



COMPLIANCE / ENGINEERING / REMEDIATION

LT Environmental Inc.  
17 West Mill Street  
P.O. Box 874  
Bayfield, Colorado 81122  
T/F 970-884-5215

December 12, 2007

Ms. Lisa Winn  
XTO Energy, Inc.  
2700 Farmington Avenue  
Farmington, NM 87401

RE: November 2007 Well Site Investigation  
Flagg #6-3 and Five Abandoned Production Wells  
La Plata County, Colorado

Dear Ms. Winn:

LT Environmental, Inc. (LTE) is pleased to provide XTO Energy, Inc. (XTO) with this letter summarizing the results of the well site investigation activities conducted in the vicinity of one active production well site and five abandoned production well sites located in La Plata County, Colorado on November 26, 2007. LTE completed this work in response to a concern for methane seepage in the vicinity of a recently drilled production well identified as the Flagg #6-3 (API #05-067-09387).

## BACKGROUND

After completion of the Flagg #6-3 production well, methane was observed seeping from the groundwater around the surface casing. LTE conducted soil gas surveys at the Flagg #6-3 well site and at four of the five closest abandoned production well sites (A O Martin #1 [API #05-067-05174], J. W. Carlson #1 [API #05-067-05198], Jones #1 [API #05-067-05220], and Phillip J. Schalles [API #05-067-05186]) in order to determine whether potentially hazardous environmental conditions, specifically methane seepage, exist that could impact the Flagg #6-3 well site. LTE originally planned to include five abandoned production wells as part of this well site investigation, however, LTE was denied access to the John Sauer #1 (API #05-067-05215) abandoned well site by the landowner. Therefore, LTE did not conduct a soil gas survey at this location.

## SITE DESCRIPTION

The active Flagg #6-3 well site and the five abandoned well sites of concern are located in La Plata County, Colorado (Figure 1).

The following table presents the locations of the active production well and the five abandoned production wells, including the geographic coordinates, as measured by LTE using GPS, and the legal description, as listed on the COGCC database.



## WELL SITE LOCATIONS

Well Name	API #	Geographic Coordinates (NAD83)		PLSS Location	County
		Latitude	Longitude		
Flagg #6-3	05-067-09387	37.04906	-107.53759	SWNE Sec. 6, T32N, R6W	La Plata
A. O. Martin #1	05-067-05174	37.04338	-107.53677	NESE Sec. 6, T32N, R6W	La Plata
John Sauer #1	05-067-05215	37.05603*	-107.53619*	SESE Sec. 31 T33N, R6W	La Plata
J. W. Carlson #1	05-067-05198	37.05061	-107.52945	NWNW Sec. 5, T32N, R6W	La Plata
Jones #1	05-067-05220	37.05695	-107.54635	CSW Sec. 31, T33N, R6W	La Plata
Phillip J Schalles #1	05-067-05186	37.05042	-107.54734	NWNW Sec. 6, T32N, R6W	La Plata

API - American Petroleum Institute  
NAD 83 - North American Datum 1983  
PLSS - Public Land Survey System  
\* - As listed on the COGCC database

## SOIL GAS SURVEY METHODOLOGY

LTE reviewed online well files for each of the four abandoned production well sites in the vicinity of the Flagg #6-3 production well. Compiled information relevant to location and boundaries of each well site and associated well head was incorporated into LTE's Geographic Information System (GIS).

Prior to conducting the field work, LTE generated a 300-foot by 300-foot electronic sampling grid with 100-foot spacing to cover each of the well site mapping areas systematically and to provide a means to delineate the extent of any gas seepage. The grid was generated using AutoCAD LT® 2004 and projected into the appropriate coordinate system using ArcMap 8.3. The grid was uploaded onto a Trimble GeoXT® GPS unit for use in the field. The sampling grid was centered over the location of the well head at each site.

During each site survey, a slide hammer was used to advance a half-inch diameter steel rod (probe) at the corners of each square on the grid and at points close to the actual well head location. Tubing was lowered into each borehole and gas measurements were collected directly from the shallow surface soil approximately 3 feet below ground surface (bgs). LTE measured the concentration of methane, carbon monoxide, hydrogen sulfide, and oxygen at each sampling location using a Mine Safety Appliances (MSA) Gasport® four-gas meter.

Each sample point location was recorded using GPS. The measured gas concentrations and other relevant field notes were stored as attributes in the GPS unit with the associated GPS mapped position. A minimum of 17 and a maximum of 19 subsurface gas measurements were collected from the soil during each gas survey. LTE used the GPS to map additional pertinent site features and structures and collected photographs of the site and all features of interest. LTE also used

GPS to map the actual location of each well head for comparison to the GPS coordinates provided by the COGCC database.

## **SOIL GAS SURVEY RESULTS**

LTE was able to conduct soil gas surveys at four of the five abandoned well sites of concern and at the Flagg #6-3 active well site. Methane gas was not detected at any of the four abandoned well sites surveyed during this investigation. Methane gas was detected in the vicinity of the Flagg #6-3 well site. LTE was not granted access to the John Sauer #1 well site during field activities. The following sections summarize the results of the five soil gas surveys conducted during this investigation. Photographs of the five sites are included as Attachment 1.

### **Flagg #6-3**

The sampling grid for the Flagg #6-3 soil gas survey was centered over the active production well. LTE personnel advanced 18 subsurface probes across the Flagg #6-3 well site. Results of this survey indicate that methane was found at four of the sample locations. Detectable methane concentrations ranged from 1,000 parts per million (ppm) to 180,000 ppm (18 percent [%]). Hydrogen sulfide was not detected at any of the sample locations. Oxygen concentrations ranged from 16.5% to 20.7%. Detectable concentrations of carbon monoxide ranged from 2 ppm to 69 ppm. No stressed vegetation was observed during the survey. Results of the soil gas survey are depicted on Figure 2. Table 1 presents the subsurface gas measurements collected during the Flagg #6-3 survey.

At the request of XTO, Ecosphere Environmental Services (Ecosphere) previously completed a soil gas survey of the Flagg #6-2 (API #05-067-08080) abandoned well site on May 17, 2007. This previous environmental investigation is significant because the Flagg #6-2 abandoned well is located on same well pad as the newly drilled active production well Flagg #6-3. The work was completed to document subsurface soil gas conditions as required by the Memorandum of Understanding (MOU) between the La Plata County Board of Commissioners and XTO. During the May 2007 soil gas survey performed at the Flagg #6-2 abandoned well, methane was not detected at any of the six subsurface probes advanced by Ecosphere personnel. Ecosphere's May 2007 report, entitled *Soil Gas Survey XTO Energy, Inc. Flagg #06-02 Plugged and Abandoned Natural Gas Well*, is included as Attachment 2.

### **A.O. Martin #1**

No abandoned well marker was observed in the vicinity of the A.O. Martin #1 abandoned well site. LTE determined the location of the well site as being a relatively flat area with excavated rocks resting on the ground surface. A stake was observed in the center of the rocks. Information provided on the COGCC website confirmed this location. LTE centered the sampling grid for this survey over the rocks and stake.

LTE personnel advanced 19 subsurface probes across A.O. Martin #1 abandoned production well site. Results of this survey indicate that methane was not detected at any of the sample locations.



Additionally, hydrogen sulfide was not detected at any of the sample locations. Oxygen concentrations ranged from 20.3% to 20.7%. Detectable concentrations of carbon monoxide ranged from 1 ppm to 5 ppm. No stressed vegetation was observed during the survey. Results of the soil gas survey are depicted on Figure 3. Table 2 presents the subsurface gas measurements collected during the A.O. Martin #1 survey.

LTE conducted a previous environmental investigation at the A.O. Martin #1 abandoned well site on April 17, 2007. The survey was conducted as part of the Environmental Response Fund (ERF) well investigation which included surveys of 30 orphaned plugged and abandoned (P&A) well sites in the southwest region of Colorado. The objective of the ERF investigation was to determine whether potentially hazardous environmental conditions, specifically methane seepage, exist in the vicinity of the well site as a result of unsuccessful plugging operations and/or changing environmental conditions. Results of the April 2007 soil gas survey indicated that methane was not detected at any of the 17 subsurface probes advanced by LTE in the vicinity of the A.O. Martin #1 abandoned well site. LTE's June 2007 report, entitled *Environmental Response Fund Well Site Investigation Report – Southwest Region – A.O. Martin #1 (05-067-05174)*, is included as Attachment 2.

#### **J.W. Carlson #1**

No abandoned well marker was observed in the vicinity of the J.W. Carlson #1 abandoned well site. LTE determined the location of the well site as being a relatively flat area in a recently plowed field. The landowner and information provided on the COGCC website confirmed this location. LTE centered the sampling grid for this survey over the COGCC database position of the well.

LTE personnel advanced 17 subsurface probes across J.W. Carlson #1 abandoned production well site. Results of this survey indicate that methane was not detected at any of the sample locations. Additionally, hydrogen sulfide was not detected at any of the sample locations. Oxygen concentrations ranged from 20.3 % to 20.7%. Detectable concentrations of carbon monoxide ranged from 1 ppm to 5 ppm. No stressed vegetation was observed during the survey. Results of the soil gas survey are depicted on Figure 4. Table 3 presents the subsurface gas measurements collected during the J.W. Carlson #1 survey.

#### **Jones #1**

No abandoned well marker was observed in the vicinity of the Jones #1 abandoned well site. LTE determined the location of the well site as being a relatively flat area along a roadside. LTE centered the sampling grid for this survey over the COGCC database position of the well.

LTE personnel advanced 18 subsurface probes across the Jones #1 abandoned production well site. Results of this survey indicate that methane was not detected at any of the sample locations. Additionally, hydrogen sulfide was not detected at any of the sample locations. Oxygen concentrations ranged from 19.6% to 20.5%. Detectable concentrations of carbon monoxide ranged from 4 ppm to 20 ppm. No stressed vegetation was observed during the survey. Results



of the soil gas survey are depicted on Figure 5. Table 4 presents the subsurface gas measurements collected during the Jones #1 survey.

#### **Phillip J. Schalles #1**

LTE observed an abandoned well marker identified as the Phillip J. Schalles #1 at the abandoned well site. LTE centered the sampling grid for this survey over the abandoned well marker.

LTE personnel advanced 17 subsurface probes across the Phillip J. Schalles #1 abandoned production well site. Results of this survey indicate that methane was not detected at any of the sample locations. Additionally, hydrogen sulfide was not detected at any of the sample locations. Oxygen concentrations ranged from 19.5% to 20.8%. Detectable concentrations of carbon monoxide ranged from 1 ppm to 6 ppm. No stressed vegetation was observed during the survey.

