTIC, STIFF, DRY, SLIGHT APPARENT HC ODOR DETECTED PHYSICALLY WITHIN CUTTINGS (21.0 - 24.0 FT. BELOW GRADE).

NOTE:
- SAND.
- SILTY SAND.
- SILTY CLAY TO CLAY.

TOS - TOP OF SCREEN FROM GROUND SURFACE.
TD - TOTAL DEPTH OF MONITOR WELL FROM GROUND SURFACE.
GW - GROUND WATER.

Monitor well consist of 2 inch PVC piping - casing from 2.00 ft. above grade to 13.00 ft. below grade, 0.010 slotted screen between 13.00 to 23.00 feet below grade, sand packed annular to 10 ft. below grade, then filled with clean native soil to surface.

DRAWING: RANDEL-7-MW6.SKF	DATE: 10/19/05	DWN BY: NJV

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: 1
Well #: MW-7
Page: 1 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29.508' N, 107° 59.720' W
GWL Depth: 19'
Drilled By: Enviro-Drill
Well Logged By: Ashley Ager
Date Started: 05/01/07
Date Completed: 05/01/07

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
0	1	0-5'	cuttings	brown, unconsolidated, poorly sorted sand and gravel, damp	0	Easy
5	2	5-7'	split spoon	brown, unconsolidated, poorly sorted sand and gravel, damp	0	Easy
10	3	10-12	split spoon	10-10.5: brown, unconsolidated, poorly sorted sand and gravel, damp 10.5-12: whitish-brown medium sand, well sorted, unconsolidated, dry	0 0	Easy
15	4	15-17	split spoon	15-15.5: reddish brown coarse sand, poorly sorted, damp 15.5-16.5: brown clay with white chalkish material on top 16.5-17: reddish brown silty sand, coarse, poorly sorted, damp	7.2 0 0	Easy
20						

Comments:

Geologist Signature *Ashley L. Ager*

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: 1
Well #: MW-7
Page: 2 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29.522' N, 107° 59.736' W
GWL Depth: 16.5
Drilled By: Enviro-Drill
Well Logged By: Ashley Ager
Date Started: 05/01/07
Date Completed: 05/01/07

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
20	5	20-22	split spoon	20-20.4: reddish brown, coarse sand, poorly sorted, damp	1.3	Easy
				20.4-20.8: gray coarse sand, moist, poorly sorted	1.0	
				20.8-21: saturated gray coarse sand, poorly sorted	0.5	
25				21-22: reddish gray clay	0	
	6	25-16	split spoon	Variegated reddish brown clay, dry	0	Easy
30	7	30-32	split spoon	Variegated reddish brown clay, dry	0	Easy
35						
40						

Comments: Very thin saturated layer at approximately 20'. Stiff clay is present below that. Wet layer probably represents a small perched aquifer atop the clay.

Geologist Signature *Ashley L. Ager*

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: 1
Well #: MW-8
Page: 1 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29.522' N, 107° 59.736' W
GWL Depth: 16.5
Drilled By: Enviro-Drill
Well Logged By: Ashley Ager
Date Started: 05/01/07
Date Completed: 05/01/07

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
0	1	0-5'	cuttings	brown, unconsolidated, poorly sorted sand and gravel, damp	0	Easy
5	2	5-7'	split spoon	brown, unconsolidated, poorly sorted sand and gravel, damp	0	Easy
10	3	10-11.8	split spoon	brown, unconsolidated, poorly sorted sand and gravel, damp	0	Easy
15	4	15-16.9	split spoon	15-15.8: brown, unconsolidated, poorly sorted sand and gravel 15.8-16.4: moist, grayish brown sandy silt 16.4-16.9: coarse, poorly sorted, grayish brown sand, wet, some HC odor	0 52.8 319	Easy Easy Easy
20						

Comments:

Geologist Signature *Ashley L. Ager*

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: 1
Well #: MW-8
Page: 2 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29.522' N, 107° 59.736' W
GWL Depth: 16.5
Drilled By: Enviro-Drill
Well Logged By: Ashley Ager
Date Started: 05/01/07
Date Completed: 05/01/07

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
20	5	20-21.8	split spoon	20-20.4: reddish brown sand, coarse, poorly sorted, some gravel content, moist	78.9	Easy
				20.4-21.8: variegated reddish gray stiff clay, moist	0.2	Easy
25	6	25-27	split spoon	Variegated reddish brown clay wet at top, dry at bottom	0	Easy
30	7	30-32	split spoon	30-30.7: variegated reddish brown clay	0	Steady
				30.7-31.8: greenish gray silty sand, coarse, poorly sorted, consolidated, dry	0	
35						
40						

Comments: Very thin saturated layer at approximately 16.5'. Stiff clay is present below that. Wet layer probably represents a small perched aquifer atop the clay.

