3R - 134

2013 AGWMR

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2013 ANNUAL GROUNDWATER REPORT

Valdez A #1E

3RP-134

Unit G, Section 24, Township 29N, Range 11W
San Juan County, New Mexico

PREPARED FOR:

Mr. Glenn Von Gonten
New Mexico Oil Conservation Division
1220 South St. Francis Street
Santa Fe, New Mexico 87505
(505) 476-3488

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Attachments

Attachment 1: NMOCD Letter to Tenneco Oil Company (1988)

Attachment 2: Completion Diagrams and Borehole Logs

Attachment 3: Amoco Request for Closure (1996)

Attachment 4: 2013 Laboratory Reports

Attachment 5: 2013 Field Notes

VALDEZ A #1E
3RP-134

SITE DETAILS

LEGALS – TWN: 29N	**RNG**: 11W	**SEC**: 24	**UNIT**: G
OCD HAZARD RANKING: 40		**LAND TYPE**: FEE	
LATITUDE: 36.71186		**LONGITUDE**: -107.94220	

INTRODUCTION

XTO Energy Inc. (XTO) acquired the Valdez A #1E well site from Amoco Production Company (Amoco) in January 1998. This is a gas producing well in the Dakota Sandstone and Otero Chacra formations and is currently active. The San Juan River flows in a general west/southwest direction approximately 1,000 feet from the location. A topographic map is presented as ***Figure 1***.

HISTORY

Tenneco Oil Company (Tenneco) was the original owner/operator of this well site. In September of 1987, the New Mexico Oil Conservation Division (NMOCD) augered four exploratory borings to between 10½ feet and 18 feet deep at the site. The borings identified impact to groundwater in the vicinity of a produced water tank and separator. A letter documenting the NMOCD findings is included as ***Attachment 1***. Tenneco was required by NMOCD to install a series of monitoring wells to delineate the vertical and lateral extent of groundwater impact and to monitor concentrations of benzene, toluene, ethylbenzene, and total xylenes (BTEX). Tenneco installed six monitoring wells (MW-1, MW-2, MW-3, MW-4, MW-5, and MW-6) in June of 1988. Completion Diagrams and Borehole Logs are presented in ***Attachment 2***. The monitoring wells were sampled in July of 1988 with the exception of monitoring well MW-4, which was damaged. Groundwater from monitoring well MW-6 contained BTEX concentrations in excess of New Mexico Water Quality Control Commission (NMWQCC) standards. Monitoring well MW-4 was repaired in August of 1988 and all monitoring wells were sampled. Laboratory analytical results indicated elevated BTEX concentrations existed in groundwater from monitoring wells MW-4 and MW-6. Tenneco submitted a groundwater report to the NMOCD in September of 1988 documenting activities and laboratory results.

Amoco acquired the location in January of 1989. Based on historical analytical data, it is assumed that additional monitoring wells, MW-7, MW-8, MW-9 and MW-10 were installed in the first quarter of 1992. In January of 1996, Amoco submitted a written request to the NMOCD to discontinue groundwater monitoring at the site. Based on data collected since 1988, Amoco argued that the groundwater plume was stable, causing no risk to human health and the environment and making continued groundwater monitoring unnecessary. Since NMWQCC standards had not been met within the defined groundwater plume, the

request was denied by the NMOCD in March of 1996. Amoco's closure request and the subsequent response by NMOCD are included as ***Attachment 3***.

After XTO acquired the site in 1998, XTO submitted an annual groundwater report to the NMOCD in February of 1999 presenting data collected from 1996 through 1998. Monitoring well MW-2 was dry during that time period. No BTEX concentrations in groundwater sampled from monitoring wells MW-1, MW-3, and MW-9 ever exceeded NMWQCC standards. Elevated concentrations of BTEX were documented during one sampling event between 1996 and 1998 at monitoring wells MW-4, MW-5, and MW-10, but BTEX concentrations were below the NMWQCC standards thereafter. BTEX concentrations consistently exceeded NMWQCC standards in groundwater sampled from monitoring wells MW-6, MW-7, and MW-8; however, a significant decrease in BTEX concentrations was observed in these monitoring wells between 1996 and 1998. In June 1998, 0.88 feet of free-phase product was measured in monitoring well MW-7. Monitoring well MW-8 was damaged during the last quarter of 1998.

Based on the conditions described above, XTO sampled groundwater from monitoring wells MW-6, MW-7, MW-9, and MW-10 from 1999 to 2005 to monitor natural degradation and confirm free-phase product was not migrating. According to the text in a former annual report, BTEX concentrations were not detected or were below NMWQCC standards in groundwater sampled from monitoring wells MW-9 and MW-10 for four consecutive quarters and sampling was discontinued. In April 2002, monitoring wells MW-2, MW-3, and MW-5 were plugged and abandoned per surface owner's (FEE) request and NMOCD approval. In 2005, MW-9 and MW-10 were removed by the property owner.

From 2006 through 2007, XTO conducted annual or semi-annual sampling of groundwater monitoring wells MW-6 and MW-7 to monitor natural degradation of BTEX constituents.

The 2008 annual groundwater report was submitted to the NMOCD in April of 2009 proposing the addition of chemical oxygenate to monitoring wells MW-6 and MW-7 with a change in frequency from semi-annual sampling to quarterly sampling. No response was provided by NMOCD, so XTO did not proceed with the activities and continued semi-annual sampling through 2009. XTO implemented quarterly sampling of monitoring wells MW-6 and MW-7 and addition of chemical oxygenate to monitoring well MW-7 in 2010 via Oxygen Release Compound® (ORC) socks. In the 2010 annual groundwater report submitted to the NMOCD in March of 2011, XTO proposed cessation of sampling from monitoring well MW-6 after the NMWQCC standards for BTEX concentrations were met for four consecutive quarters. Sampling of MW-6 was discontinued in 2011. XTO continued to apply chemical oxygenate to groundwater in monitoring well MW-7 and sampled the monitoring well quarterly through 2012.

A summary of groundwater elevation data and laboratory results from historical and current groundwater monitoring is presented in ***Table 1*** and ***Table 2*** respectively.

METHODOLOGY

XTO used ORC socks in monitoring well MW-7 throughout 2013 and sampled groundwater in the monitoring well quarterly to analyze for BTEX concentrations by United States Environmental Protection Agency Method 8021B. ORC socks were removed from monitoring well MW-7 at least seven days prior to sampling to allow groundwater to equilibrate; after sampling, the ORC socks were replaced. Depth to water was measured quarterly at monitoring wells MW-1, MW-3, MW-6, and MW-7 during 2013.

Water Level Measurements

Static groundwater level monitoring included recording depth to groundwater measurements with a Keck oil/water interface probe. The interface probe was decontaminated with Alconox™ soap and rinsed with de-ionized water prior to each measurement.

Groundwater Sampling

Prior to sampling groundwater, depth to groundwater and total depth of the well was measured with a Keck oil/water interface probe. Presence of any free-phase petroleum hydrocarbon was also investigated using the interface probe. The interface probe was decontaminated with Alconox™ soap and rinsed with de-ionized water prior to each measurement. The volume of water in the well was calculated, and a minimum of three casing volumes of water were purged from the well using a new disposable polyvinyl chloride (PVC) bailer or a dedicated PVC bailer or the monitoring well was purged dry. All purge water was disposed of into tanks on site.

Once the monitoring well was purged, groundwater samples were collected by filling at least two (2) 40-milliliter (ml) glass vials. The laboratory supplied vials were filled and capped with no air inside to prevent degradation of the sample. Samples were labeled with the date and time of collection, well designation, project name, collector's name and parameters to be analyzed. The samples were immediately sealed, packed on ice, and shipped to Environmental Science Corporation (ESC) in Mt. Juliet, Tennessee via Fed-Ex overnight delivery. Proper chain-of-custody (COC) procedures were followed with logs documenting the date and time sampled, sample number, type of sample, sampler's name, preservative used (if any), analyses required and sampler's signature. Laboratory reports are included in ***Attachment 4*** and field notes from the quarterly monitoring events are included in ***Attachment 5***.

Groundwater Contour Maps

Groundwater elevations obtained from monitoring wells during site visits were used to draft groundwater contour maps. Contours were inferred based on depth to water measurements and observation of physical characteristics at the site (topography, proximity to irrigation ditches, etc.).

RESULTS

Laboratory results from monitoring well MW-7 indicate BTEX concentrations were below NMWQCC standards for all four quarters of 2013, except for the third quarter 2013 when benzene was detected at 70 micrograms per liter (µg/L) and total xylenes were detected at a concentration of 2,800 µg/L. Laboratory analytical results are summarized in ***Table 2***, laboratory reports from 2013 are included in ***Attachment 4***, and copies of the field notes are provided in ***Attachment 5***.

Field data collected during site monitoring activities indicate the groundwater continues to flow to the southwest, toward the San Juan River similar to historical observations. ***Figure 2 through Figure 5*** illustrates the estimated groundwater potentiometric surface for 2013. Depth to groundwater and groundwater elevation data are summarized on ***Table 1.***

CONCLUSIONS

BTEX concentrations continue to decline at the site as the addition of oxygen to the aquifer via ORC socks is enhancing natural degradation of petroleum hydrocarbons in the groundwater.

RECOMMENDATIONS

XTO proposes the continued use of ORC socks in monitoring well MW-7 to enhance biodegradation of the petroleum hydrocarbons in groundwater. The ORC socks will be replaced annually. XTO will continue quarterly sampling of groundwater from monitoring well MW-7 for BTEX concentrations until NMWQCC standards have been met for four (4) consecutive quarters, at which time groundwater sampling from MW-7 will cease. Following NMOCD approval for closure, all monitoring well locations will be plugged and abandoned in accordance with the monitoring well abandonment plan.

TABLE 1
GROUNDWATER ELEVATIONS SUMMARY

TABLE 2
GROUNDWATER ANALYTICAL RESULTS SUMMARY

FIGURE 1
SITE LOCATION MAP

FIGURE 2
MARCH 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS

FIGURE 3
JUNE 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS

FIGURE 4
SEPTEMBER 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS

FIGURE 5
DECEMBER 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS

ATTACHMENT 1
NMOCD LETTER TO TENNECO OIL COMPANY (1988)

ATTACHMENT 2
COMPLETION DIAGRAMS AND BOREHOLE LOGS

ATTACHMENT 3
AMOCO REQUEST FOR CLOSURE (1996)

ATTACHMENT 4
2013 LABORATORY REPORTS

ATTACHMENT 5
2013 FIELD NOTES

TABLE 1
GROUNDWATER ELEVATIONS SUMMARY

TABLE 1

GROUNDWATER ELEVATIONS SUMMARY
VALDEZ A #1E
XTO ENERGY, INC.

Well ID	Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet relative to site)
MW-1	7/1/1988	NM	NM
MW-1	8/31/1988	NM	NM
MW-1	3/5/1992	NM	NM
MW-1	2/23/1993	13.59	88.97
MW-1	6/7/1993	12.92	89.64
MW-1	9/8/1993	12.06	90.50
MW-1	3/9/1994	14.20	88.36
MW-1	6/24/1994	12.39	90.17
MW-1	9/23/1994	11.35	91.21
MW-1	12/9/1994	12.35	90.21
MW-1	3/13/1995	13.71	88.85
MW-1	6/3/2008	12.95	89.61
MW-1	12/7/2009	12.37	90.19
MW-1	6/21/2010	13.23	89.33
MW-1	9/15/2010	12.14	90.42
MW-1	12/13/2010	12.89	89.67
MW-1	3/10/2011	14.29	88.27
MW-1	6/16/2011	13.10	89.46
MW-1	9/13/2011	11.66	90.90
MW-1	12/14/2011	12.41	90.15
MW-1	3/8/2012	13.90	88.66
MW-1	6/14/2012	12.63	89.93
MW-1	9/12/2012	11.12	91.44
MW-1	12/21/2012	12.25	90.31
MW-1	3/14/2013	13.69	88.87
MW-1	6/17/2013	12.58	89.98
MW-1	9/11/2013	11.16	91.40
MW-1	12/16/2013	12.29	90.27
MW-3	7/1/1988	NM	NM
MW-3	8/31/1988	NM	NM
MW-3	3/5/1992	NM	NM
MW-3	2/23/1993	14.02	87.04
MW-3	6/7/1993	13.66	87.40
MW-3	9/8/1993	13.16	87.90
MW-3	3/9/1994	14.54	86.52
MW-3	6/24/1994	12.95	88.11
MW-3	9/23/1994	12.24	88.82
MW-3	12/9/1994	12.94	88.12
MW-3	3/13/1995	13.88	87.18
MW-3	6/3/2008	13.21	87.85
MW-3	12/7/2009	12.78	88.28
MW-3	6/21/2010	13.47	87.59
MW-3	9/15/2010	12.54	88.52
MW-3	12/13/2010	13.16	87.90
MW-3	3/10/2011	14.23	86.83
MW-3	6/16/2011	13.32	87.74

TABLE 1

GROUNDWATER ELEVATIONS SUMMARY
VALDEZ A #1E
XTO ENERGY, INC.

