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2011 COLORADO RULE 608 COMPLIANCE REPORT

RATON BASIN, COLORADO

JANUARY 2012

Prepared for:

**XTO ENERGY, INC.
Aztec, New Mexico**



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EXECUTIVE SUMMARY

LT Environmental, Inc. (LTE) completed the tasks for the 2011 Colorado Rule 608 Compliance Program on behalf of XTO Energy, Inc. (XTO) with respect to XTO operations in Las Animas County, Colorado (Project Area) (Figure 1). LTE followed the Colorado Oil and Gas Conservation Commission (COGCC)-approved Work Plan, dated May 5, 2010, in accordance with the following subsections of the COGCC Rule 608:

- 608(a) – Assessment and monitoring of plugged and abandoned (P&A) production wells within one-quarter ($\frac{1}{4}$) mile of proposed coalbed methane (CBM) wells;
- 608(b) – Water well sampling; and
- 608(c) – Coal outcrop and coal mine monitoring.

The 2011 Rule 608 Compliance Program meets the requirements of subsections a, b, and c of the COGCC Rule 608.

Four P&A production wells were identified within the 2011 Project Area. No further action was granted on the four P&A production wells by the COGCC on April 28, 2011.

Two water wells were identified within the 2011 Project Area; however, no proposed CBM production wells were installed near the two water wells. Water well sampling will occur prior to the installation of XTO CBM production wells meeting Rule 608 (b) criteria.

LTE did not identify any new methane seeps within the Vermejo Formation or the Quinto, Vega, and Tercio mines through color infrared (CIR) images and field verification.

LTE identified, through previous investigations and the 2011 ground survey, 39 suspect seep areas within the 2011 Project area. Of the 39 suspect seep areas, 10 areas had methane seepage during the investigation and we recommend they be monitored in 2012. There are 11 suspect seep areas that did not have methane seepage and we recommend they be reassessed in 2012 before removing them from the annual monitoring program. Eighteen suspect seep areas did not record methane or methane was reported due to other potential sources such as fugitive gases from oil and gas equipment/production, and we recommended they be discontinued from the annual monitoring requirement.

Gas samples were collected from suspect seep areas 9, 18, and 32. Due to compromised sample containers for gas samples from suspect seep area 9 and 32, isotopic analysis could not be analyzed. Suspect seep area 32 appears to be a methane seep; therefore, LTE will collect an additional gas sample from suspect seep area 32 for isotopic analysis in 2012. Analytical isotopic results for suspect seep area 18 indicated the gas is highly oxidized and matured thermogenic gas.

One natural spring was sampled for water quality analysis. The water type appears to be predominately sodium and potassium bicarbonate. Dissolved methane for the water sample Spring01 was detected at a concentration of 0.277 mg/L, which is below the 2 mg/L threshold

used by the COGCC to analyze for gas composition and for carbon and hydrogen isotopes of methane. In addition to collecting a water sample, subsurface soil gas measurements were collected in the vicinity of the natural spring. Methane was not detected at any of the measurement locations.

LTE, at the direction of XTO, plans to continue conducting Rule 608 compliance activities in Las Animas County in accordance with the COGCC-approved Work Plan as XTO development activities expand.

SECTION 1.0

INTRODUCTION

LT Environmental, Inc. (LTE) has prepared this 2011 Colorado Rule 608 Compliance Report on behalf of XTO Energy, Inc. (XTO) to summarize the tasks completed with respect to XTO operations in Las Animas County, Colorado (Project Area) (Figure 1). Compliance activities were conducted in accordance with the Colorado Oil and Gas Conservation Commission (COGCC)-approved Work Plan (LTE, May 2010) previously submitted on May 5, 2010. This is the second event in accordance with this compliance program.

1.1 OBJECTIVE

The objective of the Rule 608 Compliance Program is to meet compliance requirements, as discussed in the May 2010 Work Plan, associated with the drilling and installation of coalbed methane (CBM) wells in Colorado. This Rule 608 Compliance Program as applied to XTO CBM development in Las Animas County, Colorado, applies the following subsections of Rule 608 from the COGCC 600 Series Safety Regulations, as amended on March 30, 2009:

- 608(a) – Assessment and monitoring of plugged and abandoned (P&A) production wells within one-quarter ($\frac{1}{4}$) mile of proposed CBM wells;
- 608(b) – Water well sampling; and
- 608(c) – Coal outcrop and coal mine monitoring.

As part of the Rule 608 Compliance Program, gas composition and isotopic analysis data is collected and evaluated to determine the significant aspects of the gas composition for each methane seep area in the overall Project Area. The objective is to have a data set that assists in the identification of potential sources of gas seepage and observe and evaluate seep characteristics across the entire Project Area.

1.2 PROJECT AREA

The Project Area is located in the Raton Basin in southern Colorado. The Raton Basin is a geologic structural basin in southern Colorado and northern New Mexico. The basin is situated in Huerfano and Las Animas counties, Colorado, and Colfax County, New Mexico. The basin has long been a source of coal production and more recently a source of CBM. Much of the regional geology presented herein was derived from the report, *A Geologic Assessment of Natural Gas from Coal Seams in the Raton and Vermejo Formations, Raton Basin* (Stevens, et.al. 1992).

The Raton Basin is an asymmetric synclinal basin with the axis of the La Veta syncline oriented roughly north-south and passing through Weston, Colorado, which is immediately east of the area defined by XTO for development of CBM. The Raton Formation outcrops over approximately 50 percent (%) of the Project Area. The discontinuous nature of the coal beds both in the subsurface and on the surface makes it difficult to identify and/or correlate individual

continuous coal beds from the subsurface producing zone to the surface coal outcrop. The XTO proposed drilling area is located on the western side of the La Veta syncline suggesting that the formations encountered within the Project Area are dipping to the east.

The Vermejo Formation consists of sandstone, interbedded siltstone, shale, carbonaceous shale, and coal accumulated above the fluvial-deltaic sequences of the Trinidad Sandstone (Stevens, et al. 1992). The Vermejo Formation outcrops along the western edge of the Raton Basin syncline basin, which is on the west side of the Project Area. Of the more than 90,000-acre Project Area, the Vermejo formation outcrop covers approximately 2% of the overall Project Area. The Raton and Vermejo formation outcrops are depicted on Figure 1.

1.3 SCOPE OF WORK

XTO proposes to drill CBM production wells in the Project Area of the Raton Basin (red outline on Figure 1). The 2011 Project Area was determined by a 2-mile buffer around the XTO 2010 and 2011 proposed CBM production wells as well as CBM production wells XTO installed in 2010. The 2011 Project Area (green outline on Figure 2), proposed CBM production well locations, recorded P&A production well locations, water well locations, topography, and mine features are illustrated on Figure 2.

The scope of work for the 2011 Rule 608 Compliance Program included the following tasks:

- Task 1: Assessment of applicable P&A production wells;
- Task 2: Assessment of applicable water wells;
- Task 3: Ground survey to locate suspect methane seeps on the Raton Formation outcrop;
- Task 4: Color infrared (CIR) aerial imagery and field verification of suspect areas along the Vermejo Formation and at the Quinto, Tercio, and Vega mines;
- Task 5: Detailed mapping of suspect seep areas;
- Task 6: Assessment of applicable natural springs; and
- Task 7: Preparation of this report.

1.4 REPORT ORGANIZATION

This report is organized into five sections including this introduction (Section 1.0), which presents the objectives and scope of work related to the project. The field methods are described in Section 2.0. The 2011 results are summarized in Section 3.0. The conclusions of the 2011 work are in Section 4.0. The report references are included in Section 5.0. Figures, tables, and appendices follow the text.

SECTION 2.0

FIELD METHODS

2.1 2011 PROJECT AREA

The 2011 Project Area was determined by a 2-mile buffer around the XTO 2010 and 2011 proposed CBM production wells as well as CBM production wells XTO installed in 2010. The 2011 Project Area is outlined in green on Figure 2. The overall Project Area is outlined in red on Figure 2.

2.2 PROPERTY ACCESS

Prior to conducting 2011 field activities, LTE, with the cooperation of the XTO land department, acquired landowner information from the Las Animas County Assessor's office. LTE and XTO cross-referenced parcel data to identify owners of parcels located in the 2011 Project Area. LTE requested to gain access to all properties where fieldwork was proposed, but was denied access to several properties; and as a result, no investigation activities were conducted on those properties. The 2011 property owner and access information is presented in Table 1.

2.3 ASSESSMENT OF PLUGGED AND ABANDONED PRODUCTION WELLS

Determining surveys of P&A production wells per Rule 608(a) was accomplished on a well-by-well basis. P&A production wells were identified through the Colorado Oil and Gas Information System (COGIS). Plugging procedures from all P&A production wells within the regulatory radius (2 miles) were assessed from existing COGCC well file notes, bond logs, and permit information.

There were no discrepancies or issues of concern identified in plugging data, and as a result, COGCC approval was requested for no further action (COGCC, April 2011). The request was granted by the COGCC on April 28, 2011. The information related to the no further action is discussed in Section 3.1..

In the event there were discrepancies or issues of concern, a field survey for methane seepage would have been completed at the P&A production well. The P&A production wells would then be resurveyed one year and three years after commencement of production of the newly installed CBM production wells.

The locations of the P&A production wells within the 2011 Project Area are illustrated on Figure 3.

2.4 WATER WELL SAMPLING

Determining water well sampling per Rule 608(b) is accomplished on a well-by-well basis. Water well sampling is based on the following criteria set forth in Rule 608(b):

1. If a conventional gas well or P&A production well is located within a ¼-mile of a planned XTO CBM well, then the closest two water wells within a one-half (½) mile radius of the conventional gas well or P&A well will be sampled;
2. If there are no conventional gas wells or P&A production wells located within a ¼-mile radius of a proposed XTO CBM well, then water wells located within ¼-mile radius of the proposed XTO CBM well will be sampled. If there are more than two water wells located within the ¼-mile radius of the proposed XTO CBM well, the closest two water wells will be selected and sampled;
3. If there are no water wells located within a ¼-mile radius of the proposed XTO CBM well, then the closest water well within a ½-mile radius of the proposed XTO CBM well will be selected and sampled; or
4. If there is no water well located within a ½-mile radius of the planned XTO CBM well, then no sampling is required.

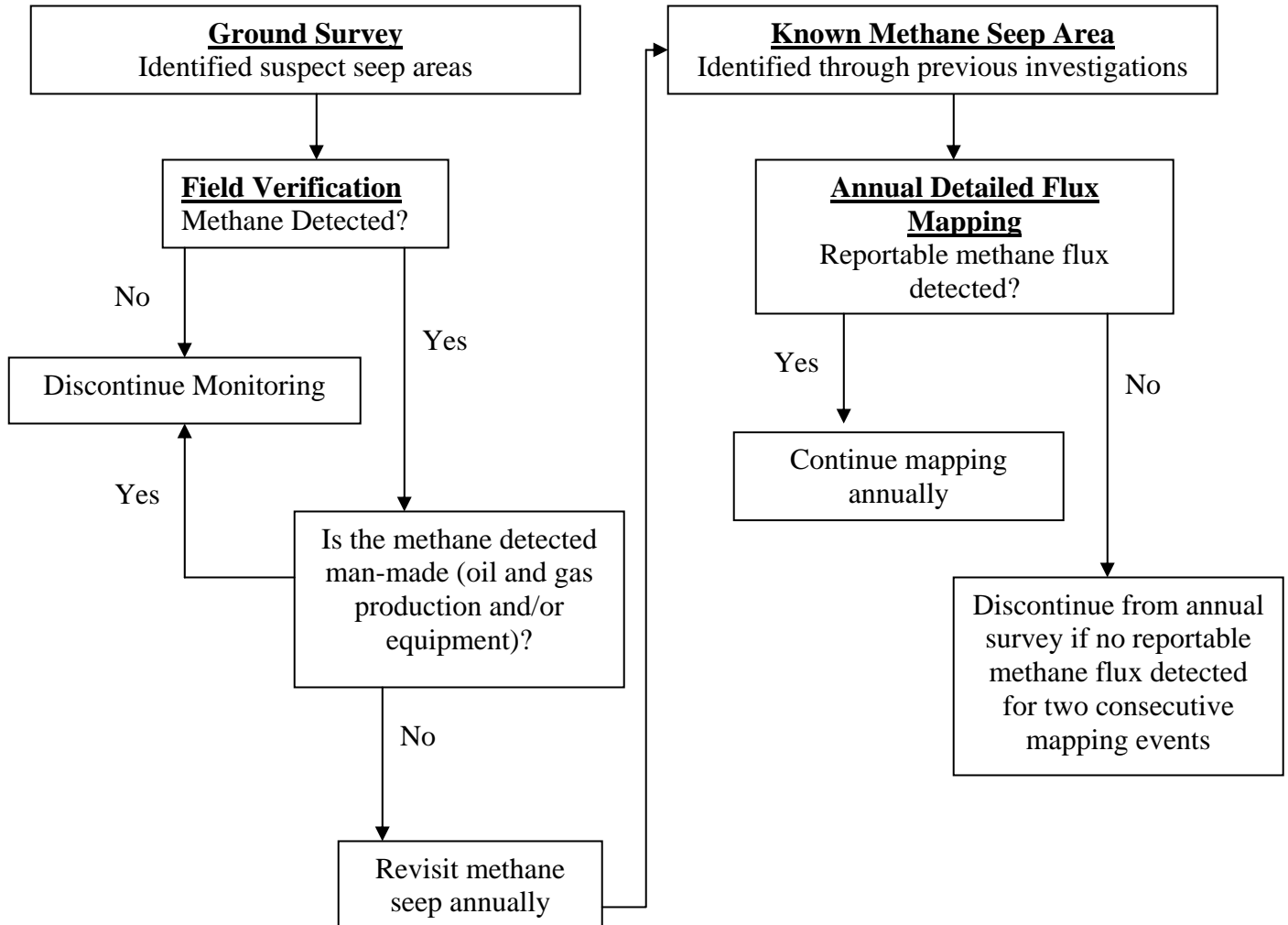
A review of water wells within the 2011 Project Area meeting the requirements set forth in subsection 608(b) identified one water well (Permit Number 39685) that met the second criteria above for sampling. However, the two proposed XTO CBM production wells (New Elk 22-13 and New Elk 22-14) nearest to the water well were not installed during 2011. As a result, no water wells were sampled during the 2011 Colorado Rule 608 Compliance Program. Water well #39685 will be sampled prior to the drilling of New Elk 22-13 and New Elk 22-14.

2.5 GROUND SURVEY WITHIN RATON FORMATION

The 2011 ground surveys along the Raton Formation were conducted by Apogee Scientific, Inc. (Apogee) to meet the requirements of Rule 608(c). The survey was completed in a manner similar to the ground survey conducted by Apogee for the Colorado Rule 608 Compliance Program in 2010. This is the method of survey utilized by the COGCC during previous monitoring events and appears to be the most effective method for monitoring large areas. The 2011 ground survey was limited to accessible roads within the 2011 Project Area. The survey area will increase, per the approved May 2010 Work Plan, as the drilling program progresses over subsequent years.

The ground survey is conducted to identify areas where methane is detected in the atmosphere along accessible roadways Apogee drives for the survey. Any area where methane is detected in the atmosphere by Apogee is considered a “suspect seep area”. Those suspect seep areas are then verified by using a flux meter as described in Section 2.7. Suspect seep areas become a methane seep when methane flux is identified within the suspect seep area and other potential methane sources are ruled out. Other potential methane sources include equipment for oil and gas production and/or production itself. Only those suspect seep areas determined to be methane seeps will be monitored annually. The suspect seep areas that are not considered methane seeps will not be monitored and discontinued from future detailed mapping events. The flow chart below illustrates how a methane seep is determined within the Raton Formation.

Methane Seepage Within Raton Formation



The technique involves using a vehicle-mounted leak detection system (LDS) to survey the 2011 Project Area using the existing roadway network as a reasonable means to cover the formations and identify seep areas. The LDS is an infrared spectrometer (IRS)-based gas analyzer designed to locate methane emission sources from mobile platforms (cars, trucks, helicopters, ATVs, etc.) in real time. The LDS system measures methane, total hydrocarbons, and carbon dioxide with sub-parts per million (ppm) detection limits and displays the data in real time on the control computer. The LDS incorporates a global positioning system (GPS) that records the route taken by the survey vehicle. Wind direction and ambient temperature sensors are mounted on the survey vehicle. Appendix A contains the specifications of the LDS system and GPS unit.

As the survey vehicle was driven, any increases in methane concentration exceeding the local background concentration was marked and investigated with the goal of identifying a potential

source of the methane plume. Marking a potential seep area involved recording the latitude, longitude, wind speed, wind direction, temperature, and other pertinent data about the location.

Apogee conducted the 2011 ground survey on April 27 and 28, 2011. Figure 4 illustrates the ground survey paths taken in 2011.

2.6 COLORED INFRARED AERIAL IMAGERY AND FIELD VERIFICATION

A regional reconnaissance for methane seepage along the Vermejo Formation outcrop and at the Quinto, Tercio, and Vega mines was conducted in 2011 using CIR aerial imagery (conducted in 2010) and field verification of suspect areas. This survey method was selected due to the high topographic relief and limited accessible roads in this portion of the Project Area as compared to the Raton Formation outcrop areas in the basin.

This method only identifies areas within the CIR imagery that are anomalous to the surrounding areas and as such are deemed “suspect areas”. Suspect areas are verified by conducting subsurface soil gas surveys to identify the presence or absence of methane within the suspect areas. A suspect area becomes a methane seep area when methane is identified through subsurface soil gas investigations, as described in Section 2.6.2. Those areas that do not record methane in the soil gas probes are not considered methane seep areas and are discontinued from further investigations. Review the flow chart in Section 2.5 for a visual illustration of the methodology. Below illustrates how a methane seep is determined within the Vermejo Formation and within the Quinto, Tercio, and Vega mines.

Methane Seepage Within the Vermejo Formation and the Quinto, Tercio, and Vega Mines

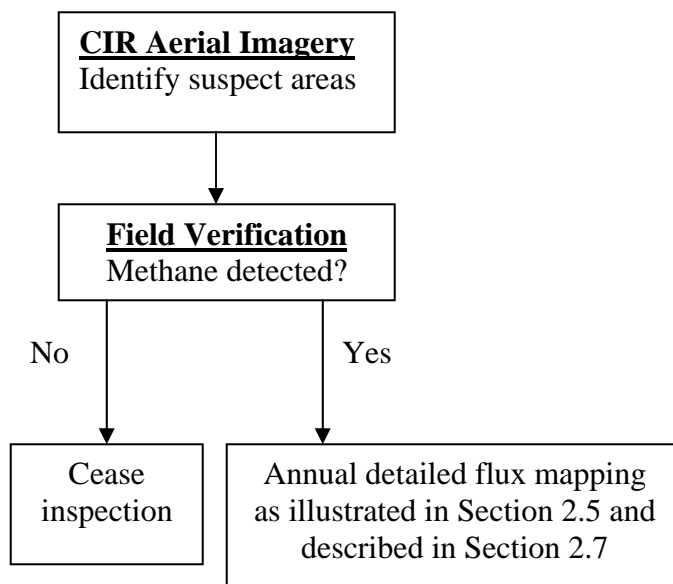


Figure 5 depicts the CIR aerial imagery conducted in 2010. Figures 6 through 8 depict specific areas of interest in 2011.

2.6.1 Infrared Aerial Imagery Acquisition

A CIR camera mounted on an aircraft was used to collect high-resolution, low-altitude imagery. The imagery was georeferenced and rectified using digital elevation model (DEM) ortho-correction. Since methane seepage frequently affects vegetative conditions, the CIR imagery was used as the key indicator of potential seepage. The images were reviewed for suspect seep areas, which were defined as areas with CIR reflectance anomalies generally caused by dead or stressed vegetation. The CIR imagery cannot detect the presence or absence of methane; therefore, each suspect area identified in the imagery was field verified to determine if methane seepage was present.

The CIR imagery acquisition was conducted by Agro Engineering, Inc. (Agro) of Alamosa, Colorado. Agro flew over the Vermejo Formation outcrop using an CIR camera mounted on an aircraft at 1-meter and 1.5-meter resolution. This reconnaissance flight was conducted during peak vegetation conditions in order to be effective. Once the imagery was acquired, Agro georeferenced the imagery and provided it to LTE for interpretation.

Identified suspect areas along the Vermejo Formation and mines that appeared to contain dead or stressed vegetation or an anomalous CIR reflectance signature were delineated as polygons on the imagery and uploaded to a GPS unit for field verification.

Upon completion of the imagery review activities, field verification of the suspect areas was conducted with the goal of identifying the presence or absence of methane seepage. The field personnel were equipped with the aerial imagery, topographic maps, a digital camera, and a GPS.

The initial CIR reconnaissance flight was conducted on June 15, 2010, for the 2010 Colorado Rule 608 Compliance Program. CIR reconnaissance flights are scheduled on a 3-year cycle with the next fly over event scheduled for 2013, as approved by the COGCC. Field verification of the CIR suspect areas for 2011 was conducted from August 11 to August 15, 2011.

To determine methane seep areas, LTE reviewed the suspect seep areas from the ground surveys and the suspect areas from the CIR aerial imagery to identify the presence or absence of methane and then classified those suspect seep areas and suspect areas based on the results. Section 2.6 includes a flow chart of methane seep determination methodology. Results are discussed in Section 3.0.

2.6.2 Subsurface Soil Gas Measurements

For each accessible CIR suspect area, a traditional subsurface soil gas survey was conducted within the polygons.

A Mine Safety Appliances (MSA) GasPort[®] multi-gas meter is used to measure the concentrations of methane, carbon monoxide, hydrogen sulfide, and oxygen in the subsurface soil. Subsurface soil gas measurements are collected by using a hand-driven slide hammer to drive a ½-inch diameter steel rod into the ground to depths ranging from approximately 1 foot below ground surface (bgs) to 3 feet bgs. Occasionally, advancement of boreholes in consolidated soil or outcrop materials is limited. Where probe refusal occurs, measurements are taken at the depth bored.

Once the rod is removed from the ground, a ¼-inch diameter polyethylene tubing is inserted into the borehole. The tubing is perforated at the bottom 6 inches to allow soil gas to enter the tubing. Once the temporary tubing is in place and the borehole is sealed with native soil, the multi-gas meter is attached to the tubing. The multi-gas meter's internal pump draws gas from the soil, through the tubing and into the meter's gas sensors.

The multi-gas meter is capable of detecting methane in concentrations from 0.0 to 100%, oxygen concentrations from 0.0 to 25%, carbon monoxide concentrations from 0.0 to 1,000 parts per million (ppm), and hydrogen sulfide concentrations from 0.0 to 100 ppm. Specifications for the multi-gas meter are included in Appendix A.

The maximum concentrations of methane, carbon monoxide, and hydrogen sulfide, and the minimum concentration of oxygen at each sampling location are recorded. Data are recorded in a field notebook and a hand-held Trimble GeoXT[®] GPS unit, which is discussed further in the following subsection.

2.6.3 Global Positioning System Data Management

Each sample location is recorded using a GPS unit. Soil gas sampling grids are created in ArcView[®] and pre-loaded into the GPS unit so field personnel can quickly and accurately position detection equipment along the Project Area. Soil gas measurements and other relevant field data are then stored as attributes in the GPS unit along with the associated location data. The data stored in the GPS unit is downloaded later for processing and reporting.

The GPS unit location data are collected in the World Geodetic System 1984 (WGS 84) and projected in Universal Transverse Mercator (UTM) Zone 13 South, North American Datum 1983 (NAD 83) for use in an ArcView[®] project file. On average, 25 GPS log points are collected for each point feature in order to obtain more accurate positioning.

Readings collected with the GPS unit can be located with 1-meter accuracy. However, the terrain and forest canopy can adversely affect GPS unit accuracy. North-facing slopes and heavily wooded areas can distort or block satellite signals. When satellite signals are limited, positioning accuracy decreases. In locations where the GPS unit cannot obtain a signal, field personnel will note measurement data on their field reference maps. Specifications of the GPS unit are included in Appendix A.

2.7 DETAILED MAPPING OF SUSPECT SEEP AREAS

To be compliant with Rule 608(c), annual detailed mapping of suspect seeps areas are conducted within the Project Area for that year. The 2011 Project Area includes a 2-mile buffer around 2010 and 2011 proposed XTO CBM production wells as well as XTO CBM production wells installed in 2010.

Field mapping of previously identified and newly identified suspect seep areas consists of utilizing a portable flux meter to measure the magnitude and extent of methane seepage within the survey area. Measurements for previously identified suspect seep areas are typically collected using a sampling grid approach. Those suspect seep areas identified in 2011 were investigated by

determining the wind direction during the ground survey and potential sources in the vicinity, such as oil and gas production equipment, wellheads, and/or dead/stressed vegetation.

Grids for detailed mapping areas consisted of varying numbers of squares, with grid nodes spaced 50 feet or 200 feet apart, depending on historical data for previously identified suspect seep areas. The smaller grid spacings are typically used to map known methane seep areas of relatively small extent. A flux measurement is collected at the corner of each grid square. When methane is detected along the outer edges of the mapping area, additional grid points are developed and measured to determine the extent of methane seepage. Where appropriate, photographs of vegetative conditions, visible seeps, and sensitive receptors are collected.

Full color spectrum aerial photographs were used as base maps for field use and figures for reporting. The geologic contacts depicted on the aerial photographic maps were derived from geologic maps prepared by the Colorado Geological Survey (CGS) and digitized. Accuracy of the formation contact is reduced when aerial photographs are viewed at a smaller scale.

Detailed mapping of the suspect seep areas was conducted from August 10 to August 20, 2011.

2.7.1 Flux Measurements

The flux of soil gases moving across the soil surface to the atmosphere is measured using the West Systems® portable gas flux meter (flux meter). The flux meter has been used to measure soil gas seepage on the Raton Formation in the Raton Basin in Colorado. The portable flux meter measures the flux of methane, hydrogen sulfide, and carbon dioxide by employing individual gas-specific sensors that records the increases, if any, of gas concentrations over time for a given surface area. These increases in concentration over time are proportional to the flux of each gas.

The flux meter components include an accumulation chamber connected by circulation tubes to the gas detector unit. At each sampling point, the accumulation chamber is placed on the ground surface to capture gas seeping from the ground. A fan in the chamber continuously mixes the gases in the chamber during the measurement process. A pump moves gases in the accumulation chamber to the detector unit. After passing through the detector unit, gases are returned to the chamber. This closed-loop process allows soil gases discharging to the chamber to increase over time. Increases in concentrations are measured and recorded automatically. No gas is allowed to escape the system. However, a vacuum is not created during the process. This enables measurement of natural seep conditions, if present. The result for each gas is reported as a mass flux in units of moles per square meter per day ($\text{mol}/\text{m}^2\cdot\text{day}$).

Flux measurement accuracy can be limited by surface conditions. One of the most important factors is the quality of the seal between the accumulation chamber base and the ground surface. To ensure a proper seal between the ground surface and the chamber, field personnel choose relatively flat surfaces where possible and placed loose soil surrounding the base of the chamber to reduce the potential for gas loss at the base of the chamber. In addition, ground disturbance is minimized during the measurement process in order to maintain the natural seep conditions. In areas with heterogeneous surfaces, the seal is sometimes difficult to achieve. This scenario is evident at locations with poorly developed soil or where the soil surface is obscured by decayed organic matter on the forest floor.

The accuracy of the total flux estimation within the Project Area is influenced by the ability of the grid spacing system to represent the actual flux on a detailed level relative to the subsurface fracture system, coal quality, and stratigraphy within the Raton Formation.

The methane sensor within the flux meter unit has a range of 60 parts per million (ppm) to 50,000 ppm. The flux meter methane measurement range is 0.0 mol/m²·day to 300 mol/m²·day. Methane fluxes below 0.2 mol/m²·day are detectable with decreased accuracy. As a result, reporting of methane fluxes will not include values less than 0.2 mol/m²·day.

The carbon dioxide sensor has a full-scale range of 0.0 ppm to 20,000 ppm and flux measurement range of 0.0 mol/m²·day to 600 mol/m²·day at an accuracy of ±25%.

The hydrogen sulfide detector has a full-scale range of 0.0 ppm to 20 ppm and a flux measurement range of 0.0025 mol/m²·day to 0.5 mol/m²·day at an accuracy of ±25%. The sensor is an electrochemical cell that measures hydrogen sulfide through a chemical oxidation process. The sensing process consumes a small volume of the hydrogen sulfide, which is not returned to the flux meter's accumulation chamber. Therefore, the flux meter can underestimate hydrogen sulfide flux by as much as 10%. For this reason, hydrogen sulfide values less than 0.0025 mol/m²·day will not be reported. Information on the West Systems portable gas flux meter is provided in Appendix A.

During the measurement process, gas concentrations are recorded at 1-second intervals and directly downloaded via Bluetooth[®] connection to a portable digital assistant (PDA) integrated with the GPS unit. Other measurements recorded include barometric pressure, temperature, date, and time.

Integrated West Systems Flux Manager[®] software on the GPS unit recorded the gas measurement data. The software plots the curve of gas concentration versus time for each measurement collected. The best-fit line for the curve generated is selected. The slope of the best-fit line is proportional to the flux at the measurement point.

2.7.2 Flux Volume Estimations

LTE estimated the volumetric flux of methane and carbon dioxide for each suspect seep area or a combination of several suspect seep area if they are close in lateral proximity. Flux data were interpolated and gridded, then contoured and processed to estimate total volumetric flux.

The results were converted to volumetric flux rates common to the natural gas production industry in units of thousand cubic feet per day (MCFD). For a better perspective of the methane flux and carbon dioxide flux rates, LTE converted the mass flux values into volumetric flux units of cubic feet per day (CFD), assuming equal areas. The unit conversion is based on the molecular weight of the gas and the density of the gas at approximately 7,400 feet above mean sea level.

For methane flux, the calculation is as follows:

$$\frac{\text{mol CH}_4}{\text{day}} \times \frac{16.04276 \text{ g CH}_4}{\text{mol CH}_4} \times \frac{0.0698 \text{ ft}^3 \text{ CH}_4}{\text{g CH}_4} = \frac{\text{ft}^3 \text{ CH}_4}{\text{day}}$$

For example,

$$1.0 \text{ mol/day CH}_4 = 1.12 \text{ CFD CH}_4$$

For carbon dioxide flux, the calculation is as follows:

$$\frac{\text{mol CO}_2}{\text{day}} \times \frac{44.01 \text{ g CO}_2}{\text{mol CO}_2} \times \frac{0.0253 \text{ ft}^3 \text{ CO}_2}{\text{g CO}_2} = \frac{\text{ft}^3 \text{ CO}_2}{\text{day}}$$

For example,

$$1.0 \text{ mol/day CO}_2 = 1.11 \text{ CFD CO}_2$$

Notes:

Ft³ – cubic feet CH₄ – methane CO₂ – carbon dioxide g – gram
CFD – cubic feet per day mol - mole

The volumetric flux values calculated are estimates and may not represent actual values for the specific areas. Interpolation calculation techniques are highly sensitive to data skewness and can result in large changes in calculated flux values based on measurements made at only a few locations.

2.7.3 Soil Gas Analysis

While conducting detailed mapping of suspect seep areas in 2011, gas samples were collected from those areas with reportable methane flux and where existing isotopic information from the 2007 COGCC Phase II Seep Investigation (LTE, 2007) or the 2010 XTO Colorado Rule 608 Compliance Program (LTE, 2010) does not exist. During the 2007 Phase II Seep Investigation conducted for the COGCC, gas samples were collected from many of the suspect seep areas in the Raton Basin. As a result, re-sampling these seeps was not conducted.

Gas samples were collected from the area within each seep with the highest observed methane concentration. Field personnel used a hand pump attached to tubing inserted into a borehole driven by a slide hammer. The tubing was purged of the ambient air and a Cali-5-bond[®] Mylar bag was filled with a sample of the gas within the borehole for analysis of the following:

- Fixed Gas Chromatography: hydrogen (H₂), argon (Ar), nitrogen (N₂), oxygen (O₂), carbon dioxide (CO₂), and hydrogen sulfide (H₂S);
- Hydrocarbon Gas Chromatography: methane, ethane, propane, i-butane, n-butane, i-pentane, n-pentane, and hexane+; and
- Isotopic Analysis: carbon and hydrogen isotopes of methane, carbon isotopes of CO₂, and carbon isotopes of ethane and propane.

Isotopic analysis was dependent on the gas concentration detected in the sample. Gas seep concentrations of methane, carbon dioxide, and ethane vary greatly and at times are insufficient to conduct isotopic analysis.

The samples were packaged and shipped by a Department of Transportation (DOT)-certified hazardous materials shipper to Isotech Laboratories, Inc. of Champaign, Illinois.

2.8 NATURAL SPRING MONITORING

Surveys of natural springs are conducted on a well-by-well basis. Only natural springs identified on United States Geological Survey (USGS) topographic maps within the 2011 Project Area were surveyed.

Once a natural spring was identified, water samples were collected. At each natural spring, field personnel located the position and elevation using a GPS. A discharge rate was measured, when possible, using a graduated cylinder and stopwatch. Water quality measurements, including pH, total dissolved solids (TDS), specific conductance (SC), oxidation-reduction potential (ORP), and temperature were collected using a YSI[®] 556 meter. The equipment specifications for the water quality field meter are provided in Attachment A.