LTE observed a permanent soil monitoring probe next to the abandoned well marker for the Phillip J. Schalles #1. Methane was not detected in the soil monitoring probe. Results of the soil gas survey are depicted on Figure 6. Table 5 presents the subsurface gas measurements collected during the Phillip J. Schalles #1 survey.

#### **CONCLUSIONS**

Methane gas was not detected at any of the four abandoned well sites surveyed during this investigation. Methane gas was detected at concentrations up to 180,000 ppm at the Flagg #6-3 active well site. LTE was not granted access to the John Sauer #1 well site during field activities. Therefore, the presence or absence of methane gas seepage in the vicinity of the John Sauer #1 abandoned well site cannot be determined at this time.

LTE appreciates the opportunity to provide environmental services to the XTO Energy, Inc. If you have any questions regarding this report or would like additional information, please contact us at (303) 433-9788.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in black ink that reads "Kyle G. Siesser".

Kyle G. Siesser  
Project Geologist

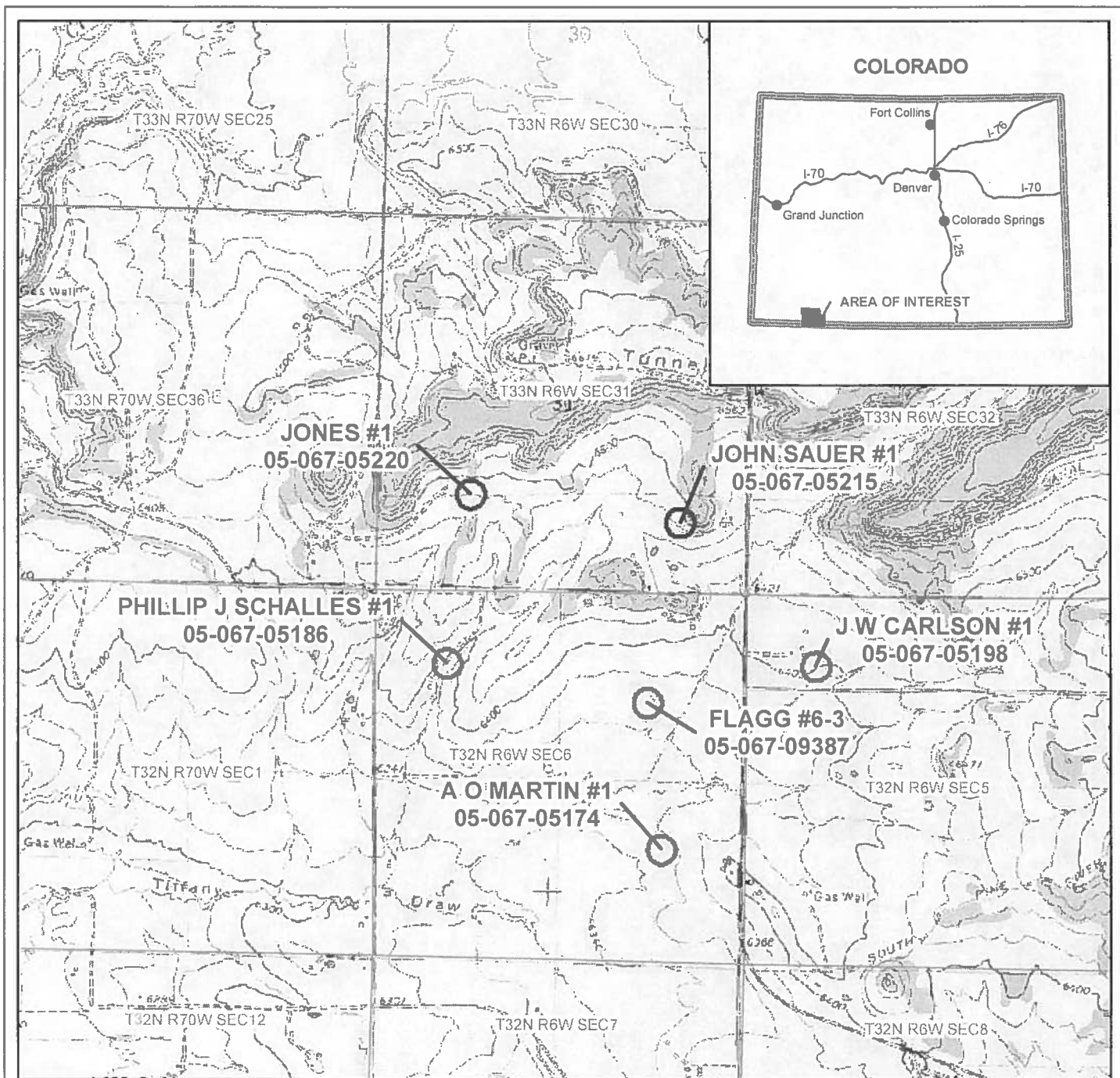
A handwritten signature in black ink that reads "John D. Peterson".

John D. Peterson, P.G.  
Project Manager

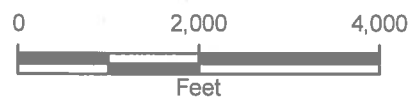
Attachments

## FIGURES AND TABLES





MAP SOURCE: USDA/NRCS



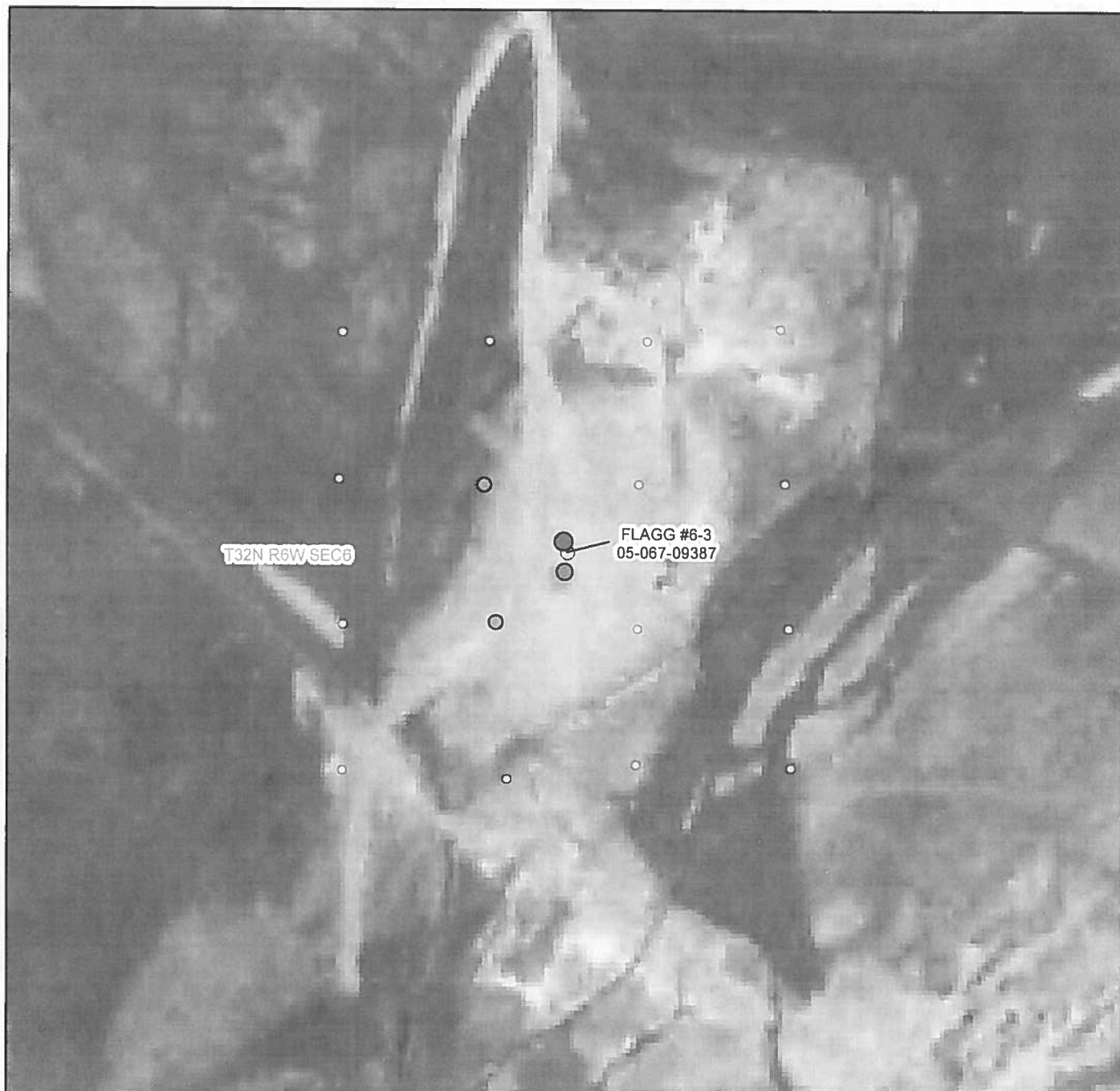
#### LEGEND

 SITE LOCATION

FIGURE 1  
SITE LOCATION MAP  
SOIL GAS SURVEYS  
LA PLATA COUNTY, COLORADO

XTO ENERGY, INC.





# LEGEND

## SUBSURFACE METHANE MEASUREMENTS

- 0 ppm
- 1ppm - 500 ppm
- 501 ppm - 5%
- 6% - 15%
- 16% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%

○ COGCC OIL & GAS WELL LOCATION

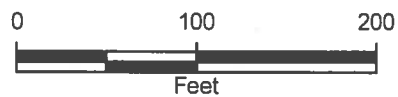


FIGURE 2  
DETAILED MAPPING RESULTS  
FLAGG #6-3 (API #05-067-09387)  
WELL SITE INVESTIGATION  
LA PLATA COUNTY, COLORADO  
XTO ENERGY, INC.



MAP SOURCE: USDA/NRCS, 2005





# LEGEND

## SUBSURFACE METHANE MEASUREMENTS

- 0 ppm
- 1ppm - 500 ppm
- 501 ppm - 5%
- 6% - 15%
- 16% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%



PLUGGED AND ABANDONED WELL

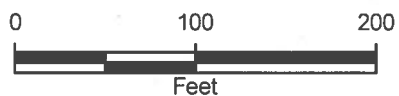


FIGURE 3  
 DETAILED MAPPING RESULTS  
 A O MARTIN #1 (API #05-067-05174)  
 WELL SITE INVESTIGATION  
 LA PLATA COUNTY, COLORADO  
 XTO ENERGY, INC.