Well ID	Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet relative to site)
MW-3	9/13/2011	12.20	88.86
MW-3	12/14/2011	12.76	88.30
MW-3	3/8/2012	13.94	87.12
MW-3	6/14/2012	12.97	88.09
MW-3	9/12/2012	11.78	89.28
MW-3	12/21/2012	12.64	88.42
MW-3	3/14/2013	13.77	87.29
MW-3	6/17/2013	12.91	88.15
MW-3	9/11/2013	11.79	89.27
MW-3	12/16/2013	12.60	88.46
MW-6	7/1/1988	NM	NM
MW-6	8/31/1988	NM	NM
MW-6	3/5/1992	NM	NM
MW-6	2/23/1993	15.06	82.03
MW-6	6/7/1993	14.72	82.37
MW-6	9/8/1993	14.27	82.82
MW-6	12/2/1993	14.69	82.40
MW-6	3/9/1994	15.49	81.60
MW-6	6/24/1994	14.05	83.04
MW-6	9/23/1994	13.40	83.69
MW-6	12/9/1994	14.02	83.07
MW-6	1/10/1995	14.28	82.81
MW-6	2/9/1995	14.58	82.51
MW-6	3/13/1995	14.85	82.24
MW-6	4/10/1995	15.00	82.09
MW-6	6/19/1995	14.48	82.61
MW-6	8/7/1995	14.08	83.01
MW-6	9/12/1995	13.89	83.20
MW-6	10/10/1995	13.74	83.35
MW-6	11/15/1995	13.98	83.11
MW-6	12/7/1995	14.12	82.97
MW-6	3/7/1996	15.07	82.02
MW-6	6/18/1996	14.40	82.69
MW-6	6/17/1997	14.97	82.12
MW-6	6/12/1998	14.92	82.17
MW-6	9/25/1998	14.36	82.73
MW-6	5/26/1999	15.12	81.97
MW-6	6/26/2000	14.53	82.56
MW-6	5/15/2001	14.91	82.18
MW-6	6/25/2002	13.72	83.37
MW-6	5/20/2003	14.47	82.62
MW-6	6/19/2004	14.07	83.02
MW-6	9/27/2004	8.27	88.82
MW-6	6/29/2005	9.13	87.96
MW-6	6/28/2006	8.78	88.31
MW-6	6/15/2007	9.76	87.33

TABLE 1

GROUNDWATER ELEVATIONS SUMMARY
VALDEZ A #1E
XTO ENERGY, INC.

Well ID	Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet relative to site)
MW-6	12/20/2007	9.16	87.93
MW-6	6/3/2008	9.58	87.51
MW-6	12/4/2008	9.85	87.24
MW-6	6/10/2009	9.75	87.34
MW-6	12/7/2009	9.15	87.94
MW-6	6/21/2010	9.77	87.32
MW-6	9/15/2010	9.01	88.08
MW-6	12/13/2010	9.50	87.59
MW-6	3/10/2011	10.45	86.64
MW-6	6/16/2011	9.66	87.43
MW-6	9/13/2011	8.79	88.30
MW-6	12/14/2011	9.17	87.92
MW-6	3/8/2012	10.18	86.91
MW-6	6/14/2012	Dry	Dry
MW-6	9/12/2012	8.27	88.82
MW-6	12/21/2012	9.02	88.07
MW-6	3/14/2013	10.01	87.08
MW-6	6/17/2013	9.31	87.78
MW-6	9/11/2013	8.34	88.75
MW-6	12/16/2013	9.18	87.91
MW-7	3/5/1992	NM	NM
MW-7	2/23/1993	13.37	86.22
MW-7	6/7/1993	14.54	85.05
MW-7	9/8/1993	14.15	85.44
MW-7	12/2/1993	14.56	85.03
MW-7	3/9/1994	15.30	84.29
MW-7	6/24/1994	14.04	85.55
MW-7	9/23/1994	13.51	86.08
MW-7	12/9/1994	13.94	85.65
MW-7	1/10/1995	14.23	85.36
MW-7	2/9/1995	14.50	85.09
MW-7	3/13/1995	14.73	84.86
MW-7	4/10/1995	14.87	84.72
MW-7	6/19/1995	14.39	85.20
MW-7	8/7/1995	14.04	85.55
MW-7	9/12/1995	13.85	85.74
MW-7	10/10/1995	13.73	85.86
MW-7	11/15/1995	13.94	85.65
MW-7	12/7/1995	14.05	85.54
MW-7	3/7/1996	14.94	84.65
MW-7	6/18/1996	14.34	85.25
MW-7	6/17/1997	14.83	84.76
MW-7	6/12/1998	14.83	84.76
MW-7	9/25/1998	NM	NM
MW-7	5/26/1999	NM	NM
MW-7	8/25/1999	NM	NM

TABLE 1

GROUNDWATER ELEVATIONS SUMMARY
VALDEZ A #1E
XTO ENERGY, INC.

Well ID	Date	Depth to Water (feet BTOC)	Groundwater Elevation (feet relative to site)
MW-7	11/30/1999	NM	NM
MW-7	6/26/2000	14.46	85.13
MW-7	5/15/2001	14.87	84.72
MW-7	6/25/2002	13.72	85.87
MW-7	5/20/2003	14.43	85.16
MW-7	6/19/2004	13.97	85.62
MW-7	6/29/2005	13.81	85.78
MW-7	6/28/2006	13.37	86.22
MW-7	6/15/2007	15.00	84.59
MW-7	12/20/2007	13.65	85.94
MW-7	6/3/2008	14.03	85.56
MW-7	12/4/2008	13.46	86.13
MW-7	6/10/2009	14.20	85.39
MW-7	12/7/2009	13.61	85.98
MW-7	6/21/2010	14.19	85.40
MW-7	9/15/2010	13.76	85.83
MW-7	12/13/2010	13.98	85.61
MW-7	3/10/2011	14.81	84.78
MW-7	6/16/2011	14.10	85.49
MW-7	9/13/2011	13.21	86.38
MW-7	12/14/2011	13.68	85.91
MW-7	3/8/2012	14.62	84.97
MW-7	6/14/2012	13.88	85.71
MW-7	9/12/2012	12.89	86.70
MW-7	12/21/2012	13.59	86.00
MW-7	3/14/2013	14.49	85.10
MW-7	6/17/2013	13.83	85.76
MW-7	9/11/2013	12.93	86.66
MW-7	12/16/2013	13.56	86.03

Notes:
BTOC = Below Top of Casing
NM = Not Measured

TABLE 2
GROUNDWATER ANALYTICAL RESULTS SUMMARY

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
VALDEZ A #1E
XTO ENERGY, INC.

Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
NMWQCC Groundwater Standard		**10**	**750**	**750**	**620**
MW-1	7/1/1988	ND	ND	ND	ND
MW-1	8/31/1988	ND	ND	ND	ND
MW-1	3/5/1992	ND	ND	ND	ND
MW-1	2/23/1993	ND	ND	ND	ND
MW-1	6/7/1993	ND	0.5	ND	1
MW-1	9/8/1993	ND	ND	ND	ND
MW-1	3/9/1994	ND	ND	ND	ND
MW-1	6/24/1994	ND	ND	ND	ND
MW-1	9/23/1994	0.9	0.2	ND	3.8
MW-1	12/9/1994	0.8	ND	ND	ND
MW-1	3/13/1995	ND	ND	ND	ND
MW-3	7/1/1988	ND	ND	ND	ND
MW-3	8/31/1988	ND	ND	ND	ND
MW-3	3/5/1992	3	6.9	0.3	7.8
MW-3	2/23/1993	ND	ND	ND	ND
MW-3	6/7/1993	ND	ND	ND	0.6
MW-3	9/8/1993	ND	0.6	ND	11.7
MW-3	3/9/1994	ND	ND	ND	ND
MW-3	6/24/1994	ND	ND	ND	ND
MW-3	9/23/1994	ND	ND	ND	ND
MW-3	12/9/1994	ND	ND	ND	ND
MW-3	3/13/1995	ND	ND	ND	ND
MW-6	7/1/1988	**1,500**	**3,300**	550	**4,560**
MW-6	8/31/1988	**1,700**	**1,600**	340	**1,300**
MW-6	3/5/1992	**65**	44.1	20.3	82.7
MW-6	2/23/1993	**2,090**	**7,800**	578	**4,080**
MW-6	6/7/1993	**1,300**	444	293	**840**
MW-6	9/8/1993	**770**	**980**	174	**783**
MW-6	12/2/1993	**540**	**1,140**	144	**867**
MW-6	3/9/1994	**580**	**1,520**	130	**888**
MW-6	6/24/1994	**542**	**1,923**	164	**1,172**
MW-6	9/23/1994	**484**	**1,696**	170	**1,300**
MW-6	12/9/1994	**593**	**2,242**	183	**1,707**
MW-6	1/10/1995	**450**	**1,380**	153	**1,248**
MW-6	2/9/1995	**710**	**2,160**	271	**2,297**
MW-6	3/13/1995	**19.8**	**2,471**	289	**2,460**
MW-6	4/10/1995	**525**	**1,840**	222	**1,502**
MW-6	6/19/1995	**299.3**	**998.8**	114.5	**1,045.4**
MW-6	8/7/1995	**593**	**1,650**	247	**2,111**
MW-6	9/12/1995	**412**	**1,390**	259	**1,549**
MW-6	10/10/1995	**176**	**970**	191	**1,552**
MW-6	11/15/1995	**598**	**1,370**	339	**2,819**

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
VALDEZ A #1E
XTO ENERGY, INC.

Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
NMWQCC Groundwater Standard		**10**	**750**	**750**	**620**
MW-6	12/7/1995	**599**	**1,310**	304	**2,322**
MW-6	3/7/1996	**426**	467	234	**1,876**
MW-6	6/18/1996	**462**	773	305	**2,540**
MW-6	6/17/1997	**110**	19.6	37.6	288.9
MW-6	6/12/1998	**55.6**	25.2	45.9	296.1
MW-6	9/25/1998	**42.7**	17.7	68.3	**469**
MW-6	5/26/1999	**78.9**	22	51.6	273.9
MW-6	6/26/2000	**26**	2.5	100	**670**
MW-6	5/15/2001	**13**	0.5	74	490
MW-6	6/25/2002	**20**	ND	200	**1,740**
MW-6	5/20/2003	**14**	1.1	190	**1,400**
MW-6	6/19/2004	7.5	ND	79	530
MW-6	9/27/2004	8.4	ND	140	**1,100**
MW-6	6/29/2005	6.9	ND	150	**1,100**
MW-6	6/28/2006	6.7	ND	190	**790**
MW-6	6/15/2007	2.1	ND	76	470
MW-6	12/20/2007	2.9	ND	130	**750**
MW-6	6/3/2008	1.5	ND	**88**	**680**
MW-6	12/4/2008	1.6	3.6	98	**640**
MW-6	6/10/2009	1.6	1.4	140	**810**
MW-6	12/7/2009	< 1.0	< 1.0	7.2	29
MW-6	6/21/2010	< 1.0	< 1.0	1.5	3.7
MW-6	9/15/2010	< 0.5	< 5.0	< 0.5	1.6
MW-6	12/13/2010	0.6	<5.0	1.1	3.1
MW-7	3/5/1992	**1,160**	**1,110**	302	**1,972**
MW-7	2/23/1993	ND	1	ND	2
MW-7	6/7/1993	**640**	**2,270**	330	**2,430**
MW-7	9/8/1993	**820**	**1,660**	306	**1,780**
MW-7	12/2/1993	**319**	366	35.1	**242**
MW-7	3/9/1994	**103**	88	10.3	74
MW-7	6/24/1994	**569**	**2,090**	288	**3,094**
MW-7	9/23/1994	**627**	**1,805**	189	**1,755**
MW-7	12/9/1994	**707**	**1,220**	161	**1,342**
MW-7	1/10/1995	**298**	394	54.8	365.4
MW-7	2/9/1995	**465**	624	92	582
MW-7	3/13/1995	**997.8**	**813.2**	168.4	**1,015.9**
MW-7	4/10/1995	**648**	456	104	**623**
MW-7	6/19/1995	**366.7**	414.7	66.1	602.2
MW-7	8/7/1995	**869**	**1,000**	171	**1,431**
MW-7	9/12/1995	**1725**	**846**	141	**1,035**
MW-7	10/10/1995	**143**	**689**	93.6	**925**
MW-7	11/15/1995	**710**	**1,000**	178	**1,642**
MW-7	12/7/1995	**1,050**	**606**	**167**	**996**
MW-7	3/7/1996	**101**	10.3	8.69	42.27

TABLE 2

GROUNDWATER ANALYTICAL RESULTS
VALDEZ A #1E
XTO ENERGY, INC.