Water samples from the natural spring were collected and analyzed for the following:

- Major Cations [dissolved sodium (Na), calcium (Ca), magnesium (Mg), potassium (K), and iron (Fe)] by Environmental Protection Agency (EPA) Method 6010/6020;
- Dissolved Metals [selenium (Se), manganese (Mn)] by EPA Method 6010/6020;
- Alkalinity (carbonate/bicarbonate) by EPA Method 300;
- Major Anions [chloride (Cl), sulfate (SO₄), bromide (Br), and fluoride (F)] by EPA Method 300;
- pH by EPA Method 150.1;
- SC by MCA Method WW 120.1;
- Nitrate/Nitrite as Nitrogen (N) by EPA Method 353.3;
- TDS by EPA Method 160.1;
- Dissolved Methane by Method RSK 175;
- Sodium Adsorption Ratio (SAR) by Louisiana Department of Natural Resources (LaDNR) Statewide Order Number 29B; and
- Bacteria by IRB/SRB/SLYM/ Coliform.

Laboratory-provided sample bottles were filled with water for analysis of the parameters identified above. All water samples collected were submitted in a cooler under strict chain-of-custody documentation to Accutest Mountain States (Accutest) located in Wheat Ridge, Colorado.

The COGCC informed XTO and LTE that natural springs that overlap with other oil and gas industry companies conducting similar activities to comply with Rule 608 did not need to be sampled. As a result, LTE did not attempt to sample Spring 05 (Vega Canyon), Spring 07 (Spring Canyon), or Spring 08 (Middle Lorencito).

Spring 01 (North Fork Apache Canyon) was sampled on August 15, 2011.

SECTION 3.0

RESULTS

3.1 PLUGGED AND ABANDONED PRODUCTION WELLS

LTE identified four P&A production wells within one quarter ($\frac{1}{4}$) mile of XTO 2011 proposed coalbed methane (CBM) production wells as described in the Colorado Rule 608(a). XTO engineers have reviewed the P&A reports and identified no discrepancies or indications that the production wells were improperly abandoned.

XTO respectfully requested the COGCC to issue a no further action for the identified P&A production wells and eliminate the need to conduct a soil gas survey at these P&A production wells. LTE received a confirmation email from the COGCC on April 28, 2011. According to the COGCC, there were no conflicts noted when reviewing the P&A reports that would indicate potential risks of gas migration to the ground surface. As a result, the COGCC approved XTO's no further action request.

Table 2 summarizes the P&A production wells identified in 2011. The locations of the P&A production wells related to XTO 2011 proposed production wells are illustrated on Figure 3. The Plugged Wellbore Diagrams for the four P&A production wells are included in Appendix B.

3.2 WATER WELL SAMPLING

Two proposed XTO CBM production wells (New Elk 22-13 and New Elk 22-14) nearest to water well #39685 were not installed during 2011. As a result, the water well was not sampled during the 2011 Colorado Rule 608 Compliance Program. Water well #39685 will be sampled prior to the drilling of New Elk 22-13 and New Elk 22-14.

3.3 GROUND SURVEY AND DETAILED MAPPING OF SUSPECT SEEP AREAS

Apogee conducted the ground survey along accessible roads within the 2011 Project Area (Figure 4). The ground survey was conducted on April 27 and 28, 2011, and identified 20 suspect seep areas over approximately 240 miles of roadway. Table 3 summarizes the 20 suspect seep areas identified in 2011 as well as suspect seep areas identified in 2007 and 2010. The 2011 ground survey report prepared by Apogee is presented in Appendix C.

Suspect seep areas were identified by a numbering convention implemented by Apogee during each ground survey event. A total of 39 suspect seep areas were identified within the 2011 Project Area and mapped from August 10 to August 20, 2011.

3.3.1 Suspect Seep Area Results

Of the 39 suspect seep areas identified in the 2011 Project Area, 11 suspect seep areas had reportable methane flux. Summaries of each suspect seep area including the rationale for the potential source of methane is included in Table 3. Methane measurements are presented on Figures 9 through 39.

Suspect seep areas 32 and L-1049 had a total reportable volumetric methane flux of 304.12 MCFD. Reportable methane flux was recorded in an area approximately 2,260 feet by 800 feet. This suspect seep area had the highest reportable volumetric methane flux in 2011. Due to the elevated reportable methane flux values and the areal extent of the reportable methane flux values, this suspect seep area appears to be a methane seep.

Suspect seep area L-1021 had a total reportable volumetric methane flux of 129.71 MCFD. Reportable methane flux was recorded in an area approximately 520 feet by 150 feet. This suspect seep area had the second highest reportable volumetric methane flux in 2011. Due to the presence of dead vegetation in the area and the high reportable methane flux values, this area appears to be a methane seep.

Suspect seep area L-1030 had a total reportable volumetric methane flux of 2.19 MCFD. Reportable methane flux was recorded in an area approximately 100 feet by 100 feet. A well pad was identified by Apogee and LTE during the mapping event. However, the location of the reportable methane flux appears to indicate that this area is a methane seep.

Suspect seep area 5 had a total reportable volumetric methane flux of 2.16 MCFD. Reportable methane flux was recorded in an area approximately 625 feet by 300 feet. Due to the elevated reportable methane flux values and the lack of other potential sources of the methane in the area, this suspect seep area appears to be a methane seep.

Suspect seep areas with historical methane data with no or minor reportable methane flux in 2011 are still considered suspect seep areas. These areas are recommended to be monitored for one more year to determine whether the area is a methane seep or not.

Calculations used to determine total reportable methane and carbon dioxide volumetric flux for suspect seep areas are presented in Appendix D. Flux data are presented in Appendix E.

3.3.2 Gas Composition and Isotopic Analytical Results

Gas samples were collected from suspect seep areas 9, 18, and 32 where the highest flux measurements were recorded for each respective seep area.

Gas samples from suspect seep areas 9 and 32 were compromised during the shipment of the samples to Isotech. As a result, only gas composition analysis was conducted on the suspect seep area 32 and no analysis was conducted on the gas sample from suspect seep area 9. Suspect seep area 9 does not appear to be a methane seep and as a result, a gas sample will not be collected in 2012. Suspect seep area 32 does appear to be a methane seep and as a result, LTE will collect a soil gas sample from suspect seep area 32 in 2012.

Results of the isotopic analysis of gas from suspect seep area 18 indicates the methane gas does not fall within typical near surface or subsurface microbial gases or thermogenic in origin. The isotopic analysis indicates the methane gas is extremely oxidized and falls out of the maturation phase of thermogenic gas.

Results of the gas composition and isotopic analysis are summarized on Table 4. Figure 40 illustrates the isotopic analysis of suspect seep area 18 gas as well as other suspect seep areas

within the 2011 Project Area and plots them on a chart indicating the potential origin (thermogenic versus biogenic) of the methane gas detected. Appendix G includes the gas composition and isotopic analytical report.

3.4 COLORED INFRARED AERIAL IMAGERY AND FIELD VERIFICATION

The initial CIR aerial imagery flight was conducted on June 15, 2010. The fly over of the Vermejo Formation and the Tercio, Quinto, and Vega mines was conducted after 11 a.m. so shadows would not affect the overall quality of the CIR images and not produce additional suspect areas due to the shadow affect. In the event that future CBM production wells are near mines, CIR imagery will be reviewed for suspect areas and mapped for verification. As observed in other studies, the methane seeps do not dramatically change from year to year and as a result, the CIR imagery from 2010 will be utilized for three years, as approved by the COGCC. The next CIR fly over will be conducted in 2013.

LTE reviewed the CIR images of the Vermejo Formation within the 2011 Project Area. LTE identified 12 CIR suspect areas for field verification within the Vega Mine and Quinto Mine boundaries and along a portion of the Vermejo Formation (Figure 5). Due to property access denial and limitations, LTE was only able to verify CIR suspect areas 1 through 5.

LTE conducted field verification of the five accessible suspect areas from August 11 to August 15, 2011. LTE did not identify methane at any of the five accessible CIR suspect areas within the Quinto Mine boundary.

Subsurface gas measurement locations for the CIR suspect areas 1 through 5 are illustrated on Figure 6. Detailed suspect area maps for the 12 CIR suspect areas are illustrated on Figures 6 through 8. Subsurface gas measurements are presented in Appendix D.

3.5 NATURAL SPRING SURVEY

LTE identified 10 natural springs within the 2011 Project Area (Figure 2). Natural springs Spring 05 (Vega Canyon), Spring 07 (Spring Canyon), and Spring 08 (Middle Lorencito) were excluded from the sampling list as approved by the COGCC. Six natural springs were located on private property with no access granted at the time of the sampling event. As a result, only Spring 01 (North Fork Apache Canyon) was sampled on August 15, 2011.

3.5.1 Field Observations

The North Fork Apache Canyon natural spring was identified as a pooled area of water and was not flowing at the time of the fieldwork. As a result, flow rate readings were not collected. LTE field personnel did observe what appeared to be a pipe connected to the natural spring and a windmill platform. The pipe appeared to be filled in with sand to approximately one foot below the top of the well casing.

LTE collected field measurements from the pooled water from the natural spring, which was documented in the field logbook. The 2011 field observations and measurements for the natural spring are summarized in Table 5.

3.5.2 Sampling and Analysis

Dissolved methane was detected in water from Spring01 at a concentration of 0.277 mg/L. This concentration is below the 2 mg/L threshold used by the COGCC to identify water for further investigation of the origin of the methane in the water.

By plotting the major anions (Cl, SO₄, Br, and F) and major cations (Na, Ca, Mg, K, Fe) that are dissolved in the natural spring water sample on a Stiff diagram, the water type can be presented graphically. The water from Spring01 continues to indicate it is predominately sodium and potassium bicarbonate.

Laboratory analytical results for the natural spring sample are summarized in Table 6. A Stiff diagram illustrating the water type is depicted on Figure 41. Natural spring analytical results are presented in Appendix H.

3.5.3 Subsurface Soil Gas Measurements

During the 2011 natural spring sampling event, 13 subsurface soil gas measurements were collected at Spring01 using traditional subsurface soil-gas sampling techniques and the multi-gas meter. Subsurface methane was not detected in any of the subsurface soil gas probes at the measured natural spring.

SECTION 4.0

CONCLUSIONS

The 2011 Rule 608 Compliance Program meets the requirements of subsections a, b, and c of the COGCC Rule 608.

No further action on four P&A production wells was granted by the COGCC on April 28, 2011. Therefore no surveys for methane were conducted at any of the P&A production wells in 2011.

Two water wells were identified within the 2011 Project Area; however, no proposed CBM production wells were installed near the two water wells. Water well sampling will occur prior to the installation of XTO CBM productions wells meeting Rule 608 (b) criteria.

LTE did not identify new methane seeps within the Vermejo Formation outcrop and at the Quinto, Vega, and Tercio mines through the 2010 CIR images and 2011 field verification survey.

LTE identified, through previous investigations and the 2011 ground survey, 39 suspect seep areas within the 2011 Project Area. The following is a list of suspect seep areas, the potential source, and recommendation for mapping in 2012.

¹ Methane Seep	² Continued Suspect Seep	³ Other Source of Methane
L-1021	623/L-99	L-1023
L-1030	11	L-1025
L-1033	15	L-1027
L-1050	17	L-1031
5	18	L-1036
13 & L-1026	19	L-1039
14	21, 33, 617, & L-100	L-1040
32 & L-1049	L-109	L-1041
		L-1042
		L-1043
		L-1044
		L-1045
		L-1047
		L-1048
		7, 8, 9, & L-1046

¹ Recommended for continuation of detailed flux mapping in 2012

² Recommended for detailed flux mapping in 2012 to verify the absence of methane

³ Recommended for discontinuation of detailed flux mapping in 2012

Gas samples were collected from suspect seep areas 9, 18, and 32. Due to compromised sample containers for gas samples from suspect seep area 9 and 32, isotopic analysis could not be run. Suspect seep area 32 appears to be a methane seep; therefore, LTE will collect an additional gas sample from suspect seep area 32 for isotopic analysis in 2012. Results of the isotopic analysis of gas from suspect seep area 18 indicates the methane gas does not fall within typical near surface or subsurface microbial gases and thermogenic gas in origin. The isotopic analysis indicates the methane gas is extremely oxidized and falls out of the maturation phase of thermogenic gas.

One natural spring was sampled for water quality analysis. The water type appears to be predominately sodium and potassium bicarbonate. Dissolved methane for the water sample Spring01 was detected at a concentration of 0.277 mg/L, which is below the 2 mg/L threshold used by the COGCC to analyze the gas composition and carbon and hydrogen isotopes of methane. In addition to collecting a water sample, subsurface soil gas measurements were collected in the vicinity of the natural spring. Methane was not detected at any of the measurement locations.

LTE, at the direction of XTO, plans to continue conducting Rule 608 compliance activities in Las Animas County in accordance with the COGCC-approved Work Plan as XTO's development activities expand.

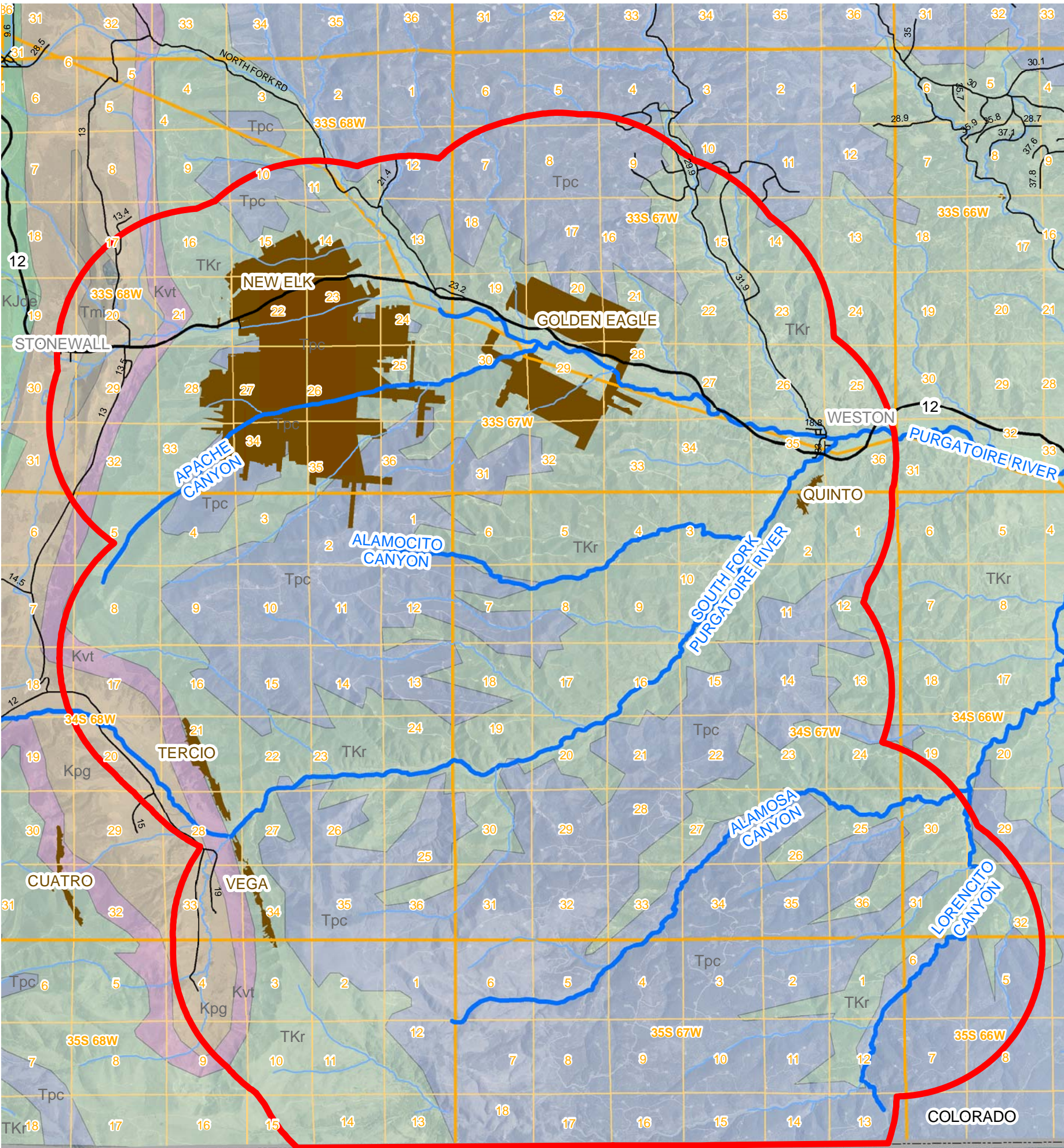
SECTION 5.0

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FIGURES



LEGEND



PROJECT AREA



COLORADO STATE LINE



TOWNSHIP AND RANGE LINES



SECTION LINE



MINE BOUNDARY

GEOLOGIC CONTACTS (TWETO, 1979)



Tmi - MIDDLE TERTIARY INTRUSIVE ROCKS



Tpc - POISON CANYON FORMATION



TKr - RATON FORMATION



Kvt - VERMEJO FORMATION



Kpg - PIERRE SHALE FORMATION



KJde - DAKOTA FORMATION

ROAD

OTHER WATER SOURCE

MAJOR DRAINAGE

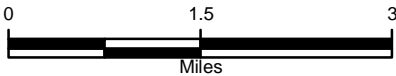


FIGURE 1
PROJECT AREA MAP
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC



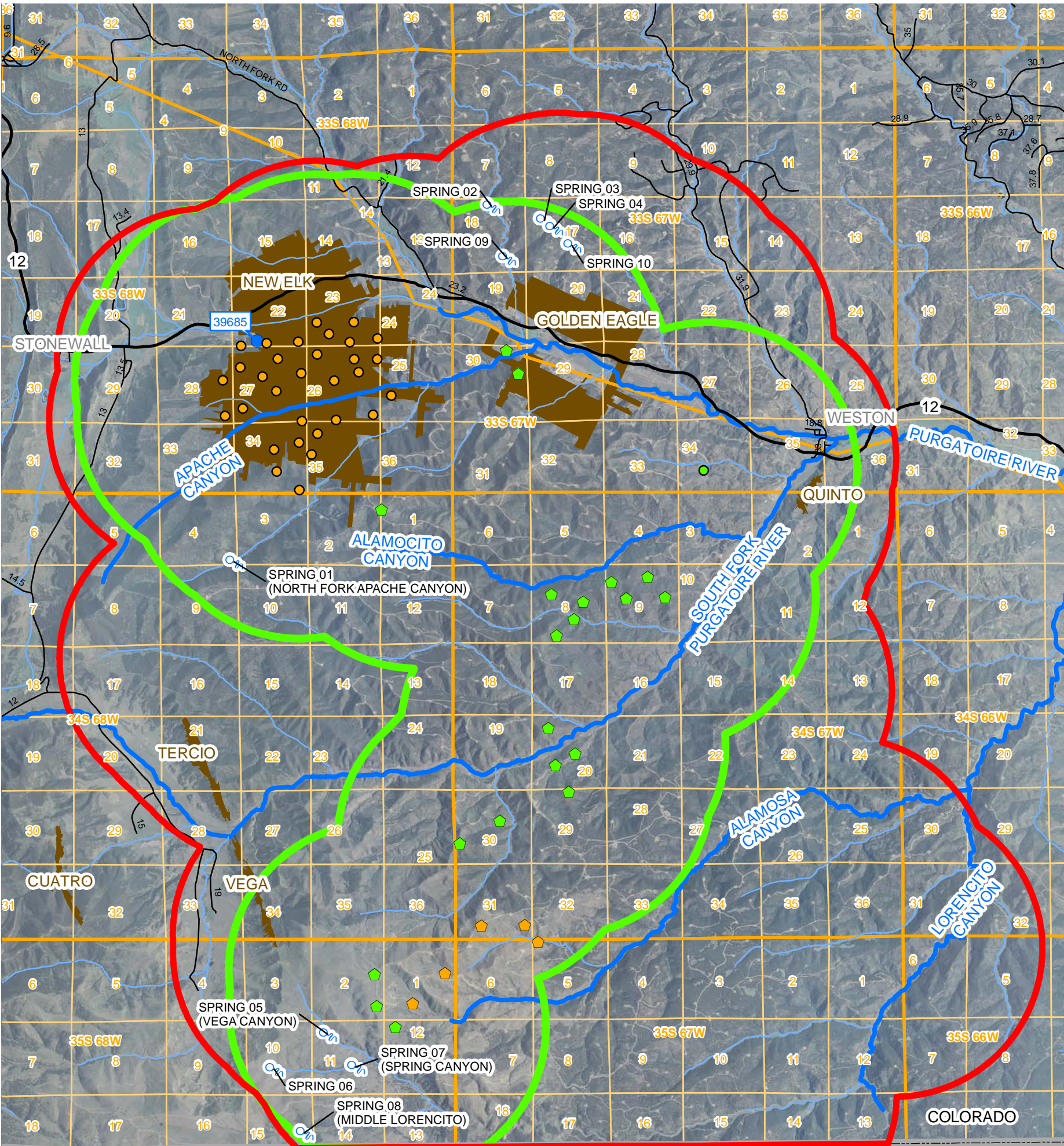


IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- 2010 PROPOSED COALBED METHANE PRODUCTION WELL
- 2010 INSTALLED COALBED METHANE PRODUCTION WELL
- 2011 PROPOSED COALBED METHANE PRODUCTION WELL
- 2011 INSTALLED COALBED METHANE PRODUCTION WELL
- WATER WELL LABELED WITH PERMIT NUMBER
- SPRING LABELED WITH SAMPLE ID (SPRING NAME, IF APPLICABLE)
- PROJECT AREA
- 2011 PROJECT AREA
- COLORADO STATE LINE
- TOWNSHIP AND RANGE LINES
- SECTION LINE
- MINE BOUNDARY
- ROAD
- OTHER WATER SOURCE
- MAJOR DRAINAGE

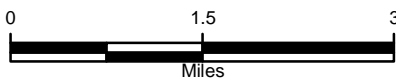


FIGURE 2
2011 PROJECT AREA MAP
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- 2010 PROPOSED COALBED METHANE PRODUCTION WELL
- 2010 INSTALLED COALBED METHANE PRODUCTION WELL
- 2011 PROPOSED COALBED METHANE PRODUCTION WELL
- 2011 INSTALLED COALBED METHANE PRODUCTION WELL
- PLUGGED & ABANDONED (P & A) PRODUCTION WELL
- SHUT IN PRODUCTION WELL (TO BE P & A)
- ROAD
- OTHER WATER SOURCE
- MAJOR DRAINAGE
- Labeled with API Number
- PROJECT AREA
- COLORADO STATE LINE
- TOWNSHIP AND RANGE LINES
- SECTION LINE
- MINE BOUNDARY

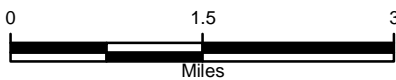


FIGURE 3
2011 PLUGGED & ABANDONED PRODUCTION WELLS
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC



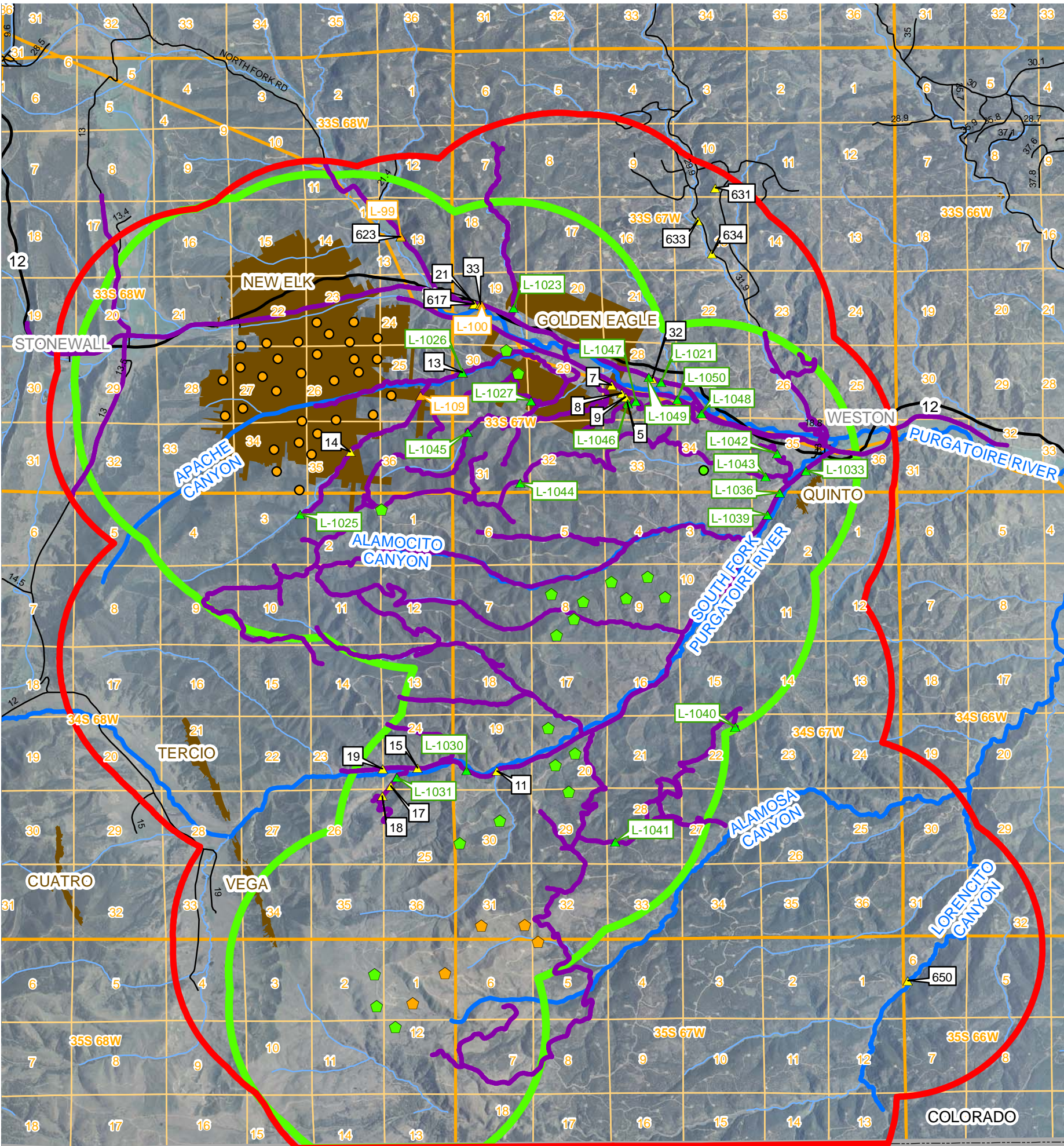


IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- 2010 PROPOSED COALBED METHANE PRODUCTION WELL
- 2010 INSTALLED COALBED METHANE PRODUCTION WELL
- 2011 PROPOSED COALBED METHANE PRODUCTION WELL
- 2011 INSTALLED COALBED METHANE PRODUCTION WELL
- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)
- ROAD
- OTHER WATER SOURCE
- MAJOR DRAINAGE
- 2011 APOGEE SURVEY ROUTE
- PROJECT AREA
- 2011 PROJECT AREA
- COLORADO STATE LINE
- TOWNSHIP AND RANGE LINES
- SECTION LINE
- MINE BOUNDARY

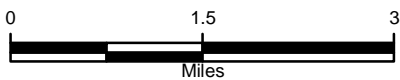
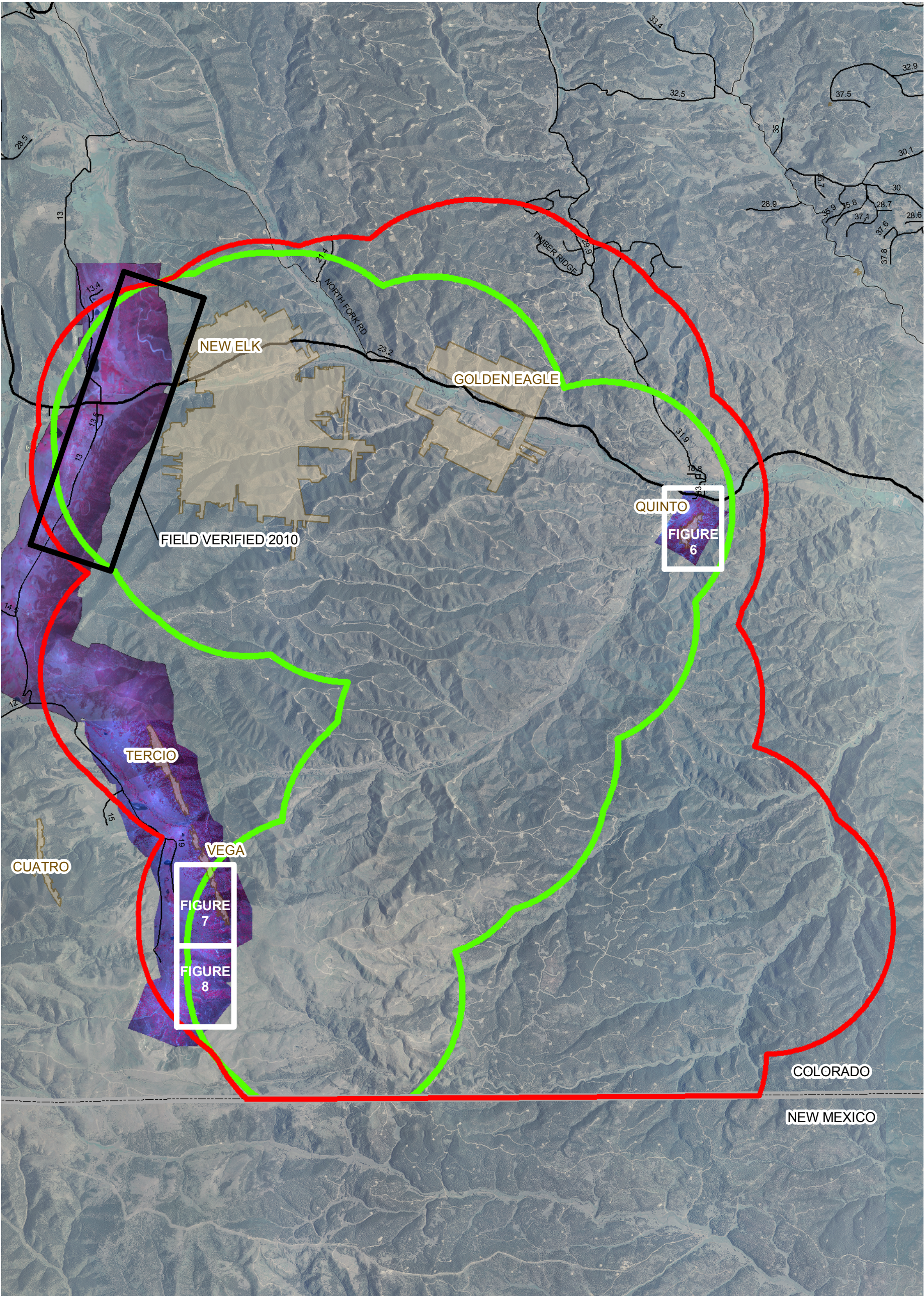


FIGURE 4
2011 GROUND SURVEY MAP
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC





COLOR INFRARED IMAGES COURTESY OF AGRO ENGINEERING, 2010
AERIAL IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

- SUSPECT AREAS FIGURE LAYOUT (WHITE)
- PROJECT AREA
 - 2011 PROJECT AREA
 - LEWICKI MINE BOUNDARIES
 - ROAD
- CIR: COLOR INFRARED

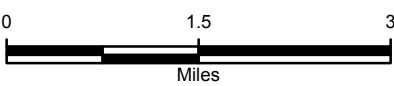
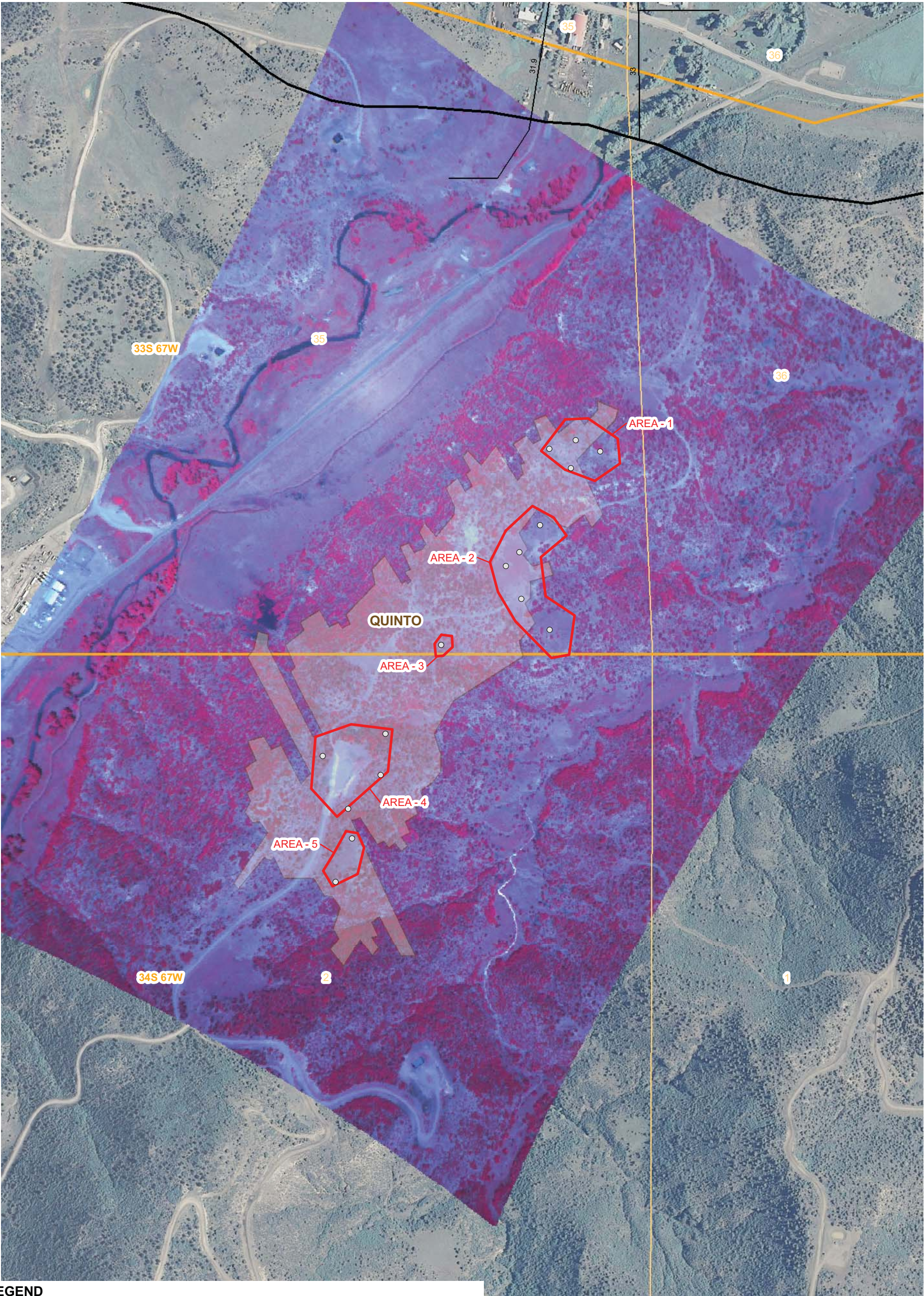