# LEGEND

## SUBSURFACE METHANE MEASUREMENTS



DRY AND ABANDONED WELL

- 0 ppm
- 1ppm - 500 ppm
- 501 ppm - 5%
- 6% - 15%
- 16% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%

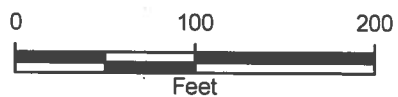


FIGURE 4  
DETAILED MAPPING RESULTS  
J W CARLSON #1 (API #05-067-05198)  
WELL SITE INVESTIGATION  
LA PLATA COUNTY, COLORADO  
XTO ENERGY, INC.





MAP SOURCE: USDA/NRCS, 2005

# LEGEND

## SUBSURFACE METHANE MEASUREMENTS



PLUGGED AND ABANDONED WELL

- 0 ppm
- 1ppm - 500 ppm
- 501 ppm - 5%
- 6% - 15%
- 16% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%

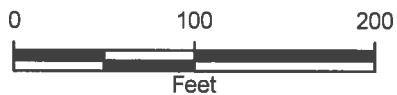


FIGURE 5  
DETAILED MAPPING RESULTS  
JONES #1 (API #05-067-05220)  
WELL SITE INVESTIGATION  
LA PLATA COUNTY, COLORADO  
XTO ENERGY, INC.





## LEGEND

### SUBSURFACE METHANE MEASUREMENTS

- 0 ppm
- 1ppm - 500 ppm
- 501 ppm - 5%
- 6% - 15%
- 16% - 25%
- 26% - 50%
- 51% - 75%
- 76% - 100%



PLUGGED AND ABANDONED WELL

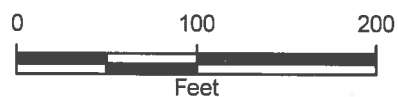


FIGURE 6  
DETAILED MAPPING RESULTS  
PHILLIP J SCHALLES #1 (API #05-067-05186)  
WELL SITE INVESTIGATION  
LA PLATA COUNTY, COLORADO  
XTO ENERGY, INC.



MAP SOURCE: USDA/NRCS, 2005

**TABLE 1**  
**SOIL GAS SURVEY DATA**  
**FLAGG #6-3 (API #05-067-09387)**  
**LA PLATA COUNTY, COLORADO**  
**XTO ENERGY, INC.**

Point ID	GPS Coordinates*		Sample Date	Subsurface CH <sub>4</sub> Conc. (ppm)	Subsurface O <sub>2</sub> Conc. (%)	Subsurface H <sub>2</sub> S Conc. (ppm)	Subsurface CO Conc. (ppm)
	NORTHING	EASTING					
1	1145732.528	2405362.021	11/26/2007	180,000	17.2	0	4
2	1145711.266	2405362.910	11/26/2007	80,000	18.3	0	69
3	1145672.007	2405413.286	11/26/2007	0	20.6	0	51
4	1145772.106	2405414.227	11/26/2007	0	20.5	0	50
5	1145871.052	2405419.787	11/26/2007	0	20.3	0	68
6	1145871.197	2405311.216	11/26/2007	0	20.4	0	4
7	1145771.568	2405307.485	11/26/2007	17,500	16.5	0	64
8	1145676.864	2405315.334	11/26/2007	1,000	20.4	0	57
9	1145574.843	2405209.300	11/26/2007	0	20.5	0	4
10	1145674.938	2405209.813	11/26/2007	0	20.6	0	0
11	1145775.382	2405206.992	11/26/2007	0	20.3	0	0
12	1145877.155	2405209.432	11/26/2007	0	20.4	0	0
13	1145568.975	2405323.191	11/26/2007	0	20.7	0	0
14	1145578.761	2405412.525	11/26/2007	0	20.4	0	2
15	1145576.511	2405519.466	11/26/2007	0	20.6	0	0
16	1145672.231	2405517.934	11/26/2007	0	20.6	0	0
17	1145772.653	2405515.224	11/26/2007	0	20.5	0	25
18	1145879.855	2405511.958	11/26/2007	0	20.4	0	48

**Notes:**

\* GPS coordinates are in Colorado State Plan South, NAD83. Units are in Feet (ft.)

CH<sub>4</sub> - methane

O<sub>2</sub> - oxygen

H<sub>2</sub>S - hydrogen sulfide

CO - carbon monoxide

Conc. - concentration

ppm - parts per million

% - percent



**TABLE 2**  
**SOIL GAS SURVEY DATA**  
**A O MARTIN #1 (API #05-067-05174)**  
**LA PLATA COUNTY, COLORADO**  
**XTO ENERGY, INC.**

Point ID	GPS Coordinates*		Sample Date	Subsurface CH <sub>4</sub> Conc. (ppm)	Subsurface O <sub>2</sub> Conc. (%)	Subsurface H <sub>2</sub> S Conc. (ppm)	Subsurface CO Conc. (ppm)
	NORTHING	EASTING					
1	1143549.116	2405555.953	11/26/2007	0	20.3	0	0
2	1143647.026	2405555.903	11/26/2007	0	20.3	0	0
3	1143745.767	2405554.828	11/26/2007	0	20.3	0	0
4	1143845.727	2405554.328	11/26/2007	0	20.3	0	0
5	1143848.828	2405658.669	11/26/2007	0	20.3	0	0
6	1143747.381	2405659.656	11/26/2007	0	20.3	0	4
7	1143651.597	2405656.726	11/26/2007	0	20.3	0	0
8	1143553.294	2405657.898	11/26/2007	0	20.3	0	0
9	1143689.935	2405524.498	11/26/2007	0	20.7	0	0
10	1143651.539	2405456.053	11/26/2007	0	20.7	0	5
11	1143750.633	2405456.681	11/26/2007	0	20.6	0	1
12	1143847.626	2405456.288	11/26/2007	0	20.6	0	1
13	1143848.595	2405358.758	11/26/2007	0	20.4	0	0
14	1143982.430	2405201.044	11/26/2007	0	20.5	0	0
15	1144092.942	2405175.834	11/26/2007	0	20.4	0	0
16	1143755.134	2405352.385	11/26/2007	0	20.4	0	0
17	1143652.932	2405356.744	11/26/2007	0	20.3	0	0
18	1143550.494	2405359.649	11/26/2007	0	20.3	0	5
19	1143551.749	2405456.056	11/26/2007	0	20.3	0	0

**Notes:**

\* GPS coordinates are in Colorado State Plan South, NAD83. Units are in Feet (ft.)

CH<sub>4</sub> - methane

O<sub>2</sub> - oxygen

H<sub>2</sub>S - hydrogen sulfide

CO - carbon monoxide

Conc. - concentration

ppm - parts per million

% - percent



**TABLE 3**  
**SOIL GAS SURVEY DATA**  
**J W CARLSON #1 (API #05-067-05198)**  
**LA PLATA COUNTY, COLORADO**  
**XTO ENERGY, INC.**

Point ID	GPS Coordinates*		Sample Date	Subsurface CH <sub>4</sub> Conc. (ppm)	Subsurface O <sub>2</sub> Conc. (%)	Subsurface H <sub>2</sub> S Conc. (ppm)	Subsurface CO Conc. (ppm)
	NORTHING	EASTING					
1	1146234.559	2407752.697	11/26/2007	0	20.7	0	5
2	1146289.571	2407800.333	11/26/2007	0	20.7	0	4
3	1146386.074	2407804.562	11/26/2007	0	20.6	0	0
4	1146384.392	2407900.887	11/26/2007	0	20.5	0	0
5	1146285.608	2407901.134	11/26/2007	0	20.6	0	0
6	1146183.865	2407900.714	11/26/2007	0	20.3	0	0
7	1146181.968	2407801.491	11/26/2007	0	20.6	0	0
8	1146081.236	2407899.263	11/26/2007	0	20.4	0	0
9	1146080.183	2407802.506	11/26/2007	0	20.5	0	1
10	1146082.213	2407709.208	11/26/2007	0	20.4	0	0
11	1146184.853	2407701.738	11/26/2007	0	20.4	0	0
12	1146284.068	2407701.662	11/26/2007	0	20.4	0	0
13	1146383.891	2407699.621	11/26/2007	0	20.4	0	1
14	1146383.429	2407601.293	11/26/2007	0	20.4	0	0
15	1146284.528	2407601.547	11/26/2007	0	20.4	0	4
16	1146180.583	2407601.452	11/26/2007	0	20.4	0	0
17	1146086.491	2407601.031	11/26/2007	0	20.4	0	0

**Notes:**

\* GPS coordinates are in Colorado State Plan South, NAD83. Units are in Feet (ft.)

CH<sub>4</sub> - methane

O<sub>2</sub> - oxygen

H<sub>2</sub>S - hydrogen sulfide

CO - carbon monoxide

Conc. - concentration

ppm - parts per million

% - percent



**TABLE 4**  
**SOIL GAS SURVEY DATA**  
**JONES #1 (API #05-067-05220)**  
**LA PLATA COUNTY, COLORADO**  
**XTO ENERGY, INC.**

Point ID	GPS Coordinates*		Sample Date	Subsurface CH <sub>4</sub> Conc. (ppm)	Subsurface O <sub>2</sub> Conc. (%)	Subsurface H <sub>2</sub> S Conc. (ppm)	Subsurface CO Conc. (ppm)
	NORTHING	EASTING					
1	1148657.694	2402858.036	11/26/2007	0	20.0	0	20
2	1148601.528	2402820.785	11/26/2007	0	20.3	0	12
3	1148599.407	2402722.023	11/26/2007	0	20.3	0	4
4	1148703.157	2402715.831	11/26/2007	0	20.3	0	4
5	1148707.991	2402824.257	11/26/2007	0	20.3	0	0
6	1148804.744	2402818.867	11/26/2007	0	20.3	0	0
7	1148803.055	2402718.335	11/26/2007	0	20.4	0	0
8	1148876.812	2402551.759	11/26/2007	0	20.3	0	20
9	1148493.705	2402822.712	11/26/2007	0	20.4	0	0
10	1148502.071	2402719.742	11/26/2007	0	20.4	0	4
11	1148495.008	2402916.782	11/26/2007	0	20.3	0	0
12	1148502.166	2403015.577	11/26/2007	0	20.3	0	7
13	1148597.150	2403017.881	11/26/2007	0	20.4	0	0
14	1148694.459	2403016.745	11/26/2007	0	20.4	0	0
15	1148800.024	2403016.364	11/26/2007	0	20.4	0	4
16	1148805.360	2402918.431	11/26/2007	0	19.6	0	0
17	1148606.734	2402917.988	11/26/2007	0	20.5	0	0
18	1148699.867	2402928.142	11/26/2007	0	20.5	0	0

**Notes:**

\* GPS coordinates are in Colorado State Plan South, NAD83. Units are in Feet (ft.)