Well ID	Date	Benzene (µg/L)	Toluene (µg/L)	Ethylbenzene (µg/L)	Total Xylenes (µg/L)
NMWQCC Groundwater Standard		**10**	**750**	**750**	**620**
MW-7	6/18/1996	**128**	65.5	11.5	175.3
MW-7	6/17/1997	**360**	16.3	16.5	127.5
MW-7	6/26/2000	**220**	63	94	**4,080**
MW-7	5/15/2001	**190**	ND	76	**880**
MW-7	6/25/2002	**92**	14	32	264
MW-7	5/20/2003	**99**	ND	40	230
MW-7	6/19/2004	**170**	4.1	120	**780**
MW-7	6/29/2005	**100**	14	68	470
MW-7	6/28/2006	**48**	14	69	580
MW-7	6/15/2007	**86**	ND	67	97
MW-7	12/20/2007	**310**	ND	220	**1,300**
MW-7	6/3/2008	**34**	ND	63	490
MW-7	12/4/2008	**100**	31	430	**3,600**
MW-7	6/10/2009	**43**	25	160	**1,100**
MW-7	12/7/2009	**62**	33	320	**2,400**
MW-7	6/21/2010	8.2	5.6	30	180
MW-7	9/15/2010	**36**	< 100	78	**660**
MW-7	12/13/2010	**22**	<5.0	60	420
MW-7	3/10/2011	7	<50	72	260
MW-7	6/16/2011	4.7	<5.0	11	78
MW-7	9/13/2011	**13**	<25	67	**890**
MW-7	12/14/2011	**39**	<50	350	**1,900**
MW-7	3/8/2012	0.91	5.4	2.7	19
MW-7	6/14/2012	2.3	<5	8.8	70
MW-7	9/12/2012	**10**	<50	28	260
MW-7	12/21/2012	7.3	5.3	27	250
MW-7	3/14/2013	7.4	<5.0	<0.5	1.9
MW-7	6/17/2013	2.7	<5.0	<0.5	3.3
MW-7	9/11/2013	**70**	<100	310	**2,800**
MW-7	12/16/2013	<5.0	<50	77	570

Notes:
NMWQCC - New Mexico Water Quality Control Commission
ND - not detected
µg/L - micrograms per liter
BOLD values exceed the NMWQCC Standard
< - indicates the result was less than the laboratory detection limit

FIGURE 1
SITE LOCATION MAP

LEGEND

SITE LOCATION

IMAGE COURTESY OF USDA/NRCS, VARIOUS DATES

0 2,000 4,000

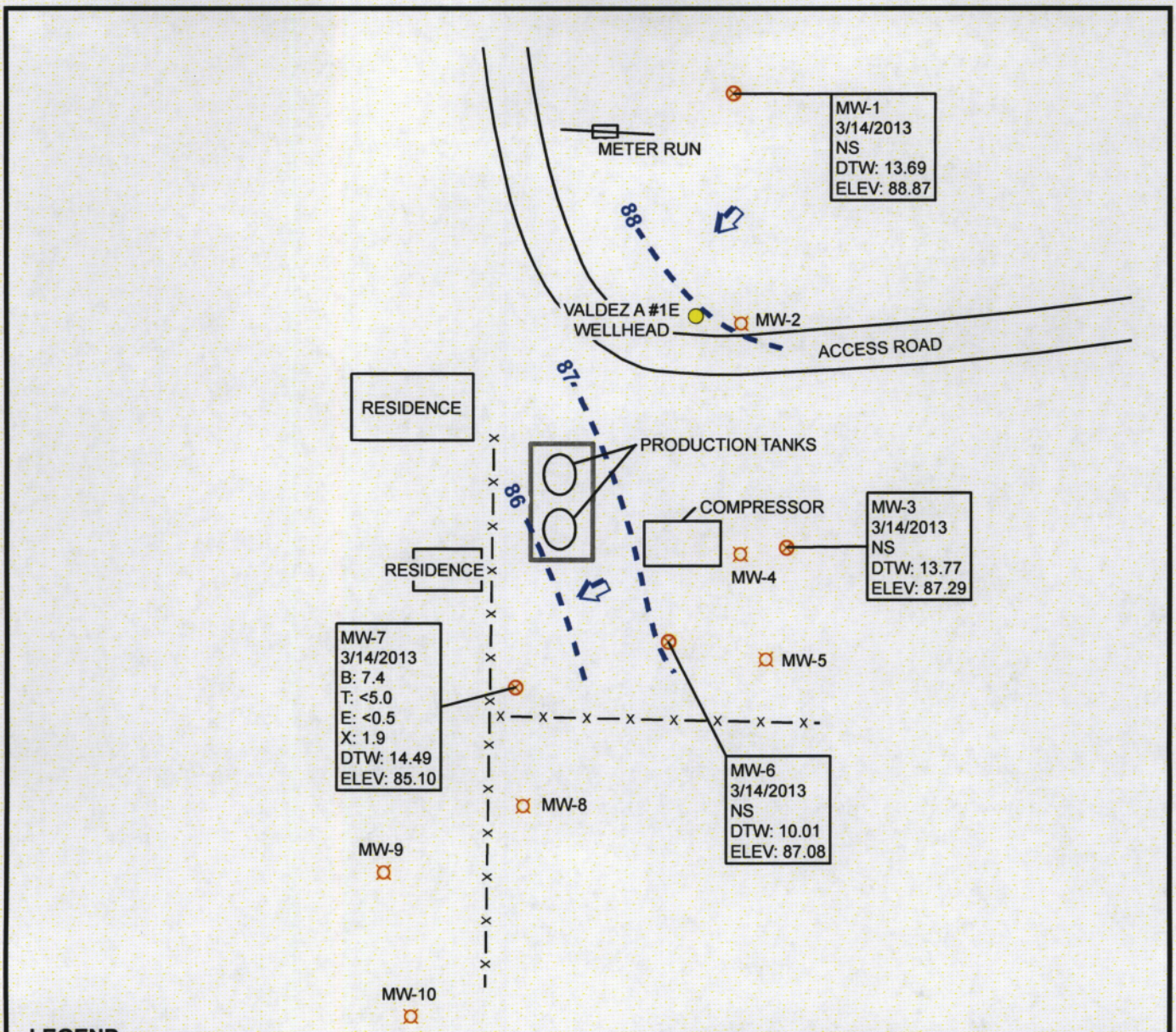
Feet

N

FIGURE 1
SITE LOCATION MAP
VALDEZ A #1E
SWNE SEC 24 T29N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\012911009\012911009_006_VALDEZ_FIG01_SL_MAP.mxd

FIGURE 2
MARCH 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS



LEGEND

- MONITORING WELL
- REMOVED MONITORING WELL
- WELLHEAD
- ESTIMATED GROUNDWATER FLOW DIRECTION
- BERM
- x — x FENCE
- INFERRED RELATIVE GROUNDWATER ELEVATION CONTOUR
  CONTOUR INTERVAL = 1 FOOT

SAMPLE ID
SAMPLE DATE
B: BENZENE IN MICROGRAMS PER LITER (µg/L)
T: TOLUENE (µg/L)
E: ETHYLBENZENE (µg/L)
X: TOTAL XYLENES (µg/L)
DTW: DEPTH TO GROUNDWATER MEASURED IN FEET BELOW TOP OF CASING
ELEV: GROUNDWATER ELEVATION MEASURED IN FEET ABOVE MEAN SEA LEVEL
NS: NOT SAMPLED
<: LESS THAN LABORATORY METHOD DETECTION LIMIT

0 80 160
Feet

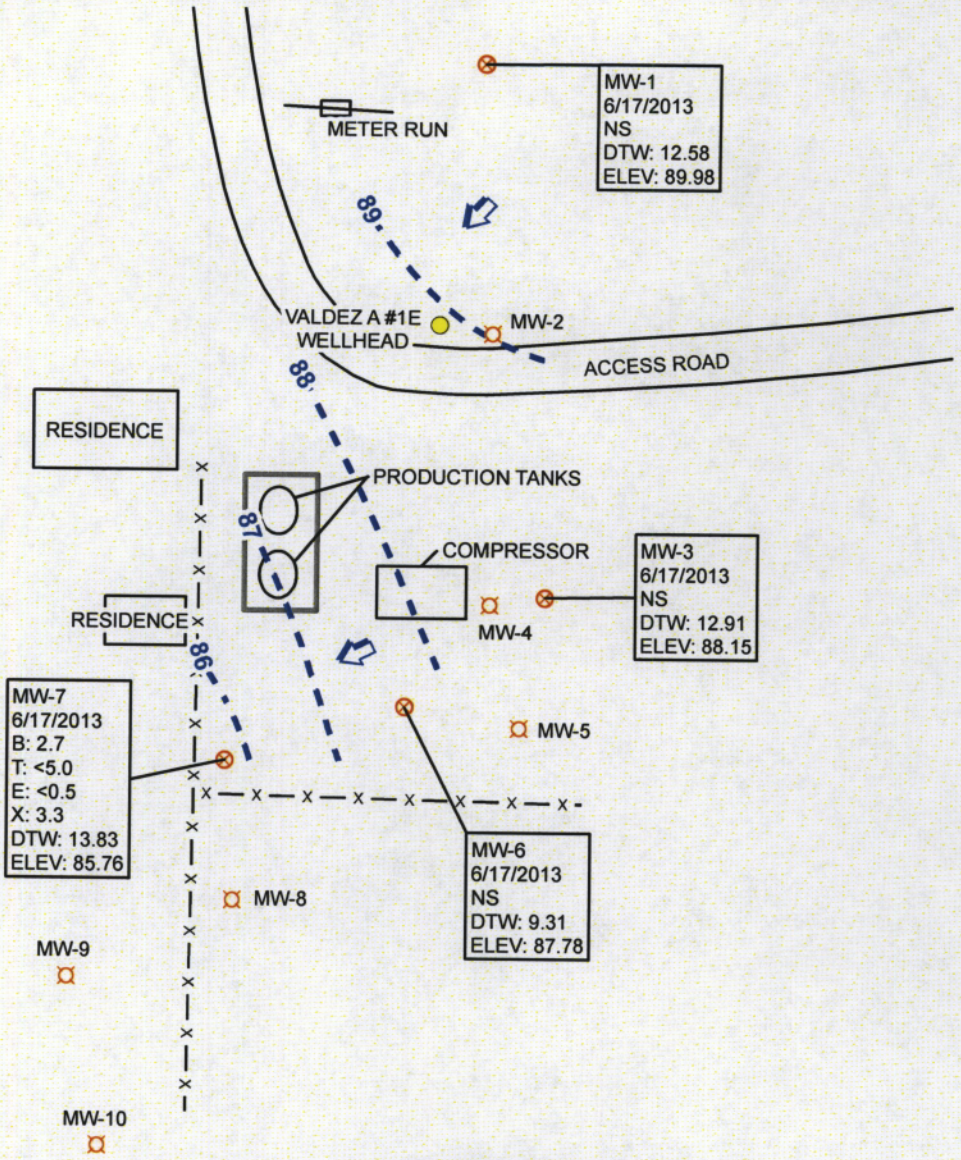
N

NOTE: MONITORING WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND MAY NOT BE TO SCALE.

FIGURE 2
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
VALDEZ A #1E
SWNE SEC 24 T229N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\012911009 ROWLAND\012911009_006_VALDEZ_FIG03_GWE_GWA_2013_Q1.mxd

FIGURE 3
JUNE 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS



LEGEND

- MONITORING WELL
- REMOVED MONITORING WELL
- WELLHEAD
- ESTIMATED GROUNDWATER FLOW DIRECTION
- BERM
- FENCE
- INFERRED RELATIVE GROUNDWATER ELEVATION CONTOUR
  CONTOUR INTERVAL = 1 FOOT

SAMPLE ID
SAMPLE DATE
B: BENZENE IN MICROGRAMS PER LITER (µg/L)
T: TOLUENE (µg/L)
E: ETHYLBENZENE (µg/L)
X: TOTAL XYLENES (µg/L)
DTW: DEPTH TO GROUNDWATER MEASURED IN FEET BELOW TOP OF CASING
ELEV: GROUNDWATER ELEVATION MEASURED IN FEET ABOVE MEAN SEA LEVEL
NS: NOT SAMPLED
<: LESS THAN LABORATORY METHOD DETECTION LIMIT

0 80 160
Feet

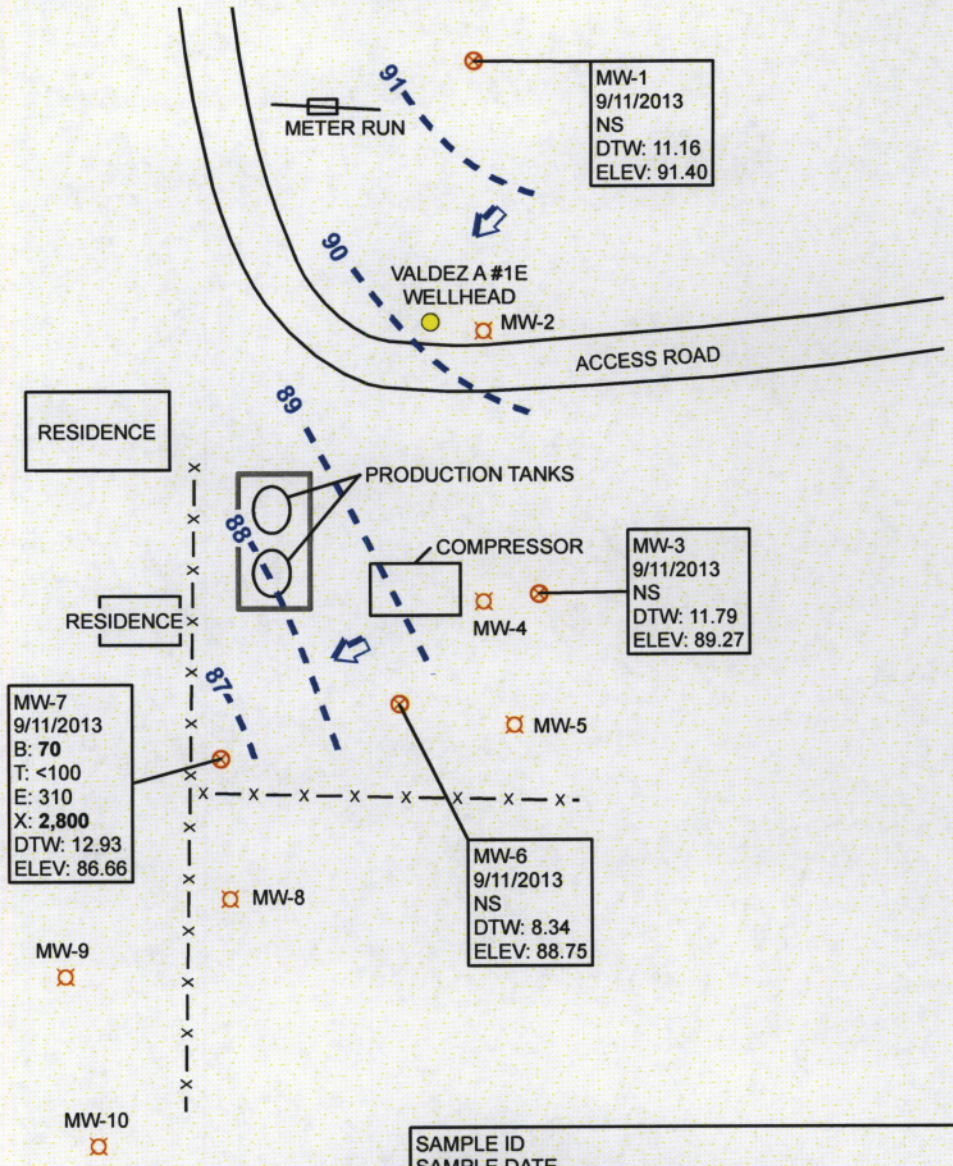
N

NOTE: MONITORING WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND MAY NOT BE TO SCALE.