FIGURE 5
CIR SUSPECT AREA LOCATION MAP
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO





LEGEND

SUBSURFACE METHANE MEASUREMENT

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

- SUSPECT AREA
- VERMEJO FORMATION BOUNDARY (Kvt)
- TOWNSHIP AND RANGE LINES
- SECTION LINE
- LEWICKI MINE BOUNDARIES
- ROAD
- CIR: COLOR INFRARED
- %: PERCENT
- ppm: PARTS PER MILLION

COLOR INFRARED IMAGES COURTESY OF AGRO ENGINEERING, 2010
AERIAL IMAGE COURTESY OF USDA/NRCS, 2009

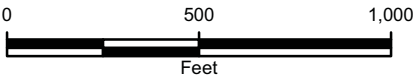
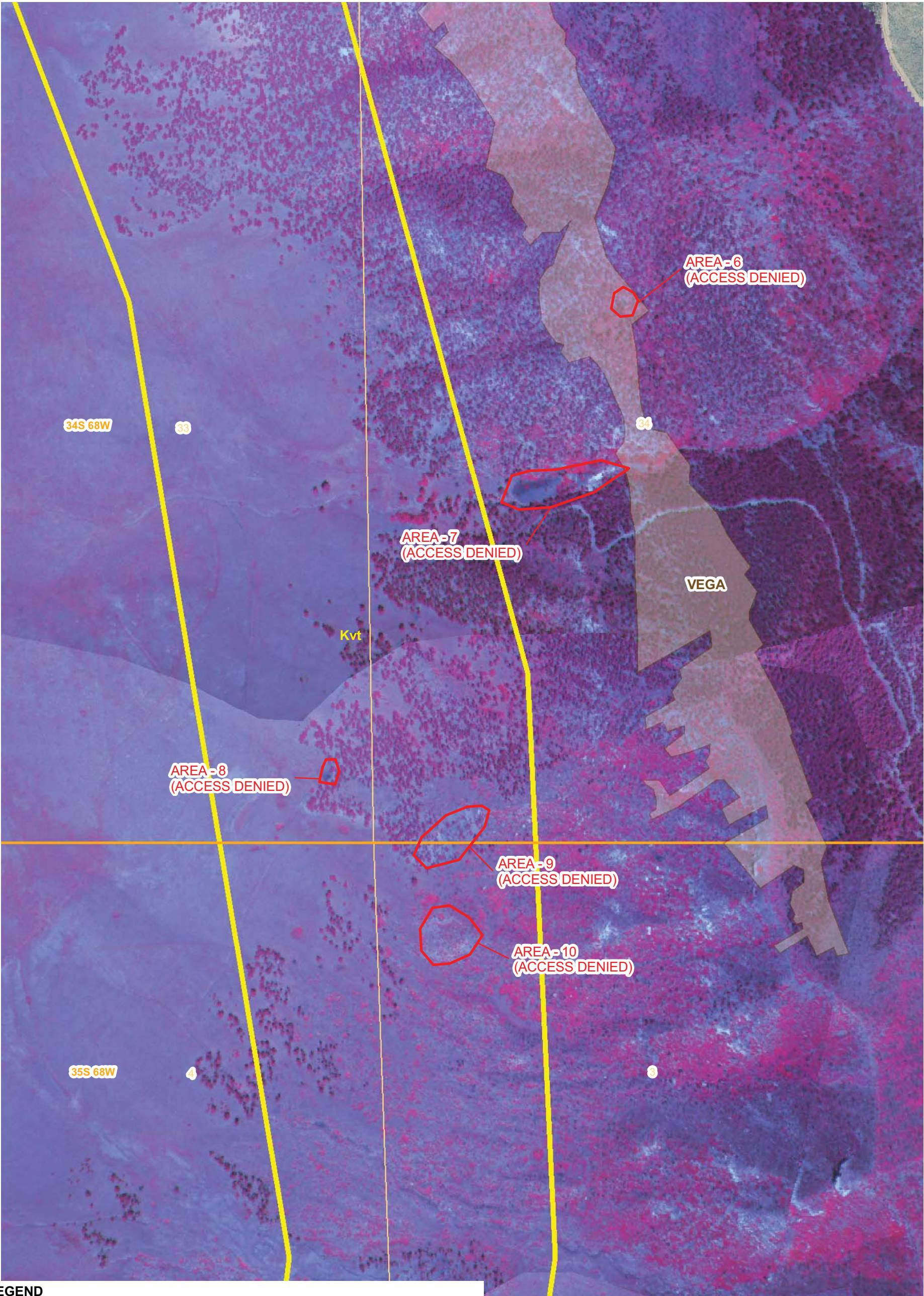


FIGURE 6
DETAILED SUSPECT AREA MAP
CIR SUSPECT AREAS 1-5
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





LEGEND

SUBSURFACE METHANE MEASUREMENT

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

- SUSPECT AREA
- VERMEJO FORMATION BOUNDARY (Kvt)
- TOWNSHIP AND RANGE LINES
- SECTION LINE
- LEWICKI MINE BOUNDARIES
- ROAD
- CIR: COLOR INFRARED
- %: PERCENT
- ppm: PARTS PER MILLION

COLOR INFRARED IMAGES COURTESY OF AGRO ENGINEERING, 2010
AERIAL IMAGE COURTESY OF USDA/NRCS, 2009

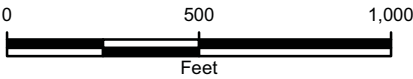
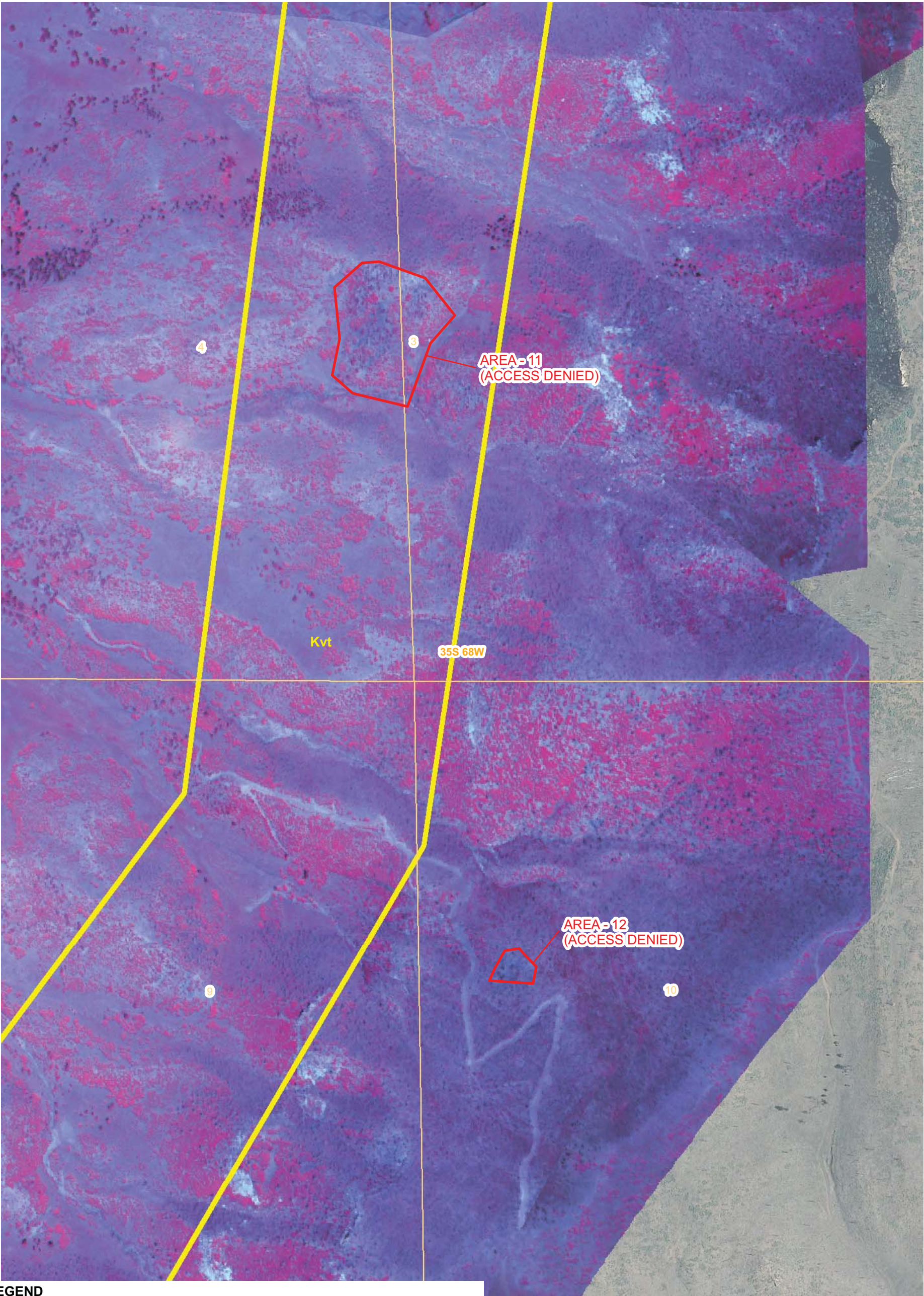


FIGURE 7
DETAILED SUSPECT AREA MAP
CIR SUSPECT AREAS 6-10
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





LEGEND

SUBSURFACE METHANE MEASUREMENT

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

- SUSPECT AREA
- VERMEJO FORMATION BOUNDARY (Kvt)
- TOWNSHIP AND RANGE LINES
- SECTION LINE
- LEWICKI MINE BOUNDARIES
- ROAD
- CIR: COLOR INFRARED
- %: PERCENT
- ppm: PARTS PER MILLION

COLOR INFRARED IMAGES COURTESY OF AGRO ENGINEERING, 2010
AERIAL IMAGE COURTESY OF USDA/NRCS, 2009

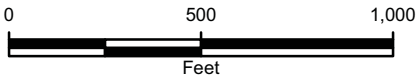


FIGURE 8
DETAILED SUSPECT AREA MAP
CIR SUSPECT AREAS 11-12
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

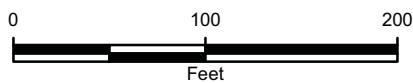


FIGURE 9
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 632/L-99
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND



METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)

mol/m² · day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² · day ARE LABELED

-  LEWICKI MINE BOUNDARY
 SECTION LINE

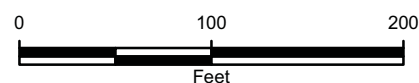


FIGURE 10
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1021
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

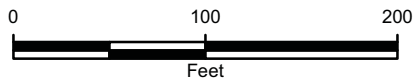


FIGURE 11
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1023
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

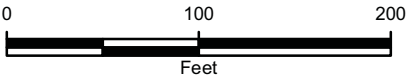


FIGURE 12
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1025
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

■ LEWICKI MINE BOUNDARY

□ SECTION LINE

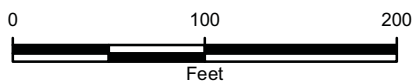


FIGURE 13
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1027
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

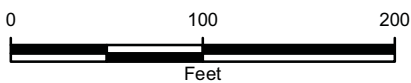


FIGURE 14
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1030
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC



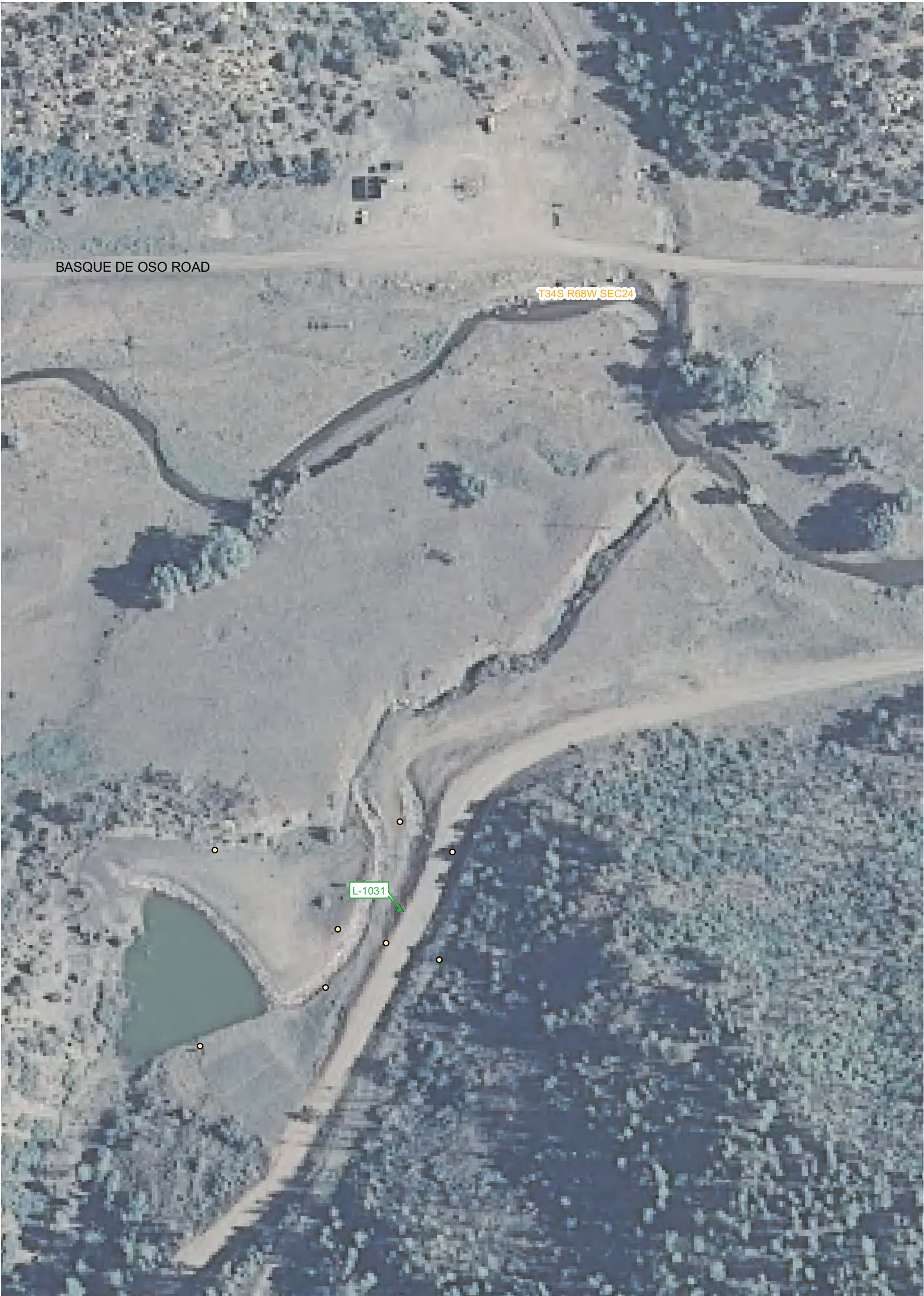


IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

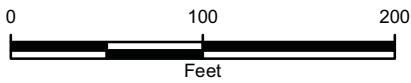


FIGURE 15
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1031
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

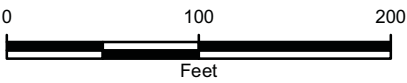


FIGURE 16
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1033
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

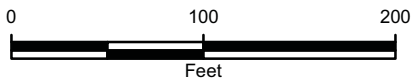


FIGURE 17
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1036
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)

CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

LEWICKI MINE BOUNDARY

SECTION LINE

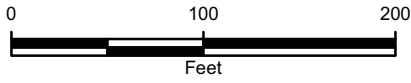


FIGURE 18
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1039
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

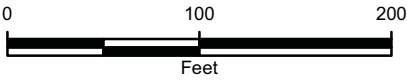


FIGURE 19
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1040
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

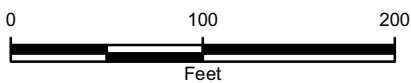


FIGURE 20
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1041
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

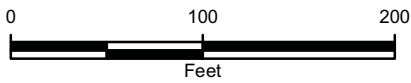


FIGURE 21
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1042
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

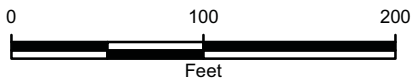


FIGURE 22
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1043
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

LEWICKI MINE BOUNDARY

SECTION LINE

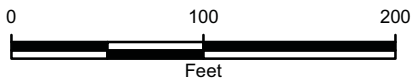


FIGURE 23
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1044
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

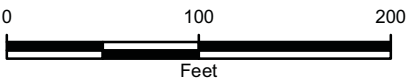


FIGURE 24
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1045
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC



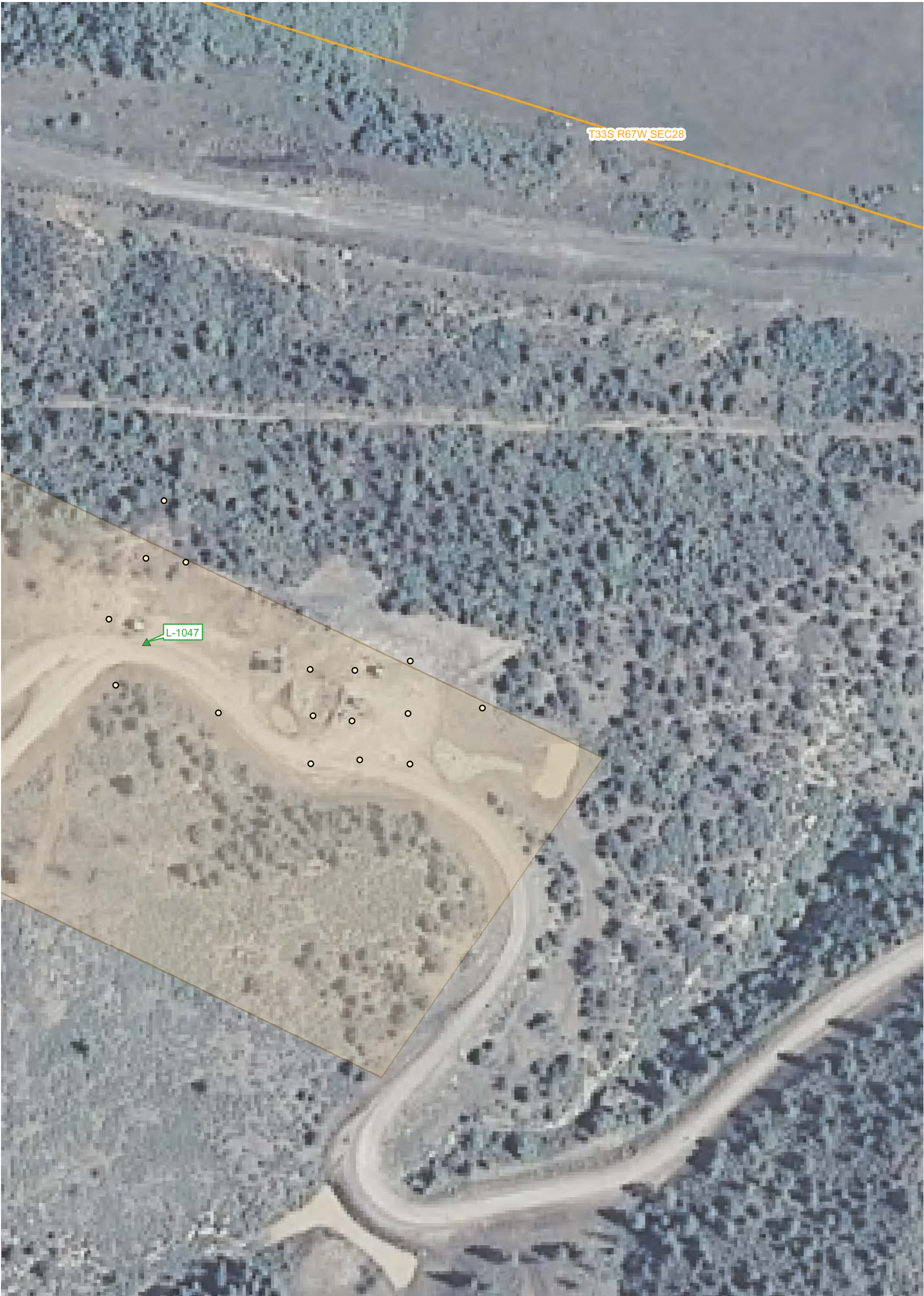


IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

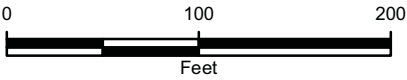


FIGURE 25
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1047
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

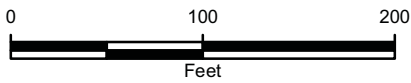


FIGURE 26
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1048
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

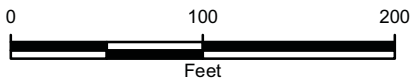


FIGURE 27
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-1050
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

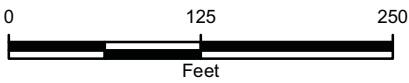


FIGURE 28
METHANE FLUX CONTOURS
SUSPECT SEEP AREAS 5, 8, 9 & L-1046
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

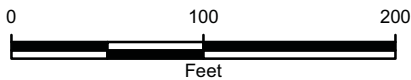


FIGURE 29
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 7
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

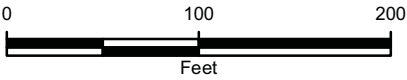


FIGURE 30
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 11
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

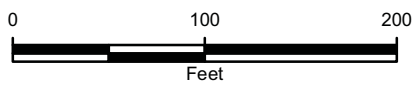


FIGURE 31
METHANE FLUX CONTOURS
SUSPECT SEEP AREAS 13 & L-1026
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

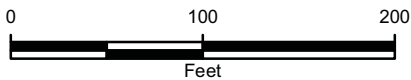


FIGURE 32
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 14
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

■ LEWICKI MINE BOUNDARY

□ SECTION LINE

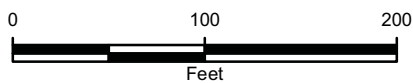


FIGURE 33
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 15
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- ▲ 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- ▲ 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- ▲ 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

— METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

■ LEWICKI MINE BOUNDARY

□ SECTION LINE

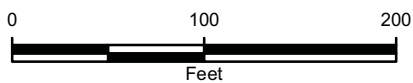


FIGURE 34
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 17
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

LEWICKI MINE BOUNDARY

SECTION LINE

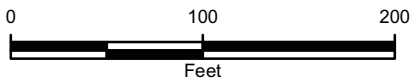


FIGURE 35
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 18
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES
mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

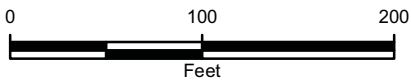


FIGURE 36
METHANE FLUX CONTOURS
SUSPECT SEEP AREA 19
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

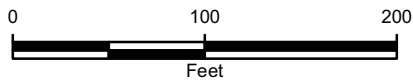


FIGURE 37
METHANE FLUX CONTOURS
SUSPECT SEEP AREAS 21, 33, 617, & L-100
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC







IMAGE COURTESY OF USDA/NRCS, 2009

LEGEND

METHANE FLUX MEASUREMENT
(mol/m² • day)

- 0.0000 - 0.1999
- 0.2000 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 10.0000
- 10.0001 - 50.0000
- 50.0001 - 100.0000
- 100.0001 - 400.0000

- 2007 SUSPECT METHANE SEEP (ID LABELED IN BLACK)
- 2010 SUSPECT METHANE SEEP (ID LABELED IN ORANGE)
- 2011 SUSPECT METHANE SEEP (ID LABELED IN GREEN)

METHANE FLUX CONTOUR (mol/m² day)
CONTOUR INTERVAL VARIES

mol/m² • day: MOLES PER SQUARE METER PER DAY
ONLY METHANE FLUX MEASUREMENTS GREATER
THAN OR EQUAL TO 0.2 mol/m² • day ARE LABELED

- LEWICKI MINE BOUNDARY
- SECTION LINE

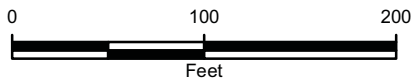
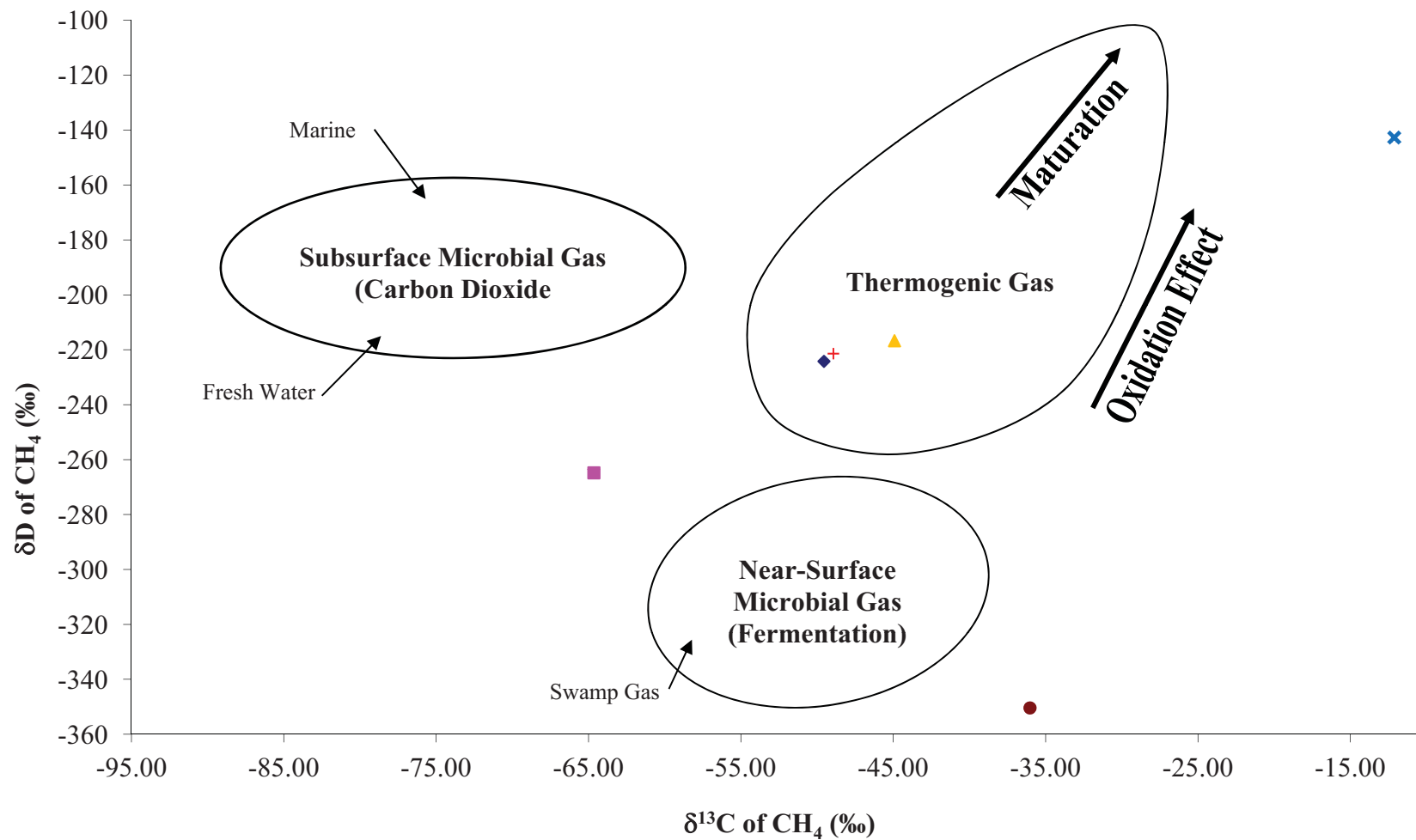


FIGURE 39
METHANE FLUX CONTOURS
SUSPECT SEEP AREA L-109
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO
XTO ENERGY, INC





LEGEND

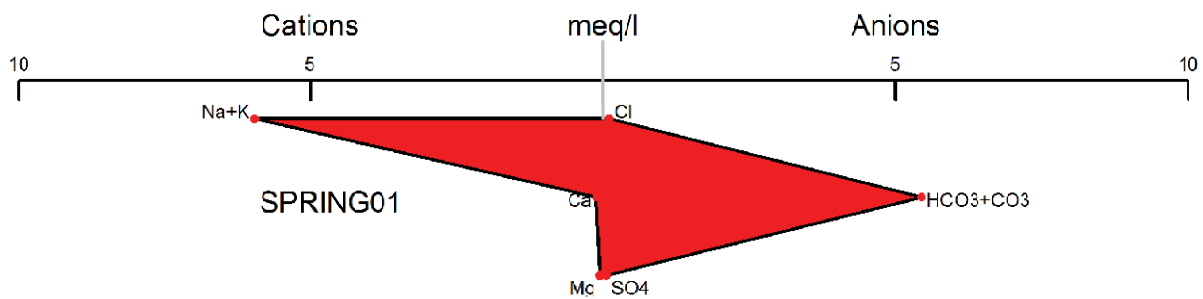
SUSPECT SEEP AREA

- ◆ 11
- 13
- ▲ 15
- ✕ 18
- ✚ 19
- 623

FIGURE 40
ISOTOPIC ANALYSIS
2011 COLORADO RULE 608 COMPLIANCE REPORT
RATON BASIN, LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC.





LEGEND

Ca: CALCIUM
 Cl: CHLORIDE
 CO3: CARBONATE
 HCO3: BICARBONATE
 K: POTASSIUM
 Mg: MAGNESIUM
 Na: SODIUM
 SO4: SULFATE
 meq/l: MILLIEQUIVALENTS PER LITER

FIGURE 41
 STIFF DIAGRAM
 AUGUST 15, 2011
 2011 COLORADO RULE 608 COMPLIANCE REPORT
 RATON BASIN, LAS ANIMAS COUNTY, COLORADO
 XTO ENERGY, INC



TABLES

TABLE 1

**PROPERTY OWNER AND ACCESS INFORMATION
2011 COLORADO RULE 608 COMPLIANCE REPORT
LAS ANIMAS, COLORADO**

XTO ENERGY, INC.

Landowner	Permission Granted	Date	Parcel ID	Section	Township	Range	Property Address
Mr. and Mrs. Arguello	Yes	7/7/2011	10136500	13	33	68	None
Mr. John Toupal	Yes	Yes - XTO purchased land	14533300	28	33	67	Pagotta Tract
			14533405	27, 28	33	67	
			14533200	27	33	67	Weston Camp and Substation Tract
Red River Ranch Holdings, LLC	No	8/14/2011	14182121	4, 5, 6, 7, 8	35	67	Red River Ranch
			1418210	1, 2, 3, 10, 11, 12, 13, 14, 15	35	68	
Vermejo Park, LLC, A Georia LTD Liability CO	Yes	6/28/2011	13303303	4, 5, 6, 7, 9	35	67	Cottonwood Canyon Tract 2
Hill Ranch LTD and Kozad Properties LTD	Yes	7/1/2011	12220713	4, 5, 6, 7, 10	35	67	Alamosa and Lorencito Canyon
			12220714	1,2, 3, 10, 11, 12, 13, 14, 15	35	68	
			11071110	21, 22, 28	34	67	Alamosa Canyon Tract
			13432508	2, 31, 32, 33	34	67	Alamosa and Lorencito
			14533003	28	33	67	Pagnotta Tract
			13297000	27, 35	33	67	
Tercio Ranch Holdings, LLC	No	8/14/2011	13118813	2, 3	35	68	Tercio Ranch
			13118810	27, 34	34	68	
Department of Natural Resources	Yes	--	10877304	2, 3, 13, 23, 24, 25, 26	34	68	Bosque De Oso Wildlife
			10877303	19	34	67	
Bill R. and Rossana T. Chavez	Yes	6/28/2011	13940200	19	33	67	None
Silver Bernadina Sandra Chacon	Yes	6/28/2011	14021300	19	33	67	None
Candido Anthony III, Deloris G., and Christina Marie Chacon	Yes	7/7/2011	10581000	19	33	67	None
Donald Mounier	No Response	--	--	17	33	67	Unit 3, Lot 2C
Al Van Staveren	No Response	--	--	17	33	67	Unit 3, Lot 3C
Sabrina Blakeney	No Response	--	14239500	17	33	67	Unit 3, Lot 7C
Gery Navalesi	No Response	--	--	18	33	67	Unit 2, Lot 16
Richard W Stiles	No Response	--	--	18	33	67	Unit 2, Lot 12

TABLE 2
PLUGGED AND ABANDONED PRODUCTION WELL SUMMARY
2011 RULE 608 COMPLIANCE REPORT
LA ANIMAS COUNTY, COLORADO

XTO ENGERY, INC.