CH<sub>4</sub> - methane

O<sub>2</sub> - oxygen

H<sub>2</sub>S - hydrogen sulfide

CO - carbon monoxide

Conc. - concentration

ppm - parts per million

% - percent





**TABLE 5**  
**SOIL GAS SURVEY DATA**  
**PHILLIP J SCHALLES #1 (API #05-067-05186)**  
**LA PLATA COUNTY, COLORADO**  
**XTO ENERGY, INC.**

Point ID	GPS Coordinates*		Sample Date	Subsurface CH <sub>4</sub> Conc. (ppm)	Subsurface O <sub>2</sub> Conc. (%)	Subsurface H <sub>2</sub> S Conc. (ppm)	Subsurface CO Conc. (ppm)
	NORTHING	EASTING					
1	1146254.378	2402500.507	11/26/2007	0	20.4	0	0
2	1146285.080	2402527.131	11/26/2007	0	20.8	0	2
3	1146381.814	2402526.418	11/26/2007	0	20.7	0	0
4	1146381.452	2402431.478	11/26/2007	0	20.7	0	1
5	1146384.363	2402329.437	11/26/2007	0	20.8	0	6
6	1146282.925	2402328.412	11/26/2007	0	20.8	0	0
7	1146182.967	2402329.062	11/26/2007	0	20.8	0	1
8	1146079.213	2402332.337	11/26/2007	0	20.7	0	5
9	1146084.989	2402417.328	11/26/2007	0	20.8	0	0
10	1146078.064	2402523.539	11/26/2007	0	20.7	0	0
11	1146081.538	2402623.165	11/26/2007	0	20.7	0	4
12	1146181.730	2402633.224	11/26/2007	0	20.0	0	0
13	1146285.833	2402626.099	11/26/2007	0	20.7	0	0
14	1146385.237	2402630.310	11/26/2007	0	20.7	0	0
15	1146288.190	2402429.225	11/26/2007	0	20.7	0	0
16	1146182.445	2402432.852	11/26/2007	0	19.5	0	1
17	1146179.760	2402526.608	11/26/2007	0	20.4	0	2

**Notes:**

\* GPS coordinates are in Colorado State Plan South, NAD83. Units are in Feet (ft.)

CH<sub>4</sub> - methane

O<sub>2</sub> - oxygen

H<sub>2</sub>S - hydrogen sulfide

CO - carbon monoxide

Conc. - concentration

ppm - parts per million

% - percent



**ATTACHMENT 1**  
**PHOTOGRAPHIC DOCUMENTATION**



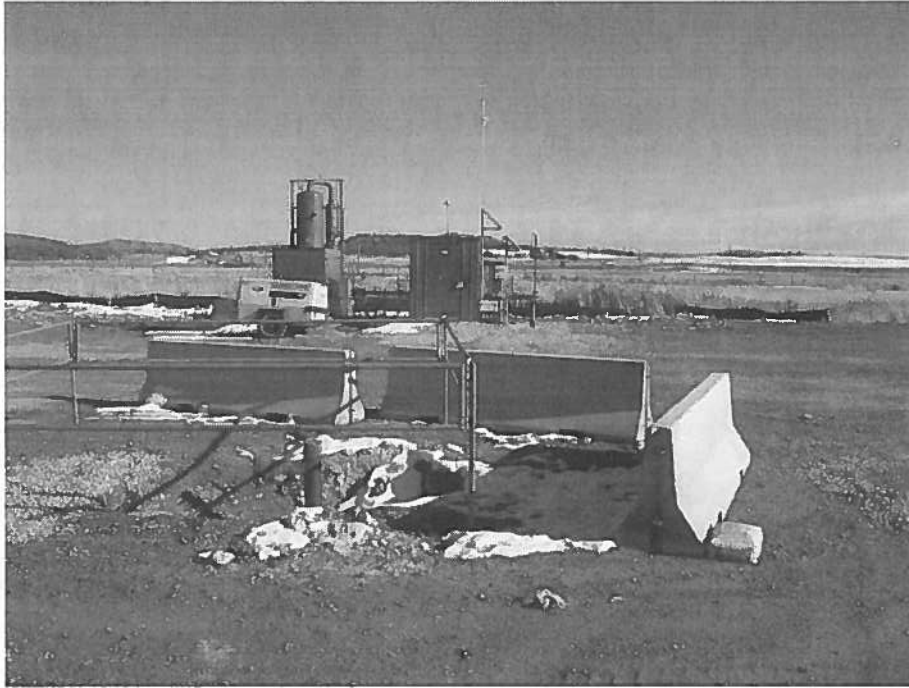


Photo 1: Flagg #6-3 active production well site, view east.



Photo 2: Methane seepage next to surface casing for Flagg #6-3 production well.

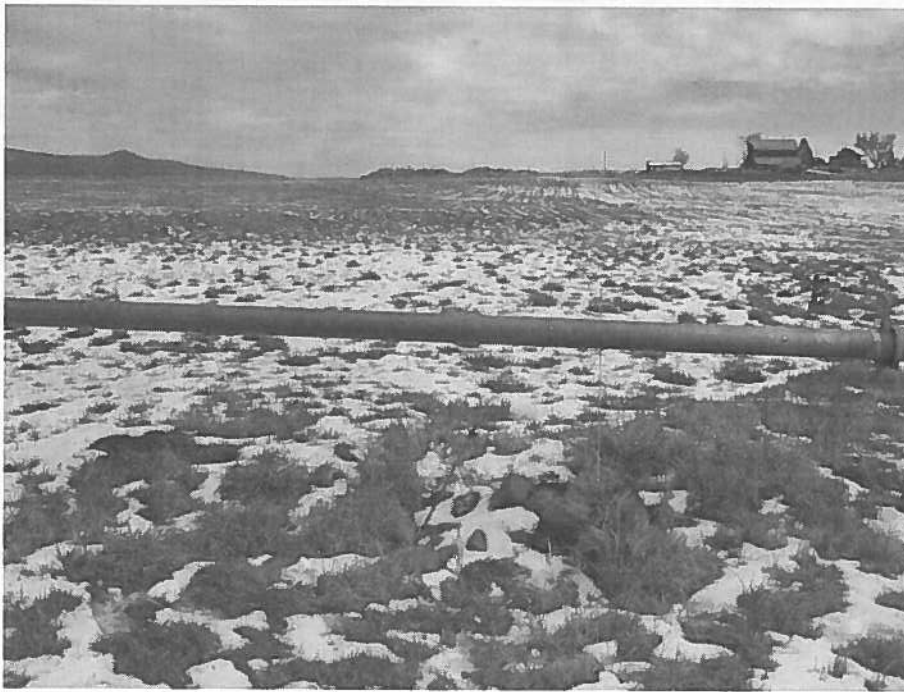


Photo 3: A.O. Martin #1 abandoned production well site, view east.



Photo 4: COGCC database position of Jones #1 abandoned production well, view east.

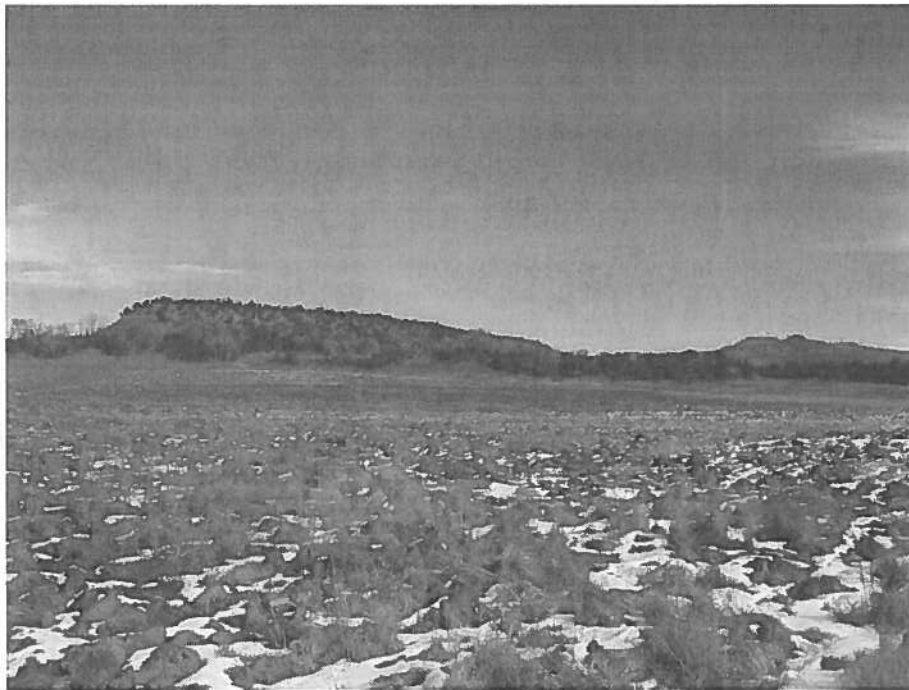


Photo 5: J.W. Carlson #1 abandoned production well site, view north.



Photo 6: Phillip J. Schalles #1 abandoned well marker, view south.



Photo 7: Permanent soil vapor monitoring probe next to Phillip J. Schalles #1 abandoned well marker.

**ATTACHMENT 2**  
**PREVIOUS ENVIRONMENTAL INVESTIGATION REPORTS**



## ECOSPHERE ENVIRONMENTAL SERVICES



May 23, 2007

Lisa Winn  
XTO Energy, Inc.  
San Juan Division  
2700 Farmington Avenue  
Building K, Suite 1  
Farmington, NM 87401

Re: Soil Gas Survey, XTO Energy Inc. Flagg #06-02 Plugged and Abandoned Natural Gas Well: La Plata County, Colorado

Dear Ms. Winn:

The following information summarizes Ecosphere Environmental Services (Ecosphere's) field work and results in completing a soil gas survey at the XTO Energy Inc. Flagg #06-02 Plugged and Abandoned (P and A) natural gas well located in La Plata County, Colorado (Photo 1). The plugged and abandoned well is located in the northeast quarter of Section 6, Township 32 North, Range 6 West NMPM (see Figure 1).