FIGURE 3
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
VALDEZ A #1E
SWNE SEC 24 T229N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\012911009 ROWLAND\012911009_006_VALDEZ_FIG03_GWE_GWA_2013_Q2.mxd

FIGURE 4
SEPTEMBER 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS



LEGEND

- MONITORING WELL
- REMOVED MONITORING WELL
- WELLHEAD
- ESTIMATED GROUNDWATER FLOW DIRECTION
- BERM
- FENCE
- INFERRED RELATIVE GROUNDWATER ELEVATION CONTOUR
  CONTOUR INTERVAL = 1 FOOT

SAMPLE ID
SAMPLE DATE
B: BENZENE IN MICROGRAMS PER LITER (µg/L)
T: TOLUENE (µg/L)
E: ETHYLBENZENE (µg/L)
X: TOTAL XYLENES (µg/L)
DTW: DEPTH TO GROUNDWATER MEASURED IN FEET BELOW TOP OF CASING
ELEV: GROUNDWATER ELEVATION MEASURED IN FEET ABOVE MEAN SEA LEVEL
NS: NOT SAMPLED
<: LESS THAN LABORATORY METHOD DETECTION LIMIT
BOLD INDICATES RESULT EXCEEDS THE NEW MEXICO WATER QUALITY CONTROL COMMISSION STANDARD

0 80 160
Feet

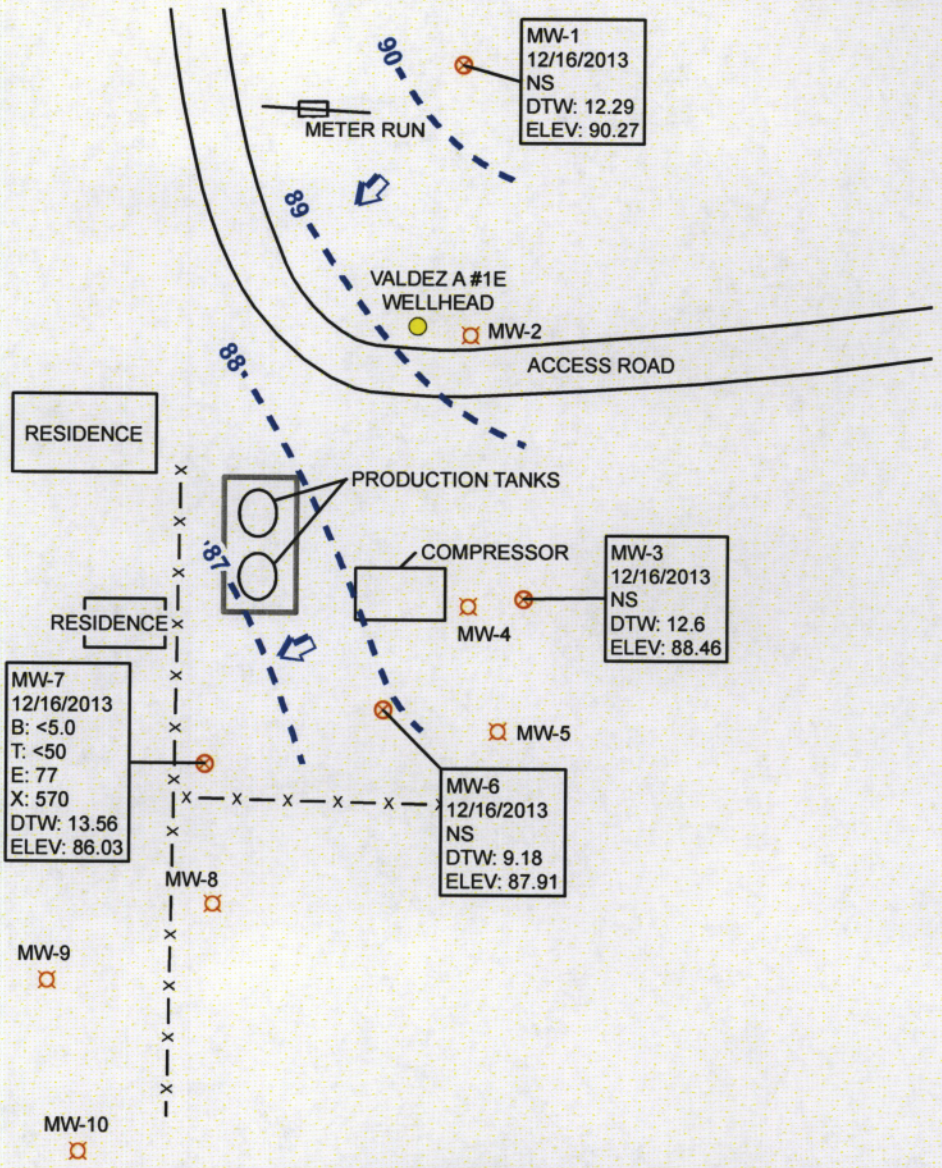
N

NOTE: MONITORING WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND MAY NOT BE TO SCALE.

FIGURE 4
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
VALDEZ A #1E
SWNE SEC 24 T229N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\012911009 ROWLAND\012911009_006_VALDEZ_FIG03_GWE_GWA_2013_Q3.mxd

FIGURE 5
DECEMBER 2012 GROUNDWATER ELEVATIONS AND ANALYTICAL RESULTS



LEGEND

- MONITORING WELL
- REMOVED MONITORING WELL
- WELLHEAD
- ESTIMATED GROUNDWATER FLOW DIRECTION
- BERM
- x — x FENCE
- INFERRED RELATIVE GROUNDWATER ELEVATION CONTOUR
  CONTOUR INTERVAL = 1 FOOT

SAMPLE ID
SAMPLE DATE
B: BENZENE IN MICROGRAMS PER LITER (µg/L)
T: TOLUENE (µg/L)
E: ETHYLBENZENE (µg/L)
X: TOTAL XYLENES (µg/L)
DTW: DEPTH TO GROUNDWATER MEASURED IN FEET BELOW TOP OF CASING
ELEV: GROUNDWATER ELEVATION MEASURED IN FEET ABOVE MEAN SEA LEVEL
NS: NOT SAMPLED
<: LESS THAN LABORATORY METHOD DETECTION LIMIT

0 80 160
Feet

N

NOTE: MONITORING WELL LOCATIONS ARE ONLY AS ACCURATE AS THE INSTRUMENTS USED IN OBTAINING THE FOOTAGE AND BEARING FROM THE WELL HEAD (BRUNTON COMPASS AND LASER RANGE FINDER). ALL OTHER STRUCTURES DISPLAYED ON THE SITE MAP ARE SOLELY FOR REFERENCE AND MAY NOT BE TO SCALE.

FIGURE 5
GROUNDWATER ELEVATION AND ANALYTICAL RESULTS
VALDEZ A #1E
SWNE SEC 24 T229N R11W
SAN JUAN COUNTY, NEW MEXICO
XTO ENERGY, INC.

P:\XTO Energy\GIS\MXD\012911009\012911009_006_VALDEZ_FIG03_GWELEV_GWANALY_2011_Q4.mxd

ATTACHMENT 1
NMOCD LETTER TO TENNECO OIL COMPANY (1988)

STATE OF NEW MEXICO

ENERGY, MINERALS AND NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION

GARREY CARRUTHERS
GOVERNOR

POST OFFICE BOX 2088
STATE LAND OFFICE BUILDING
SANTA FE, NEW MEXICO 87504
(505) 827-5800

June 6, 1988

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Martin W. Buys
Tenneco Oil Company
P. O. Box 3249
Englewood, Colorado 80155

RE: Ground Water Contamination Sites: Tenneco Valdez A1E
Tenneco Riddle F LS 3A

Dear Mr. Buys:

On September 17, 1987, the Oil Conservation Division (OCD) personnel augered four 10½'-18' holes at the Valdez A1E well site and discovered ground water contamination in the vicinity of the produced water tank and the separator. You have been sent laboratory analyses and a field map of the well site.

On October 27, 1987, the OCD augered five 13'-16' holes at the Riddle F LS #3A well site and discovered ground water contamination in the vicinity of the dehydrator and tank drain pit. Copies of the laboratory analysis of fluids found in Auger Hole #2 and a field map locating the auger holes in relation to the well site are enclosed.

Because ground water contamination has been found at these well sites, Tenneco is required to install a series of monitor wells at the sites to define the contamination plume and to monitor contaminant concentration levels. At this time remedial action is not being required. The need for such action will be reevaluated after review of information and data collected at these sites.

OCD staff will be available the week of June 27 to supervise installation of the monitor wells and to split samples of fluids found in the wells. Monitor well installation requirements have been discussed with you by phone.

If you have any questions, please contact me at (505) 827-5812 or Jami Bailey at (505) 827-5884.

Sincerely,

David G. Boyer
Environmental Bureau Chief

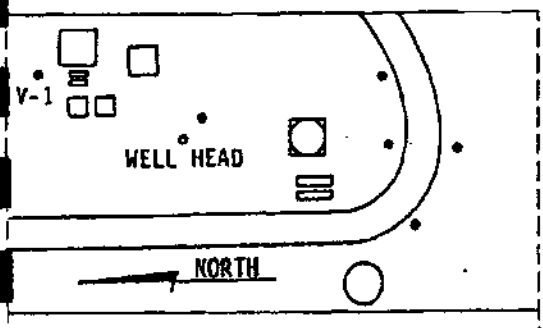
DGB:JB:sl

Enclosure

cc: OCD - Aztec

ATTACHMENT 2
COMPLETION DIAGRAMS AND BOREHOLE LOGS

BOREHOLE LOG (SOIL)



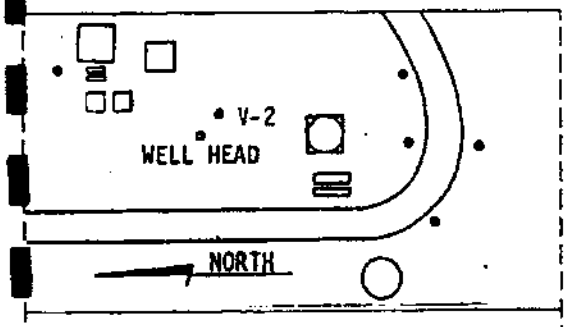
___1/4 ___1/4 ___1/4 ___1/4 S 24 T 29N R 11W

SITE ID: Valdez LOCATION ID: V-1
SITE COORDINATES (ft.): 2390 FNL, 2500 FEL
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: HSA
DRILLING CONTR.: Western Technologies
DATE STARTED: 7/01/88 DATE COMPLETED: 7/01/88
FIELD REP.: W.S. Dubyk, P. Linley
COMMENTS: _____

LOCATION DESCRIPTION: _____

DEPTH	LITH.	REC	SAN	RUN #	RUN FROM	RUN TO	SAMPLE REC.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0									CH	0'-13' Clay - moderate brown 5 YR 3/4, plastic, damp, no odor.
5									ML	13'-17' Silt - dark yellowish brown, 10 YR 4/2, with clay and minor sand grains.
10									GC	17'-20.5' Gravel - with clay and sand, poor cutting return. Water noted at 17'.
15										
20	T.D. 20.17'									
25										
30										

BOREHOLE LOG (SOIL)



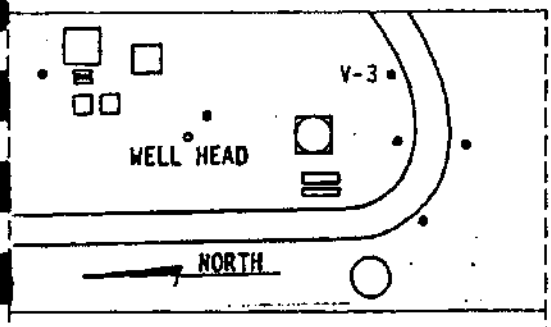
___1/4 ___1/4 ___1/4 ___1/4 S 24 T 29N R 11W

SITE ID: Valdez LOCATION ID: V-2
SITE COORDINATES (ft.): 2390 FNL, 2500 FEL
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: HSA
DRILLING CONTR.: Western Technologies
DATE STARTED: 7/01/88 DATE COMPLETED: 7/01/88
FIELD REP.: W.S. Dubyk, P. Linley
COMMENTS: Cored.