2011 Planned CBM Production Well ID	Plugged and Abandoned Wells within 1/4 -mile of Planned Well			
	API Number	Well Number and Name	Latitude	Longitude
AC 20-11	05-071-06342	20-6 APACHE CANYON	37.070864	-104.91369
GE 30-02	05-071-06164	30-2 APACHE CANYON	37.147302	-104.926611
GE 34-11	05-071-06889	34-11 CH-GE	37.127533	-104.876419
AC 01-04	05-071-07963	36-13 APACHE CANYON	37.120699	-104.952511

Notes:

CBM - coalbed methane

API - American Petroleum Institute



TABLE 3
SUSPECT SEEP AREA SUMMARIES
2011 COLORADO RULE 608 COMPLIANCE REPORT
LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC.

Suspect Seep Area(s)	Figure Number	Ground Survey Conducted			2007 Subsurface Methane Gas Detected	2010			2011			Observations	Potential Methane Source	Conclusions	Recommendations
		2007	2010	2011		Total Number of Flux Points	Reportable CH ₄ Flux Points*	Total CH ₄ Flux (MCFD)**	Total Number of Sample Points	Reportable CH ₄ Flux Points*	Total CH ₄ Flux (MCFD)**				
623/L-99	9	x	x		623: Yes L-99: --	78	4	0.07	27	0	0.00	Methane was detected in 2007 and 2010.	Methane seep	LTE will continue to assess this seep to determine if this is a methane seep.	Will monitor during 2012 event to confirm 2011 results
L-1021	10			x	--	--	--	--	44	10	129.71	Gas lines in the vicinity of the detected methane during the 2011 ground survey. Dead vegetation such as bushes and grass in vicinity of reportable methane flux.	Methane seep	The high methane flux and dead vegetation appears to indicate that this area is a methane seep area.	Will monitor during 2012 event
L-1023	11			x	--	--	--	--	8	0	0.00	Apogee identified gas lines and risers in the vicinity of the detected methane during the 2011 ground survey. LTE also observed gas lines and risers during the 2011 mapping event.	Leaking gas lines and/or risers	With the absence of methane flux in the vicinity of suspect seep area, it appears this area is not a seep area.	Will discontinue monitoring of suspect seep area
L-1025	12			x	--	--	--	--	9	0	0.00	Apogee identified the methane near a well pad and associated generator. LTE personnel also observed the well pad and generator during the detailed mapping event.	Off-gassing of wellhead and/or generator	The lack of methane flux in the vicinity of suspect seep area and the presence of a well head, well pad, and generator indicate the likely source is from the off-gassing of wellhead and/or generator.	Will discontinue monitoring of suspect seep area
L-1027	13			x	--	--	--	--	8	0	0.00	Apogee identified a riser pipe in the vicinity of the detected methane during the 2011 ground survey.	Leaking gas lines and/or risers	The lack of methane flux in the vicinity of suspect seep area and the presence of a riser pipe indicates the likely source of the methane is from a leaking riser pipe.	Will discontinue monitoring of suspect seep area
L-1030	14			x	--	--	--	--	17	3	2.19	Apogee identified a well pad southeast of the suspect area during the 2011 ground survey	Methane seep	Due to the distance of the suspect seep area from the existing gas lines, it appears this suspect area is related to methane seeping and not from leaking gas lines.	Will monitor during 2012 event
L-1031	15			x	--	--	--	--	8	0	0.00	Apogee identified a riser pipe in the vicinity of the suspect area during the 2011 ground survey	Leaking gas lines and/or risers	The lack of reportable methane flux in the vicinity of the suspect seep area and observations of riser pipes indicate the likely source of methane is from leaking riser pipes.	Will discontinue monitoring of suspect seep area
L-1033	16			x	--	--	--	--	26	1	0.02	Apogee identified small concentration of methane in the vicinity. LTE observed stressed and dead vegetation near vacant structures on the north side of Basque De Oso Road.	Methane seep	Based on the correlation of methane flux within an area that contains stressed/dead vegetation and the lack of other potential sources, it appears that suspect seep area is methane seep.	Will monitor during 2012 event
L-1036	17			x	--	--	--	--	9	0	0.00	Apogee identified a gas compressor station near the suspected seep areas during the 2011 ground survey. LTE also observed the gas compressor station west of the suspect area.	Off-gassing of compressor station	Based on the lack of methane flux and the presence of a gas compressor station nearby, it appears the methane Apogee detected during the ground survey was from the gas compressor station and not methane seep.	Will discontinue monitoring of suspect seep area
L-1039	18			x	--	--	--	--	8	0	0.00	Apogee observed the nearby gas compressor station off-gas while recording the methane measurements at L-1039.	Off-gassing of compressor station	Based on the lack of reportable methane flux and the off-gassing of the gas compressor station at the time of the 2011 ground survey, the likely source of methane is the gas compressor station.	Will discontinue monitoring of suspect seep area
L-1040	19			x	--	--	--	--	14	1	0.02	Apogee identified a well pad near the detected methane during the 2011 ground survey. LTE also observed the well pad during the detailed mapping event.	Off-gasing wellhead and/or leaking gas lines	Based on the low methane flux and limited total reportable volumetric methane flux, the detected methane appears related to the well pad and is not considered a methane seep.	Will discontinue monitoring of suspect seep area

Will monitor during 2012 event
Will monitor during 2012 event to confirm 2011 results
Will discontinue monitoring of suspect seep area



TABLE 3
SUSPECT SEEP AREA SUMMARIES
2011 COLORADO RULE 608 COMPLIANCE REPORT
LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC.

Suspect Seep Area(s)	Figure Number	Ground Survey Conducted			2007 Subsurface Methane Gas Detected	2010			2011			Observations	Potential Methane Source	Conclusions	Recommendations
		2007	2010	2011		Total Number of Flux Points	Reportable CH ₄ Flux Points*	Total CH ₄ Flux (MCFD)**	Total Number of Sample Points	Reportable CH ₄ Flux Points*	Total CH ₄ Flux (MCFD)**				
L-1041	20			x	--	--	--	--	7	0	0.00	Apogee during the 2011 ground survey. Apogee identified a gas compressor station near the suspect area during the 2011 ground survey.	Off-gassing of compressor station	Based on the presence of a gas compressor station and no reportable methane flux, methane detected by Apogee in 2011 appears to be from off-gassing of the gas compressor station and not a methane seep. Will monitor during 2012 event.	Will discontinue monitoring of suspect seep area
L-1042	21			x	--	--	--	--	8	0	0.00	Apogee identified a well pad and associated wellhead near the suspect area during the 2011 ground survey.	Off-gasing wellhead and/or leaking gas lines	Based on the presence of a wellhead and no reportable methane flux, methane detected by Apogee in 2011 appears to be from off-gassing of the wellhead and not a methane seep. Will monitor during 2012 event.	Will discontinue monitoring of suspect seep area
L-1043	22			x	--	--	--	--	11	0	0.00	Apogee did not identify any oil and gas structure that could be the potential source of the detected methane during the 2011 ground survey.	Fugitive atmospheric gas	Based on the lack of methane flux in the vicinity of the suspect seep area, methane detected by Apogee appears to be fugitive gas in the atmosphere and not a methane seep	Will discontinue monitoring of suspect seep area
L-1044	23			x	--	--	--	--	9	0	0.00	Apogee identified a new production well being drilling during the 2011 ground survey.	Production well installation activities	Based on the lack of reportable methane flux in the vicinity of the suspect seep area and the installation of a new production well, it appears methane detected by Apogee during the 2011 ground survey was related to the installation of the production well and not a methane seep. Will monitor during 2012 event.	Will discontinue monitoring of suspect seep area
L-1045	24			x	--	--	--	--	8	0	0.00	Apogee identified a well pad in the vicinity of where methane was detected during the 2011 ground survey.	Off-gasing wellhead and/or leaking gas lines	Based on the location of the suspect seep area to an active well pad and the lack of reportable methane flux, the methane Apogee detected during the 2011 ground survey appears to be from the tank battery associated with the well pad and not a methane seep.	Will discontinue monitoring of suspect seep area
L-1047	25			x	--	--	--	--	17	0	0.00	Apogee observed a well pad in the vicinity of the suspect seep area where methane was detected during the 2011 ground survey.	Off-gasing wellhead and/or leaking gas lines or off-gassing of mine	Based on the lack of reportable methane flux and the presence of an active well pad, the methane detected by Apogee during the 2011 ground survey is related to the well pad and not a methane seep. Also within mine boundary to be another possible source.	Will discontinue monitoring of suspect seep area
L-1048	26			x	--	--	--	--	15	1	0.27	Apogee observed a well pad upwind of the suspect seep area where methane was detected during the 2011 ground survey.	Off-gasing wellhead and/or leaking gas lines	Based on limited reportable methane flux and the presence of an active well pad, the methane detected by Apogee during the 2011 ground survey is related to the well pad and not a methane seep. Will monitor during 2012 event.	Will discontinue monitoring of suspect seep area
L-1050	27			x	--	--	--	--	22	4	0.69	Apogee during the 2011 ground survey. Apogee observed a well pad upwind of the suspect seep area where methane was detected during the 2011 ground survey.	Off-gasing wellhead and/or leaking gas lines	Based on limited reportable methane flux and the presence of an active well pad, the methane detected by Apogee during the 2011 ground survey is related to the well pad and not a methane seep.	Will monitor during 2012 event
5, 7, 8, 9, & L-1046	28 & 29	x		x	5: Yes 7: -- 8: -- 9: --	-- -- -- --	-- -- -- --	-- -- -- --	167	16	2.16	Suspect seep areas located near or within Golden Eagle mine boundary. Apogee identified a well pad northeast of suspect area L-1046.	Methane seep (suspect seep area 5)	Based on reportable methane detected in the vicinity of suspect seep area 5 and the lack of other observable potential sources of methane, suspect seep area 5 appears to be caused by methane seeping from the ground. Suspect seep areas 8, 9,and L-1046 do not appear to be methane seeps.Due to the low concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mapping event appears to indicate the historical seep has diminished.	Will monitor suspect seep area 5 during 2012 event. Will discontinue monitoring of suspect seep areas 7, 8, 9, & L-1046

Will monitor during 2012 event
Will monitor during 2012 event to confirm 2011 results
Will discontinue monitoring of suspect seep area



TABLE 3
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LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC.

Suspect Seep Area(s)	Figure Number	Ground Survey Conducted			2007 Subsurface Methane Gas Detected	2010			2011			Observations	Potential Methane Source	Conclusions	Recommendations
		2007	2010	2011		Total Number of Flux Points	Reportable CH ₄ Flux Points*	Total CH ₄ Flux (MCFD)**	Total Number of Sample Points	Reportable CH ₄ Flux Points*	Total CH ₄ Flux (MCFD)**				
11	30	x			Yes	--	--	--	47	0	0.00	Methane was detected in 2007.	Diminished methane seep	Due to the low methane subsurface concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mapping event, this area does not appear to be a methane seep.	Will monitor during 2012 event to confirm 2011 results.
13 & L-1026	31	x		x	--	29	8	10.74	56	2	0.03	Reportable methane detected in 2010 and confirmed in 2011	Methane seep	Based on reoccurring reportable methane flux for last two years, suspect seep area appears to be a methane seep	Will monitor during 2012 event
14	32	x			--	94	16	0.56	50	7	0.34	Reportable methane detected in 2010 and confirmed in 2011	Methane seep	Based on reoccurring reportable methane flux for last two years, suspect seep area appears to be a methane seep	Will monitor during 2012 event
15	33	x			Yes	--	--	--	23	0	0.00	Methane was detected in 2007.	Diminished methane seep	Due to the low methane subsurface concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mapping event, this area does not appear to be a methane seep.	Will monitor during 2012 event to confirm 2011 results
17	34	x			--	--	--	--	38	0	0.00	Methane was detected in 2007.	Diminished methane seep	Due to the low methane subsurface concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mapping event, this area does not appear to be a methane seep.	Will monitor during 2012 event to confirm 2011 results
18	35	x			--	--	--	--	40	1	0.00	Methane was detected in 2007.	Diminished methane seep	Due to the low methane subsurface concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mapping event, this area does not appear to be a methane seep.	Will monitor during 2012 event to confirm 2011 results
19	36	x			Yes	--	--	--	23	0	0.00	Methane was detected in 2007.	Diminished methane seep	Due to the low methane subsurface concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mapping event, this area does not appear to be a methane seep.	Will monitor during 2012 event to confirm 2011 results
21, 33, 617, & L-100	37	x	x		--	74	1	0.03	35	0	0.00	Methane was detected in 2007 and 2010.	Diminished methane seeps	Due to the low methane subsurface concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mapping event, this area does not appear to be a methane seep.	Will monitor during 2012 event to confirm 2011 results
32 & L-1049	38	x			--	--	--	--	372	146	304.12	Apogee identified gas lines and risers near suspect seep area L-1049 during the 2011 ground survey. Suspect seep areas are just east of the Golden Eagle mine	Methane seep	Based on previously detected methane around suspect seep area 32 and the numerous reportable methane flux and high total reportable methane volumetric flux, it appears the methane dected in these areas are from methane seeps.	Will monitor during 2012 event
L-109	39		x		--	83	3	0.03248	24	0	0.00	Limited reportable methane flux detected in 2010. Suspect seep area located within Allen-East and West Portals mine	Diminished methane seeps	Due to the low methane subsurface concentrations recorded four years ago and the lack of reportable methane flux during the 2011 mappingevent, this area does not appear to be a methane seep.	Will monitor during 2012 event to confirm 2011 results

Will monitor during 2012 event

Will monitor during 2012 event to confirm 2011 results

Will discontinue monitoring of suspect seep area

Notes:
CH₄ - Methane
moles/m²-day - moles per meter squared per day
MCFD - thousand cubic feet per day
-- - No data available
* - Points where flux values were above 0.000 moles/m²-day
* - Only points where flux values were above the reporting limit of 0.2 moles/m²-day
** - Volume includes only gridded values > 0.2 moles/m²-day



TABLE 4
GAS COMPOSITON AND ISOTOPIC ANALYSIS
2011 COLORADO RULE 608 COMPLIANCE REPORT
LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC.

Suspect Seep Area	Sample Date	He (%)	H2 (%)	Ar (%)	O ₂ (%)	CO ₂ (%)	N ₂ (%)	CO (%)	C ₁ (%)	C ₂ (%)	C ₂ H ₄ (%)	C ₃ (%)	iC ₄ (%)	nC ₄ (%)	iC ₅ (%)	nC ₅ (%)	C ₆ + (%)	δ ¹³ C ₁ (‰)	δDC ₁ (‰)	Specific Gravity	BTU
11	8/30/2007	0.0041	0	0.617	13.07	0.39	50.17	0	35.75	0.0039	0	0	0	0	0	0	0	-49.55	-224.2	0.842	362
9	8/19/2011	Sampling container comprimised - No analysis																			
13	8/10/2010	0	0	0.460	1.83	3.66	28.24	0	65.81	0.0038	0	0	0	0	0	0	0	-64.65	-264.8	0.72	667
15	8/30/2007	0	0.002	0.707	14.55	0.86	57.48	0	26.4	0.003	0	0	0	0	0	0	0	-44.92	-216.7	0.886	267
18	8/17/2011	0	0	0.953	20.30	0.89	77.24	0	0.617	0	0	0	0	0	0	0	0	-12.12	-142.7	1.001	6
19	8/30/2007	0	0	0.927	19.9	0.39	70.02	0	8.76	0	0	0	0	0	0	0	0	-48.93	-221.4	0.964	89
32	8/19/2011	NA	0	0.000	21.82	0.19	77.18	0	0.809	0	0	0	0	0	0	0	0	NA	NA	0.995	8
L-109	8/11/2010	0	0	0.935	20.62	0.35	78.1	0	0	0	0	0	0	0	0	0	0	NA	NA	1.001	0
14	8/12/2010	0	0	0.935	20.94	0.16	77.96	0	0.0036	0	0	0	0	0	0	0	0	NA	NA	1.001	0
L-99	8/13/2010	0	0	0.933	20.07	1.05	77.95	0	0	0	0	0	0	0	0	0	0	NA	NA	1.005	0
623	8/30/2007	0	0	0.91	19.06	4.37	67.05	0	8.61	0	0	0	0	0	0	0	0	-36.03	-350.4	0.986	87
L-100	8/13/2010	0	0	0.931	20.95	0.072	78.05	0	0	0	0	0	0	0	0	0	0	NA	NA	1.000	0

Notes:

He - Helium	CO - Carbon Monoxide	nC ₄ - Butane	% - percent
H ₂ - Hydrogen	C ₁ - Methane	iC ₅ - Isopentane	‰ - per milion
Ar - Argon	C ₂ - Ethane	nC ₅ - Pentane	BTU - British Thermal Units (At 60 degrees Fahrenheit and 14.7 psia)
O ₂ - Oxygen	C ₂ H ₄ - Ethylene	C ₆ + - Hexanes +	NA - Not analyzed due to insufficient concentration for analysis or comprimised sampling container
CO ₂ - Carbon Dioxide	C ₃ - Propane	δ ¹³ C ₁ - Carbon isotope of Methane	
N ₂ - Nitrogen	iC ₄ - Isobutane	δDC ₁ - Hydrogen isotope of Methane	



TABLE 5
NATURAL SPRING FIELD OBSERVATIONS AND MEASUREMENTS
2011 COLORADO RULE 608 COMPLIANCE REPORT
LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC.

Natural Spring	Location	Inspection Date	Specific Electrical Conductance (µS/cm)	pH (Units)	ORP (mV)	Temperature (°C)	DO (mg/L)	TDS (mg/L)
Spring01	North Fork Apache Canyon	8/13/2010	381	9.2	140.5	22.4	10.25	247
		8/19/2011	408	7.1	-99.5	13.29	13.4	432

Notes:

Blank cells indicate no measurement.

µS/cm - microSiemens per centimeter

ORP - oxidation reduction potential

mV - millivolts

mg/L - milligrams per liter

°C - degrees celsius

TDS - total dissolved solids

ppm - parts per million

NM - Not Measured

DO - dissolved oxygen



TABLE 6
NATURAL SPRING ANALYTICAL RESULTS
2011 COLORADO RULE 608 COMPLIANCE REPORT
LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC.

Natural Spring	Location	Sample Date	Calcium (mg/L)	Magnesium (mg/L)	Sodium (mg/L)	Potassium (mg/L)	Manganese (mg/L)	Selenium (mg/L)	Carbonate (mg/L)	Bicarbonate (mg/L)	TDS (mg/L)	Specific Conductivity (umhos/cm)	pH
Spring01	North Fork Apache Canyon	8/13/2010	3.4	0.652	97.7	1.41	0.021	<0.00080	<5.0	205	280	364	10.13
		8/19/2011	2.21	0.52	136	1.640	0.126	<0.00080	<5.0	332	420	428	8.16

Natural Spring	Location	Sample Date	Sulfate (mg/L)	Chloride (mg/L)	Bromide (mg/L)	Fluoride (mg/L)	Hydrogen Sulfide (mg/L)	Nitrogen as Nitrate (mg/L)	Nitrogen as Nitrite (mg/L)	Iron Reducing Bacteria (cfu/ml)	Slime Forming Bacteria (cfu/ml)	Sulfate Reducing Bacteria (cfu/ml)	Dissolved Methane (mg/L)
Spring01	North Fork Apache Canyon	8/13/2010	2.9	3.3	<0.20	0.74	<0.50	<0.23	<0.061	500	>350,000	700,000	0.109
		8/19/2011	2.7	3.7	<0.20	1.4	NA	<0.045	<0.011	9,000	350,000	700,000	0.277

Notes:

mg/L - milligrams per liter
TDS - Total dissolved solids
SAR - Sodium adsorption ratio
umhos/cm - Microohms per centimeter
cfu/ml - Coliform units per milliliter
< - Less than the laboratory reporting limit
NA - Not analyzed



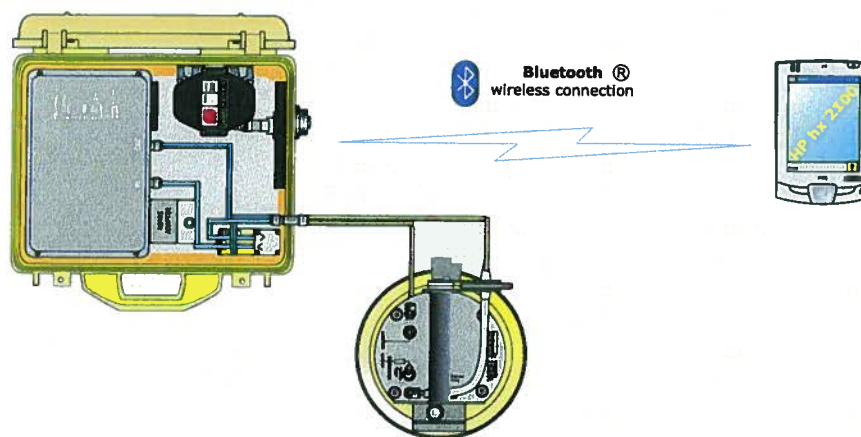
APPENDIX A
EQUIPMENT SPECIFICATIONS



WEST Systems portable soil flux meter

for Carbon dioxide, Methane and Hydrogen sulfide fluxes

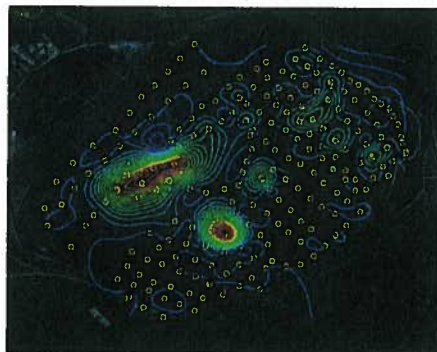
The WEST Systems Fluxmeter is a portable instrument for the measurement of soil gas diffuse degassing phenomena that uses the accumulation chamber method.



This method studied for soil respiration in agronomy (Parkinson) and for soil degassing in volcanic areas (R. Cioni et al.), has been designed by WEST Systems to obtain a portable instrument that allows the performance of measurements with very good accuracy in a short time. The instrument allows a wide range evaluation of the amount of soil gas flux and can be utilized for the evaluation of biogas degassing (landfills), for the survey of non visible degassing phenomena in volcanic and geothermal areas as well as soil respiration rate in agronomy. In the picture below, the results of the degassing survey of a landfill.



Portable fluxmeter



Methane flux contour lines



a group of researchers during a flux mapping fieldwork, using the WS-LI820 flux meter
Courtesy of United States Geological Survey

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WEST
Systems

Portable soil flux meter

Common physical characteristics:

Total Weight = 8.3 Kg/16 lbs. to be carried on the back using the backpack-like support vest. The field operator will also have to carry one of the accumulation chambers and the palmtop:

Warm Up

Only at instrument cold start-up a warm-up time of 20 minutes is required. The typical measurement time ranges from 2 to 4 minutes and the autonomy of the instrument is about 4 hours with a single NiMH 14.4 Volts, 2.6 A/h battery. The instrument comes with two interchangeable batteries.

Accumulation Chamber specifications:

- Accumulation chamber A diameter : 200 mm / Height: 100 mm / weight: 1.5 Kg/3.3 lbs
- Accumulation chamber B diameter : 200 mm / Height: 200mm / weight : 2.2 Kg /4.84 lbs

Palm top computer: PocketPC Color Display based on Windows Mobile operating system.

- PalmTop with cables, 0.3 Kg/0.7 lbs.
- Size 125mm (4.8") x 82mm (3.2") * 25 mm (1").

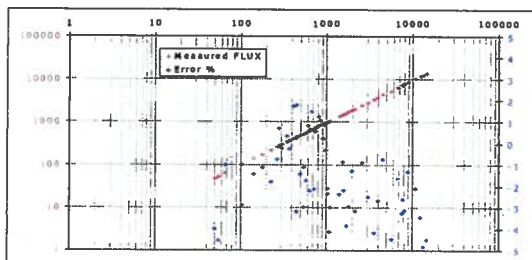
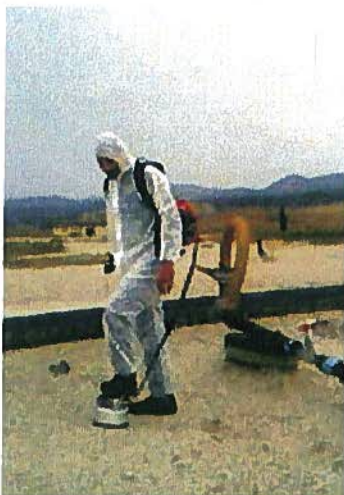
Software The instrument is supplied with a custom software, FluxManager, which allows recording and visualization of the increase in concentration of the target gas in the accumulation chamber, and then the flux calculations. The obtained measurements can be saved on the palmtop computer and then transferred to a desktop PC with a USB connection or using a SD card.

The instrument is supplied complete with:

- backpack-like support vest
- Carrying case for transport and storage
- 2 batteries NiMH 14.4 Volts 2.6 A/h and 1 NiMH battery charger
- Accumulation chamber A and B
- Palmtop Pocket PC
- User Manual, in English
- FLUX Manager Software for Windows Mobile, in English

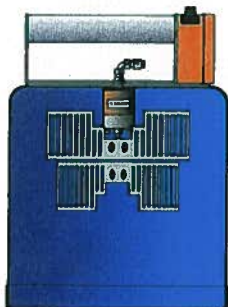
The standard flux meter configuration is supplied with a single gas detector, normally the carbon dioxide detector. The fluxmeter can host two sensors by the way special releases, based on specific customer request, it can be supplied with a maximum of 3 sensors.

Finally we improved the connection between the instrument and the palmtop that now is based on Bluetooth wireless embedded device.



The measured carbon dioxide flux vs imposed flux (grams $m^{-2} day^{-1}$);
The error % vs imposed flux (in blue).

The instrument is extremely versatile and allows measurement of flux in 2/4 minutes. In the picture: Soil bio-gas flux monitoring in a landfill.

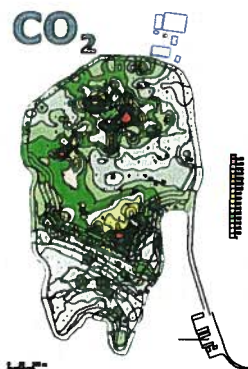


The accumulation chambers

In the normal use of instrument only the chamber B is used. To extend the instrument sensitivity to very low fluxes the accumulation chamber A is supplied.

	Type A	Type B
net area m^2	0.0314	
net volume m^3	0.003	0.006

Accumulation Chamber Type B



CO₂ - LI820

LI820 based Carbon dioxide fluxmeter

The CO₂ Fluxmeter is equipped with the LICOR LI-820 the most accurate and reliable portable carbon dioxide detector. The LI-820 is a double beam infrared sensor compensated for temperature variation in the range from -10 to 45°C and for atmospheric pressure variation in the range 660-1060 HPa. Accuracy 2% repeatability ± 5 ppm. The full scale range can be set to 1000, 2000, 5000 or 20000 ppmV of carbon dioxide. The characteristics of precision refer to the sensor set to a full scale range of 20000 ppmV. If a very high sensitivity is required, the detector can be set to 1000 or 2000 ppm full scale value to measure with very high precision fluxes in the range from 0 to 10 moles m⁻² day⁻¹

CO₂ FLUX Measurement range:

from 0 up 600 moles m⁻² day⁻¹

The accuracy depends on the measured flux:

0 to 0.5 moles m ⁻² day ⁻¹	25% (Acc.ch.A)
0.5 to 1 moles m ⁻² day ⁻¹	15% (Acc.ch.A or B)
1 to 150 moles m ⁻² day ⁻¹	10% (Acc.ch.B)
150 to 300 moles m ⁻² day ⁻¹	10% (Acc.ch.B)
300 to 600 moles m ⁻² day ⁻¹	20% (Acc.ch.B)

WS-DRAGER: CO₂ Flux measurement:

A double beam infrared sensor compensated for temperature variation in the range from -20 to 65°C. Accuracy 3%. The full scale value can be set from 2,000 to 300,000 ppm of carbon dioxide. Carbon Dioxide flux measurement range from 0.5 to 1500 moles/m² per day.

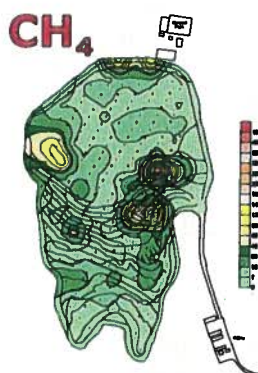
The precision depends on the measured flux:

range: 0.5 – 5 moles/m² per day 25% (Acc. chamber A)

5-350 moles/m²/day 10% (Acc. chamber B)

350-600 moles/ m²/day 25% (Acc. chamber B)

600-1500 moles/ m²/day 25% (Acc.Ch.B/ F.S.=10%)



WS-HC CH₄

Methane fluxmeter

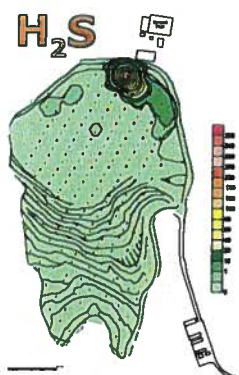
The methane sensor is an IR spectrometer. The full-scale range is 50000ppm, accuracy of 5% of reading, and repeatability is 2% of span. Detection limit 60 ppm, resolution 22 ppm. The detector was designed to measure the not controlled emissions of landfill, but it can be used to detect methane emission from coal or wherever the 0.2 moles/m²/day detection limit is acceptable.

Methane Flux measurement range

from 0.2 up 300 moles m⁻² day⁻¹

The fluxmeter is provided with 2 accumulation chambers and the accuracy depends on the measured flux:

0.2 to 10 moles m ⁻² day ⁻¹	25% (Acc.Ch.A)
10 to 150 moles m ⁻² day ⁻¹	15% (Acc.Ch.A)
150 to 300 moles m ⁻² day ⁻¹	20% (Acc.Ch.B)



H₂S - WEST

Hydrogen sulfide

The hydrogen sulphide detector is a electrochemical cell with the following specifications:

The full-scale range is 20ppm, with a precision of 3% of reading, and the repeatability is 1.5% of span with a zero offset of 0.3%.

H₂S Flux measurement range: from 0.0025 to 0.5 moles/m² per day.

The precision depends on the measured flux:

0.0025 – 0.05 moles/m ² per day	$\pm 25\%$ (Acc. Chamber A)
0.05 – 0.5 moles/m ² per day	$\pm 10\%$ (Acc. Chamber B)

NOTE: The hydrogen sulphide flux evaluation can be affected by the presence of large quantities of water in both liquid and vapour phases.

We thanks to N.Lima et al. for the maps.

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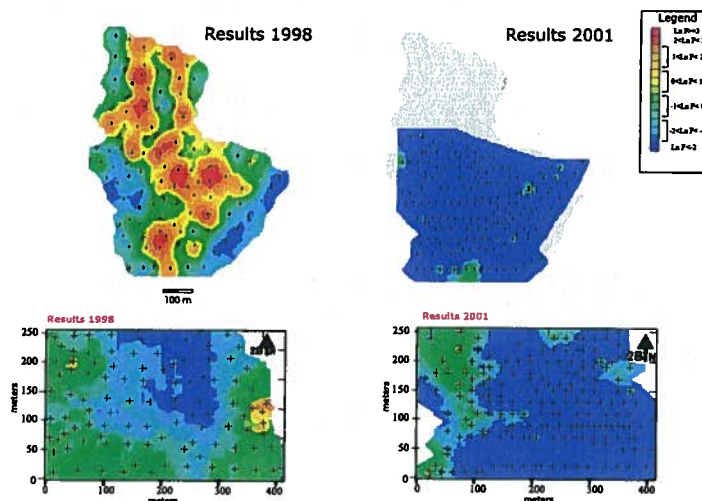
WEST
Systems

Application on a landfill: mapping the biogas non controlled emissions.

The figure shows the compare between the results of the measurement regime of a land/fill undertaken in 1998 and 2001: the mapping performed in 1998 gave clear indications of the areas which required intervention to improve the cover and the capture system.

The interventions were performed only where necessary with a significant economic savings.

The measurement regime of 2001 indicates without any doubt that the interventions were efficient and state-of-the-art.



The obtained results:

- Minor atmospheric emissions;
- Higher quantity and better quality of biogas for cogeneration;
- Optimisation of management costs.

Continuous soil flux monitoring

WEST Systems produces a soil gas station for the continuous monitoring of carbon dioxide and hydrogen sulfide flux, soil temperature, soil water content, soil pressure gradient, soil heat flux and meteorological parameters.

For more information contact your local representative, visit our web site or e-mail to: g.virgili@westsystems.com

Local sales representative

H.Q.