The soil gas survey was completed at the request of XTO to document subsurface soil gas conditions as required by the Memorandum of Understanding (MOU) between the La Plata County Board of County Commissioners and XTO. The work was completed to evaluate for potential presence of subsurface methane gas in the vicinity of the Flagg #06-02 P and A natural gas well. The following sections provide a description of the field methods and results of the soil gas survey.

### *Field Methodology*

The soil gas survey was completed utilizing an AMS Soil Gas Vapor Probe for ground penetration and a CES Landtec GEM-500 landfill gas monitor for screening soil gas vapors. The soil gas vapor probe is a manually advanced 3 foot by 1/2 inch outer diameter hollow probe, with perforations at the tip to allow for measurement of soil gas concentrations in subsurface soils. The GEM-500 gas monitor measures ambient concentrations of gaseous constituents by pumping vapors through the unit, and measuring gas constituents with appropriate detectors.

The general field methodology included advancing the soil gas vapor probe to the maximum depth possible in the subsurface soils. After achieving final depth the soil

4801 N. BUTLER, SUITE 15101 • FARMINGTON, NEW MEXICO 87401 • (505) 327-3088 • FAX (505) 327-9546  
2231 MAIN AVENUE, SUITE 4 • DURANGO, COLORADO 81301 • (970) 382-7256 • FAX (970) 382-7259



vapor probe interior liner rod was removed and a PVC connection valve was attached to the top of the probe. The intake port for the landfill gas monitor was then connected directly to the soil gas vapor probe to allow screening of subsurface soil gas vapors.

To measure the soil gas vapor concentrations, the landfill gas monitor pump was turned on and allowed to run for 60 seconds to pull ambient air into the PVC line and measure ambient air conditions. The ambient air concentrations of methane ( $\text{CH}_4$ ), carbon dioxide ( $\text{CO}_2$ ), oxygen ( $\text{O}_2$ ) and the balance of the gas present were recorded at each location prior to measuring soil gas concentrations. The gas monitor measures the percent concentration of each of the constituents relative to the total gas present. The gas monitor was then connected to the valve at the top of the soil gas vapor probe, and the soil gas concentration was measured by the monitor, as the pump in the unit removed gas through the tip of the soil gas vapor probe.

Soil vapor measurements were collected in a radial pattern surrounding the well pad for the P and A well. Due to the gravel and cobble material present in the surface material for the well pad, only one soil gas sample was collected from within the well pad area (Soil Gas Sample 1). The remaining samples (Soil Gas Sample # 2-6) were collected around the edge of the well pad area. The locations of the soil gas survey points relative to the wellhead marker are provided in Table 1.

### *Results*

The soil gas survey work was completed on May 17, 2007. The soil gas survey was performed by Keith Fox, Environmental Scientist with Ecosphere.

The general site conditions were recorded prior to measuring soil gas concentrations at the site. The well pad for the former well has not been reclaimed, and it is utilized for production equipment for the adjacent XTO Energy Schalles A-1 natural gas well. Surface vegetation surrounding the well pad consists of irrigated hay production and pasture species including alfalfa and smooth brome. The soil gas samples were collected within the fenced area of the well pad. There were no visible surface indications of variations in vegetation growth due to subsurface gas presence observed in the general vicinity of the wellhead location.

The area has moderate vegetation cover, with areas of riparian vegetation present to the east of the well pad within an established drainage. The agricultural land adjacent to the well pad was being actively irrigated at the time of the soil gas survey.

The ambient temperatures were in the low 60s (degrees Fahrenheit) at the time of the survey, with generally calm conditions.

Surface soils in the vicinity of the P and A wellhead marker were moist due to recent precipitation in the area. The soil surface was dry, but subsurface soils were moist. Due to the moist soil conditions the soil vapor probe was easily advanced in the subsurface soils. The soil vapor probe was able to penetrate to depths ranging from 1.5 to 3 feet

below ground surface (BGS) around the well, but was not generally able to be advance on the existing well pad area with the exception of soil sample #1, which was collected at a depth of 18 inches BGS.

A total of 6 monitoring points had soil gas measurements collected. The results of the soil gas measurements are summarized in Table 1. Both ambient concentrations prior to sampling and subsurface soil gas concentrations are included in the table. No methane was detected in any of the soil gas survey sample collection locations. There were some variations in oxygen and carbon dioxide concentrations in the subsurface as compared to ambient conditions.

Please call me if you have any questions regarding this report (970) 382-7256.

Sincerely,



Keith Fox  
Project Scientist

Attachments

Table 1					
Soil Gas Survey Results					
Gas Production Company RC Echols 1 Plugged and Abandoned Natural Gas Well					
Sample Number	Location/depth	Measured Gas Constituents			
	(Location relative to well marker)	methane (CH <sub>4</sub> ) (Percent)	carbon dioxide (CO <sub>2</sub> ) (Percent)	oxygen (O <sub>2</sub> ) (Percent)	Balance (Percent)
SS1 Ambient	15' to north	0.0	0.0	20.4	79.6
SS1	6" deep	0.0	0.0	20.1	79.9
SS2 Ambient	100' to southeast	0.0	0.0	20.0	80.0
SS2	36" deep	0.0	0.0	19.8	80.2
SS3 Ambient	150' to northeast	0.0	0.0	20.0	80.0
SS3	30" deep	0.0	0.0	20.0	80.0
SS4 Ambient	55' to northwest	0.0	0.0	19.6	80.4
SS4	18" deep	0.0	0.2	19.6	80.2
SS5 Ambient	110' to southwest	0.0	0.0	19.3	80.7
SS5	18" deep	0.0	0.1	19.5	80.4
SS6 Ambient	90' to west	0.0	0.0	19.3	80.7
SS6	36" deep	0.0	0.0	19.5	80.5

# **ENVIRONMENTAL RESPONSE FUND WELL SITE INVESTIGATION REPORT - SOUTHWEST REGION**

**A O MARTIN #1 - API #05-067-05174  
LA PLATA COUNTY, COLORADO**

**JUNE 2007**

**Prepared for:**

**COLORADO OIL AND GAS CONSERVATION COMMISSION  
Denver, Colorado**

**ENVIRONMENTAL RESPONSE FUND WELL SITE  
INVESTIGATION REPORT - SOUTHWEST REGION**

**A O MARTIN #1 - API #05-067-05174  
LA PLATA COUNTY, COLORADO**

**JUNE 2007**

**Prepared for:**

**COLORADO OIL AND GAS CONSERVATION COMMISSION  
1120 Lincoln Street, Suite 801  
Denver, Colorado 80203**

**Prepared By:**

**LT ENVIRONMENTAL, INC.  
4600 West 60<sup>th</sup> Avenue  
Arvada, Colorado 80003  
(303) 433-9788**



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## APPENDICES

APPENDIX A	EQUIPMENT SPECIFICATIONS
APPENDIX B	ERF WELL INVESTIGATION FIELD FORM



## EXECUTIVE SUMMARY

LT Environmental, Inc. (LTE) has been retained by the Colorado Oil and Gas Conservation Commission (COGCC) to conduct a soil gas survey at the A O Martin #1 (API #05-067-05174) abandoned production well site. The survey was conducted as part of the Environmental Response Fund (ERF) well investigation which included surveys of 30 orphan plugged and abandoned (P&A) well sites in the southwest region of Colorado.

The objective of this study is to determine whether potentially hazardous environmental conditions exist, specifically methane seepage, in the vicinity of the well site as a result of unsuccessful plugging operations and/or changing environmental conditions.

Based on the results of the soil gas survey, methane was not detected in the 17 subsurface probes advanced by LTE at the A O Martin #1 former production well site. Therefore, LTE does not believe that additional investigation is warranted at this time. However, future changes to the well site and/or surrounding properties, including development, may warrant additional investigation.



## SECTION 1.0

### INTRODUCTION

LT Environmental, Inc. (LTE) has been retained by the Colorado Oil and Gas Conservation Commission (COGCC) to conduct a soil gas survey at the A O Martin #1 (API #05-067-05174) abandoned production well site. The survey was conducted as part of the Environmental Response Fund (ERF) well investigation which included surveys of 30 orphan plugged and abandoned (P&A) well sites in the southwest region of Colorado.

#### 1.1 OBJECTIVES

The objective of this study is to determine whether potentially hazardous environmental conditions exist, specifically methane seepage, in the vicinity of the well site as a result of unsuccessful plugging operations and/or changing environmental conditions.

#### 1.2 BACKGROUND

The ERF program has funded the P&A of over 200 orphan oil and gas production wells in Colorado. Only limited documentation regarding the completion and/or the P&A of these wells is available. In 2005, methane seepage in the vicinity of the Bryce 1-X orphan well in Bondad, Colorado created increased awareness of the potential hazardous conditions associated with the integrity of the P&A of orphan wells.

#### 1.3 SITE LOCATION INFORMATION

The following table presents the location of the A O Martin #1 orphan well, including the geographic coordinates, as measured by LTE using a Global Positioning System (GPS), and the legal description, as listed on the COGCC database.

#### WELL SITE LOCATION

A O Martin #1 (API #05-067-05174)			
Geographic Coordinates (NAD83)		PLSS Location	County
Latitude	Longitude		
37.043478 North	-107.536888 West	NESE Sec. 6, T32N, R6W	La Plata

API - American Petroleum Institute  
NAD 83 - North American Datum 1983  
PLSS - Public Land Survey System





#### 1.4 SITE DESCRIPTION

The A O Martin #1 well site is located in La Plata County, Colorado, approximately 7 miles southeast of Ignacio, Colorado (Figure 1). The surrounding land use consists of agricultural land with a residence further to the east. Pertinent photographs are presented below.



**A O Martin #1 - API#05-067-05174: Former wellhead location, view southeast**



**A O Martin #1 - API#05-067-05174: Site layout, view east**

## **SECTION 2.0**

### **METHODOLOGY**

The following section summarizes the methodology used to complete the well site investigation.

#### **2.1 DATABASE RESEARCH AND PLANNING**

Prior to field activities, LTE conducted research of the online COGCC database. LTE reviewed the online well files for the orphan well site in order to compile any information relevant to location and boundaries of the well site and/or associated wellhead. This information was incorporated into the Geographic Information System (GIS) and used to develop a sampling grid for the well site. LTE also acquired aerial photographic images for the survey area and incorporated them into the GIS to assist in identifying the former location of the well site.