LOCATION DESCRIPTION: _____

DEPTH	LITH.	RECOVERY	SAMPLE #	RUN FROM	RUN TO	SAMPLE REC.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0			1	0'	3'	100%		CH	0'-3' Clay - silty, damp, pale brown 5 YR 5/2 plastic, no odor, fill material.
5			2	3'	8'	60%		SC	3'-8' Sand and Silt - clayey, poorly sorted, moderately rounded, very fine to coarse, yellowish gray damp, probably fill. Grayish Orange Pink 5 Y 7/2.
10			3	8'	13.5'	100%		CH	8'-13.5' Clay - slightly silty, plastic damp, no odor, caliche streaks in fracs. Dark yellowish brown 10 YR 4/2.
15			4	13.5'	18.5'	75%		CH	13.5'-18.5' Clay - as above. Gravel at 18.4', to 2" diameter, slightly rounded, in clay and sand matrix. No coring after 18.5'.
20	T.D. 21.5'		5	18.5'	21.5'	0%		GC	18.5'-21.5' Gravel - no recovery, very slow drilling.
25									
30									

BOREHOLE LOG (SOIL)



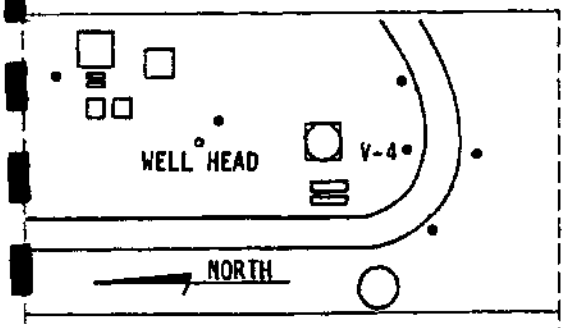
___1/4 ___1/4 ___1/4 ___1/4 S 24 T 29N R 11W

SITE ID: Valdez LOCATION ID: V-3
SITE COORDINATES (ft.): 2390 FNL, 2500 FEL
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: HSA
DRILLING CONTR.: Western Technologies
DATE STARTED: 6/30/88 DATE COMPLETED: 6/30/88
FIELD REP.: W.S. Dubyk, P. Linley
COMMENTS: _____

LOCATION DESCRIPTION: _____

DEPTH	LITH.	REC	SAN	RUN #	RUN FROM	RUN TO	SAMPLE REC.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0									ML	0'-8' Fill - very fine grained silty clay, no odor, light brown 5 YR 6/4.
5									CH	8'-18' Clay - silty, minor rounded quartz grains; plastic, cohesive, carbonate, damp, no odor caliche in fracs. Water at 18' medium brown, 5 YR 4/4.
10										
15									GC	18'-23' Gravel - no sample return difficult drilling.
20	TD 22.94'									
25										
30										

BOREHOLE LOG (SOIL)



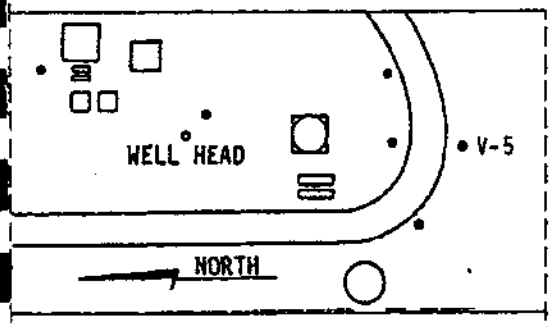
___1/4 ___1/4 ___1/4 ___1/4 S 26 T 29N R 11W

SITE ID: Valdez LOCATION ID: V-4
SITE COORDINATES (ft.): 2390 FNL, 2500 FEL
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: HSA
DRILLING CONTR.: Western Technologies
DATE STARTED: 7/1/88 DATE COMPLETED: 7/1/88
FIELD REP.: W.S. Dubyk, P. Linley
COMMENTS: Cored with continuous sampler

LOCATION DESCRIPTION: _____

DEPTH	LITH.	REC	SAM	RUN #	RUN FROM	RUN TO	SAMPLE REC.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0				1	2'	7'	100%			0'-7' Fill - Clayey sand, no odor.
									CH	7'-13' Clay - Dusky, yellowish brown 10 YR 2/2, laminated, damp, plastic. Hydrocarbon string at 11', odor noted.
5				2	7'	12'	100%			
									CH	13'-17.5' Clay - as above, grades downward into sandy clay, medium yellowish brown, 10 YR 5/4.
10				3	12'	14'	50%			17.5'-18' Sand - with minor gravel moderately yellowish
									GC	brown 10 YR 5/4 moderately sorted, fine to coarse grained. Core to 18'.
15				4	14'	18'	100%		GC	18' Gravel - no sample, difficult drilling.
20										
	T.D. 23'									
25										
30										

BOREHOLE LOG (SOIL)



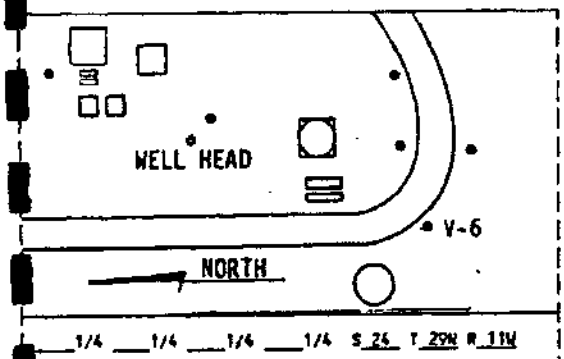
___1/4 ___1/4 ___1/4 ___1/4 S 24 T 29N R 11W

SITE ID: Valdez LOCATION ID: V-5
SITE COORDINATES (ft.): 2390 FNL, 2500 FEL
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: HSA
DRILLING CONTR.: Western Technologies
DATE STARTED: 6/30/88 DATE COMPLETED: 6/30/88
FIELD REP.: W.S. Dubyk, P. Linley
COMMENTS: _____

LOCATION DESCRIPTION: _____

DEPTH	LITH.	REC	SAH	RUN #	RUN FROM	RUN TO	SAMPLE REC.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0										0'-8' Fill - silty clay, light brown 5 YR 5/6, no odor.
									CH	9'-13' Clay - silty, laminated, dusky brown 5 YR 2/2 plastic, damp, no odor.
5										
									MH	13'-17.5' Silt - with clay and ~20% medium to coarse sand grains. Laminated, dusky brown 5 YR 2/2 damp, no odor, plastic.
10										
									GC	17'-23' Gravel - no sample return. H_2O at 17' noted at top of hole. Difficult drilling at 18'.
15										
20										
	T.D. 23'									
25										
30										

BOREHOLE LOG (SOIL)



___1/4 ___1/4 ___1/4 ___1/4 S 25 T 29N R 11W

SITE ID: Valdez LOCATION ID: V-6
SITE COORDINATES (ft.): 2390 FNL, 2500 FEL
N _____ E _____
GROUND ELEVATION (ft. MSL): _____
STATE: New Mexico COUNTY: San Juan
DRILLING METHOD: HSA
DRILLING CONTR.: Western Technologies
DATE STARTED: 6/29/88 DATE COMPLETED: 6/30/88
FIELD REP.: W.S. Dubyk, P. Linley
COMMENTS: _____

LOCATION DESCRIPTION: _____

DEPTH	LITH.	REC	SAN	RUN #	RUN FROM	RUN TO	SAMPLE REC.	SAMPLE TYPE	USCS	VISUAL CLASSIFICATION
0										0'-9' Fill - silty clay, pale brown 5 YR 5/2, very fine grained.
									CH	9'-17' Clay - silty, carbonate, lined fracs. medium brown 5 YR 4/6, odor at 12'.
5										
									GC	17'-18' Gravel - cobbles, difficult drilling.
10										
									CH	18'-20' Clay - grayish brown 5 YR 3/2; odor noted; plastic, wet.
15										
									GC	20'-20.5' Cobbles - gravel, no sample return. Very difficult drilling (refusal).
20	TD 20.81'									
25										
30										

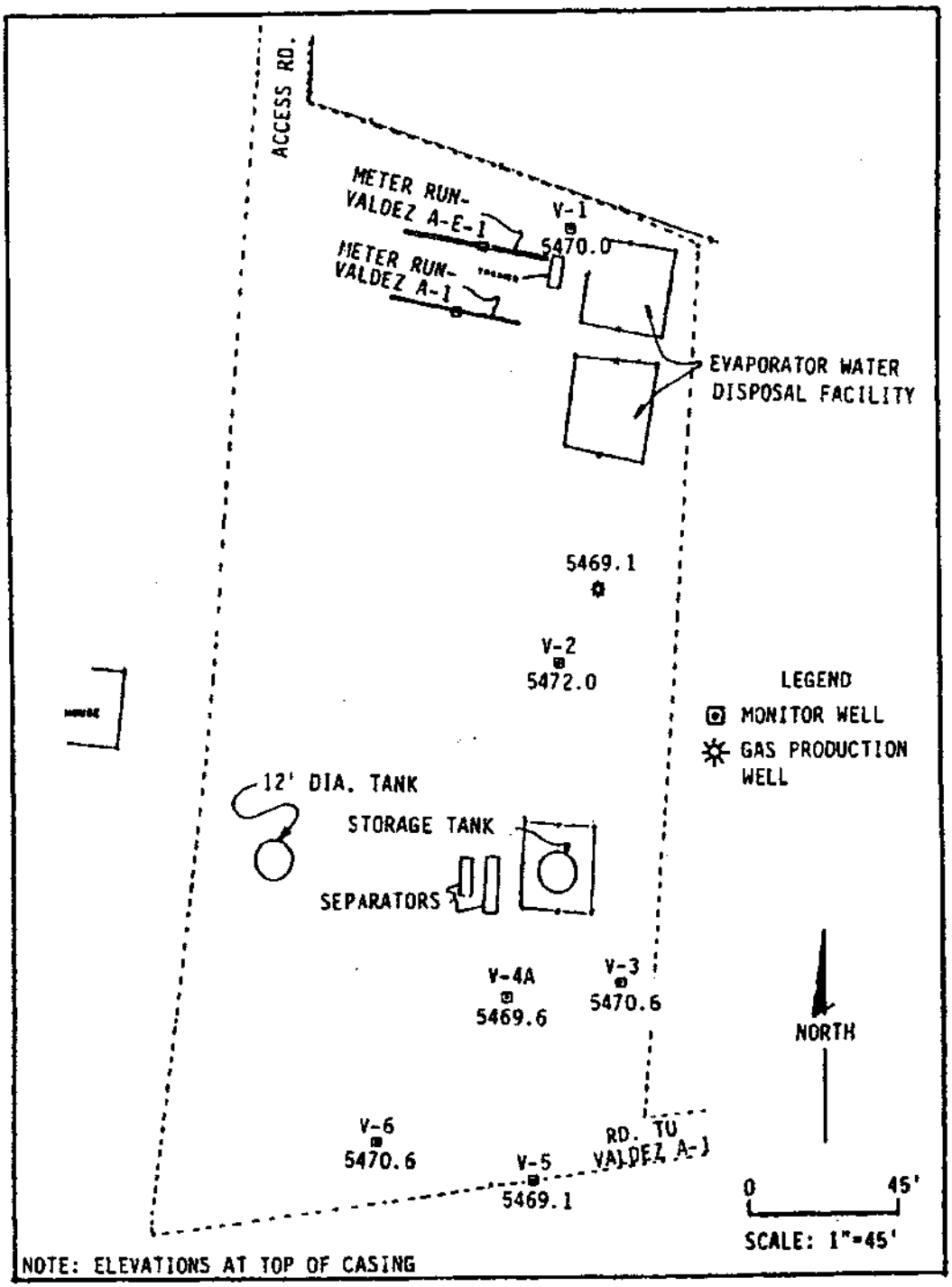


FIGURE 4-1

SITE MAP OF MONITOR WELL LOCATIONS AT VALDEZ A-1-E WELL SITE

ATTACHMENT 3
AMOCO REQUEST FOR CLOSURE (1996)

NEW MEXICO ENERGY, MINERALS
& NATURAL RESOURCES DEPARTMENT

OIL CONSERVATION DIVISION
2040 South Pacheco Street
Santa Fe, New Mexico 87505
(505) 827-7131

March 12, 1996

CERTIFIED MAIL
RETURN RECEIPT NO. Z-765-962-549

Mr. B.D. Shaw
Amoco Production Company
200 Amoco Court
Farmington, New Mexico 87401

RE: GROUND WATER CONTAMINATION
VALDEZ A#1E

Dear Mr. Shaw:

The New Mexico Oil Conservation Division (OCD) has completed a review of Amoco Production Company's (Amoco) JANUARY 8, 1996 "REDUCTION OF GROUNDWATER MONITORING REQUIREMENTS FOR AMOCO WELL SITE VALDEZ A-1-E". This document contains Amoco's request to cease ground water monitoring related to contamination from a former unlined production pit at the Valdez A#1E well site.