Geologist Signature *Ashley L. Ager*

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: B-1
Well #: MW-9
Page: 1 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29.531' N, 107° 59.731' W
GWL Depth: 16'
Drilled By: Kelly Padilla
Well Logged By: Ashley Ager
Date Started: 07/07/09
Date Completed: 07/07/09

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
0		0-5	cuttings	brown, poorly sorted coarse sand and gravel, road base		easy
5	1	5-7'	split spoon, 17"	0-13.5": 7.5 YR 5/6 strong brown sp, poorly sorted coarse sand, sub angular, dry, unconsolidated 13.5 - 17": 10YR 6/1 gray, sandy shale, crumbly	0	34 Blows
10	2	10-12	split spoon, 22"	10 YR 5/3 brown sp, poorly sorted, coarse sand, sub angular, dry	0	30 Blows
15	3	15-17	split spoon, 18"	0-2": same as above 2 - 16": 10 YR 5/3 brown sm, poorly sorted, medium sand w/ higher silt content, damp	0	25 Blows
20						

Comments:

Geologist Signature: *Ashley L. Ager*

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: B-1
Well #: MW-9
Page: 2 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29.531' N, 107° 59.731' W
GWL Depth: 16'
Drilled By: Kelly Padilla
Well Logged By: Ashley Ager
Date Started: 07/07/09
Date Completed: 07/07/09

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
20	4	20-22	split spoon, 20"	10 YR 3/2 v. dark grayish brown CL, clay some coarse sand at top, damp	0.1	68 Blows Wet rod
25	5	25-27	split spoon, 18"	10 YR 7/2 light gray CL, clay interbedded with 10 yr 4/2 dark grayish brown clays, iron discoloration, dry	0	58 Blows
30	6	30-32	split spoon, 18"	same as above, dry	0	76 Blows
35	7	35-37'	split spoon, 15"	same as above, dry	0	41 Blows
40						

Comments: Drilling stopped at 35' based on previous knowledge of depth in existing monitoring wells. Identified damp sandy layer at 16', and hole is dry after drilling to 37'. Will let sit and see if water fills in. 3" of water in hole after 30 mins. Set well.

Geologist Signature: *Ashley L. Ager*

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: B-2
Well #:
Page: 1 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29' 30.46" N, 107° 59' 44.2" W
GWL Depth: Dry Hole
Drilled By: Kelly Padilla
Well Logged By: Ashley Ager
Date Started: 07/07/09
Date Completed: 07/08/09

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
0		0-5'	cuttings	brown poorly sorted coarse sand and gravel - road base		easy
5	1	5-7'	split spoon, 11"	2.5 Y 6/1 Gray coarse sand sp, subrounded, backfill	0	Easy, 26 Blows
10	2	10-12	split spoon, 16"	2.5 Y 4/2 dark grayish brown, fine sand, poorly sorted, lots of fines	0	25 Blows
15	3	15-17	split spoon, 10"	2.5 Y 4/1 Dark Gray, fine silty sand, about 5% c. content, damp, backfill	0	12 Blows Wet rod
20						

Comments:

Geologist Signature: *Ashley L. Ager*

RECORD OF SUBSURFACE EXPLORATION

LodeStar Services
P.O. Box 4465
Durango, CO 81302
303-917-6288

Borehole #: B-2
Well #:
Page: 2 of 2
Project Number:
Project Name: XTO Ground Water
Project Location: OH Randel #7

Borehole Location: 36° 29' 30.46" N, 107° 59' 44.2" W
GWL Depth: dry hole
Drilled By: Kelly Padilla
Well Logged By: Ashley Ager
Date Started: 07/07/09
Date Completed: 07/08/09