After database research was completed, LTE contacted the Utility Notification Center of Colorado (UNCC) in order to identify any buried utilities within the gas survey area. LTE also contacted all non-UNCC members (such as municipalities) in order to ensure that all known buried utilities within the survey area were marked prior to the advancement of soil gas survey probes. The LTE field crew carried copies of the utility locate request and associated identification numbers during field activities.

LTE created a 300-foot by 300-foot sampling grid with 100-foot spacing to cover the mapping area systematically and to provide a means to delineate the extent of the gas seepage. The grid was generated using AutoCAD LT® 2004 and projected into the appropriate coordinate system using ArcMap 8.3. The grid was uploaded onto a Trimble GeoXT® GPS unit for use in the field. The Trimble GPS unit meets the specifications of the COGCC Rule 215. The specification sheet for the GPS is included in Appendix A.

#### **2.2 SOIL GAS SURVEY**

On April 17, 2007, LTE conducted a soil gas survey of the well site. LTE used information obtained from the COGCC database, field observations, and information obtained through interviews with the current landowner to identify the location of the well site.

Once the well site location was determined, LTE used the electronic grid overlay to initiate the soil gas survey. During the survey, a slide hammer was used to advance a half-inch diameter steel rod (probe) at the corners of each square on the grid. Tubing was lowered into each borehole and gas measurements were collected directly from the shallow surface soil approximately 1 foot to 4 feet below ground surface (bgs). LTE measured the concentration of methane, carbon monoxide, hydrogen sulfide, and oxygen at each sampling location using a Mine Safety Appliances (MSA) Gasport® four gas meter. The specification sheet for the four gas meter is included in Appendix A.

Each sample location was recorded using the GPS. The measured gas concentrations and other relevant field notes were stored as attributes in the GPS unit with the associated GPS mapped

position. LTE also mapped pertinent features, if observed, including abandoned wellhead markers, the corners of the well site, roads, surface water features, and/or other structures on site.

LTE collected photographs of pertinent features observed during the soil gas survey. At a minimum, two photographs were collected depicting the site layout and/or wellhead marker. The starting and ending digital image file numbers were stored in the GPS datalogger.

A well investigation field form was completed for the well site survey. The form included the following information:

- The well name and API number;
- Directions to the well site;
- The absence or presence of a well marker or well pad;
- The absence or presence of other wells at the well site;
- Whether or not methane was detected at the well site;
- The absence or presence of stressed vegetation at the well site;
- The absence or presence of surface staining at the well site;
- The absence or presence of utilities at the well site;
- The absence or presence of oil and gas related equipment at the well site;
- The absence or presence of sensitive receptors on or nearby the well site; and
- A photographic log.

The field form is included as Appendix B of this report.

### **2.3 SENSITIVE RECEPTOR SURVEY**

LTE conducted a sensitive receptor survey at the well site. LTE observed the well site and surrounding area to determine if receptors, such as houses, surface water features, and/or water wells, were present which could potentially be impacted by methane seepage from the well site. LTE documented the presence or absence of sensitive receptors on the well investigation field forms.

## **SECTION 3.0**

### **RESULTS**

The following section summarizes the results of the soil gas survey conducted at the well site.

#### **3.1 WELL SITE IDENTIFICATION**

No abandoned well marker was observed at the location of the well site. Database research indicated that the well casing was most likely cut at a depth of 4 feet bgs and the area was backfilled and restored to its original condition. However, based on field observations, LTE determined the location of the well site as being a relatively flat area with excavated rocks resting on the ground surface. A stake was observed in the center of the rocks. Documentation provided on the COGCC website confirmed this location. LTE centered the sampling grid for this survey over the location of the rocks and the stake.

#### **3.2 SOIL GAS SURVEY**

LTE personnel advanced a total of 17 subsurface probes across the project area. Results of this survey indicate that methane was not detected at any of the sample locations. Additionally, hydrogen sulfide and carbon monoxide were not detected at any of the sample locations. Oxygen concentrations ranged from 19 percent (%) to 21%. Results of the soil gas survey are depicted on Figure 2. Table 1 presents the subsurface gas measurements collected during the survey.

LTE observed an area of stressed vegetation located approximately 35 feet east-northeast of the abandoned well location. No methane was detected in the vicinity of the stressed vegetation. Figure 2 shows the location of the stressed vegetation mapped during the soil gas survey.

#### **3.3 SENSITIVE RECEPTOR SURVEY**

LTE did not identify any sensitive receptors on the well site during the survey. However, LTE observed a residence and a barn located approximately 850 feet east of the well site.

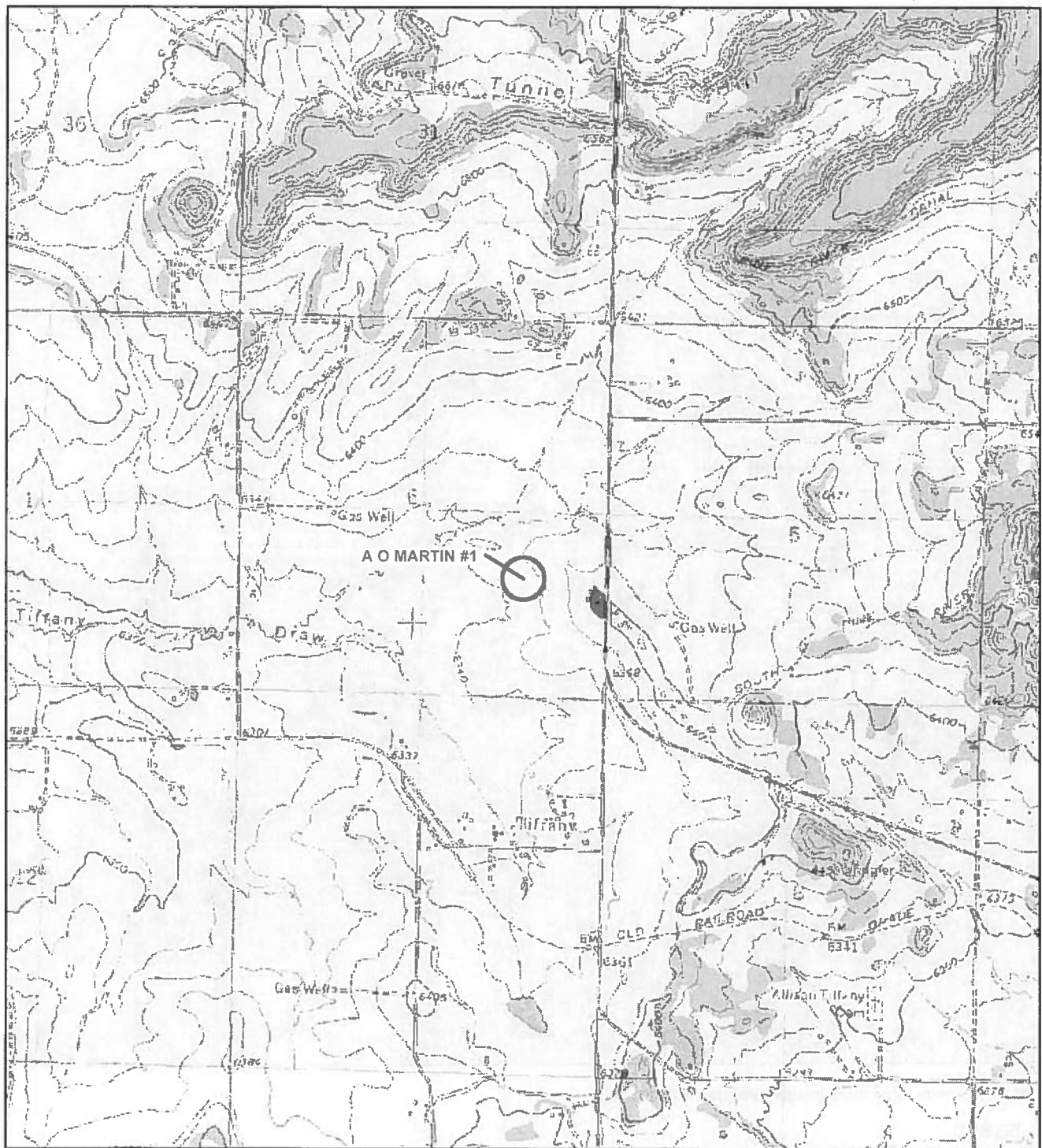
## **SECTION 4.0**

### **CONCLUSIONS AND RECOMMENDATIONS**

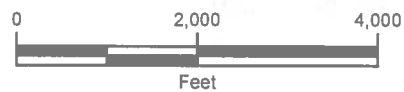
Based on the results of the soil gas survey, methane was not detected in the 17 subsurface probes advanced by LTE at the A O Martin #1 former production well site. Therefore, LTE does not believe that additional investigation is warranted at this time. However, future changes, to the well site and/or surrounding properties including development, may warrant additional investigation.

## FIGURES





Map Source:  
 USDA, Natural Resources Conservation Service  
 National Cartography & Geospatial Center, 1999-Present



#### LEGEND

SITE LOCATION

FIGURE 1  
 SITE LOCATION MAP  
 A O MARTIN #1  
 API #05-067-05174  
 LA PLATA COUNTY, COLORADO  
 COLORADO OIL AND GAS CONSERVATION COMMISSION





Map Source:  
USDA, National Agriculture Imagery Program Mosaic, 2006

#### LEGEND

##### SUBSURFACE METHANE MEASUREMENTS

- 0 ppm
  - 1ppm - 500 ppm
  - 501 ppm - 5%
  - 6% - 15%
  - 16% - 25%
  - 26% - 50%
  - 51% - 75%
  - 76% - 100%
- ⊗ ABANDONED WELL

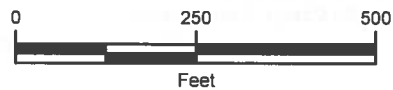


FIGURE 2  
SITE MAP  
A O MARTIN #1  
API #05-067-05174  
LA PLATA COUNTY, COLORADO  
COLORADO OIL AND GAS CONSERVATION COMMISSION





## TABLES



**TABLE 1**  
**SOIL GAS SURVEY DATA**  
**A O MARTIN #1 (API#05-067-05174)**  
**LA PLATA COUNTY, COLORADO**  
**COLORADO OIL AND GAS CONSERVATION COMMISSION**

Point ID	Sample Date	Subsurface CH <sub>4</sub> Conc. (ppm)	Subsurface O <sub>2</sub> Conc. (%)	Subsurface H <sub>2</sub> S Conc. (ppm)	Subsurface CO Conc. (ppm)
1	4/17/2007	0	20.0	0	0
2	4/17/2007	0	20.0	0	0
3	4/17/2007	0	20.0	0	0
4	4/17/2007	0	20.0	0	0
5	4/17/2007	0	20.0	0	0
6	4/17/2007	0	20.0	0	0
7	4/17/2007	0	19.0	0	0
8	4/17/2007	0	20.0	0	0
9	4/17/2007	0	20.0	0	0
10	4/17/2007	0	20.0	0	0
11	4/17/2007	0	21.0	0	0
12	4/17/2007	0	20.0	0	0
13	4/17/2007	0	20.0	0	0
14	4/17/2007	0	20.0	0	0
15	4/17/2007	0	20.0	0	0
16	4/17/2007	0	21.0	0	0
17	4/17/2007	0	20.0	0	0

Notes:

CH<sub>4</sub> - methane  
O<sub>2</sub> - oxygen  
H<sub>2</sub>S - hydrogen sulfide  
CO - carbon monoxide  
Conc. - concentration  
ppm - parts per million



**APPENDIX A**  
**EQUIPMENT SPECIFICATIONS**



# Gasport® Gas Tester

**MSA**

The Gasport Gas Tester is designed for gas utility workers to detect methane and certain toxic gases. It is a reliable, simple, versatile tool to help your service technicians get the job done quickly! With multiple ranges and sensing capabilities built into one rugged housing, the Gasport Tester simplifies your work by reducing the number of meters you have to carry on the job.