According to New Mexico Water Quality Control Commission (WQCC) regulations, a responsible party is required to remediate and monitor contaminated ground water until WQCC standards have been achieved. While the data shows that the contaminated ground water plume has decreased in size, ground water within the plume is still approximately 65 times WQCC ground water standards. Since WQCC standards have not been met, the OCD cannot approve a proposal to cease remedial actions and ground water monitoring. Therefore, the above referenced request is denied.

The OCD would like to point out to Amoco that according to WQCC regulation 4103.F. and 4106 Amoco can voluntarily submit an "Abatement Plan" which could petition for approval of alternate abatement standards. The WQCC regulations are enclosed for your reference.

If you have any questions, please call me at (505) 827-7154.

Sincerely,

William C. Olson
Hydrogeologist
Environmental Bureau

cc: OCD Aztec District Office

Southern
Rockies
Business
Unit

January 8, 1996

San Juan Operations Center

Mr. William Olsen
New Mexico Oil Conservation Division
P.O. Box 2088
Santa Fe, NM 87504

RE: REDUCTION OF GROUNDWATER MONITORING REQUIREMENTS FOR AMOCO WELL SITE VALDEZ A-1-E

Dear Bill:

I have asked Geoscience Consultants, Ltd. (GCL) to evaluate the groundwater chemistry of the above-referenced site. The data, which have been collected from 1988 to 1996, are presented in the attached table, figure, and graphs. Amoco believes the data support our request to cease routine groundwater monitoring at this site. The justification and contingency plan presented below demonstrate that the plume is stable, natural biodegradation is occurring at this site, threats to human health and the environment do not exist, and installation of a remedy at this site would best be accomplished after plugging and abandonment of the on-site natural gas production well.

Trends in BTEX Concentrations

The attached concentration/time plots demonstrate the benzene, toluene, ethylbenzene, and xylenes (BTEX) concentrations outside the center of mass of the plume have remained low and below Water Quality Control Commission (WQCC) standards since 1992. Concentrations in wells inside the center of mass of the plume (MW-6, MW-7, MW-8, and MW-10) are remaining fairly constant or, in the case of well MW-10, have decreased (if the initial 1988 analysis is valid). Some "spikes" in BTEX concentrations may be due to sampling or analytical error.

No Plume Migration

The attached plume map clearly shows the plume has not migrated over time and, in fact, the plume has actually retracted slightly towards the center of mass. It is our understanding that no new water supply wells have been installed near the site and therefore the plume should not migrate from its present position. It appears to be essentially in a steady state, if not slowly retracting.

A solute transport model simulation conducted by RESPEC in 1992 is superimposed on the plume map. This model predicted the extent of contamination if retardation factors, such as bioremediation, did not occur. Clearly, plume conditions predicted by the model were never borne out by groundwater quality analyses conducted since 1992. Natural bioremediation of BTEX constituents is a well-documented process in the literature and is probably responsible for the static

plume observed at this site. Irrigation return water provides nutrients and oxygen to the system, and the petroleum hydrocarbons sorbed to the subsurface soils and dissolved in groundwater provide a carbon source. The rate of petroleum hydrocarbon transport from the source soils is completely offset by the metabolism of these hydrocarbons by indigenous microbes. Amoco strongly believes this process is operating effectively at this site, based upon the eight years of groundwater data.

Human Health and Environment Adequately Protected

The land use in the area is agricultural/pastureland, and we believe it will likely remain so for the lifetime of the gas production well. Provided current conditions do not change, the plume will remain stable or slowly degrade, and not impact a human or ecological receptor. If conditions change, Amoco will implement the contingency plan outlined below.

- If a domestic water well is installed within 200 feet (the length of the plume) of the edge of the plume, or if an irrigation well is installed within 400 feet of the edge of the plume, Amoco will commence semi-annual monitoring of MW-10 and any other monitoring well that lies between the plume's center of mass and the production well.

- If a spill of natural gas liquids occurs, Amoco will commence quarterly monitoring of MW-10 and the monitoring well nearest the spill location.

- If groundwater pumping or spillage causes plume migration, as demonstrated by monitoring, Amoco will commence active remediation of groundwater through a soil venting program and, if required, an air sparging program to arrest the plume and prevent more extensive degradation of groundwater quality.

- One year prior to plugging and abandonment of the natural gas production well, Amoco will collect one year of quarterly monitoring data from all monitoring wells. If contamination remains to the extent that WQCC standards would be exceeded at a place of reasonably foreseeable future use, as determined by the NMOCD, Amoco will install an appropriate groundwater remedy or institutional controls to ensure that all regulatory requirements are met.

Based upon the stability of the plume and the lack of risk it poses to human health and the environment, Amoco believes that continuation of groundwater monitoring is unnecessary. Amoco will commit to remediation of the plume or institutional controls to fully protect usable groundwater (1) if and when site conditions change, (2) the well is plugged, or (3) Amoco or any subsequent operator loses control of the site. Based on the above information, we urge you to approve this request to cease groundwater monitoring at this site.

If you have any questions on the information I have provided you, please feel free to give me a call.

Sincerely,
Amoco

Buddy Shaw

J:\AMOCO.LTR

cc: Roger Anderson, NMOCD
Randall Hicks, GCL

ATTACHMENT 4
2013 LABORATORY REPORTS

ESC LAB SCIENCES
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

James McDaniel
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

Report Summary

Thursday March 21, 2013

Report Number: L625293
Samples Received: 03/15/13
Client Project:

Description: Valdez A 1E

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By: Alan Harvill

T. Alan Harvill , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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REPORT OF ANALYSIS

James McDaniel
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

March 21, 2013

ESC Sample # : L625293-01

Date Received : March 15, 2013
Description : Valdez A 1E

Site ID :

Sample ID : MW-7

Project # :

Collected By : Kyla Vaughan
Collection Date : 03/14/13 10:49

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.0074	0.00050	mg/l	8021B	03/21/13	1
Toluene	BDL	0.0050	mg/l	8021B	03/21/13	1
Ethylbenzene	BDL	0.00050	mg/l	8021B	03/21/13	1
Total Xylene	0.0019	0.0015	mg/l	8021B	03/21/13	1
Surrogate Recovery(%)						
a,a,a-Trifluorotoluene(PID)	101.		% Rec.	8021B	03/21/13	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

Reported: 03/21/13 17:10 Printed: 03/21/13 17:10

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XTO Energy - San Juan Division
James McDaniel
382 County Road 3100

Aztec, NM 87410

Quality Assurance Report
Level II

L625293

March 21, 2013

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Benzene	< .0005	mg/l			WG652020	03/21/13 05:31
Ethylbenzene	< .0005	mg/l			WG652020	03/21/13 05:31
Toluene	< .005	mg/l			WG652020	03/21/13 05:31
Total Xylene	< .0015	mg/l			WG652020	03/21/13 05:31
a,a,a-Trifluorotoluene(PID)		% Rec.	100.3	55-122	WG652020	03/21/13 05:31

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Benzene	mg/l	.05	0.0484	96.7	79-114	WG652020
Ethylbenzene	mg/l	.05	0.0493	98.7	80-116	WG652020
Toluene	mg/l	.05	0.0485	97.0	79-112	WG652020
Total Xylene	mg/l	.15	0.151	101.	84-118	WG652020
a,a,a-Trifluorotoluene(PID)				102.9	55-122	WG652020

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Benzene	mg/l	0.0457	0.0484	91.6	79-114	5.68	20	WG652020
Ethylbenzene	mg/l	0.0464	0.0493	93.0	80-116	6.09	20	WG652020
Toluene	mg/l	0.0456	0.0485	91.9	79-112	6.09	20	WG652020
Total Xylene	mg/l	0.143	0.151	95.0	84-118	5.91	20	WG652020
a,a,a-Trifluorotoluene(PID)				100.1	55-122			WG652020

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Benzene	mg/l	0.0496	0	.05	99.2	35-147	L625975-08	WG652020
Ethylbenzene	mg/l	0.0508	0	.05	102.	39-141	L625975-08	WG652020
Toluene	mg/l	0.0503	0	.05	101.	35-148	L625975-08	WG652020
Total Xylene	mg/l	0.156	0	.15	104.	33-151	L625975-08	WG652020
a,a,a-Trifluorotoluene(PID)					102.4	55-122		WG652020

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Benzene	mg/l	0.0510	0.0496	102.	35-147	2.72	20	L625975-08	WG652020
Ethylbenzene	mg/l	0.0521	0.0508	104.	39-141	2.49	20	L625975-08	WG652020
Toluene	mg/l	0.0509	0.0503	102.	35-148	1.12	20	L625975-08	WG652020
Total Xylene	mg/l	0.159	0.156	106.	33-151	1.57	20	L625975-08	WG652020
a,a,a-Trifluorotoluene(PID)				103.0	55-122				WG652020

Batch number /Run number / Sample number cross reference

WG652020: R2591899: L625293-01

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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Mt. Juliet, TN 37122
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Fax (615) 758-5859

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XTO Energy - San Juan Division
James McDaniel
382 County Road 3100

Aztec, NM 87410

Quality Assurance Report
Level II

L629293

March 21, 2013

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J6" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

Summary of Remarks For Samples Printed
03/21/13 at 17:10:32

TSR Signing Reports: 288
R5 - Desired TAT

Domestic Water Well Sampling-see L609759 Lobato for tests

Sample: L625293-01 Account: XTORNM Received: 03/15/13 09:00 Due Date: 03/22/13 00:00 RPT Date: 03/21/13 17:10

XTO Energy, Inc
382 County Road 3100
Aztec NM 87410

Billing Information:

XTORNM031810S

Report to: James McDaniel

Email to: james_mcdaniel@xtoenergy.co

Analysis/Container/Preservative

Chain of Custody Page 1 of 1

ESC LAB SCIENCES
12065 Lebanon Road
Mt. Juliet, TN 37122

Phone: (800) 767-5859
Phone: (615) 758-5858
Fax: (615) 758-5859

Project Description: Federal GC H #1

City/State Collected

Phone: 505-333-3701
FAX:

Client Project #:

ESC Key:

Collected by: Kyla Vaughan

Site/Facility ID#:

P.O.#:

Collected by (signature): K Vaughan

Immediately Packed on Ice N Y

Rush? (Lab MUST Be Notified)
____ Same Day........200%
____ Next Day........100%
____ Two Day.........50%
____ Three Day.......25%

Date Results Needed:
Email? __No__Yes
FAX? __No__Yes

CoCode XTORNM (lab use only)
Template/Prelogin
Shipped Via:

Sample ID	Comp/Grab	Matrix*	Depth	Date	Time	No. of Cntrs	BTEX 8021	Remarks/Contaminant	Sample # (lab only)
MW-1		GW		3/14/13	13:33	3	✓	L625290	-01

*Matrix: SS - Soil/Solid GW - Groundwater WW - WasteWater DW - Drinking Water OT - Other________

pH ________ Temp ________

Remarks:

Flow ________ Other ________

5435550093382

Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Samples returned via: ☐ UPS ☐ FedEx ☐ Courier ☐		Condition: (lab use only)
Vaughan	3/14/13	15:18				OK JR
Relinquished by: (Signature)	Date:	Time:	Received by: (Signature)	Temp: 2.6°C	Bottles Received: 3v	CoC Seals Intact: ___ Y ___ N ___ NA
Relinquished by: (Signature)	Date:	Time:	Received for lab by: (Signature)	Date: 3/15	Time: 0900	pH Checked: NCF:

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Est. 1970

James McDaniel
XTO Energy - San Juan Division
382 Road 3100
Aztec, NM 87410

Report Summary

Wednesday June 26, 2013

Report Number: L641996
Samples Received: 06/18/13
Client Project:

Description: Valdez A 1E

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By:

Mark W. Beasley , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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REPORT OF ANALYSIS

James McDaniel
XTO Energy - San Juan Division
382 Road 3100
Aztec, NM 87410

June 26, 2013

ESC Sample # : L641996-01

Date Received : June 18, 2013
Description : Valdez A 1E

Site ID : VALDEZ A 1E

Sample ID : MW-7 45FT

Project # :

Collected By : Brooke Herb
Collection Date : 06/17/13 11:24

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.0027	0.00050	mg/l	8021B	06/25/13	1
Toluene	BDL	0.0050	mg/l	8021B	06/25/13	1
Ethylbenzene	BDL	0.00050	mg/l	8021B	06/25/13	1
Total Xylene	0.0033	0.0015	mg/l	8021B	06/25/13	1
Surrogate Recovery(%)						
a,a,a-Trifluorotoluene(PID)	97.6		% Rec.	8021B	06/25/13	1

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 06/26/13 15:41 Printed: 06/26/13 15:42

Summary of Remarks For Samples Printed
06/26/13 at 15:42:15

TSR Signing Reports: 288
R5 - Desired TAT

Domestic Water Well Sampling-see L609759 Lobato for tests EDD's

Sample: L641996-01 Account: XTORNM Received: 06/18/13 18:01 Due Date: 06/25/13 00:00 RPT Date: 06/26/13 15:41