Drilling Method: Hollow Stem Auger
Air Monitoring Method: PID

Depth (feet)	Sample Number	Sample Interval	Sample Type & Recovery (inches)	Sample Description	Air Monitoring	Drilling Conditions
20	4	20-22	split spoon, 19"	5 YR 3/2 Dark reddish brown CL, Clay, damp	0.1	59 Blows
25	5	25-27	split spoon, 16.5"	0 - 2": same as above 2-16.5": 10YR 6/2 light brownish gray, silty clay, dry	0	66 Blows
30	6	30-32	split spoon, 14"	same as above, damp	0	48 Blows
35	7	35-37'	split spoon, 9"	same as above, dry Stop to see if it fills	11.2	45 Blows
40						

Comments: Drilling stopped at 35' based on previous knowledge of depth in existing monitoring wells. Identified damp sandy layer at ~16' and hole is dry after drilling to 37'. Let sit for 2 hours and did not fill in. Let sit overnight. At 11:15 am on 07/08/09, hole is still dry. Plug.

Geologist Signature: *Ashley L. Ager*

ATTACHMENT 3
LODESTAR SERVICES, INC. REMEDIATION WORK PLAN (2006)

Lodestar Services, Inc.
P.O. Box 3861, Farmington, NM 87499-3861, 505-334-2791

August 15, 2006

Mr. Steve Austin
Navajo Nation EPA
PO Box 1999
Shiprock, NM 87420

CERTIFIED MAIL: 7004 1160 0007 4952 1517

RE: OH Randel #7

Dear Mr. Austin,

XTO Energy Inc. (XTO) has contracted Lodestar Services, Incorporated (Lodestar) to oversee groundwater monitoring and remedial activities at the OH Randel #7 natural gas production well. It has come to our attention that the well is located on land regulated by the Navajo Nation Environmental Protection Agency (NNEPA). Previous regulatory correspondence has been with the New Mexico Oil Conservation Division (NMOCD). An annual comprehensive report was submitted to the NMOCD in January 2006 and is included for your review.

The OH Randel #7 is located in Unit D of Section 16 of Township 26N, Range 11W, and includes a former oil-water-separator pit that may have affected shallow groundwater. Six groundwater monitoring wells were previously installed on the site to investigate groundwater quality. One of the wells, MW-6, contains free-phase hydrocarbons. Previously MW-1 and MW-2 contained free-phase hydrocarbons. MW-1 is located in the center of the former pit. MW-2 is directly adjacent to the pit, and MW-6 is located down gradient of the pit. The annual report included herein has several groundwater contour maps provided by Blagg Engineering that indicate varying groundwater flow directions. Navajo Agricultural Products Incorporated (NAPI) conducts irrigation adjacent to the site and may influence groundwater flow direction.

The following steps are proposed remove impacted soil and free-phase hydrocarbons:

1. Excavate affected soil associated with historical operations from the former pit. Impacted soil will be disposed at a local land farm permitted by the NMOCD. Soil headspace gas will be monitored with a photo-ionization detector (PID) to determine extent of impacted soil during excavation according to the NMOCD Guidelines for headspace analysis. Soil above 10 milligrams per kilogram (mg/kg) benzene, 50 mg/kg total benzene, toluene, ethylbenzene, and xylenes (BTEX), and 100 mg/kg total petroleum hydrocarbons will be removed. Laboratory analyses of composite samples collected from the sidewalls of the excavation will be used to document that impacted soil has been removed.
2. Erect temporary fencing around the excavated site and remove impacted water and free-phase hydrocarbons from the pit.

3. Once the free-phase hydrocarbons have been removed, backfill the excavation site with clean soil.
4. Replace groundwater-monitoring wells as necessary.
5. Install additional down gradient monitoring wells as necessary to characterize impacted groundwater.
6. Remove free phase hydrocarbons from groundwater, then sample groundwater-monitoring wells for benzene, toluene, ethylbenzene and total xylenes (BTEX) on a quarterly basis to monitor progress at the site.

Following completion of the above tasks, XTO will provide a letter report describing onsite activities and analytical results. XTO wishes to complete this work as soon as practical and will contact you to schedule activities. Should you have any questions or require additional information, please do not hesitate to contact Lisa Winn of XTO at (505) 324-1090 or you can call me at (505) 334 2791.

Sincerely,
LODESTAR SERVICES, INC

Martin Nee

Cc: Lisa Winn, XTO, w/o enclosures
Kim Champlin, XTO, w/o enclosures
Ashley Ager, LSI, w/o enclosures
Glenn Von Gonten, NMOCD
File

Attachments: Annual Report

cc Mr Jim Wells USEPA

ATTACHMENT 4
LODESTAR SERVICES, INC. REPORT OF EXCAVATION AND SAMPLING (2007)