## Applications

The Gasport Tester's poison-tolerant methane sensor provides three measurement ranges for your daily service needs:

- Open air, safety sampling
- Small, in-home leak detection
- Street/outdoor service line leak detection



## Features and Benefits

- **Proven in field use—rugged and reliable**  
Less costly to maintain, less time in repair
- **Multiple functions in one instrument**  
No need to buy, carry & maintain multiple instruments
- **New, poison-tolerant combustible gas sensor**  
Reduces meter ownership costs
- **User-selectable, "silent" operation mode**  
Reduces customer disturbances and worries
- **Fast warm up time**  
Fastest warm up time in industry saves time
- **Can monitor up to four gases at a time**  
Fewer instruments to carry
- **Show all gas concentrations simultaneously**  
Eliminates guesswork on what reading is displayed
- **Autoranging methane sensor**  
Automatically switches between 0-5% and 5-100% methane ranges
- **Gas readings recorded for later retrieval**  
Can double check readings after job is done
- **Simple manual or automated calibration options**  
Reduces training time and helps ensure accuracy
- **Intrinsically safe**  
Meets safety standards for work in hazardous areas
- **Lifetime warranty on case and electronics**  
Reduced maintenance and lifetime costs

## Specifications

Gas	Range	Resolution
Methane	0-5000 ppm	50 ppm
Methane	0-100% LEL or 0-5% CH <sub>4</sub>	1 % LEL or 0.1% CH <sub>4</sub>
Methane	5-100% CH <sub>4</sub>	1% CH <sub>4</sub>
Oxygen	0-25%	0.1%
Carbon Monoxide	0-1000 ppm	1 ppm
Hydrogen Sulfide	0-100 ppm	1 ppm

<b>Battery types:</b>	NiCd and Alkaline
<b>Case material:</b>	Impact resistant, stainless-steel-fiber-filled polycarbonate
<b>Operating temperature:</b>	normal -10 to 40°C; extended -20 to 50°C
<b>Operating humidity:</b>	Continuous: 15-95% RH, non-condensing Intermittent duty: 5-95% RH, non condensing
<b>Warm up time:</b>	Less than 20 seconds to initial readings
<b>Datalog capacity:</b>	12 hours
<b>Input:</b>	3 clearly marked, metal domed keys
<b>Warranty:</b>	Case and Electronics: Lifetime Sensors and consumable parts: 1 year

**The answer for gas utilities' gas detection needs**

# Gasport® Gas Tester

## Ordering Information

### Battery Chargers

Part No.	Description
494716	Omega 120 VAC 50/60Hz
495965	Omega 220 VAC 50/60Hz
801759	Omega 110/220 VAC, Five Unit, 50/60Hz
800525	Omega 8 - 24VDC for vehicle use

### Battery Packs

Part No.	Description
496990	Standard NiCd Rechargeable
800526	Alkaline, Type C
711041	Alkaline, with Thumbscrews
800527	Heavy Duty NiCd Rechargeable

### Sensors

Part No.	Description
813693	Combustible Gas
480566	O <sub>2</sub>
812389	CO
812390	H <sub>2</sub> S

### Protective Boots

Part No.	Description
804955	Black, for NiCd Battery Packs
802806	Orange, for NiCd Battery Packs
806751	Black, for Alkaline Battery Packs
806750	Orange, for Alkaline Battery Packs
806749	Black, for HD NiCd Battery Packs
806748	Orange, for HD NiCd Battery Packs
812833	Yellow Soft Carrying Case with Harness
711022	Black padded Vinyl Carrying Case with Harness

### Sampling Equipment

Part No.	Description
800332	Probe - 1 ft., plastic
800333	Probe - 3 ft., plastic
803561	Probe - 3 ft., plastic (holes 2" from end) (bar hole probe)
803962	Probe - 3 ft., plastic (holes 2" from handle) (solid probe)
803848	Probe - Hot Gas Sampler
710465	Sampling Line - 5 ft., coiled
497333	Sampling Line - 10 ft.
497334	Sampling Line - 15 ft.
497335	Sampling Line - 25 ft.

### Sampling Accessories

Part No.	Description
801582	Replacement Filter, Probe, pkg. of 10
801291	External Filter Holder
014318	Charcoal Filter
711039	Line Scrubber Filter Holder
711059	Line Scrubber Replacement Cartridges, Box of 12
808935	Dust Filter, Pump Module
802897	Water Trap (Teflon) Filter, Pump Module

### Calibration Check Equipment

Part No.	Description
477149	Calibration Kit Model RP with 0.25 lpm Regulator
491041	Calibration Gas - methane, 2.5%
473180	Calibration Gas - 300 ppm CO
813718	Calibration Gas - methane, 2.5% oxygen, 15% 60 ppm CO
813720	Calibration Gas - methane, 2.5% oxygen, 15% 300 ppm CO 10 ppm H <sub>2</sub> S
710288	Gas Miser™ Demand Regulator 0 - 3.0 lpm

### Accessories

Part No.	Description
804679	Data Docking Module Kit. Includes the Data Docking Module, MSA Link Software and Instruction Manual

## Approvals

The Gasport Gas Tester has been designed to meet intrinsic safety testing requirements in certain hazardous atmospheres.

The Gasport Gas Tester is approved by MET (an OSHA Nationally Recognized Testing Laboratory [NRTL]) for use in Class I, Division I, Groups A, B, C, D; Class II, Division I, Groups E, F, G; and Class III Hazardous locations. Gasport tGas Testers sold in Canada are approved by CSA for use in Class I, Division I, Groups A, B, C, and D locations.

Contact MSA at 1-800-MSA-2222 for more information or with questions regarding the status of approvals.

### Gasport Gas Tester Kits

	IEL Display	O <sub>2</sub>	CO	H <sub>2</sub> S	Alarms Always	Alarms Optional	Leak Detect Page	Peak	Alkaline Battery	NiCd Battery	5ft Coiled Line	1ft Probe	Part No.
4-Gas, Selectable, NiCd	•	•	•	•	•	•	•	•	•	•	•	•	711489
4-Gas, Selectable, Alkaline	•	•	•	•	•	•	•	•	•	•	•	•	711490
3-Gas, Selectable, NiCd	•	•	•	•	•	•	•	•	•	•	•	•	711493
3-Gas, Selectable, Alkaline	•	•	•	•	•	•	•	•	•	•	•	•	711494
2-Gas, Selectable, NiCd	•	•	•	•	•	•	•	•	•	•	•	•	711495
2-Gas, Selectable, Alkaline	•	•	•	•	•	•	•	•	•	•	•	•	711496
4-Gas, Alarms On, NiCd	•	•	•	•	•	•	•	•	•	•	•	•	711491
4-Gas, Alarms On, Alkaline	•	•	•	•	•	•	•	•	•	•	•	•	711492

### Assemble-to-Order (ATO) System: You Make the Choices

The ATO System makes it easy to "custom order" the Gasport Gas Tester, configured exactly the way you want it. You can choose from an extensive line of base instrument components and accessories. To obtain a copy of the "ATO System and Price Information for the Gasport Gas Tester," call toll-free 1-800-MSA-2222, and request Bulletin 0804-28. To obtain a copy of the ATO via FAX, call MSA QuickLit Information Service at 1-800-672-9010. At the prompt, request QuickLit Document #2345 (ATO for Gasport Gas Tester).

Note: This Data Sheet contains only a general description of the products shown. While uses and performance capabilities are described, under no circumstances shall the products be used by untrained or unqualified individuals and not until the product instructions including any warnings or cautions provided have been thoroughly read and understood. Only they contain the complete and detailed information concerning proper use and care of these products.

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Corporate Headquarters  
PO Box 426  
Pittsburgh, PA 15230 USA  
Phone (412) 967-3000  
www.MSAnet.com

U.S. Customer Service Center  
1-800-MSA-2222

MSA International  
Phone (412) 967-3354  
FAX (412) 967-3451

Offices and representatives worldwide  
For further information:



# GeoXT

## The total GPS platform for all your GIS field requirements

The GeoXT™ handheld, from the GeoExplorer® series, is an essential tool for maintaining your GIS. It's all you need to collect location data, keep existing GIS information up to date, and even mobilize your GIS.

The unique GeoExplorer series combines a Trimble® GPS receiver with a rugged field-ready handheld computer running the Microsoft® Windows Mobile™ 2003 software for Pocket PCs. Plus there's an internal battery that easily lasts for a whole day of GPS operation. The result is tightly integrated, tough, and incredibly powerful.

### High-accuracy integrated GPS

The GeoXT is optimized to provide the reliable, high-accuracy location data you need. Advanced features like EVEREST™ multipath rejection technology let you work under canopy, in urban canyons, or anywhere where accuracy is crucial.

Need submeter accuracy in real-time? Use corrections from a satellite-based augmentation system (SBAS) like WAAS<sup>1</sup> or EGNOS<sup>2</sup>. Want to get that extra edge in precision? Collect data with Trimble's TerraSync™ or GPSCorrect™ software, and then postprocess back in the office.

Because the GPS receiver and antenna are built into the handheld computer, it's never been easier to use GPS in your application. The system is more than just cable-free: it's a totally integrated solution.