ESC LAB SCIENCES
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12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

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Est. 1970

XTO Energy - San Juan Division
James McDaniel
382 Road 3100

Aztec, NM 87410

Quality Assurance Report
Level II

L641996

June 26, 2013

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Benzene	< .0005	mg/l			WG668260	06/25/13 18:13
Ethylbenzene	< .0005	mg/l			WG668260	06/25/13 18:13
Toluene	< .005	mg/l			WG668260	06/25/13 18:13
Total Xylene	< .0015	mg/l			WG668260	06/25/13 18:13
a,a,a-Trifluorotoluene(PID)		% Rec.	98.01	55-122	WG668260	06/25/13 18:13

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Benzene	mg/l	.05	0.0446	89.2	79-114	WG668260
Ethylbenzene	mg/l	.05	0.0466	93.3	80-116	WG668260
Toluene	mg/l	.05	0.0454	90.8	79-112	WG668260
Total Xylene	mg/l	.15	0.137	91.6	84-118	WG668260
a,a,a Trifluorotoluene(PID)				98.13	55-122	WG668260

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Benzene	mg/l	0.0457	0.0446	91.3	79-114	2.45	20	WG668260
Ethylbenzene	mg/l	0.0473	0.0466	94.5	80-116	1.28	20	WG668260
Toluene	mg/l	0.0458	0.0454	92.0	79-112	0.870	20	WG668260
Total Xylene	mg/l	0.138	0.137	92.0	84-118	0.900	20	WG668260
a,a,a-Trifluorotoluene(PID)				98.38	55-122			WG668260

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Benzene	mg/l	0.0495	0	.05	99.1	35-147	L642885-02	WG668260
Ethylbenzene	mg/l	0.0520	0	.05	104.	39-141	L642885-02	WG668260
Toluene	mg/l	0.0510	0.000247	.05	101.	36-148	L642885-02	WG668260
Total Xylene	mg/l	0.154	0.000253	.15	103.	33-151	L642885-02	WG668260
a,a,a-Trifluorotoluene(PID)					97.84	55-122		WG668260

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Benzene	mg/l	0.0456	0.0495	91.2	35-147	8.27	20	L642885-02	WG668260
Ethylbenzene	mg/l	0.0477	0.0520	95.3	39-141	8.69	20	L642885-02	WG668260
Toluene	mg/l	0.0460	0.0510	91.5	36-148	10.3	20	L642885-02	WG668260
Total Xylene	mg/l	0.140	0.154	93.1	33-151	9.73	20	L642885-02	WG668260
a,a,a-Trifluorotoluene(PID)				97.94	55-122				WG668260

Batch number /Run number / Sample number cross reference

WG668260: R2722360: L641996-01

* ' Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

ESC
L·A·B S·C·I·E·N·C·E·S
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Est. 1970

XTO Energy - San Juan Division
James McDaniel
382 Road 3100

Aztec, NM 87410

Quality Assurance Report
Level II

L641996

June 26, 2013

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J3" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

B055

Company Name/Address
XTO Energy, Inc.
382 County Road 3100
Aztec, NM 87410

Alternate Billing
XTORNM031810S

Report to: James McDaniel

E-mail to: james_mcdaniel@xtoenergy.com

Project Description: Valdez A #1E

City/State Collected: Bloomfield, NM

PHONE: 505-333-3701
FAX:

Client Project No.

Lab Project #

Collected by: Brooke Herb

Site/Facility ID#: Valdez A #1E

P.O.#

Collected by(signature)

Packed on Ice N___ Y X

Rush? (Lab MUST be Notified)
_____Next Day.....100%
_____Two Day.....50%
_____Three Day.....25%

Date Results Needed: Standard

Email?___No_X__Yes

FAX?____No___Yes

Sample ID	Comp/Grab	Matrix	Depth	Date	Time	No of Cntrs	BTEX 8021								Remarks/contaminant	Sample # (lab only)
MW-7	Grab	GW	45'	6/17/13	11:24	3	✓								64/1996	-01

Analysis/Container/Preservative

Chain of Custody
Page 1 of 1

Prepared by:
ENVIRONMENTAL Science corp
12065 Lebanon Road
Mt. Juliet TN 37122
Phone (615)758-5858
Phone (800) 767-5859
FAX (615)758-5859

CoCode (lab use only)
XTORNM
Template/Prelogin

Shipped Via: Fed Ex

Matrix SS-Soil/Solid GW-Groundwater WW-Wastewater DW-Drinking Water OT- Other_____

pH_____ Temp_____

Remarks: "ONLY 1 COC Per Site!!"

5040 6/26 2/07

Flow_____ Other_____

Relinquished by:(Signature)	Date	Time	Received by:(Signature)	Samples returned via FedEx_X_ UPS__Other__	Condition (lab use only)
	6/17/13	1700			OK/JM
Relinquished by:(Signature)	Date:	Time:	Received by (Signature)	Temp: 3.1 / Bottles Received: 3 VOA	
Relinquished by (Signature)	Date	Time	Received for lab by (Signature)	Date: 6-18-13 / Time: 0900	pH Checked: NCF

ESC LAB SCIENCES
YOUR LAB OF CHOICE

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

James McDaniel
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

Report Summary

Wednesday September 18, 2013

Report Number: L657042
Samples Received: 09/12/13
Client Project:

Description: VALDEZ A 1E

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By: Daphne R Richards

Daphne Richards , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140. NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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Est. 1970

REPORT OF ANALYSIS

James McDaniel
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

September 18, 2013

ESC Sample # : L657042-01

Site ID :

Project # :

Date Received : September 12, 2013
Description : VALDEZ A 1E

Sample ID : VALDEZ A 1E

Collected By : Morgan Wagoner
Collection Date : 09/11/13 10:47

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	0.070	0.010	mg/l	8021B	09/17/13	20
Toluene	BDL	0.10	mg/l	8021B	09/17/13	20
Ethylbenzene	0.31	0.010	mg/l	8021B	09/17/13	20
Total Xylene	2.8	0.030	mg/l	8021B	09/17/13	20
Surrogate Recovery(%)						
a,a,a-Trifluorotoluene(PID)	102.		% Rec.	8021B	09/17/13	20

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 09/18/13 11:12 Printed: 09/18/13 11:12

Summary of Remarks For Samples Printed
09/18/13 at 11:12:37

TSR Signing Reports: 288
R5 - Desired TAT

Domestic Water Well Sampling-see L609759 Lobato for tests EDD's on ALL projects email James, Kurt and Logan all reports

Sample: L657042-01 Account: XTORNM Received: 09/12/13 09:00 Due Date: 09/19/13 00:00 RPT Date: 09/18/13 11:12

ESC LABORATORY SCIENCES
YOUR LAB OF CHOICE

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Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

XTO Energy - San Juan Division
James McDaniel
382 County Road 3100

Aztec, NM 87410

Quality Assurance Report
Level II

L657042

September 18, 2013

Laboratory Blank

Analyte	Result	Units	% Rec	Limit	Batch	Date Analyzed
Benzene	< .0005	mg/l			WG682147	09/17/13 15:27
Ethylbenzene	< .0005	mg/l			WG682147	09/17/13 15:27
Toluene	< .005	mg/l			WG682147	09/17/13 15:27
Total Xylene	< .0015	mg/l			WG682147	09/17/13 15:27
a,a,a-Trifluorotoluene(PID)		% Rec.	102.0	55-122	WG682147	09/17/13 15:27

Laboratory Control Sample

Analyte	Units	Known Val	Result	% Rec	Limit	Batch
Benzene	mg/l	.05	0.0595	119.	70-130	WG682147
Ethylbenzene	mg/l	.05	0.0571	114.	70-130	WG682147
Toluene	mg/l	.05	0.0594	119.	70-130	WG682147
Total Xylene	mg/l	.15	0.175	116.	70-130	WG682147
a,a,a-Trifluorotoluene(PID)				101.0	55-122	WG682147

Laboratory Control Sample Duplicate

Analyte	Units	Result	Ref	%Rec	Limit	RPD	Limit	Batch
Benzene	mg/l	0.0574	0.0595	115.	70-130	3.52	20	WG682147
Ethylbenzene	mg/l	0.0553	0.0571	110.	70-130	3.38	20	WG682147
Toluene	mg/l	0.0572	0.0594	114.	70-130	3.76	20	WG682147
Total Xylene	mg/l	0.168	0.175	112.	70-130	3.74	20	WG682147
a,a,a-Trifluorotoluene(PID)				100.0	55-122			WG682147

Matrix Spike

Analyte	Units	MS Res	Ref Res	TV	% Rec	Limit	Ref Samp	Batch
Benzene	mg/l	0.0517	0.0	.05	100.	57.2-131	L657287-17	WG682147
Ethylbenzene	mg/l	0.0498	0.0	.05	100.	67.5-135	L657287-17	WG682147
Toluene	mg/l	0.0506	0.0	.05	100.	63.7-134	L657287-17	WG682147
Total Xylene	mg/l	0.153	0.000336	.15	100.	65.9-138	L657287-17	WG682147
a,a,a-Trifluorotoluene(PID)					100.0	55-122		WG682147

Matrix Spike Duplicate

Analyte	Units	MSD	Ref	%Rec	Limit	RPD	Limit	Ref Samp	Batch
Benzene	mg/l	0.0571	0.0517	114.	57.2-131	9.91	20	L657287-17	WG682147
Ethylbenzene	mg/l	0.0547	0.0498	110.	67.5-135	9.40	20	L657287-17	WG682147
Toluene	mg/l	0.0572	0.0506	114.	63.7-134	8.40	20	L657287-17	WG682147
Total Xylene	mg/l	0.168	0.153	112.	65.9-138	9.13	20	L657287-17	WG682147
a,a,a-Trifluorotoluene(PID)				101.0	55-122				WG682147

Batch number /Run number / Sample number cross reference

WG682147: R2818840: L657042-01

* * Calculations are performed prior to rounding of reported values.
* Performance of this Analyte is outside of established criteria.
For additional information, please see Attachment A 'List of Analytes with QC Qualifiers.'

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XTO Energy - San Juan Division
James McDaniel
382 County Road 3100

Aztec, NM 87410

Quality Assurance Report
Level II

L607043

September 10, 2013

The data package includes a summary of the analytic results of the quality control samples required by the SW-846 or CWA methods. The quality control samples include a method blank, a laboratory control sample, and the matrix spike/matrix spike duplicate analysis. If a target parameter is outside the method limits, every sample that is effected is flagged with the appropriate qualifier in Appendix B of the analytic report.

Method Blank - an aliquot of reagent water carried through the entire analytic process. The method blank results indicate if any possible contamination exposure during the sample handling, digestion or extraction process, and analysis. Concentrations of target analytes above the reporting limit in the method blank are qualified with the "B" qualifier.

Laboratory Control Sample - is a sample of known concentration that is carried through the digestion/extraction and analysis process. The percent recovery, expressed as a percentage of the theoretical concentration, has statistical control limits indicating that the analytic process is "in control". If a target analyte is outside the control limits for the laboratory control sample or any other control sample, the parameter is flagged with a "J4" qualifier for all effected samples.

Matrix Spike and Matrix Spike Duplicate - is two aliquots of an environmental sample that is spiked with known concentrations of target analytes. The percent recovery of the target analytes also has statistical control limits. If any recoveries that are outside the method control limits, the sample that was selected for matrix spike/matrix spike duplicate analysis is flagged with either a "J5" or a "J6". The relative percent difference (%RPD) between the matrix spike and the matrix spike duplicate recoveries is all calculated. If the RPD is above the method limit, the effected samples are flagged with a "J3" qualifier.

XTO ENERGY
Western Division

Quote Number: XTONORM	Page 1 of 1	
XTO Contact: James McDaniel	XTO Contact Phone #: 505.333.3701	
Email Results to: james_mcdaniel@xtoenergy.com		
Well Site/Location: Valdez A #1E	API Number:	Test Reason: Quarterly Sampling
Collected By: Morgan Wagner	Samples on Ice (Y / N):	Turnaround: X Standard; ___ Next Day; ___ Two Day; ___ Three Day; ___ Std. 5 Bus. Days (by contract); Date Needed: ___
Company: LT Environmental	QA/QC Requested: Standard	
Signature: Morgan Wagner	Grey Areas for Lab Use Only	

Analysis: BTEX 8021

Lab Information

Office Abbreviations
Farmington = FAR
Durango = DUR
Bakken = BAK
Raton = RAT
Piceance = PC
Roosevelt = RSV
La Barge = LB
Orangeville = OV

Sample ID	Sample Name	Media	Date	Time	Preservative	No. of Conts.	Analysis	Lab Sample Number
Valdez A #1E	MW-7	GW	9-11-13	1447	HCl	3	X	

Media: Filter = F Soil = S Wastewater = WW Groundwater = GW Drinking Water = DW Sludge = SG Surface Water = SW Air = A Drill Mud = DM Other = OT

Relinquished By: (Signature) Morgan Wagner	Date: 9-11-13	Time: 1620	Received By: (Signature)	Number of Bottles:	Remarks: Condition:
Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)	Temperature:	Other Information:
Relinquished By: (Signature)	Date:	Time:	Received for Lab by: (Signature)	Date: Time:	

Comments:

* Sample ID will be the office and sampler-date-military time FARJM-MMDDYY-1200

12065 Lebanon Rd.
Mt. Juliet, TN 37122
(615) 758-5858
1-800-767-5859
Fax (615) 758-5859

Tax I.D. 62-0814289

Est. 1970

Kurt Hoekstra
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

Report Summary

Monday December 23, 2013

Report Number: L674379
Samples Received: 12/17/13
Client Project:

Description: Valdez A 1E

The analytical results in this report are based upon information supplied by you, the client, and are for your exclusive use. If you have any questions regarding this data package, please do not hesitate to call.