West Systems Srl

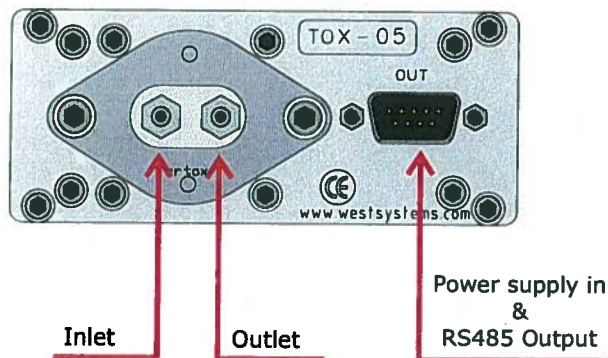
Via Molise 3 - Zona Ind. Gello - 56025 Pontedera (PI) Italy
Phone +39 0587 294216 www.westsystems.com (or .it)
Fax +39 0587 296068 g.virgili@westsystems.com (or .it)

Japan

SHOKO CO., LTD.

7-13,1-chome, Shibakoen, Minato-ku Tokyo
105-8432, Japan
TEL : 03-3459-5106 FAX : 03-3459-5081
WEB SITE <http://www.shoko.co.jp>
e-mail s-isotope@shoko.co.jp

Hydrogen Sulfide Detector



Pin	Signal
1	Gnd
2	+VDC
3	Gnd
4	RS485-B
5	RS485-A
6	Gnd
7	+12V
8	Gnd
9	RS485-B

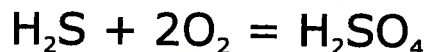
Legenda

Gnd: Ground reference for power supply and RS485
+VDC: 10-28 Volts Power supply input
RS485-A: Digital signal output A
RS485-B: Digital signal output B

Sensor specifications

Ambient conditions:
 Air temperature -40°C to 65 °C
 Air pressure 700 hPa to 1300 hPa
 Air RH 5% - 95% non condensating.
 Expected sensor life > 24 months.
 Chemical cell order code: WEST H2S-BH
 Detector order code: WEST TOX-05-H2S-BH
 Factory calibration : 20 ppm
 RMS Noise <= 0.02 ppm
 Zero Offset <= 0.2 ppm
 Max Overrange >= 200 ppm

The chemical cell reaction is:



the gas sample specific consumption is very low:

$$2.5 \times 10^{-10} \text{ moles/Sec per ppm}$$

Due to this consumption the H2S flux is methodically underestimated by a -10% with the AccumulationChamber A and by a -5% when using the accumulation chamber B. Then we advise to use the accumulation chamber B except when the flux is very very low.

Appendix M

WS-HC detector

WS-HC Hydrocarbon Flux measurement:

The HydroCarbon detector is based on a double beam infrared spectrometer able to detect methane, hexane, propane and other molecules with HC linkages. The instrument comes calibrated for the methane. *The instrument requires a frequent **zero base-line** calibration that will be done using atmospheric air. The calibration requires 20 second.*

Detector specifications:

Accuracy 5%

Repeatability 2%

Resolution 22 ppm (Methane equivalent)

Full scale range is 50000 ppm of methane.

Detection limit 60 ppm.

Methane flux measurement range from 0.1 to 150 moles/m² per day.

The precision depends on the measured flux:

range	0.1	5	moles/ m ² per day	±25%
	5	- 150	moles/ m ² per day	±10%

The measurement of very low fluxes (< 0.1 moles/m²/day) is possible but the error will increase due to the low detector sensitivity.



RS485 Connector DB9 Male panel

Pin 1	Gnd
Pin 2	+Power supply
Pin 3	Gnd
Pin 4	RS485 B
Pin 5	RS485 A
Pin 6	Gnd
Pin 7	+Power supply
Pin 8	Gnd
Pin 9	RS485 B

The gas fittings can be used with rilsan 6x4 mm tubes or silicon 5x3.2 tubes. Please respect inlet and outlet ports.

LI-820 Specifications

CO₂ Specifications

Measurement Range: 0-1000 ppm, 0-2000 ppm with 14 cm bench; 0-5000 ppm, 0-20000 ppm with 5 cm bench

Accuracy: < 2.5% of reading with 14 cm bench; 4% of reading with 5 cm bench

Calibration Drift

¹**Zero Drift:** < 0.15 ppm / °C

²**Span Drift at 370 ppm:** < 0.03% / °C

³**Total Drift at 370 ppm:** < 0.4 ppm / °C

RMS Noise at 370 ppm with 1 sec Signal Filtering: < 1 ppm

¹ Zero drift is the change with temperature at 0 concentration

² Span drift is the change after re-zeroing following a temperature change

³ Total drift is the change with temperature without re-zeroing or re-spanning

Measurement Principle: Non-Dispersive Infrared

Traceability: Traceable gases to WMO standards from 0-3000 ppm. Traceable gases to EPA protocol gases from 3000 to 20000 ppm

Pressure Compensation Range: 15 kPa-115 kPa

Maximum Gas Flow Rate: 1 liter/minute

Output Signals: Two Analog Voltage (0-2.5 V or 0-5 V) and Two Current (4-20 mA)
Digital: TTL (0-5 V) or Open Collector

DAC Resolution: 14-bits across user-specified range

Source Life: 18000 hours

Power Requirements: Input Voltage 12-30 VDC
1.2A @ 12V (14 W) maximum during warm-up with heaters on
0.3 A @ 12 V (3.6 W) average after warm-up with heaters on

Supply Operating Range: 12-30 VDC

Operating Temperature Range: -20 to 45 °C

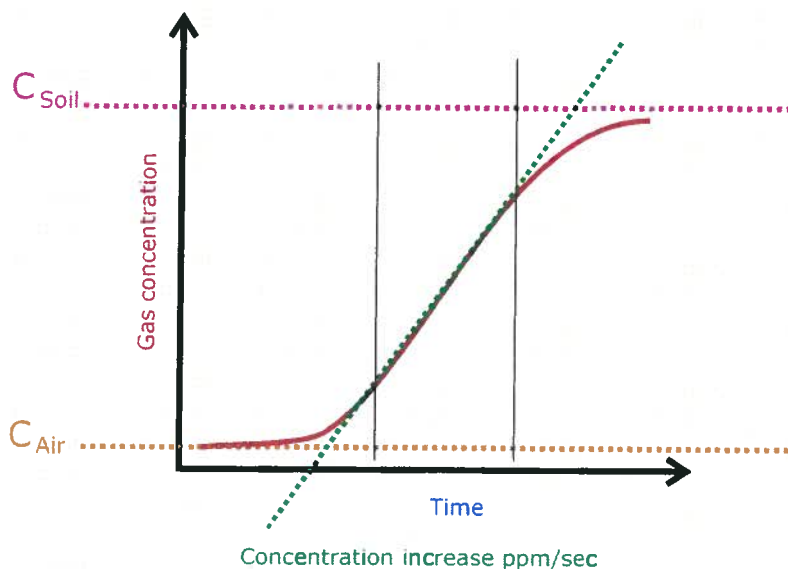
Relative Humidity Range: 0 to 95% RH, Non-Condensing

Dimensions: 8.75" x 6" x 3" (22.23 x 15.25 x 7.62 cm)

Weight: 2.2 lbs (1 kg)

Quantifying the flux

How explained in the chapter 3 the flux is proportional to the concentration increase ratio ppm/sec. The proportionality factor depends on the chamber volume/surface ratio as well as the barometric pressure and the air temperature inside the accumulation chamber.



There are two methods to carry out the field work, in both cases for each measurement you have to record the type of accumulation chamber used, the barometric pressure, and the air temperature.

The variation of few mBar of the pressure and or few degrees of temperature do not affect the evaluation of flux very much, then you can use a mean value for both parameters. Of course that depends on the accuracy you want to reach for the evaluation of flux.

The instrument measures the barometric pressure, using the embedded pressure sensor of the LICOR, with a good accuracy. A platinum Pt100 or a thermo-couple thermometer can be used to measure the air temperature as well as the soil temperature.

Choosing the flux measurement unit

The first measurements made, 10 years ago, with the accumulation chamber was expressed in cm/sec which is a speed, the speed of carbon dioxide flowing out from the soil. During the last ten years several units have been used by volcanologist and by geochemistry researchers. The most common unit is grams/squaremeter per day, but using the same instrument for two gas species to express the flux using this unit means to have two different conversion factors. Actually we use the unit **moles/squaremeter per day** that has two advantages: A single conversion factor for every gas specie and an easy conversion of the flux in grams/sm per day simply multiplying the result expressed in moles/sm per day for the molecular weight of the target gas.

From the [tools][settings] menu you can set the accumulation chamber factor in the "A.c.K." field.

If this factor is set to 1 the instrument will give you results expressed in ppm/sec, that's simply the slope of the curve in the selected interval.

If you set the A.c.K to a value different from 1 the instrument will give you the results expressed in moles per square meter per day.

Please see next page.

Quantifying the flux

Method 1: Measuring the slope

Set the Accumulation Chamber factor to 1 in order to have the flux measurement expressed in the slope unit "ppm/sec" and translate it in the desired unit with a post processing.

Using this method you can focus only on the accumulation chamber interfacing with the soil, the flux curve shape and the other aspects of the measurement, putting off choosing the correct accumulation chamber factor.

Method 2: Measuring the flux directly in moles/sm/day.

To get the results directly in moles/sm/day you have to set the Accumulation Chamber factor to the correct value, taking it from the tables.

For each measurement, if there are variations in the air temperature, or of the barometric pressure, or if you changed the accumulation chamber you have to select the [tools][settings] menu and put the correct accumulation chamber factor in the "A.c.K." field. This operation can be "critical". In any case on the saved files you'll find the results of flux evaluation expressed in both units, the raw ppm/sec and the moles/sm/day computed with the A.c.K. you set.

The accumulation chamber factors

Here following the formula used to compute the A.c.K. :

$$K = \frac{86400 \cdot P}{10^6 \cdot R \cdot T_k} \cdot \frac{V}{A}$$

Where

- **P** is the barometric pressure expressed in mBar (hPa)
- **R** is the gas constant 0.08314510 bar L K⁻¹ mol⁻¹
- **T_k** is the air temperature expressed in Kelvin degree
- **V** is the chamber net volume in cubic meters
- **A** is the chamber inlet net area in square meters.

The dimensions of the A.c.K. are

$$K = \frac{\text{moles} \cdot \text{meter}^{-2} \cdot \text{day}^{-1}}{\text{ppm} \cdot \text{sec}^{-1}}$$

In the table the conversion factors vs temperature and barometric pressure for the Accumulation Chamber Type A and B are reported.

An example:

You're using the accumulation chamber B, the slope of the flux curve is 2.5 ppm/sec, the barometric pressure is 1008 mBar (hPa) and the air temperature is 22 °C.

From the table B get the value that correspond to the barometric pressure and temperature. In this case I get the value computed for 25°C and 1013 mBar : 0.696.

Then the flux is: 2.5 x 0.696 = 1.74 moles per square meter per day.

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 ₄	1 % LEL or 0.1% CH ₄
Methane	5-100% CH ₄	1% CH ₄
Oxygen	0-25%	0.1%
Carbon Monoxide	0-1000 ppm	1 ppm
Hydrogen Sulfide	0-100 ppm	1 ppm

Battery types:	NiCd and Alkaline
Case material:	Impact resistant, stainless-steel-fiber-filled polycarbonate
Operating temperature:	normal -10 to 40°C; extended -20 to 50°C
Operating humidity:	Continuous: 15-95% RH, non-condensing Intermittent duty: 5-95% RH, non condensing
Warm up time:	Less than 20 seconds to initial readings
Datalog capacity:	12 hours
Input:	3 clearly marked, metal domed keys
Warranty:	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 ₂
812389	CO
812390	H ₂ 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 ₂ S
710288	Gasmiser™ 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 Gas 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

	LEL Display	O ₂	CO	H ₂ 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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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

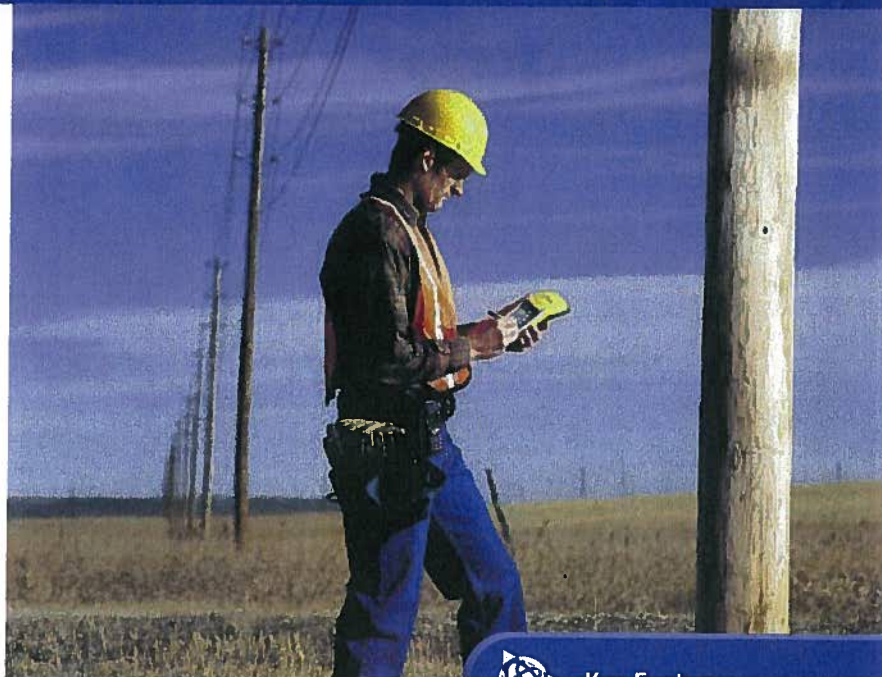
The GeoXT is optimized to provide the reliable, high-accuracy location data you need. Advanced features like EVEREST™ multipath rejection technology let you work under canopy, in urban canyons, or anywhere where accuracy is crucial.

Need submeter accuracy in real-time? Use corrections from a satellite-based augmentation system (SBAS) like WAAS¹ or EGNOS². 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.
** Microsoft Streets & Trips 2004 software available in US/Canada; Microsoft AutoRoutes® 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 WAAS¹/EGNOS²
- 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[®] Media Player, Bluetooth File Transfer, Calculator, ActiveSync[®]
- 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[®] ArcPad[®]
- GPS Pathfinder[®] Tools Software Development Kit (SDK)
- GPS Pathfinder Office
- Trimble GPS Analyst extension for ArcGIS[®]

Accessories

- Serial clip for field data and power input
- Vehicle power adaptor³
- Portable power kit³
- Hurricane antenna
- External patch antenna
- Pole-mountable ground plane
- Baseball cap with antenna sleeve
- Beacon-on-a-Belt (BoB[™]) differential correction receiver³
- Hard carry case
- Null modem cable³
- 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 www.trimble.com/geoxt_ts.asp.

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 WAAS¹ or EGNOS²

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)⁴ after differential correction

Postprocessed⁵ Submeter

Carrier postprocessed⁶ Submeter

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/esaSA/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

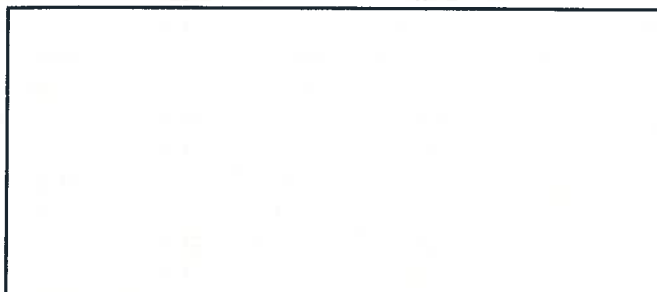
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ULTRAMETER II™



**MYRON L
COMPANY**

Water Quality Instrumentation
Accuracy • Reliability • Simplicity

ULTRAMETER II™

Advanced Design • Superior Performance



pH/ORP Sensor
protective cap

Four-digit display for
full 9999 readings, with
autoranging capability
up to 200 mS/200 ppt

Powerful microprocessor
based surface-mount
circuitry

Display prompts for simple
pH calibration

Memory for 100 readings
with Date & Time Stamp

Real Time Clock

Factory calibrations
stored in microprocessor

Conductivity

Resistivity

TDS

Temperature

pH

ORP



**ULTRA-FAST
ULTRA-EASY
ULTRA-POWERFUL**

Since 1957, the Myron L Company has designed and manufactured highly reliable analytical instruments for a wide variety of applications. Thousands of professionals around the world rely every day on the performance of our instruments. Demanding uses range from boiler water testing to ultrapure water control to medical instruments for artificial kidney machines.

We are proud of the trust our handheld instruments and monitor/controllers have earned in the past. Our product line has evolved to a new level of outstanding performance and value in analytical instruments: the Ultrameter II series. While priced like affordable single-parameter instruments, the Ultrameter II does the job of three, four or even six instruments.

Accuracy You Can Trust

Both Ultrameter II models deliver performance of $\pm 1\%$ of reading (not merely full scale). This high level of accuracy has been achieved through advanced four-electrode conductivity cell technology, a unique pH/ORP sensor and powerful microprocessor-based circuitry. With displayed values of up to 9999, the full four-digit LCD ensures resolution levels never before possible in such affordable instruments. Factory calibrated with NIST traceable solutions, each Ultrameter II may be supplied with both certification of traceability and NIST traceable solutions for definitive calibration.

Fast and accurate in the laboratory, both Ultrameter II models are rugged enough for daily in-line controller checks in hostile process applications.

Innovative Engineering

The Ultrameter II is a prime example of how high-tech engineering can greatly simplify and streamline a task. Whether in the lab, industrial plant, or in a remote field location, merely:

1. Fill the cell cup
2. Push a parameter key
3. Take the reading

Temperature compensation and range selection are both rapid and automatic. The Ultrameter II is a true one-hand operation instrument.

Easy to Calibrate

All calibrations are quickly accomplished by pressing the \square or \square keys to agree with our NIST traceable Standard Solution. When calibration is necessary, display prompts simplify pH calibration and make sure the correct buffer is being used. Plus, all parameters (excluding factory-set temperature) have an internal electronic setting that can be used for field calibration and as a check on pH/ORP sensor life.

Advanced Features

- Fully automatic temperature compensation
- User adjustable temperature compensation (up to $9.999\%/^{\circ}\text{C}$) which also allows TC to be disabled for applications requiring non-compensated readings.
- User adjustable conductivity/TDS conversion ratio for greater accuracy when measuring solutions not contained in the microprocessor.
- Auto-shutoff maximizes the life of the single 9V battery to more than 100 hours/5000 tests.
- Non-volatile microprocessor provides data back-up, even when the battery is changed. This assures all calibrations and memory data will be retained.
- Extended life pH/ORP sensor is user replaceable in the field.

High Performance at a Low Cost

Beyond their affordable purchase price, Ultra-Fast, Ultra-Easy, Ultra-Powerful Ultrameter II's save both time and money. Measure for measure, Ultrameter II's give you a better return on your investment than any other handheld instrument. To see for yourself, contact your distributor or the Myron L Company today.

Multiple Applications

Irrigation Water

Hydroponics

Laboratories

Homeland Security

Reverse Osmosis

Deionization

Wastewater

Cooling Towers

Environmental

Desalination

Fountain Solutions

BENEFITS DESIGNED TO SAVE YOU TIME & MONEY



Built-in IR Port allows you to conveniently download your data to a computer.

(Requires Myron L uDock™ Accessory Package)

Ample memory provides increased flexibility to record and store 100 separate readings.

Real Time Clock with Date & Time Stamp allows you to maintain the integrity of each individual reading.

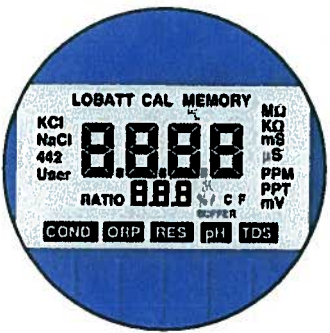
The advanced four-electrode cell for conductivity/resistivity/TDS eliminates polarization, allowing greater accuracy and stability with minimal maintenance.

The pH/ORP sensor chamber provides protection to a unique porous liquid-junction.

The large capacity KCl reservoir guarantees extended life.

A custom LCD helps simplify calibration and operation by using annunciators and prompts to indicate various conditions.

IP67/NEMA 6 rated Ultrameter II's are waterproof and buoyant and can be fully immersed to 3 feet/1 meter.



Features

Ultrameter II™ Models

	4PII	6PII
	Conductivity TDS, Resistivity Temperature	Conductivity, TDS Resistivity, pH ORP, Temperature
Autoranging	•	•
Adjustable Temp. Compensation	•	•
Adjustable Cond/TDS ratio	•	•
Memory (100 readings)	•	•
Date & Time Stamp	•	•
pH Calibration Prompts	•	•
Low battery indicator	•	•
Auto-off	•	•

Specifications

Display	4 Digit Liquid Crystal Display
Dimensions	196 x 68 x 64 mm/ 7.7 x 2.7 x 2.5 inches
Weight	352 g/12.4 oz.
Case/conductivity cell material	VALOX*
Cell capacities	pH/ORP: 1,2 mV/0.04 oz. Cond/TDS/Res: 5 mV/0.2 oz.
Power	9V alkaline battery
Battery life	>100 hours (5000 readings)
Operating/storage temperature	0 - 55°C/32 - 132°F
Protection ratings	IP67/NEMA 6 Waterproof to 1 meter/3 feet

*™ GENERAL ELECTRIC

Parameters

	Conductivity	TDS	Resistivity	pH	ORP	Temperature
Ranges	0-9999 µS/cm 10-200 mS/cm in 5 autoranges	0-9999 ppm 10-200 ppt in 5 autoranges	10 KΩ-30 MΩ	0-14 pH	±999 mV	0-71°C 32-160°F
Resolution	0.01(<100 µS) 0.1(<1000 µS) 1.0(<10 mS) 0.01(<100 mS) 0.1(<200 mS)	0.01(<100 ppm) 0.1(<1000 ppm) 1.0(<10 ppt) 0.01(<100 ppt) 0.1(<200 ppt)	0.01(<100 KΩ) 0.1(<1000 KΩ) 0.1(>1 MΩ)	±0.01 pH	±1 mV	0.1°C/F
Accuracy	±1% of reading	±1% of reading	±1% of reading	±0.01 pH	±1 mV	±0.1°C
Auto Temperature Compensation	0-71°C 32-160°F	0-71°C 32-160°F	0-71°C 32-160°F	0-71°C 32-160°F	—	—
Adjustable Temperature Compensation to 25°C	0-9.99%/°C	0-9.99%/°C	0-9.99%/°C	—	—	—
Conductivity/TDS Ratios Preprogrammed	KCl, 442*, NaCl	KCl, 442*, NaCl	—	—	—	—
Adjustable Conductivity/TDS Ratio Factor	0.20-7.99	0.20-7.99	—	—	—	—

*442 Natural Water Standard™ Myron L Company

Accessories

uDock™ Accessory Package includes uDock™, USB cable and Macintosh/PC application software for downloading data. MODEL: U2CIP

Certificates confirming the NIST traceability of an Ultrameter II are available (must be specified when placing instrument order). MODEL: MC

Conductivity Standard Solutions are necessary to maintain accuracy and for periodic calibration of conductivity/TDS parameters. All Standard Solutions are NIST traceable for your complete confidence. RECOMMENDED VALUES: KCl-7000 (7 mS), 442-3000 (TDS), or NaCl-14.0 (mS) available in 2 oz/59 ml, 1 qt/1 L, and 1 gal/3.8 L.

pH Buffers are necessary to maintain accuracy and for periodic calibration of pH and ORP parameters. Calibration with pH 7 Buffer is especially important. All pH 4, 7, and 10 Buffers are NIST traceable and are available in 2 oz/59 ml, 1 qt/1 L, and 1 gal/3.8 L.

pH Sensor Storage Solution

Available in 2 oz/59 ml, 1 qt/1 L, and 1 gal/3.8 L.

MODEL: SS20Z, SSQ and SSG

Certificate of NIST traceability for pH Buffer or Conductivity Standard Solutions are available (must be specified when placing solution order). MODEL: SC

Hard protective case (small)

MODEL: UPP

Hard protective case (kit) with three buffers (pH 4, 7, and 10), one pH/ORP storage solution, and two standard solutions, (KCl-7000 and 442-3000). All bottles are 2 oz/59 ml. MODEL: PKU

Soft protective case is constructed of padded Nylon and features a belt clip for hands-free mobility.

MODEL: UCC (Blue)

UCCDT (Desert Tan)

Replacement pH/ORP sensor

user-replaceable, features a unique/porous liquid-junction. MODEL: RPR



Built on Trust

Founded in 1957, Myron L Company is one of the world's leading manufacturers of water quality instruments. Because of our policy of continuous product improvement, changes in design and the specifications in this brochure are possible. You have our assurance any changes will be guided by our product philosophy: Accuracy, Reliability, Simplicity.

**MYRON L
COMPANY**
Water Quality Instrumentation
Accuracy • Reliability • Simplicity

Limited Warranty

All Myron L Ultrameter II's have a Two (2) Year Limited Warranty. The pH/ORP sensors have a Six (6) Month Limited Warranty. Warranty is limited to the repair or replacement of the Ultrameter II only, at our discretion. Myron L Company assumes no other responsibility or liability.

www.myronl.com

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Carlsbad, California 92010-7226 USA
Tel: +1-760-438-2021
Fax: +1-800-869-7668 / +1-760-931-9189



APPENDIX B
PLUGGED WELLBORE DIAGRAMS





April 27, 2011

Peter Gintautas
Environmental Protection Specialist
Colorado Oil and Gas Conservation Commission
PO Box 108
Trinidad, CO 81082

**RE: Plugged and Abandoned Production Well Reports – No Further Action
2011 Colorado Rule 608 Compliance
Raton Basin
Las Animas County, Colorado**

Dear Mr. Gintautas:

On behalf of XTO Energy Inc. (XTO), LT Environmental, Inc. (LTE) is please to provide the Colorado Oil and Gas Conservation Commission (COGCC) with copies of Plugged Wellbore Diagrams for plugged and abandoned (P&A) production wells related to XTO's 2011 Colorado Rule 608 Compliance Program for work completed within the Raton Basin in Las Animas County, Colorado.

LTE identified P&A productions wells within one quarter (1/4) mile of an XTO's 2011 planned coalbed methane (CBM) production wells as described in the Colorado Rule 608(a). Below is a list of the four P&A productions wells and the associated 2011 planned CBM production wells:

P&A Production Well List

2011 Planned CBM Production Well ID	Plugged and Abandoned Wells within 1/4 -mile of Planned Well			
	API Number	Well Number and Name	Latitude	Longitude
AC 20-11	05-071-06342	20-6 APACHE CANYON	37.070864	-104.913690
GE 30-02	05-071-06164	30-2 APACHE CANYON	37.147302	-104.926611
GE 34-11	05-071-06889	34-11 CH-GE	37.127533	-104.876419
AC 01-04	05-071-07963	36-13 APACHE CANYON	37.120699	-104.952511

XTO's engineers have reviewed the P&A reports and identified no discrepancies or indications that the production wells were improperly abandoned. At this time, XTO respectfully requests



COGCC to issue a no further action for the identified P&A production wells and eliminate the need to conduct a soil gas survey at these P&A production wells. The locations of the P&A production wells related to XTO's 2011 planned production wells are illustrated on Figure 1. The Plugged Wellbore Diagrams for the four P&A production wells are included in Attachment 1.

If you have any questions, please do not hesitate to contact me at (303) 962-5534.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in black ink, appearing to read "D. Moir", enclosed within a rectangular box.

Daniel R. Moir, P.G.
Project Geologist

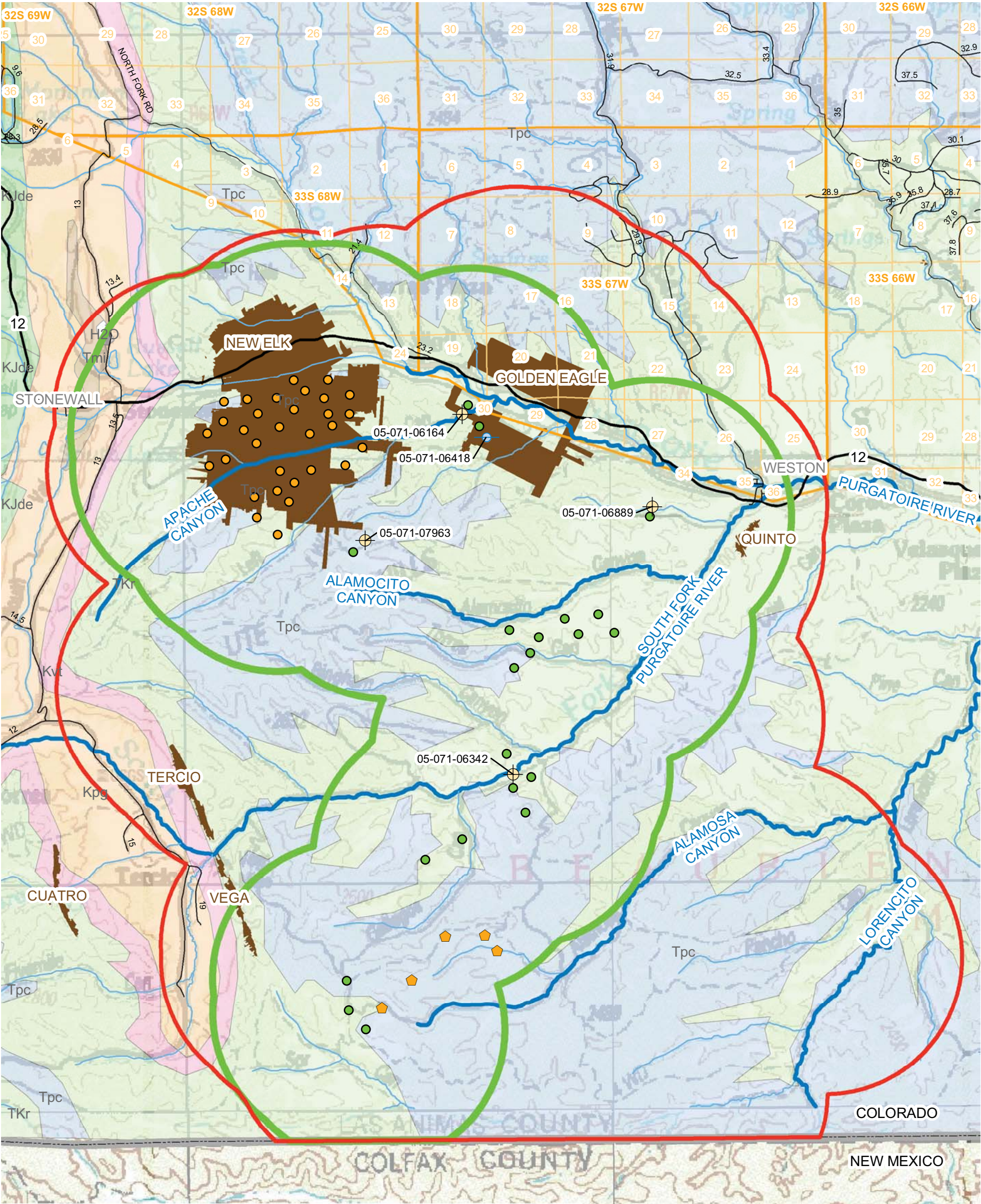
A handwritten signature in black ink, appearing to read "John D. Peterson", enclosed within a rectangular box.