### Optimized productivity

Take advantage of the power and flexibility of Windows Mobile software for Pocket PCs by choosing from the most comprehensive range of field software available—whether off-the-shelf or purpose-built. Whatever your needs, Windows



### Key Features

- High-performance submeter GPS with integrated WAAS/EGNOS
- Windows Mobile 2003 software for Pocket PCs, allowing maximum flexibility in software choice
- Rugged handheld with all-day battery
- Advanced color TFT display with backlight
- Integrated Bluetooth for wireless connectivity

Mobile lets you choose a software solution to match your workflow.

Windows Mobile includes familiar Microsoft productivity tools, including Pocket Word, Pocket Excel, and Pocket Outlook®. Pocket Outlook lets you synchronize e-mails, contacts, appointments, and data with your office computer, so whether you're in the office or in the field, you're always up to date.

Go wireless with integrated Bluetooth®\*\* for connection to other Bluetooth-enabled devices, including cell phones and PCs. You also have the option to use the USB support module to connect to a desktop computer, or use the optional serial clip for cabled connections in the field.

Receive a free copy of Microsoft Streets & Trips®\*\* 2004 software with your GeoXT handheld, and take advantage of comprehensive map and travel information for easy navigation and route planning.

### All the memory you need

There's plenty of storage space in the GeoXT for all your GIS data. The fast processor and large memory mean even big graphics files load quickly—and they're crisp and crystal-clear on the advanced TFT outdoor color screen.

From data collection to data maintenance, to mobile GIS and beyond ... the GeoXT is the handheld of choice.

\* Bluetooth type approvals are country specific. GeoExplorer series handhelds are approved for use with Bluetooth in the USA. For a complete list of other countries with Bluetooth approval please refer to: [www.trimble.com/geo\\_bluetooth.html](http://www.trimble.com/geo_bluetooth.html).

\*\* Microsoft Streets & Trips 2004 software available in US/Canada; Microsoft AutoRoute® 2004 in Europe.



# GeoXT

## The total GPS platform for all your GIS field requirements

### Standard features

#### System

- Microsoft Windows Mobile 2003 software for Pocket PCs
- 206 MHz Intel StrongARM processor
- 512 MB non-volatile Flash data storage
- Outdoor color display
- Ergonomic cable-free handheld
- Rugged and water-resistant design
- All-day internally rechargeable battery
- Bluetooth wireless

#### GPS

- Submeter accuracy
- Integrated WAAS<sup>1</sup>/EGNOS<sup>2</sup>
- RTCM real-time correction support
- NMEA and TSIP protocol support
- EVEREST multipath rejection technology

#### Software

- GPS Controller for control of integrated GPS and in-field mission planning
- GPS Connector for connecting integrated GPS to external ports
- File Explorer, Internet Explorer, Pocket Outlook (Inbox, Calendar, Contacts, Tasks, Notes), Sprite Pocket Backup, Transcriber, Pocket Word, Pocket Excel, Pictures, Windows<sup>®</sup> Media Player, Bluetooth File Transfer, Calculator, ActiveSync<sup>®</sup>
- Microsoft Streets & Trips/AutoRoute 2004 software

#### Accessories

- Support module with power supply and USB data cable
- Getting Started Guide
- Companion CD includes Outlook 2002 and ActiveSync 3.7.1
- Hand strap
- Pouch
- Stylus

### Optional Features

#### Software

- TerraSync
- GPScorrect for ESRI<sup>®</sup> ArcPad<sup>®</sup>
- GPS Pathfinder<sup>®</sup> Tools Software Development Kit (SDK)
- GPS Pathfinder Office
- Trimble GPS Analyst extension for ArcGIS<sup>®</sup>

#### Accessories

- Serial clip for field data and power input
- Vehicle power adaptor<sup>3</sup>
- Portable power kit<sup>3</sup>
- Hurricane antenna
- External patch antenna
- Pole-mountable ground plane
- Baseball cap with antenna sleeve
- Beacon-on-a-Belt (BoB<sup>™</sup>) differential correction receiver<sup>3</sup>
- Hard carry case
- Null modem cable<sup>3</sup>
- Backpack kit

Specifications subject to change without notice.

### Technical specifications

#### Physical

Size	21.5 cm × 9.9 cm × 7.7 cm (8.5 in × 3.9 in × 3.0 in)
Weight	0.72 kg (1.59 lb) with battery
Processor	206 MHz Intel StrongARM SA-1110
Memory	64 MB RAM and 512 MB internal Flash disk
Power	
Low (no GPS)	0.6 Watts
Normal (with GPS)	1.4 Watts
High (with GPS, backlight, and Bluetooth)	2.5 Watts
Battery	Internal lithium-ion, rapidly rechargeable in unit, 21 Watt-hours

#### Environmental

##### Temperature

Operating	-10 °C to +50 °C (14 °F to 122 °F)
Storage	-20 °C to +70 °C (-4 °F to 158 °F)
Humidity	99% non-condensing
Casing	Wind-driven rain and dust-resistant per IP 54 standard Slip-resistant grip, shock- and vibration-resistant

#### Input/output

Communications	Bluetooth for wireless connectivity USB via support module, serial via optional DE9 serial clip adaptor
----------------	--

#### Bluetooth

Certification	Bluetooth type approvals are country specific. GeoExplorer series handhelds are approved for use with Bluetooth in the USA. For a complete list of other countries with Bluetooth approval please refer to <a href="http://www.trimble.com/geoxt_ts.asp">www.trimble.com/geoxt_ts.asp</a> .
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#### Profiles

Both client and host support	Serial Port, File Transfer (using OBEX)
Client support only	Dial-Up Networking, Lan Access
Host support only	Basic Imaging, Object Push
Display	Advanced outdoor TFT, 240 × 320 pixel, 65,536 colors, with backlight
Audio	Microphone and half duplex speaker, record and playback utilities
Interface	Anti-glare coated touch screen, Soft Input Panel (SIP) virtual keyboard 2 hardware control keys plus 4 programmable permanent touch buttons
Handwriting recognition software, Audio system events, warnings, and notifications	

#### GPS

Channels	12
Integrated real-time	WAAS <sup>1</sup> or EGNOS <sup>2</sup>
Update rate	1 Hz
Time to first fix	30 sec (typical)
Protocols	NMEA (GGA, VTG, GLL, GSA, ZDA, GSV, RMC), TSIP (Trimble Standard Interface Protocol)

#### Accuracy (RMS)<sup>4</sup> after differential correction

Postprocessed <sup>5</sup>	Submeter
Carrier postprocessed <sup>6</sup>	
With 10 minutes tracking satellites	30 cm
Real-time	Submeter

1 WAAS (Wide Area Augmentation System). Available in North America only.

For more information, see <http://gps.faa.gov/programs/index.htm>.

2 EGNOS (European Geostationary Navigation Overlay System). Available in Europe only.

For more information, see <http://www.esa.int/export/esaNA/navigation.html>.

3 Serial clip also required.

4 Horizontal accuracy. Requires data to be collected with minimum of 4 satellites, maximum PDOP of 6, minimum SNR of 4, minimum elevation of 15 degrees, and reasonable multipath conditions. Ionospheric conditions, multipath signals or obstruction of the sky by buildings or heavy tree canopy may degrade precision by interfering with signal reception. Accuracy varies with proximity to base station by +1 ppm for postprocessing and real-time, and by +5 ppm for carrier postprocessing.

5 Postprocessing with GPS Pathfinder Office software or GPS Analyst extension for ArcGIS.

6 Requires collection of carrier data. (Only available with the GPS Pathfinder Office software).

#### NORTH & SOUTH AMERICA

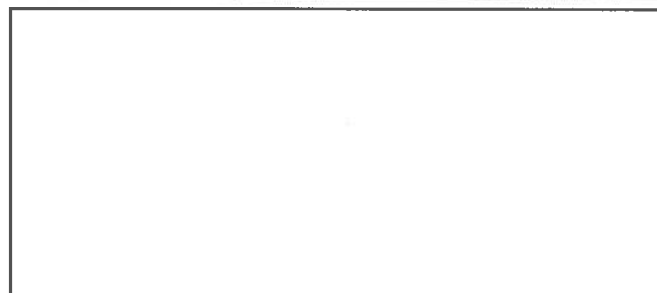
Trimble Navigation Limited  
7403 Church Ranch Blvd • Suite 100  
Westminster, CO 80021 • USA  
+1-720-887-4374 Phone • +1-720-887-8019 Fax

#### EUROPE, AFRICA & MIDDLE EAST

Trimble GmbH  
Am Prime Parc 11 • 65479 Raunheim • GERMANY  
+49-6142-2100-0 Phone • +49-6142-2100-550 Fax

#### ASIA-PACIFIC

Trimble Navigation Australia Pty. Ltd  
Level 1 • 123 Gotha St • Fortitude Valley  
Queensland 4006 • AUSTRALIA  
+61-7-3216-0044 Phone • +61-7-3216-0088 Fax



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**APPENDIX B**  
**ERF WELL INVESTIGATION FIELD FORM**





# ERF Well Investigation Field Form

Well Name AO / inactive #1  
 API # GS 0611-05174  
 Directions W of Hwy 151, N of 228 in field behind house  
 Date Visited 4/17/07 Personnel DRM/AF

Was the well or wellpad identified? ☒ Y ☒ N - abandoned well location pointed to by house owner, but no marker present  
 Are other wells observed on the wellpad? ☒ Y ☒ N  
 Was methane detected during the survey? ☒ Y ☒ N  
 Was stressed vegetation observed? ☒ Y ☒ N  
 Was surface staining observed? ☒ Y ☒ N  
 Are utilities present? ☒ Y ☒ N  
 Is oil and gas related equipment present? ☒ Y ☒ N  
 Are any sensitive receptors present? ☒ Y ☒ N

If so, what are they? \_\_\_\_\_  
 Where are they located (distance/direction)? \_\_\_\_\_

Photograph Log	Feature	View	File Number
	Well marker	SE	100-0009
	Site layout	L	100-0010
	Stressed veg.	WE	100-0011

Additional Comments: No well abandonment marker was seen  
Location and location of pile of dirt is not of concern  
 \_\_\_\_\_  
 \_\_\_\_\_  
 \_\_\_\_\_

Checklist	Complete	N/A
Grid sampling	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Measurement next to well casing	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Map stressed vegetation / staining	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Map well pad corners	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Map well location	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Map pertinent features	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Receptor survey	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Photograph collection	<input checked="" type="checkbox"/>	<input type="checkbox"/>