Entire Report Reviewed By: Alan Harvill

T. Alan Harvill , ESC Representative

Laboratory Certification Numbers

A2LA - 1461-01, AIHA - 100789, AL - 40660, CA - 01157CA, CT - PH-0197, FL - E87487, GA - 923, IN - C-TN-01, KY - 90010, KYUST - 0016, NC - ENV375/DW21704/BIO041, ND - R-140, NJ - TN002, NJ NELAP - TN002, SC - 84004, TN - 2006, VA - 460132, WV - 233, AZ - 0612, MN - 047-999-395, NY - 11742, WI - 998093910, NV - TN000032011-1, TX - T104704245-11-3, OK - 9915, PA - 68-02979, IA Lab #364, EPA - TN002

Accreditation is only applicable to the test methods specified on each scope of accreditation held by ESC Lab Sciences.
Note: The use of the preparatory EPA Method 3511 is not Approved or endorsed by the CA ELAP.

Where applicable, sampling conducted by ESC is performed per guidance provided in laboratory standard operating procedures: 060302, 060303, and 060304.

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Est. 1970

REPORT OF ANALYSIS

Kurt Hoekstra
XTO Energy - San Juan Division
382 County Road 3100
Aztec, NM 87410

December 23, 2013

ESC Sample # : L674379-01

Date Received : December 17, 2013
Description : Valdez A 1E

Site ID :

Sample ID : FARDN-121613-1000

Project # :

Collected By : Daniel Newman
Collection Date : 12/16/13 10:00

Parameter	Result	Det. Limit	Units	Method	Date	Dil.
Benzene	BDL	0.0050	mg/l	8021B	12/20/13	10
Toluene	BDL	0.050	mg/l	8021B	12/20/13	10
Ethylbenzene	0.077	0.0050	mg/l	8021B	12/20/13	10
Total Xylene	0.57	0.015	mg/l	8021B	12/20/13	10
Surrogate Recovery(%)						
a,a,a-Trifluorotoluene(PID)	100.		% Rec.	8021B	12/20/13	10

BDL - Below Detection Limit
Det. Limit - Practical Quantitation Limit(PQL)
Note:
The reported analytical results relate only to the sample submitted.

.
Reported: 12/23/13 08:44 Printed: 12/23/13 08:45

Summary of Remarks for Samples Printed
12/23/13 at 08:45:15

TSR Signing Reports: 288
R5 - Desired TAT

Domestic Water Well Sampling-see L609759 Lobato for tests EDD's on ALL projects email James, Kurt and Logan all reports

Sample: L674379-01 Account: XTORNM Received: 12/17/13 10:00 Due Date: 12/24/13 00:00 RPT Date: 12/23/13 08:44

XTO ENERGY
Western Division

Quote Number: XTO	Page 1 of 1
XTO Contact: James McDaniel	XTO Contact Phone #: 505-333-3701
Email Results to: James_mcdaniel@xtoenergy.com	
Well Site/Location: Valdez A #1E	API Number: 30-045-24145
Collected By: Daniel Newman	Samples on Ice (Y/N): Y
Company: LT Environ	QA/QC Requested: Standard
Signature:	Gray Areas for Lab Use Only!

Test Reason: Quarterly GW

Turnaround:
- X Standard
- ___ Next Day
- ___ Two Day
- ___ Three Day
- ___ Std. 5 Bus. Days (by contract)
- Date Needed ___

Analysis: X BTEX 8021

Lab Information

Office Abbreviations
Farmington = FAR
Durango = DUR
Bakken = BAK
Raton = RAT
Piceance = PC
Roosevelt = RSV
La Barge = LB
Orangeville = OV

Sample ID	Sample Name	Media	Date	Time	Preservative	No. of Conts.	Sample Number
FARDN-121313-1000	MW-7	GW	12/6/13	1000	HCl	3	474379

Media: Filter = F Soil = S Wastewater = WW Groundwater = GW Drinking Water = DW Sludge = SG Surface Water = SW Air = A Drill Mud = DM Other = OT

	Date:	Time:		Number of Bottles	Sample Condition
Relinquished By: (Signature)	12/16/13	1650	Received By: (Signature)		
Relinquished By: (Signature)	Date:	Time:	Received By: (Signature)	Temperature: 3.4°	Other Information
Relinquished By: (Signature)	Date:	Time:	Received for Lab by: (Signature)	Date: 12/17/13 Time: 1000	

Comments

count = 3

* Sample ID will be the office and sampler-date-military time FARJM-MMDDYY-1200

ATTACHMENT 5
2013 FIELD NOTES

Water Sample Collection Form

Sample Location	Valdez A #1E	Client	XTO
Sample Date	3/14/2013	Project Name	Groundwater Sampling
Sample Time	10:49	Project #	012911009.006
Sample ID	MW-7	Sampler	K. Vaughan
Analyses	BTEX 8021		
Matrix	Groundwater	Laboratory	ESC
Turn Around Time	Standard	Shipping Method	Fed Ex, Hand delivery
Trip Blank	No	Other QA/QC	None
Depth to Water	14.49	TD of Well	19.20
Time	10:24	Depth to Product	—

Vol. of H2O to purge: 4.71 x .163 = 0.768 x 3 = 2.30

*(height of water column * 0.1631 for 2" well or 0.6524 for 4" well) * 3 well vols*

Method of Purging: Disposable Bailer

Method of Sampling: Disposable Bailer

Time	Vol. Removed (gal.)	Total Vol H2O removed (gal.)	pH (std. units)	Temp. (C)	Conductivity (us or ms)	Comments
10:49	.25	3.55	N/A	N/A	N/A	Odor, clear w/blk flecks
						turns black, odor
						black w/odor
Total purge 3.55						
Sample @ 10:49						
						Retured ORC Socks to Well

Comments: 3/7/13 Sunny 50° Arrive @ 12:34 Review + Sign JSA Remove ORC Socks (6)
DO: 7.3 Date: 3/7/13 Time: 13.11 12.4° Temp
Leave Office 9:15 Arrive Site 9:44 on 3/14/2013. Review HASP + JSA Sign. No add'l Hazards. Sunny 30°
DO: 3.60 11.9° 10:19 Leave Site 11:01

Describe Deviations from SOP:

Signature: Kyla Vaughan Date: 3/14/2013

Water Level Data Collection Form

Project Name: XTO Groundwater Monitoring
Project Number: 012911009
Date: 3/14/2013
Employee Name: Kyla Vaughan

Well ID	Depth to Product (ft)	Depth to Water (ft)	Dissolved Oxygen (mg/L)	Comments
Valdez A #1E				
MW-1	—	13.69	-	9:55
MW-3	—	13.77	—	9:59
MW-6	—	10.01	—	10:03
Federal GC H #1	MW-2 was stuck hard			hard time getting lid off
MW-2	—	32.67	—	14:02
MW-3R	—	34.97	—	12:56
McCoy GC D #1E				prod on bottom in dirt
MW-2	—	DRY	—	TD=37.28
MW-3	—	DRY	—	TD=32.61
Rowland GC #1				
MW-3	N/A			
MW-4R				
MW-6				

COMPLIANCE / ENGINEERING / REMEDIATION

LT Environment
2243 Main Aven
Durango, Colora
T 970.385.1096
970.385.1873

Water Sample Collection Form

Project Name XTO Groundwater Monitoring

Project Number 12911007

Site Name Valdez A #1E

Sampler Brooke Herb

Sample Date 6/17/13

Matrix Groundwater | Analyses 8021 BTEX

Laboratory ESC | Turn Around Time Standard

Shipping FedEx | Trip Blank No

Method of Purging Dedicated bailer

Method of Sampling Purge 3 volumes or bail dry 5.32 x .16 = 0.85 x 3 = 2.55

Sample ID	Depth to Water (ft)	Total Depth (ft)	Vol to Purge (gal)*	Actual Vol Purged (gal)	Sample Time	Comments
MW-7	13.83	19.15	2.55	2.40	11:24	gray, minor sheen minor HC odor

*(height of water column * 0.1631 for 2" well or 0.6524 for 4" well) * 3 well vols

Comments
Return socks to well after sampling

Signature: [signature]

Date: 6/17/13

COMPLIANCE / ENGINEERING / REMEDIATION

LT Environmental, I
2243 Main Avenue, S
Durango, Colorado 8
T 970.385.1096 / F

Water Level Data Collection Form

Project Name: XTO Groundwater Valdez A#1E
Project Number: 012911007
Date: 6/17/13
Employee Name: Brooke Herb

Well ID	Depth to Product (ft)	Depth to Water (ft)	Dissolved Oxygen (mg/L)	Comments
MW-1	NA	12.58	NM	Minor roots on probe
MW-3	NA	12.91	NM	—
MW-4	NA	9.31	NM	—
MW-7	NA	13.83	6.01	13.9°C

COMPLIANCE / ENGINEERING / REMEDIATION

LT Environmental, Inc.
2243 Main Avenue, Suite 3
Durango, Colorado 81301
T 970.385.1096 / F
970.385.1873

Water Sample Collection Form

Project Name XTO Groundwater Monitoring
Project Number 12911007

Site Name Valdez A #1E
Sampler Morgan Wegener
Sample Date 9-11-13
Matrix Groundwater
Analyses 8021 BTEX
Laboratory ESC
Turn Around Time Standard
Shipping FedEx
Trip Blank No
Method of Purging Dedicated bailer
Method of Sampling Purge 3 volumes or bail dry

Sample ID	Depth to Water (ft)	Total Depth (ft)	Vol to Purge (gal)*	Actual Vol Purged (gal)	Sample Time	Comments
MW-7	12.93	19.15	2.98	3	1047	

*(height of water column * 0.1631 for 2" well or 0.6524 for 4" well) * 3 well vols

Comments

Signature: Morgan Wegener Date: 9-11-13

COMPLIANCE / ENGINEERING / REMEDIATION

LT Environmental, I
2243 Main Avenue, S
Durango, Colorado 8
T 970.385.1096 / F

Water Level Data Collection Form

Project Name: Valdez A #1E
Project Number: 12911007
Date: 9-11-13
Employee Name: Morgan Wagoner

Well ID	Depth to Product (ft)	Depth to Water (ft)	Dissolved Oxygen (mg/L)	Comments
MW-1	ND	11.16	NM	
MW-3	ND	11.79	NM	
MW-6	ND	8.34	NM	
MW-7	NP	12.93	5.3	sampled at 1047

Water Sample Collection Form

Sample Location	Valdez A #1E	Client	XTO
Sample Date	12/16/13	Project Name	GroundWater Sampling
Sample Time	1000	Project #	012911009
Sample ID	MW-7	Sampler	DN
Analyses	BTEX - 8021		
Matrix	GW	Laboratory	ESC
Turn Around Time	Standard	Shipping Method	Fed Ex
Trip Blank	NO	Other QA/QC	Standard
Depth to Water	13.56	TD of Well	19.15
Time	935	Depth to Product	N/A

Vol. of H2O to purge: 19.15-13.56 = 5.59 x 0.163 = 0.911729 x 3 = 2.73

*(height of water column * 0.1631 for 2" well or 0.6524 for 4" well) * 3 well vols*

Method of Purging: Bailer

Method of Sampling: Bailer

Time	Vol. Removed (gal.)	Total Vol H2O removed (gal.)	pH (std. units)	Temp. F (C)	Conductivity (us or ms)	Comments	PPt
935	0.25	0.25	7.87	56.7	2.85	slight sheen, dark grey, cloudy, slight odor	1.41
	025	0.50	7.55	57.0	2.85	No change	1.43
	025	0.75	7.31	57.2	2.93	No change	1.47
	0.25	1.00	7.13	57.4	3.03	"	1.52
	0.25	1.25	7.02	57.4	3.11	sheen, dark grey, cloudy, Heavy sediment	1.56
	0.25	1.50	6.90	57.7	3.15	No change	1.58
	0.25	1.75	6.92	57.7	3.23	"	1.61
	0.25	2.00	6.93	57.6	3.25	"	1.62
	025	2.25	6.96	57.4	3.27	"	1.63
	0.25	2.50	6.91	57.4	3.32	"	1.63
	0.25	2.75	6.89	57.6	3.31	"	1.63

Comments: Replace PRC socks (6), Dump water @on site Pit

Describe Deviations from SOP: NO

Signature: [signature] Date: 12/16/13

Valdez A#1E

Location Valdez A#1E Date 12/16/13

Project / Client XTO

Valdez A#1E T9 DO meter, interface Probe, Plunder

onsite @ 830 sunny, cool

DTW mw-1) 12.29

mw-3) 12.60

mw-6) 9.18

mw-7) 13.56

D.O.) 2.40 mg/L 21.0%

Purg 2.75 gallons, sample @ 1000 8021 BTEX

API 30-045-24445

OFF site @ 1015