John D. Peterson, P.G.
Vice President, Operations

cc: Sam Montoya, XTO Energy, Inc., Trinidad, Colorado
Martin Nee, XTO Energy, Inc., Aztec, New Mexico

Attachments

FIGURE



LEGEND

- | | | | |
|---------------------------------|--|--|--------------------------|
| | 2010 INSTALLED COALBED METHANE PRODUCTION WELL | | PROJECT AREA |
| | 2010 PLANNED COALBED METHANE PRODUCTION WELL | | 2011 PROJECT AREA |
| | 2011 PLANNED COALBED METHANE PRODUCTION WELL | | LEWICKI MINE BOUNDARIES |
| | PLUGGED & ABANDONED (P & A) PRODUCTION WELL | | COLORADO STATE LINE |
| | SHUT IN PRODUCTION WELL (TO BE P & A) | | TOWNSHIP AND RANGE LINES |
| Labeled with API number | | | SECTION LINE |
| GEOLOGIC CONTACTS (TWETO, 1979) | | | |
| | Tmi - MIDDLE TERTIARY INTRUSIVE ROCKS | | ROAD |
| | Tpc - POISON CANYON FORMATION | | OTHER WATER SOURCE |
| | TKr - RATON FORMATION | | MAJOR DRAINAGE |
| | Kvt - VERMEJO FORMATION | | |
| | Kpg - PIERRE SHALE FORMATION | | |
| | KJde - DAKOTA FORMATION | | |
| | P[Ps] - SANGRE DE CRISTO FORMATION | | |

FIGURE 1
2011 PLUGGED & ABANDONED PRODUCTION WELLS
2011 COLORADO RULE 608 COMPLIANCE PROGRAM
RATON BASIN, LAS ANIMAS COUNTY, COLORADO

XTO ENERGY, INC

ATTACHMENT 1
PLUGGED WELLBORE DIAGRAMS

GL: 7243'
No KB Corr

APACHE CANYON #20-06 PLUGGED WELLBORE DIAGRAM

DATA

DRILL & COMPLETE OPERATOR:
OPERATOR AT PLUGGING:
WELL NAME & NUMBER:
LEGAL LOCATION:

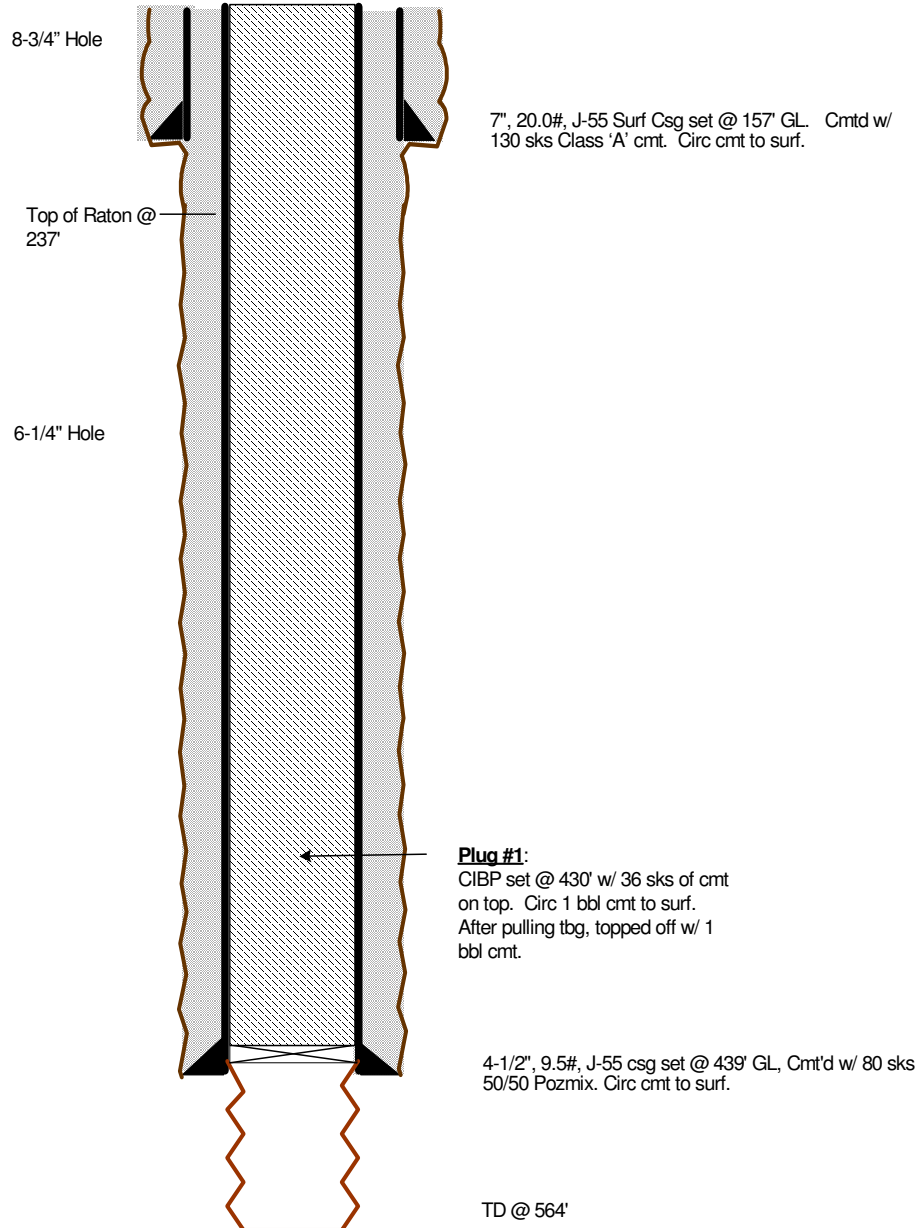
Stroud Oil Properties, Inc.
XTO Energy Inc.
Apache Canyon 20-6
2,356' FNL & 2,157 FWL
Section 20, T-34-S, R-67-W
Las Animas County, CO
05-071-06342

API NUMBER:

DATE PLUGGED:

January 6, 2006

PLUG & ABANDONMENT RISK ASSESSMENT



GL: 7,235'
KB: 7,243'
Corr: 8'

APACHE CANYON #30-02 PLUGGED WELLBORE DIAGRAM

DATA

DRILL & COMPLETE OPERATOR:

Western Oil Corp.

OPERATOR AT PLUGGING:

Barrett Resources

WELL NAME & NUMBER:

Apache Canyon 30-02

LEGAL LOCATION:

800' FNL & 3,495' FWL

Section 30, T-33-S, R-67-W

Las Animas County, CO

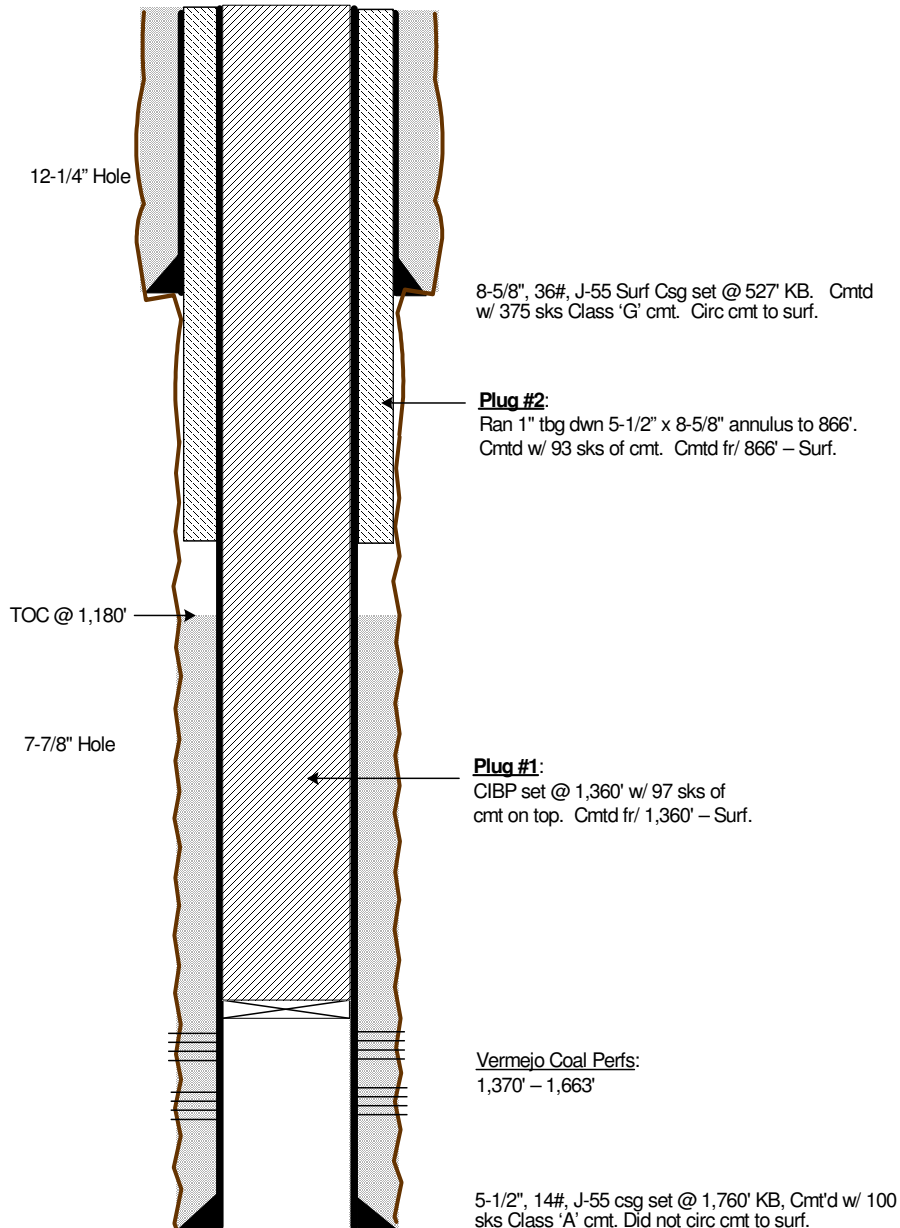
05-071-06164

API NUMBER:

DATE PLUGGED:

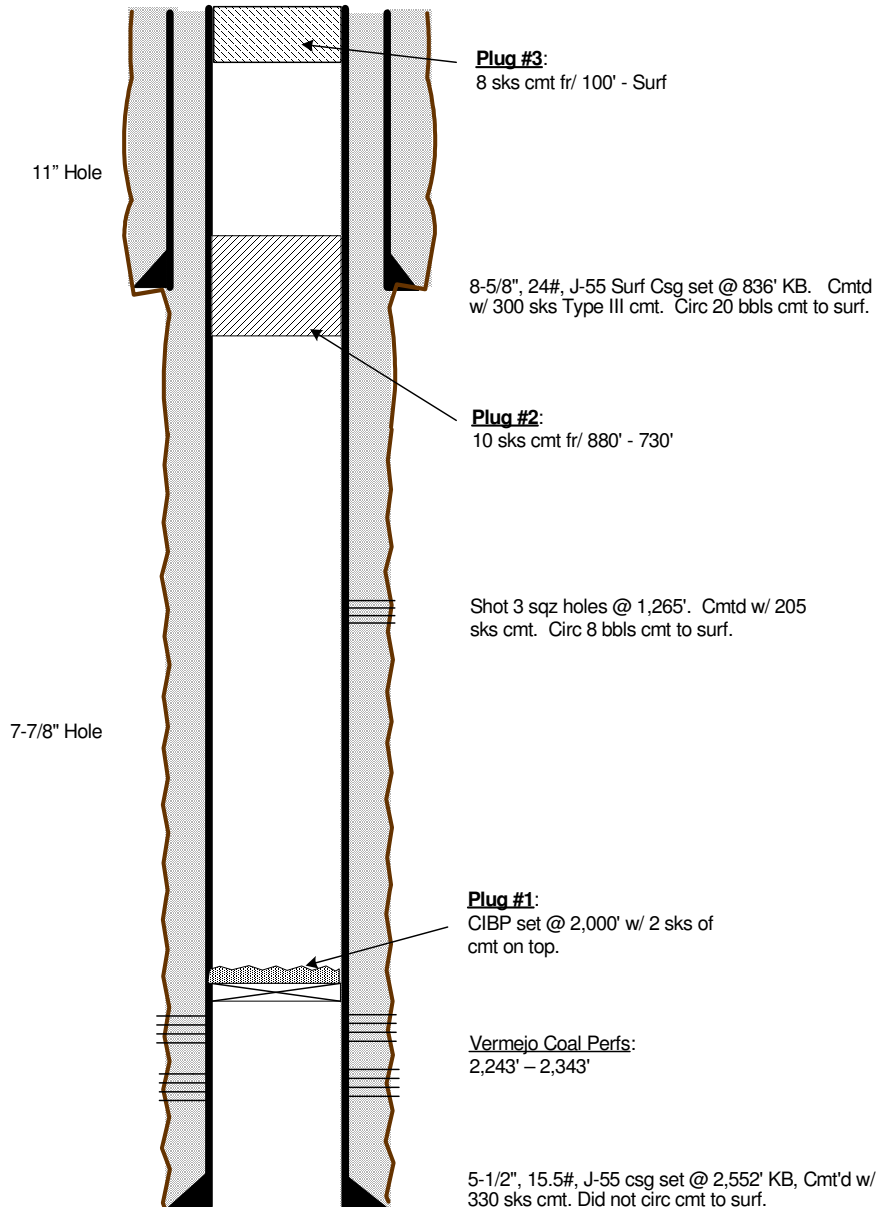
November 1, 2000

PLUG & ABANDONMENT RISK ASSESSMENT



GL: 8,461'
KB: 8,465
Corr: 4'

APACHE CANYON #36-13 PLUGGED WELLBORE DIAGRAM



DATA

DRILL & COMPLETE OPERATOR:
OPERATOR AT PLUGGING:
WELL NAME & NUMBER:
LEGAL LOCATION:

XTO Energy Inc
XTO Energy Inc.
Apache Canyon 36-13
81' FSL & 983' FWL
Section 36, T-33-S, R-68-W
Las Animas County, CO
05-071-07963

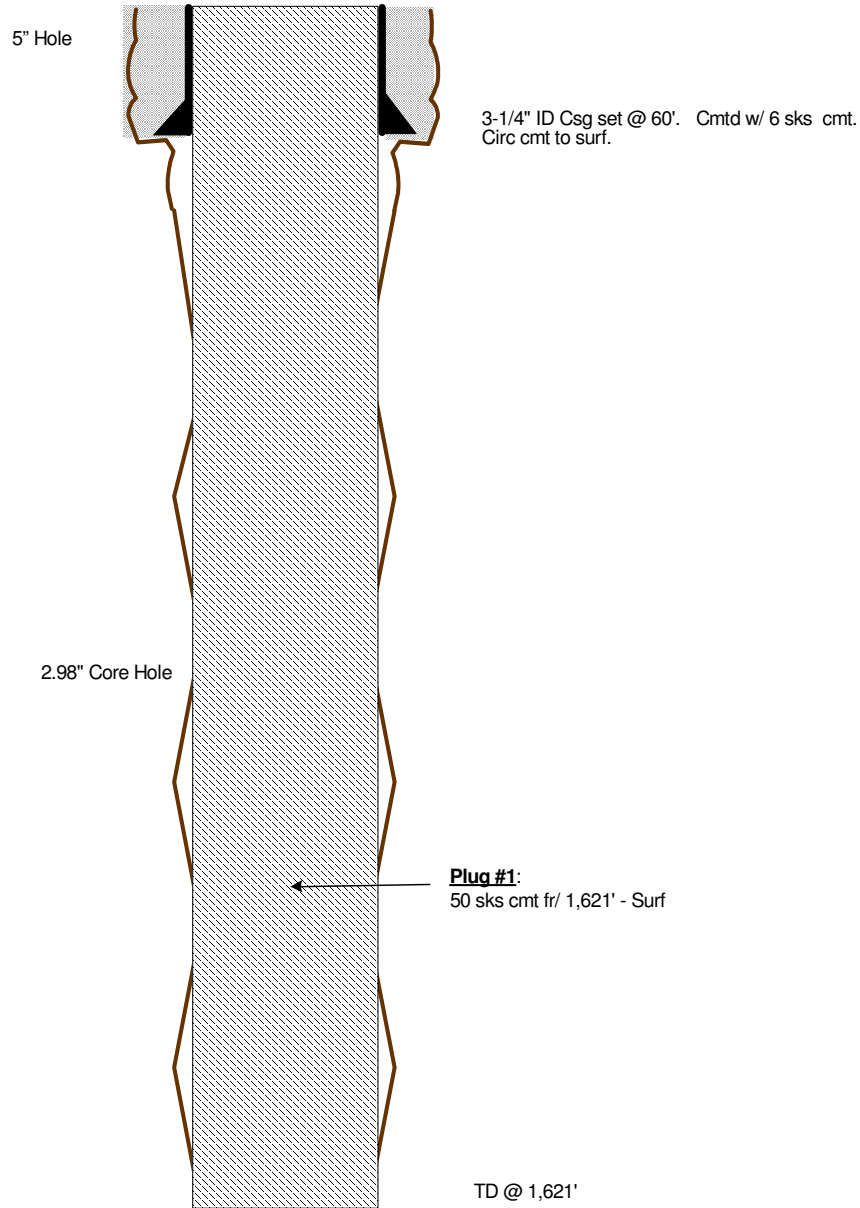
API NUMBER:

DATE PLUGGED:

May 10, 2006

PLUG & ABANDONMENT RISK ASSESSMENT

GL: 7,178'
No KB Corr



CH-GE #34-11 PLUGGED WELLBORE DIAGRAM

DATA

DRILL & COMPLETE OPERATOR:

KLT Gas Inc.

OPERATOR AT PLUGGING:

KLT Gas Inc.

WELL NAME & NUMBER:

CH-GE #34-11

LEGAL LOCATION:

2,382' FSL & 2,236' FWL
Section 34, T-33-S, R-67-W
Las Animas County, CO
05-071-06889

API NUMBER:

DATE PLUGGED:

August 9, 1999

PLUG & ABANDONMENT RISK ASSESSMENT

APPENDIX C
2011 GROUND SURVEY DATA



ID	Lat	Lon	Date-Time	Operator	Coments	Vehicle Speed (MPH)	Vehicle Direction	Altitude	Position Error (Feet)
1021	37.14277	-104.88734	04/27/11 12:54:40	MGM	Same as L-1049?	55	285	7067	0
1023	37.15750	-104.92318	04/27/11 12:59:51	MGM	Gas line is along the road, periodicallythere are small pipes coming up w/ valves on the ends, will call these 'pipe risers	13	356	7273	0
1025	37.11736	-104.97567	04/27/11 14:46:38	MGM	pumping well pad, generator (CO2 well correlated)	8	154	7928	0
1026	37.14490	-104.93575	04/27/11 14:56:34	MGM	Found last year too. There is a well pad nearby but is is downwind, and this is a very narrow peak, however the CO2 and HC correlate well.	28	76	7323	0
1027	37.13928	-104.91919	04/27/11 15:04:47	MGM	pipe riser leaking	19	302	7430	0
1029	37.08122	-104.95082	04/27/11 16:27:27	MGM	Well pad upwind	23	112	8330	0
1030	37.06707	-104.93532	04/27/11 16:39:26	MGM	Well pad upwind	18	298	7448	0
1031	37.06578	-104.95240	04/27/11 16:51:45	MGM	pipe riser leaking	27	205	7554	0
1033	37.12524	-104.85219	04/27/11 18:26:23	MGM	Very small concentration, at the detection limit for the HC, but looks to correlate reasonably wel	32	52	6912	0
1035	37.13234	-104.81040	04/28/11 10:49:45	MGM	Outside of survey area, but picked it up repeatedly. Good HC correlation	49	304	6780	0
1036	37.12086	-104.85865	04/28/11 10:55:15	MGM	Good HC correlation. Large compressor station adjacent.	29	220	6951	0
1039	37.11664	-104.86156	04/28/11 10:57:44	MGM	while commenting on 38, the compressor station blew at me. Good example of a wider plume corresponding to a greater distance away (same plume as 37, but 37 was right next to the facility)	0	212	6974	0
1040	37.07518	-104.86974	04/28/11 11:35:03	MGM	well pad	12	257	7924	0
1041	37.05287	-104.89926	04/28/11 11:59:46	MGM	compressor station	0	267	8196	0
1042	37.12857	-104.85917	04/28/11 13:09:41	MGM	well pad	16	151	7115	0
1043	37.12410	-104.86198	04/28/11 13:12:50	MGM	seep? Didn't notice anything in the vacinity related to gas production, however there is strong HC correlation	26	229	6986	0
1044	37.12321	-104.92178	04/28/11 13:28:25	MGM	drilling new well	28	285	8067	0
1045	37.13319	-104.93457	04/28/11 14:01:44	MGM	well pad	0	140	7584	0
1046	37.13861	-104.89551	04/28/11 14:37:08	MGM	well pad near by	13	61	7286	0
1047	37.13907	-104.89352	04/28/11 14:38:10	MGM	Well pad	7	101	7265	0
1048	37.13666	-104.87746	04/28/11 14:47:25	MGM	Well pad upwind	17	127	7006	0
1049	37.14374	-104.89027	04/28/11 14:55:34	MGM	Near 1021, also upwind was some gas lines rising up. Suspect that to be the source of the leal	48	294	7085	0
1050	37.13939	-104.88339	04/28/11 15:05:11	MGM	2 leaks, or maybe coming up out the ground in two places? Did not observe any gas production nearby	25	116	7051	0

LDS Leak Report

ID: L-1021

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 12:54

Max Methane Conc: 1.26 PPM

HC:CH₄ Ratio: 0.08 R₂ = 0.89

Address: 4230 State Hwy 12

Weston

CO 81091

Lat: 37.142767

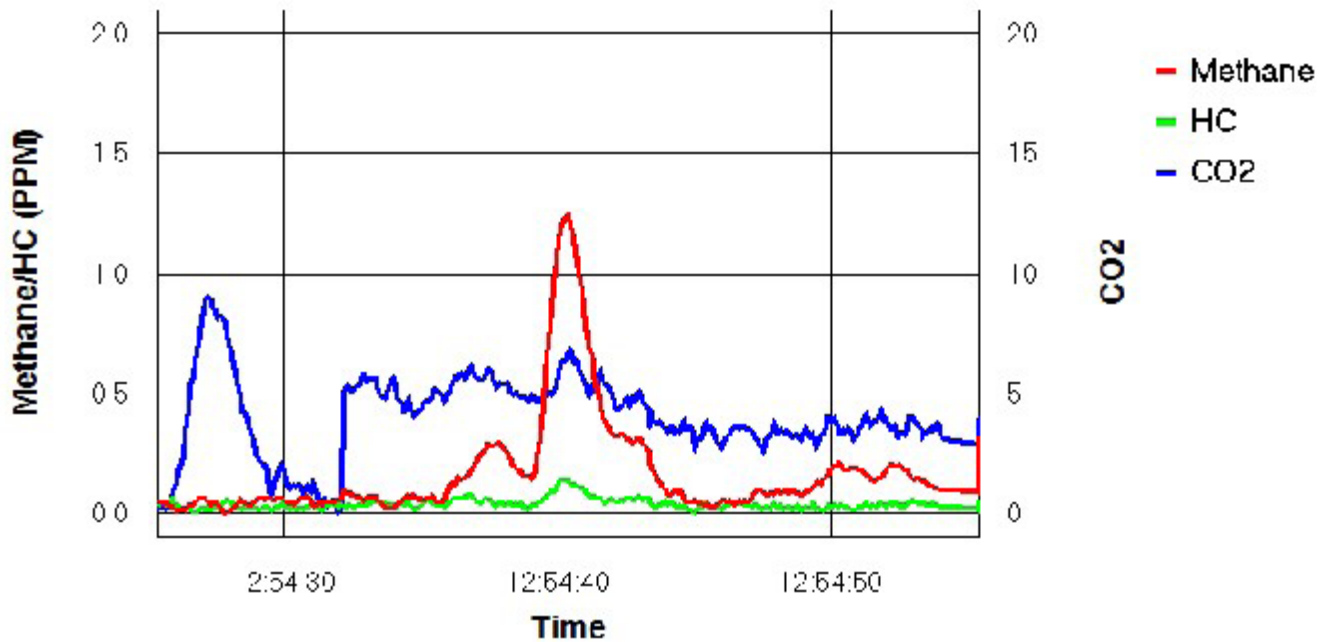
Lon: -104.887336

Altitude: 7067 ft.

Vehicle Speed: 55 mph

Operator: MGM

Comments: Same as L-1049?



LDS Leak Report

ID: L-1023

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 12:59

Max Methane Conc: 0.71 PPM

HC:CH4 Ratio: 0.13 R2 = 0.76

Address: Not Found

Lat: 37.157502

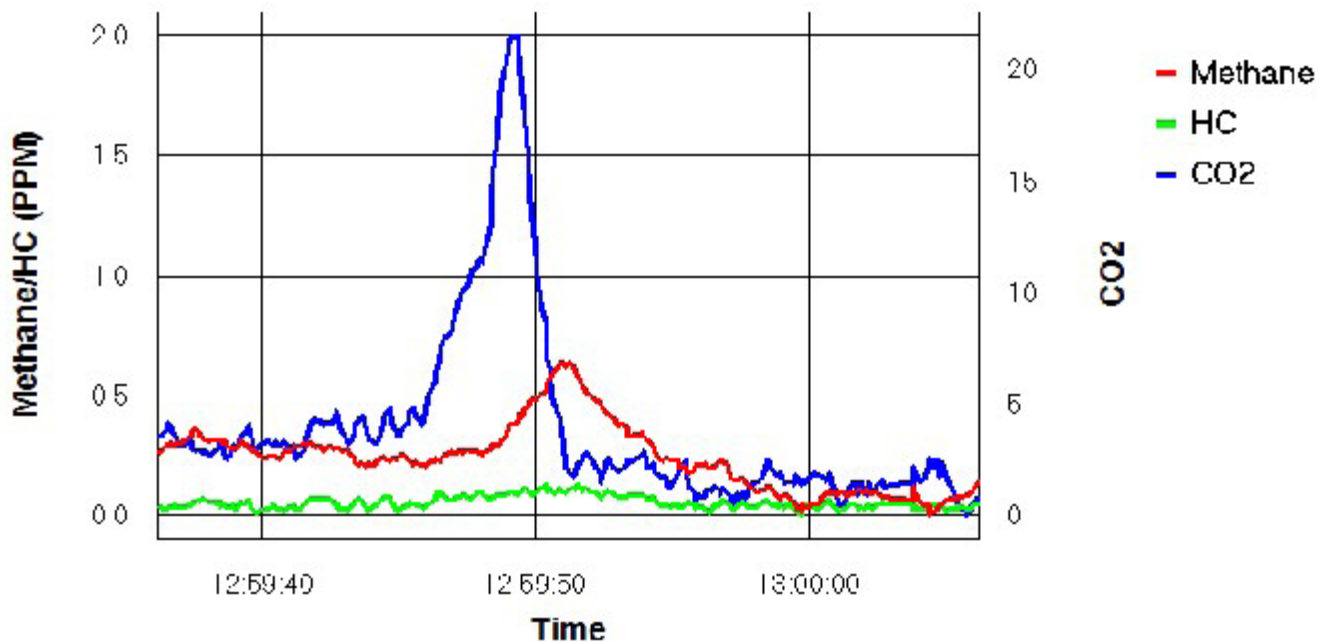
Lon: -104.923175

Altitude: 7273 ft.

Vehicle Speed: 13 mph

Operator: MGM

Comments: Gas line is along the road, periodically there are small pipes coming up w/ valves on the road with all these holes along



LDS Leak Report

ID: L-1025

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 14:46

Max Methane Conc: 4.54 PPM

HC:CH₄ Ratio: 0.09 R² = 0.99

Address: Not Found

Lat: 37.117362

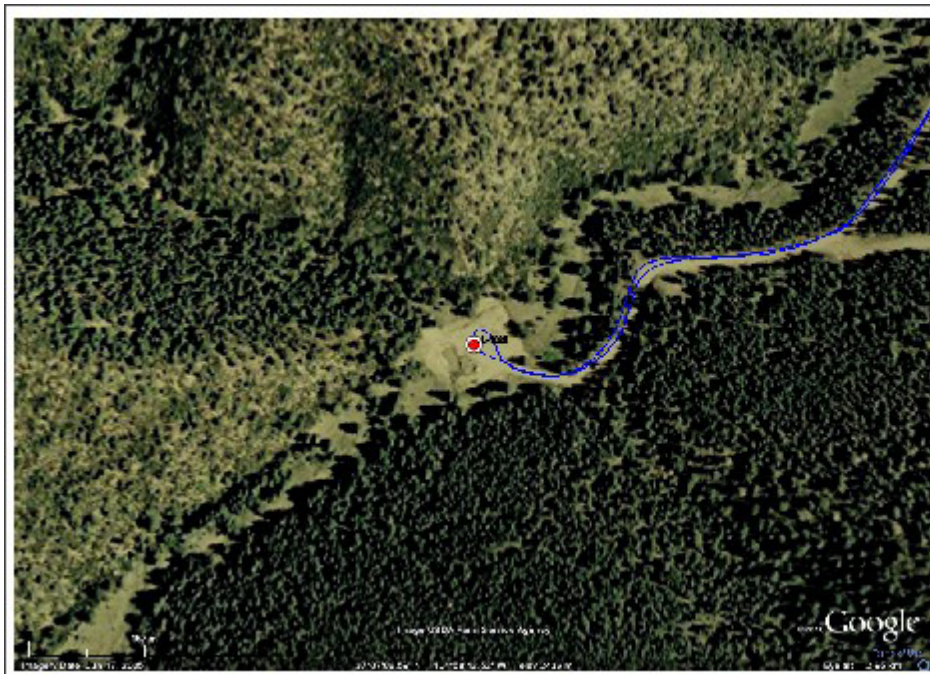
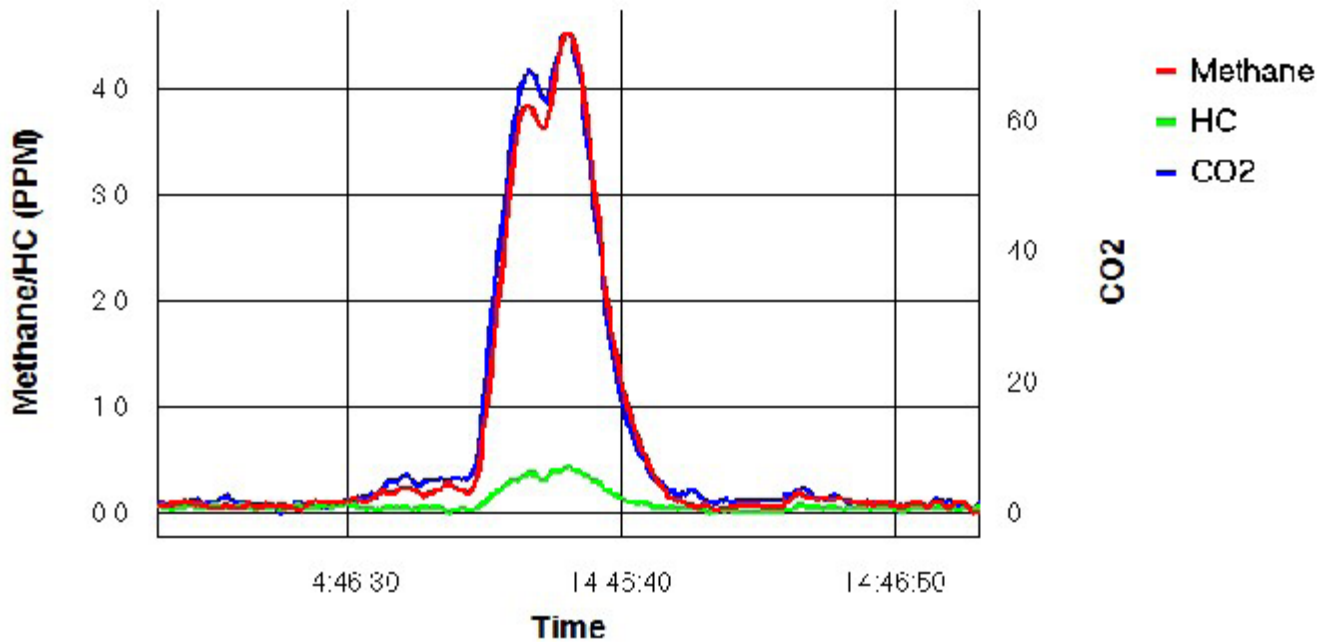
Lon: -104.975672

Altitude: 7928 ft.

Vehicle Speed: 8 mph

Operator: MGM

Comments: pumping well pad,
generator (CO₂ well correlated)



LDS Leak Report

ID: L-1026

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 14:56

Max Methane Conc: 3.84 PPM

HC:CH₄ Ratio: 0.09 R² = 0.99

Address: Not Found

Lat: 37.144896

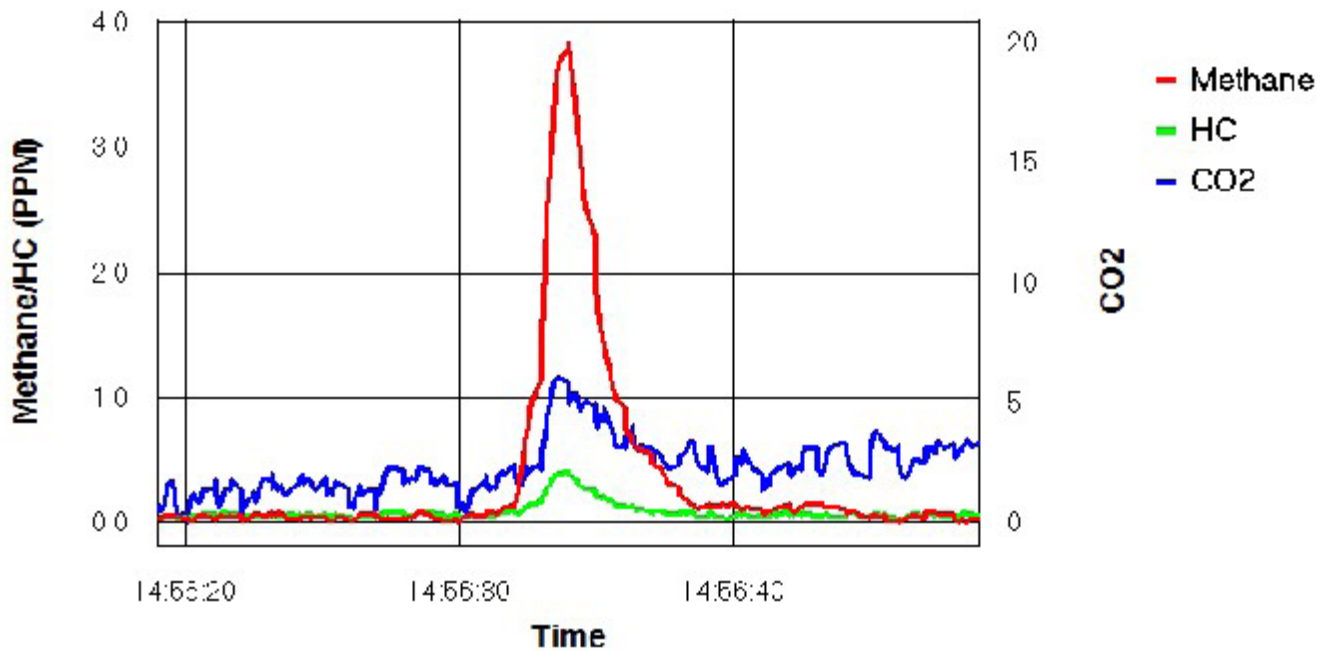
Lon: -104.935748

Altitude: 7323 ft.

Vehicle Speed: 28 mph

Operator: MGM

Comments: Found last year too.
There is a well pad nearby but is is downwind, and this is a very narrow leak between the CO₂ and HC



LDS Leak Report

ID: L-1027

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 15:04

Max Methane Conc: 10.26 PPM

HC:CH₄ Ratio: 0.09 R₂ = 1.00

Address: Not Found

Lat: 37.139279

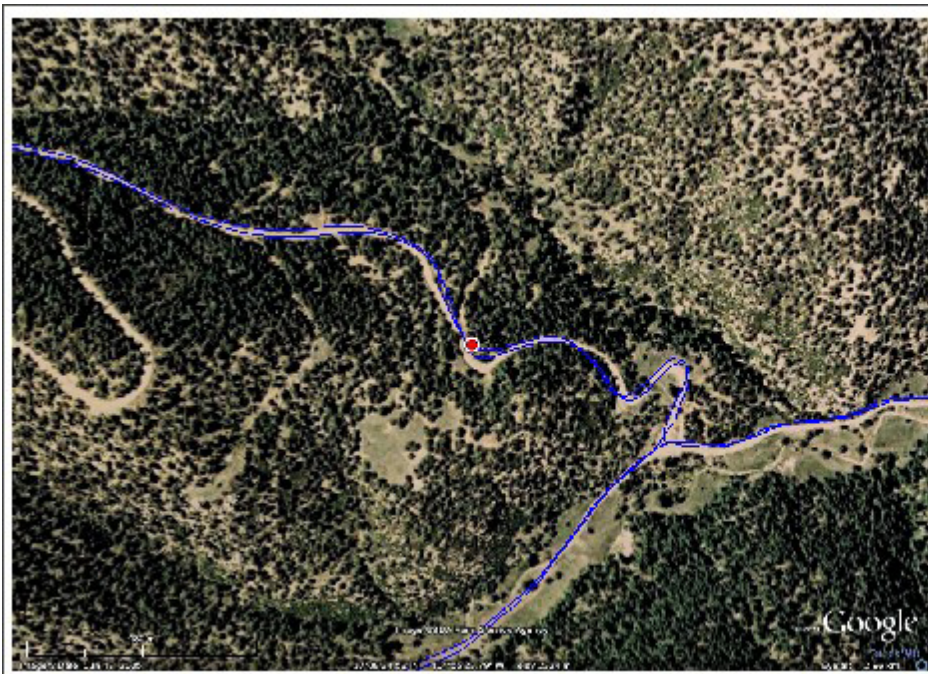
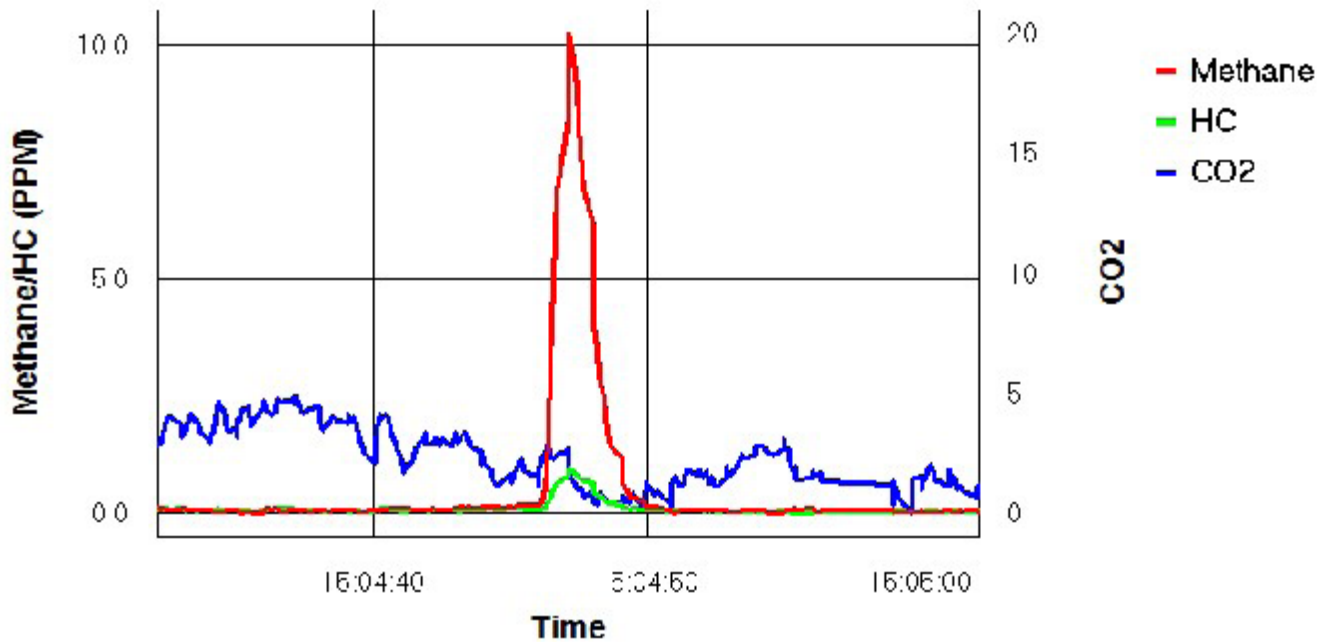
Lon: -104.919186

Altitude: 7430 ft.

Vehicle Speed: 19 mph

Operator: MGM

Comments: pipe riser leaking



LDS Leak Report

ID: L-1029

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 16:27

Max Methane Conc: 10.48 PPM

HC:CH4 Ratio: 0.08 R2 = 1.00

Address: Not Found

Lat: 37.081222

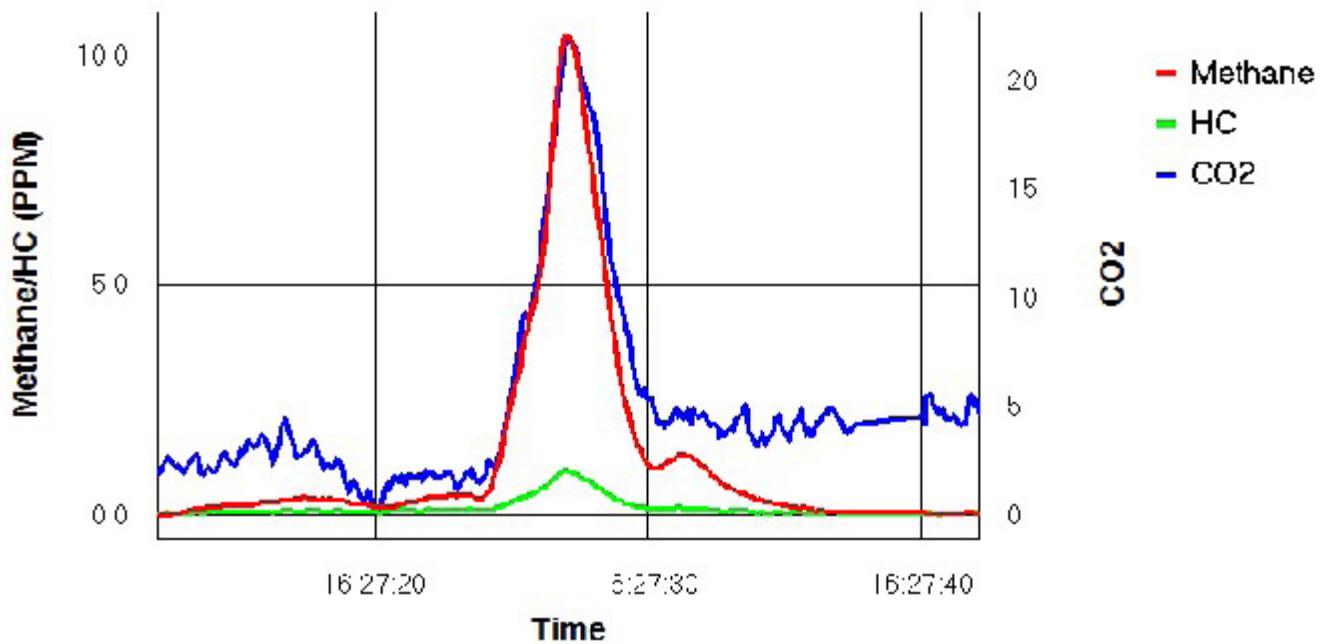
Lon: -104.950819

Altitude: 8330 ft.

Vehicle Speed: 23 mph

Operator: MGM

Comments: Well pad upwind



LDS Leak Report

ID: L-1030

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 16:39

Max Methane Conc: 8.06 PPM

HC:CH₄ Ratio: 0.08 R₂ = 1.00

Address: Not Found

Lat: 37.067067

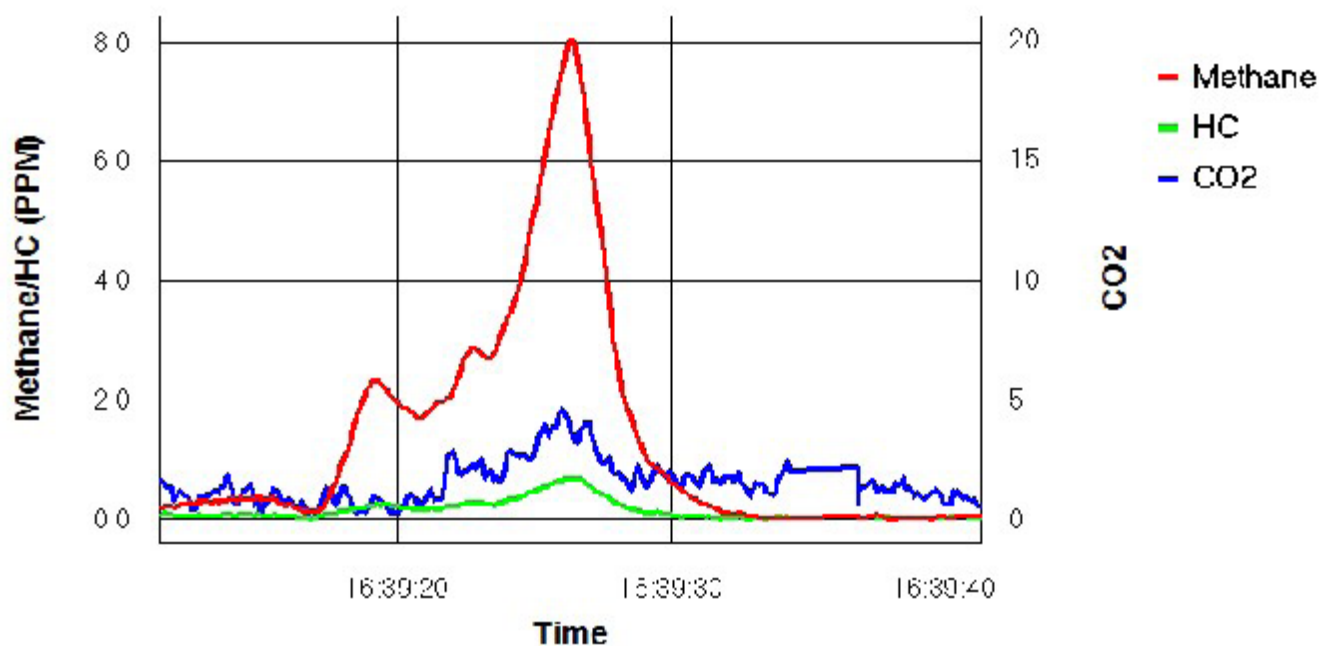
Lon: -104.935318

Altitude: 7448 ft.

Vehicle Speed: 18 mph

Operator: MGM

Comments: Well pad upwind



LDS Leak Report

ID: L-1031

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 16:51

Max Methane Conc: 1.21 PPM

HC:CH₄ Ratio: 0.10 R₂ = 0.89

Address: Not Found

Lat: 37.065783

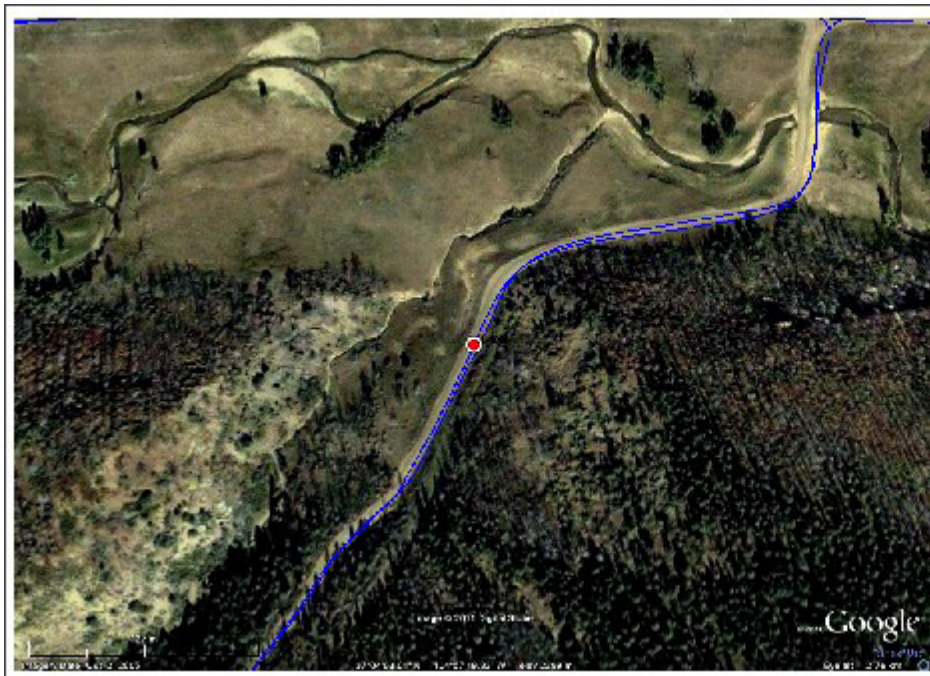
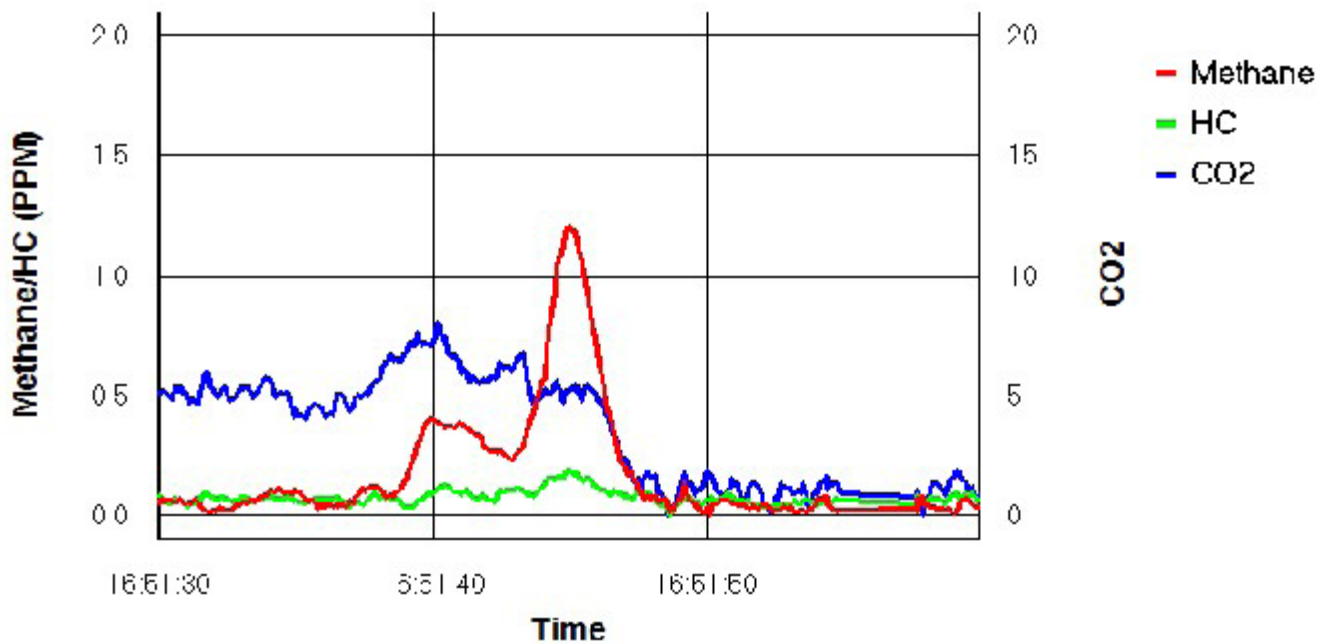
Lon: -104.952398

Altitude: 7554 ft.

Vehicle Speed: 27 mph

Operator: MGM

Comments: pipe riser leaking



LDS Leak Report

ID: L-1033

Project Name: 2011-04_LT

Date/Time Found: 04/27/2011 18:26

Max Methane Conc: 0.88 PPM

HC:CH₄ Ratio: 0.09 R₂ = 0.90

Address: Not Found

Lat: 37.125239

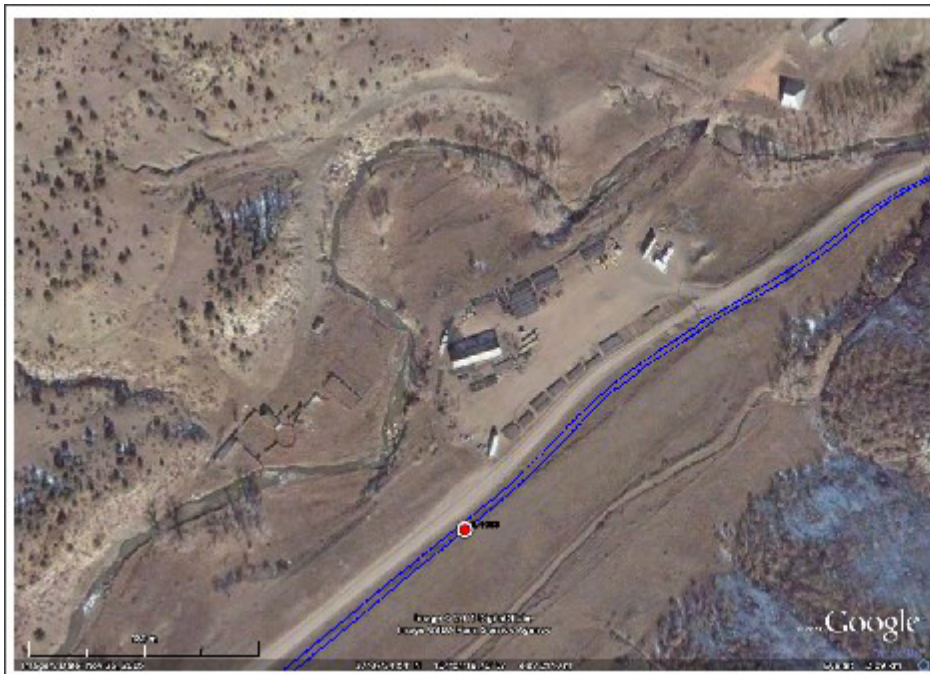
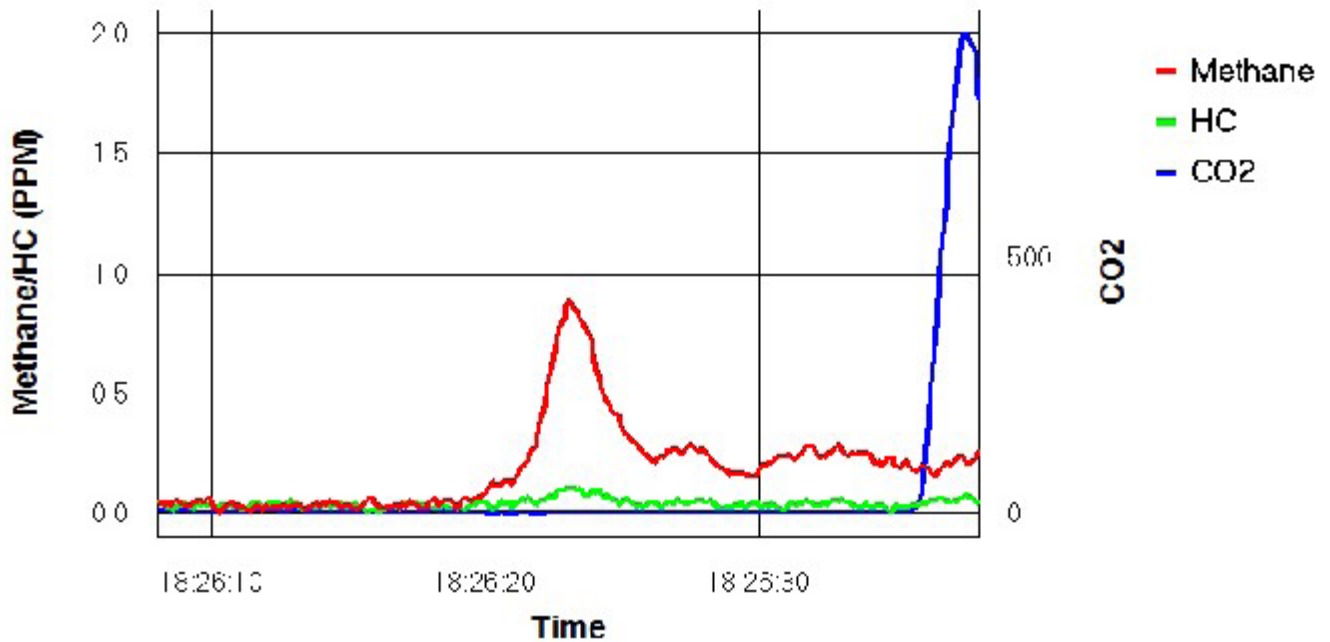
Lon: -104.852189

Altitude: 6912 ft.

Vehicle Speed: 32 mph

Operator: MGM

Comments: Very small concentration, at the detection limit for the HC, but looks to correlate



LDS Leak Report

ID: L-1035

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 10:49

Max Methane Conc: 8.23 PPM

HC:CH₄ Ratio: 0.09 R² = 1.00

Address: 220 State Hwy 12
Weston
CO 81091

Lat: 37.132335

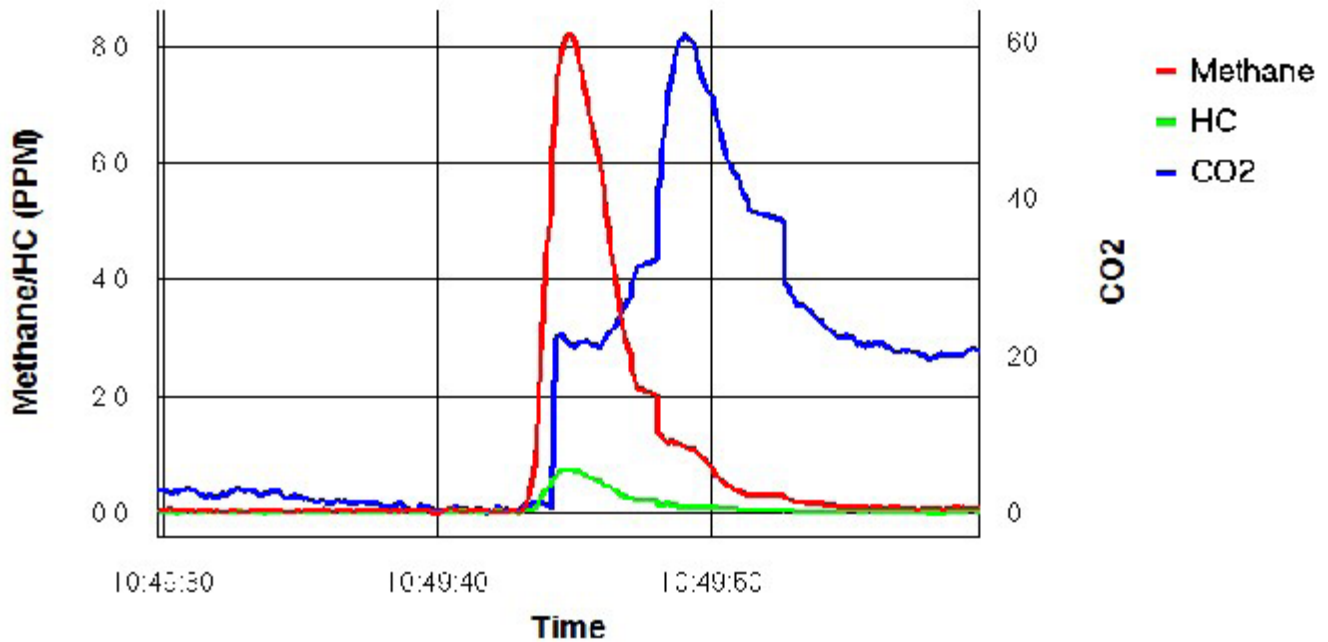
Lon: -104.810395

Altitude: 6780 ft.

Vehicle Speed: 49 mph

Operator: MGM

Comments: Outside of survey area,
but picked it up repeatedly. Good
HC correlation.



LDS Leak Report

ID: L-1036

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 10:55

Max Methane Conc: 27.31 PPM

HC:CH₄ Ratio: 0.09 R² = 1.00

Address: Not Found

Lat: 37.120855

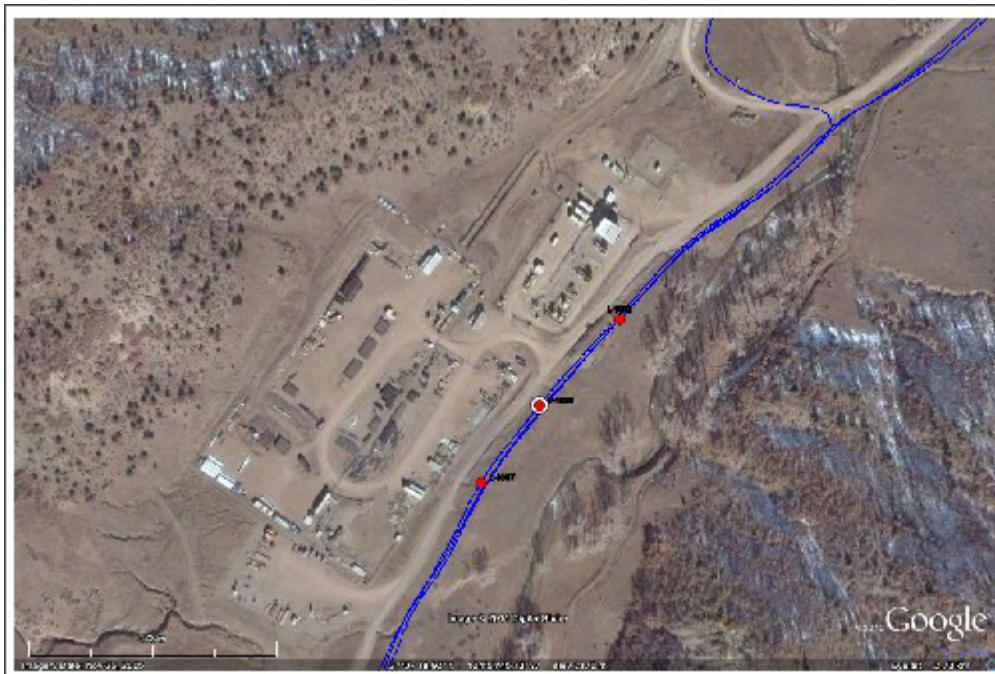
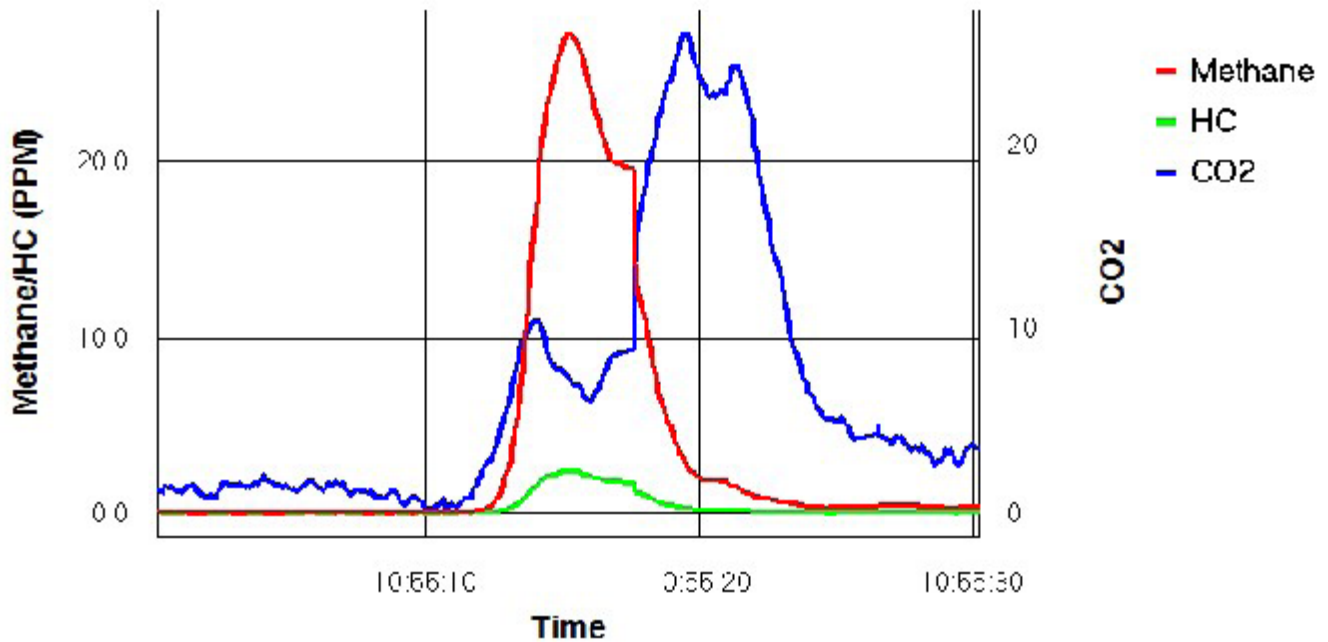
Lon: -104.858646

Altitude: 6951 ft.

Vehicle Speed: 29 mph

Operator: MGM

Comments: Good HC correlation.
Large compressor station adjacent.



LDS Leak Report

ID: L-1039

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 10:57

Max Methane Conc: 5.05 PPM

HC:CH₄ Ratio: 0.05 R₂ = 0.73

Address: Not Found

Lat: 37.116638

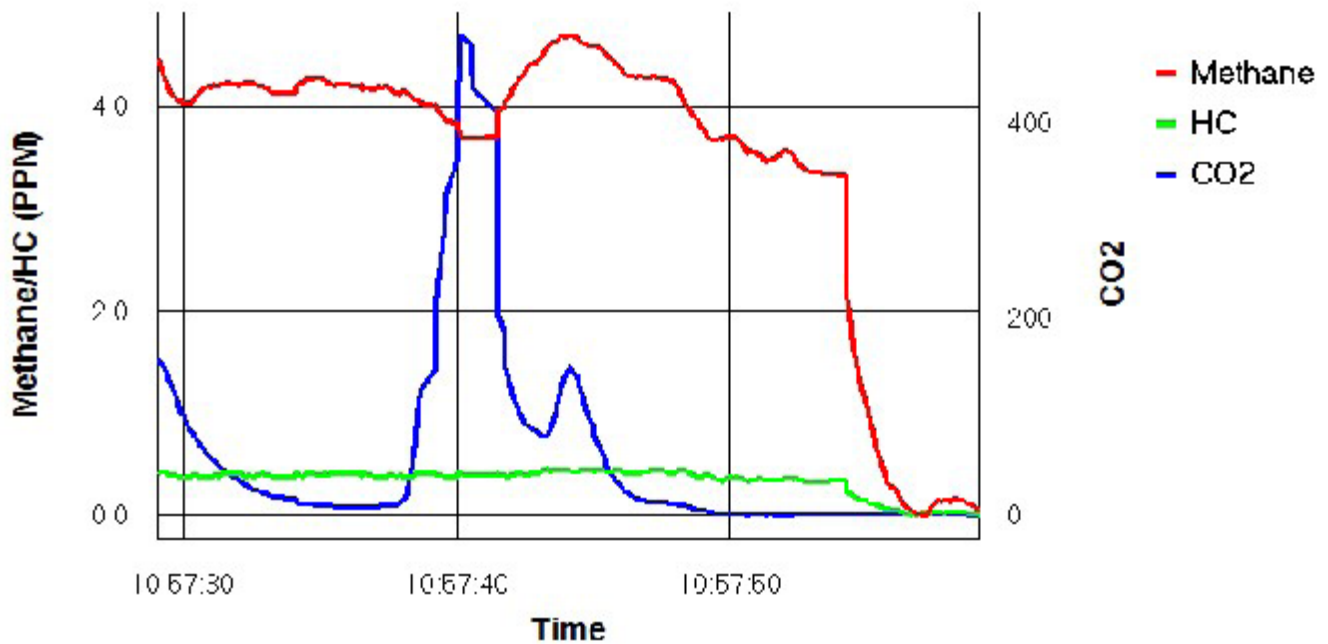
Lon: -104.861560

Altitude: 6974 ft.

Vehicle Speed: 0 mph

Operator: MGM

Comments: while commenting on 38, the compressor station blew at me. Good example of a wider



LDS Leak Report

ID: L-1040

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 11:35

Max Methane Conc: 2.04 PPM

HC:CH4 Ratio: 0.11 R2 = 0.93

Address: Not Found

Lat: 37.075178

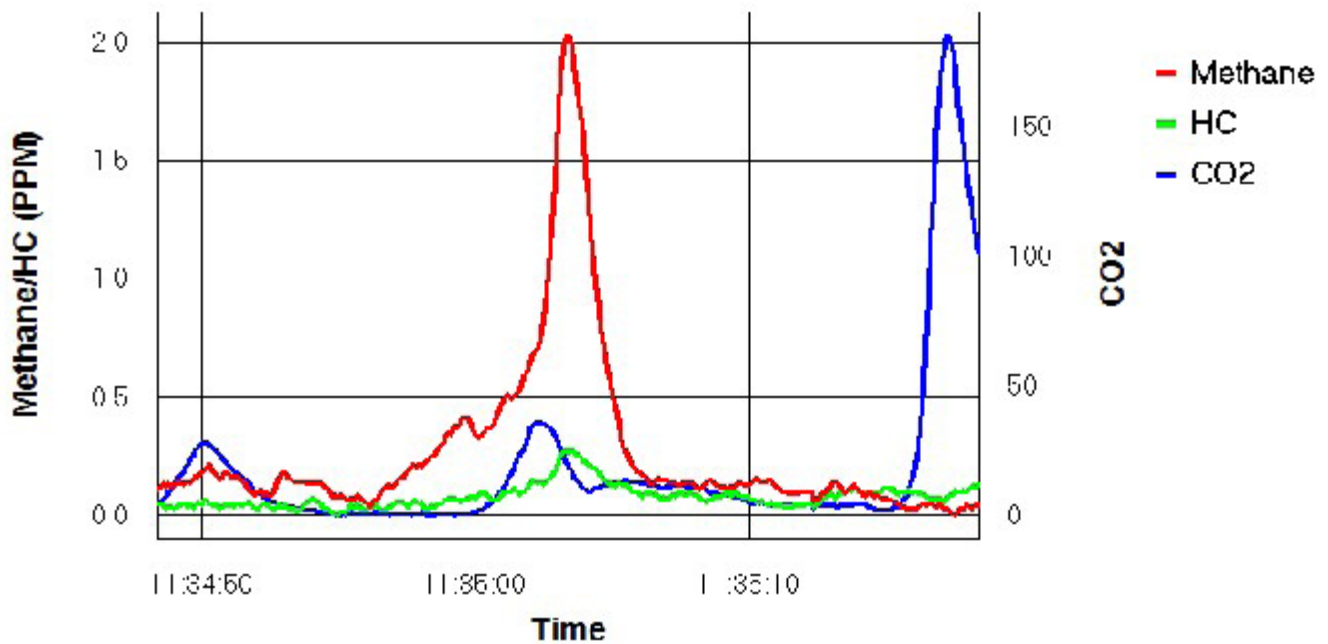
Lon: -104.869742

Altitude: 7924 ft.

Vehicle Speed: 12 mph

Operator: MGM

Comments: well pad



LDS Leak Report

ID: L-1041

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 11:59

Max Methane Conc: 18.74 PPM

HC:CH4 Ratio: 0.08 R2 = 1.00

Address: Not Found

Lat: 37.052872

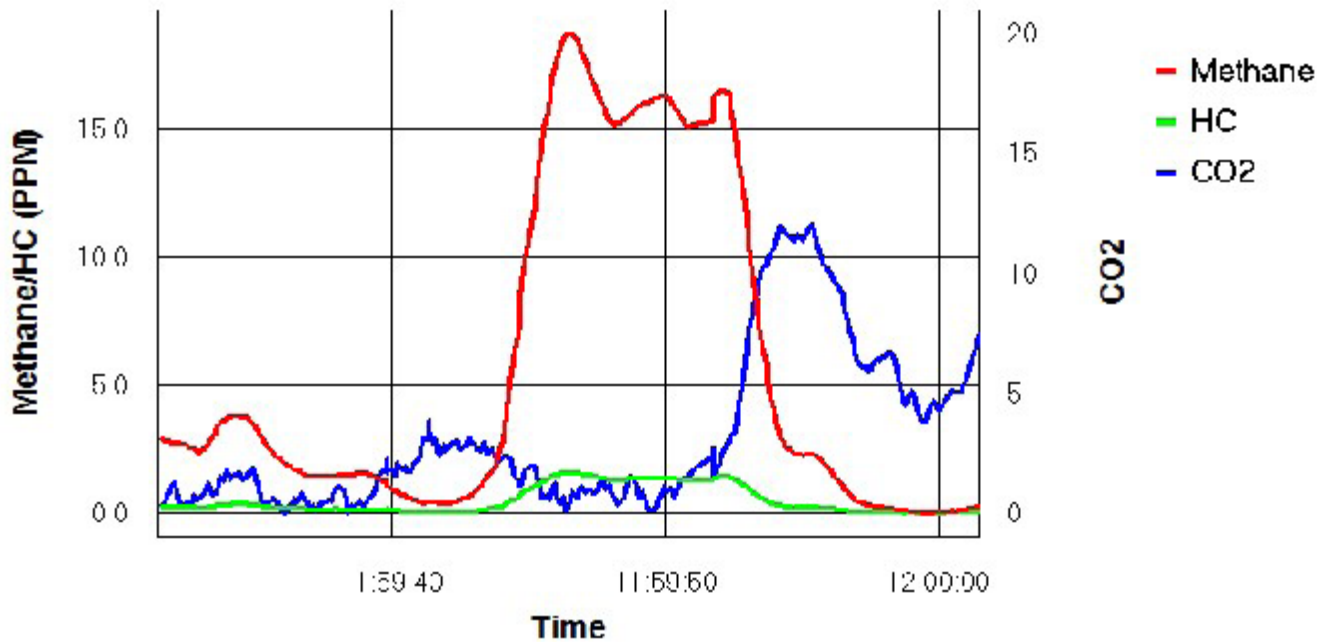
Lon: -104.899258

Altitude: 8196 ft.

Vehicle Speed: 0 mph

Operator: MGM

Comments: compressor station



LDS Leak Report

ID: L-1042

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 13:09

Max Methane Conc: 0.40 PPM

HC:CH4 Ratio: 0.11 R2 = 0.69

Address: Not Found

Lat: 37.128571

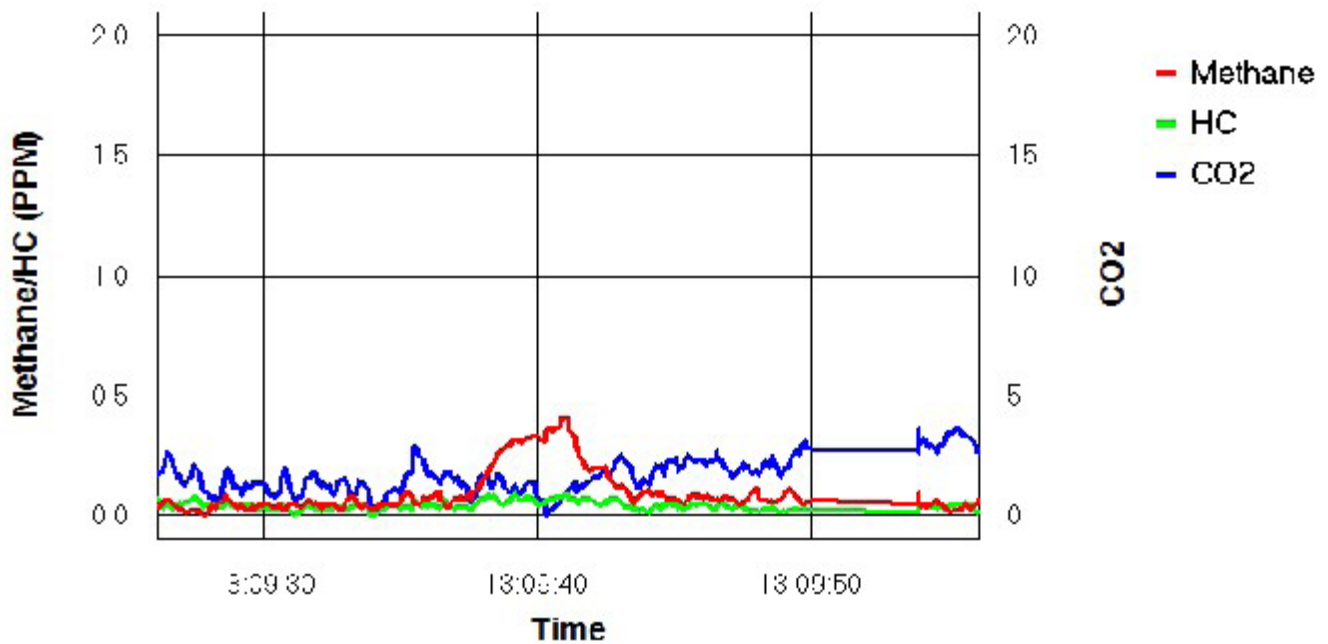
Lon: -104.859167

Altitude: 7115 ft.

Vehicle Speed: 16 mph

Operator: MGM

Comments: well pad



LDS Leak Report

ID: L-1043

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 13:12

Max Methane Conc: 1.28 PPM

HC:CH₄ Ratio: 0.09 R₂ = 0.90

Address: Not Found

Lat: 37.124097

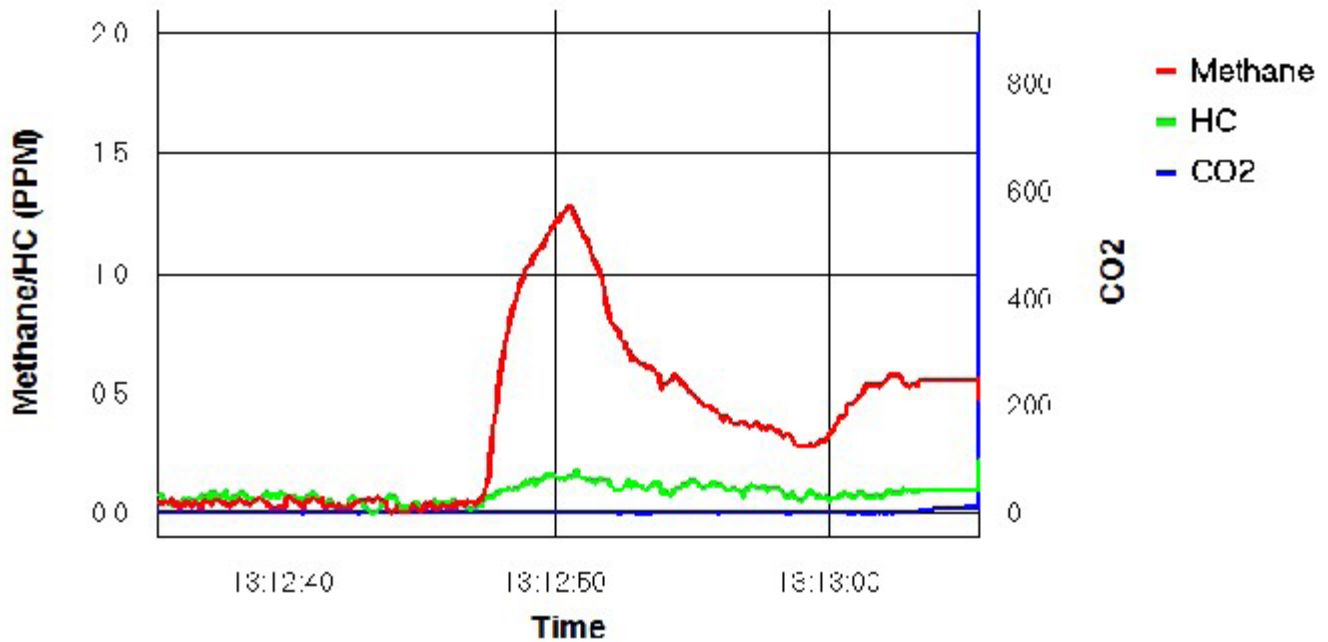
Lon: -104.861980

Altitude: 6986 ft.

Vehicle Speed: 26 mph

Operator: MGM

Comments: seep? Didn't notice anything in the vicinity related to gas production, however there is strong HC accumulation



LDS Leak Report

ID: L-1044

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 13:28

Max Methane Conc: 1.28 PPM

HC:CH₄ Ratio: 0.09 R₂ = 0.93

Address: Not Found

Lat: 37.123210

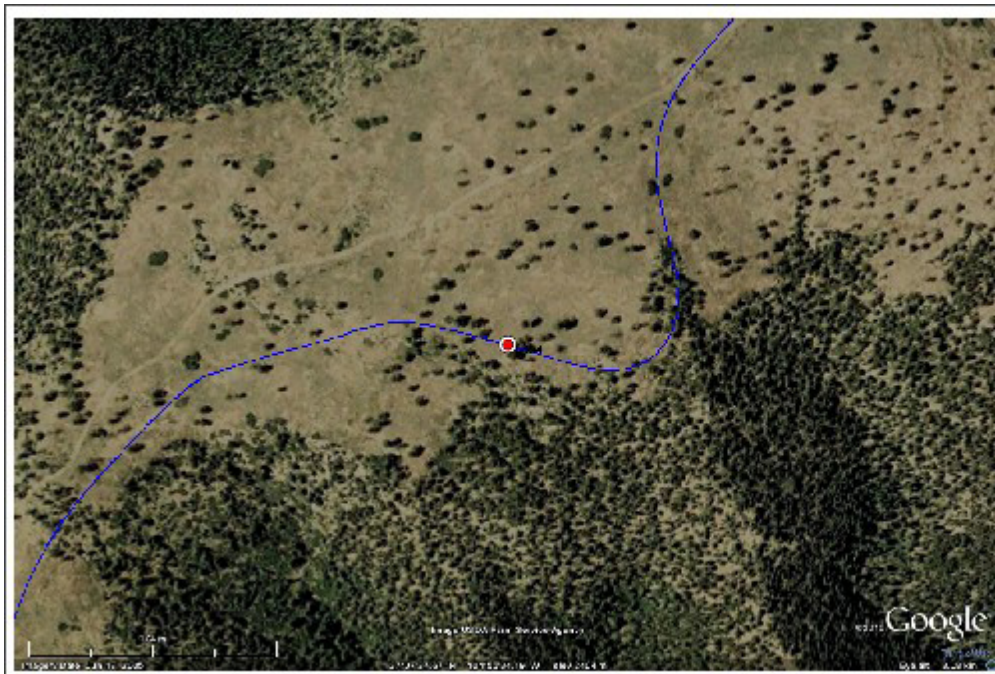
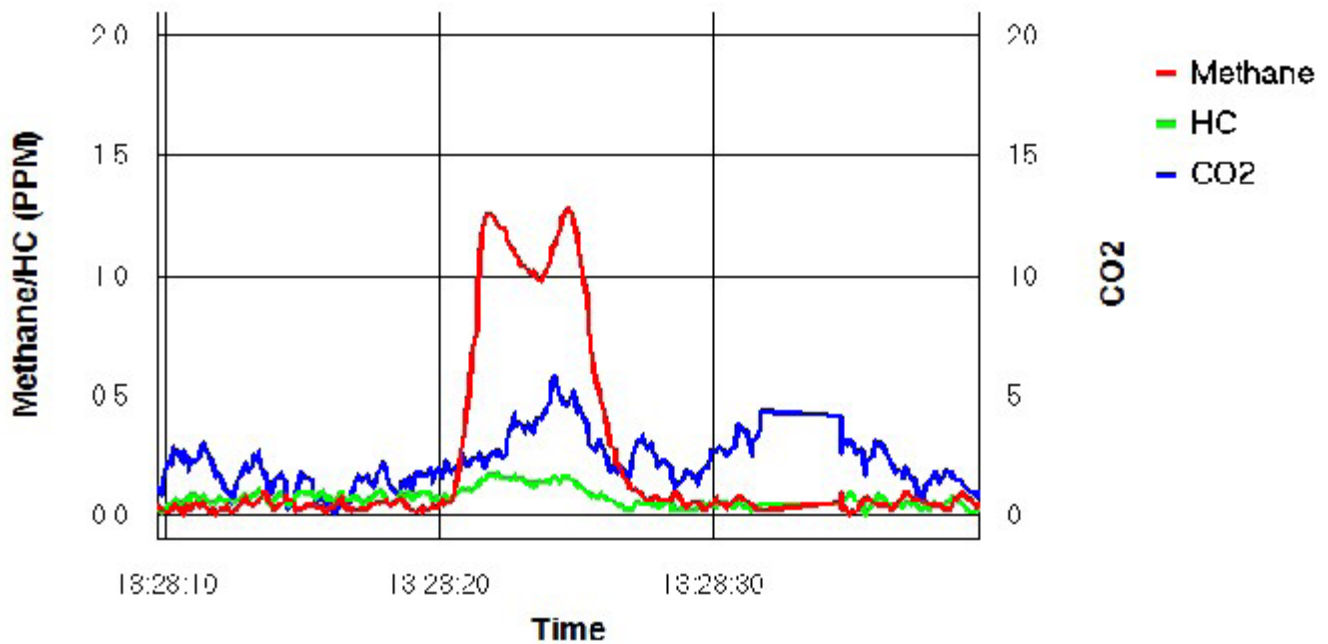
Lon: -104.921782

Altitude: 8067 ft.

Vehicle Speed: 28 mph

Operator: MGM

Comments: drilling new well



LDS Leak Report

ID: L-1045

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 14:01

Max Methane Conc: 1.43 PPM

HC:CH4 Ratio: 0.10 R2 = 0.96

Address: Not Found

Lat: 37.133193

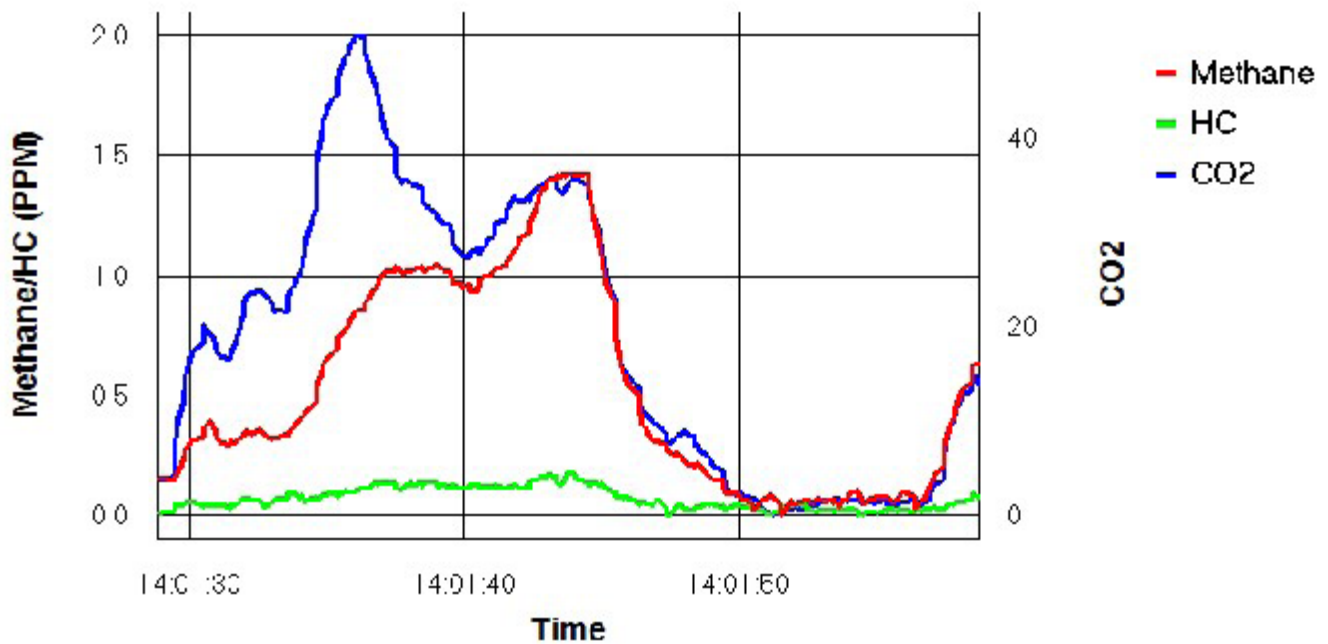
Lon: -104.934565

Altitude: 7584 ft.

Vehicle Speed: 0 mph

Operator: MGM

Comments: well pad



LDS Leak Report

ID: L-1046

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 14:37

Max Methane Conc: 2.84 PPM

HC:CH4 Ratio: 0.08 R2 = 0.98

Address: Not Found

Lat: 37.138608

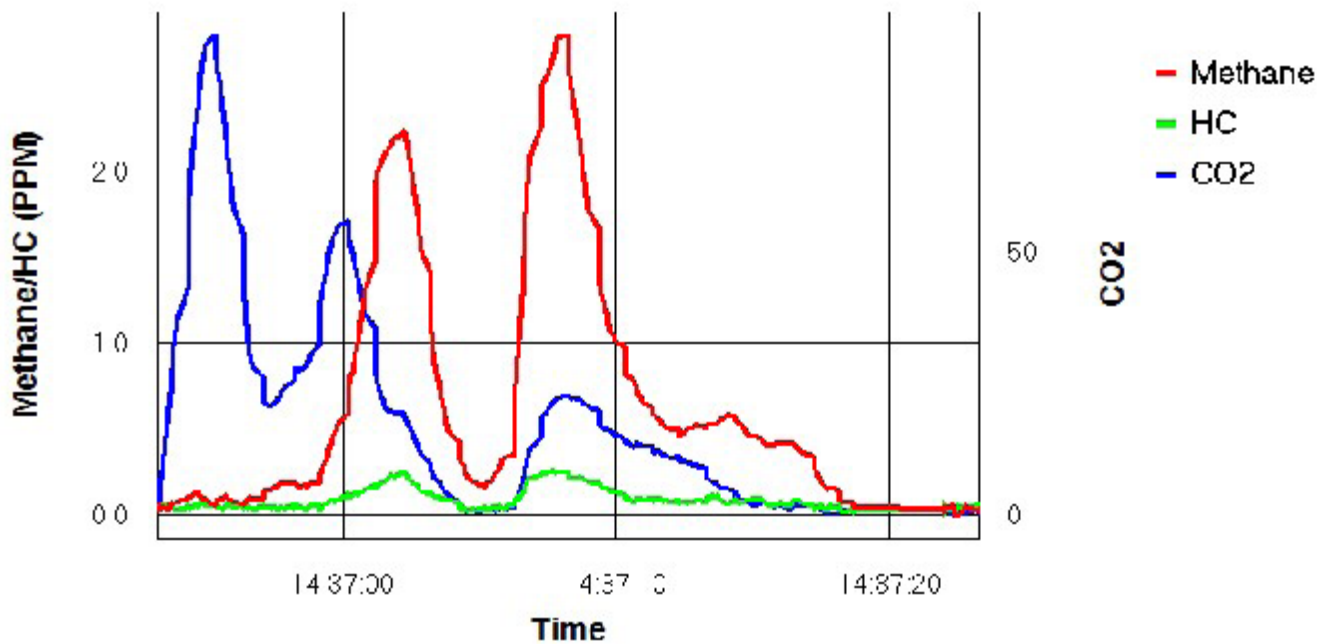
Lon: -104.895512

Altitude: 7286 ft.

Vehicle Speed: 13 mph

Operator: MGM

Comments: well pad near by



LDS Leak Report

ID: L-1047

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 14:38

Max Methane Conc: 22.89 PPM

HC:CH4 Ratio: 0.08 R2 = 1.00

Address: Not Found

Lat: 37.139066

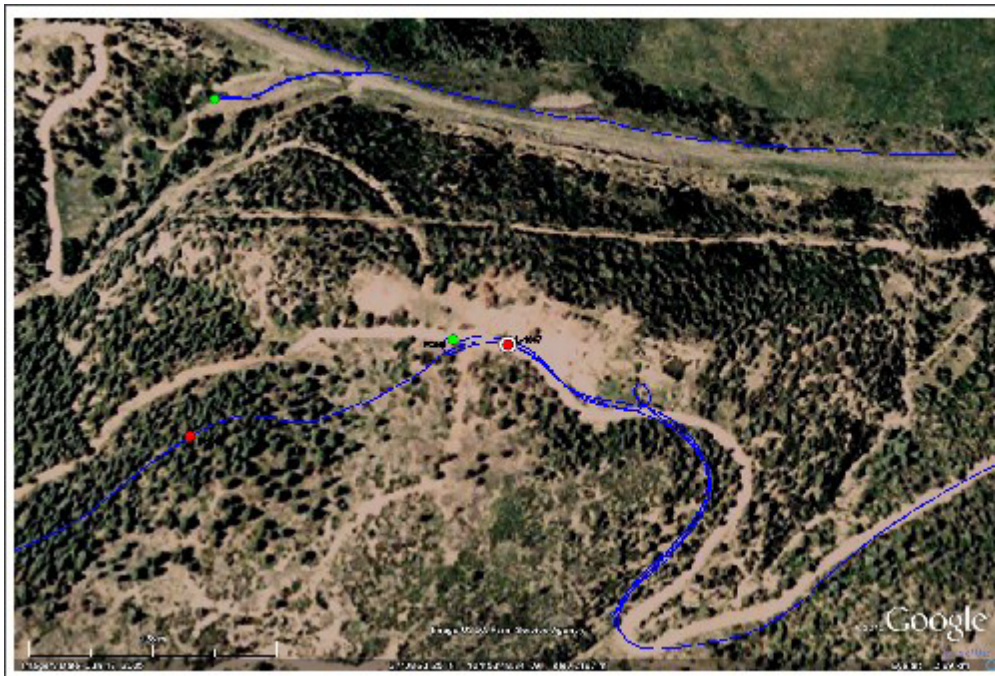
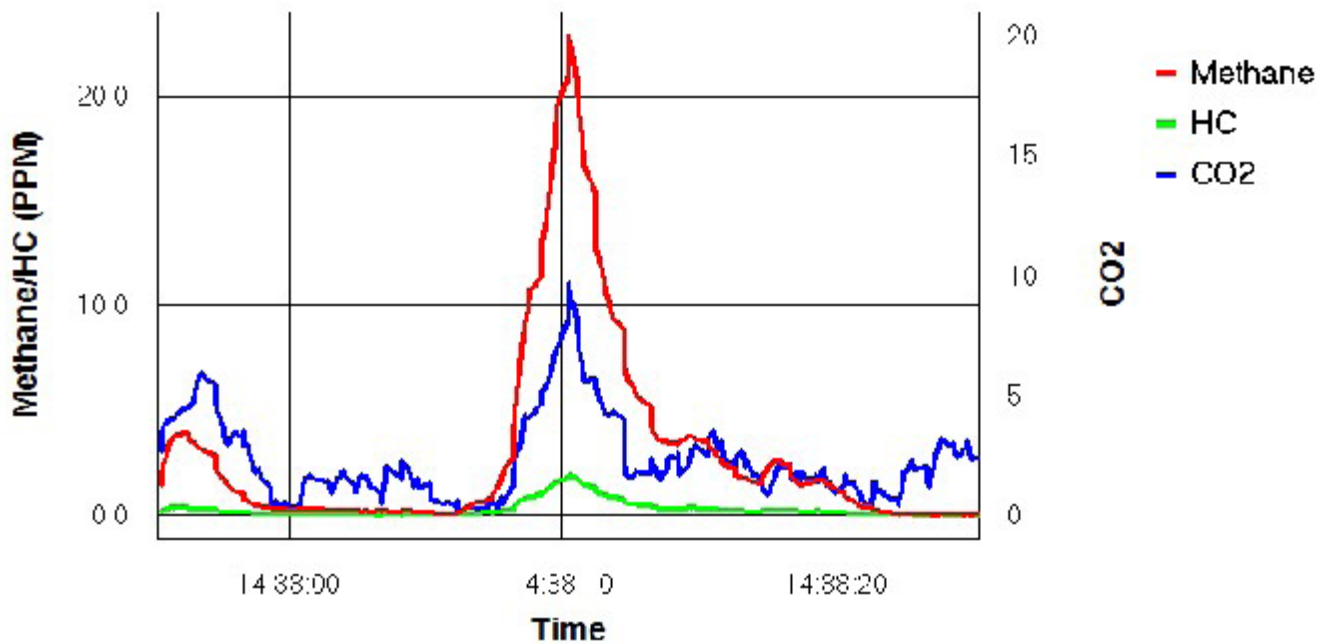
Lon: -104.893521

Altitude: 7265 ft.

Vehicle Speed: 7 mph

Operator: MGM

Comments: Well pad



LDS Leak Report

ID: L-1048

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 14:47

Max Methane Conc: 2.34 PPM

HC:CH4 Ratio: 0.08 R2 = 0.96

Address: 27191570 State Hwy 12
Weston
CO 81091

Lat: 37.136657

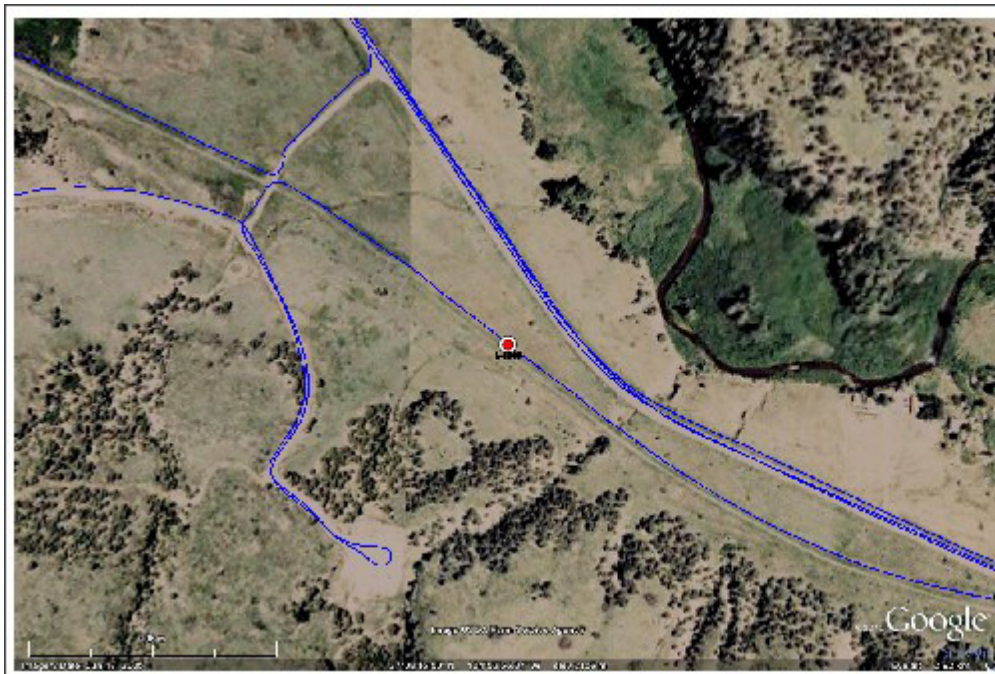
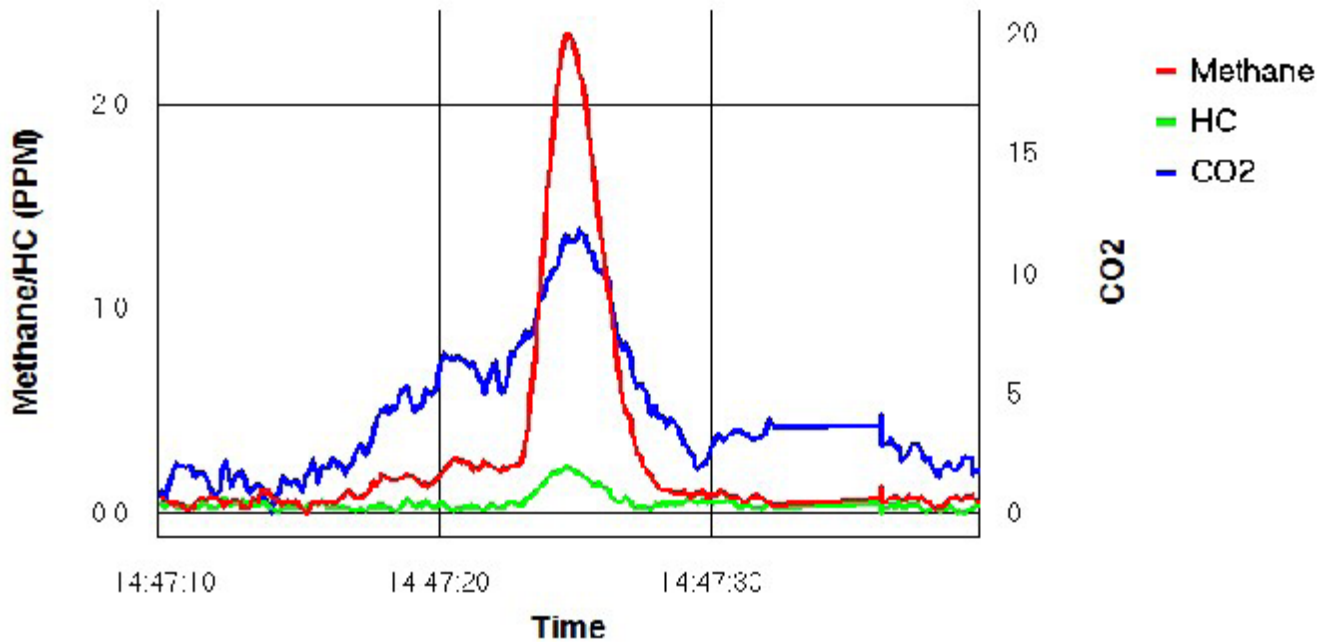
Lon: -104.877460

Altitude: 7006 ft.

Vehicle Speed: 17 mph

Operator: MGM

Comments: Well pad upwind



LDS Leak Report

ID: L-1049

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 14:55

Max Methane Conc: 18.88 PPM

HC:CH₄ Ratio: 0.08 R₂ = 1.00

Address: Not Found

Lat: 37.143741

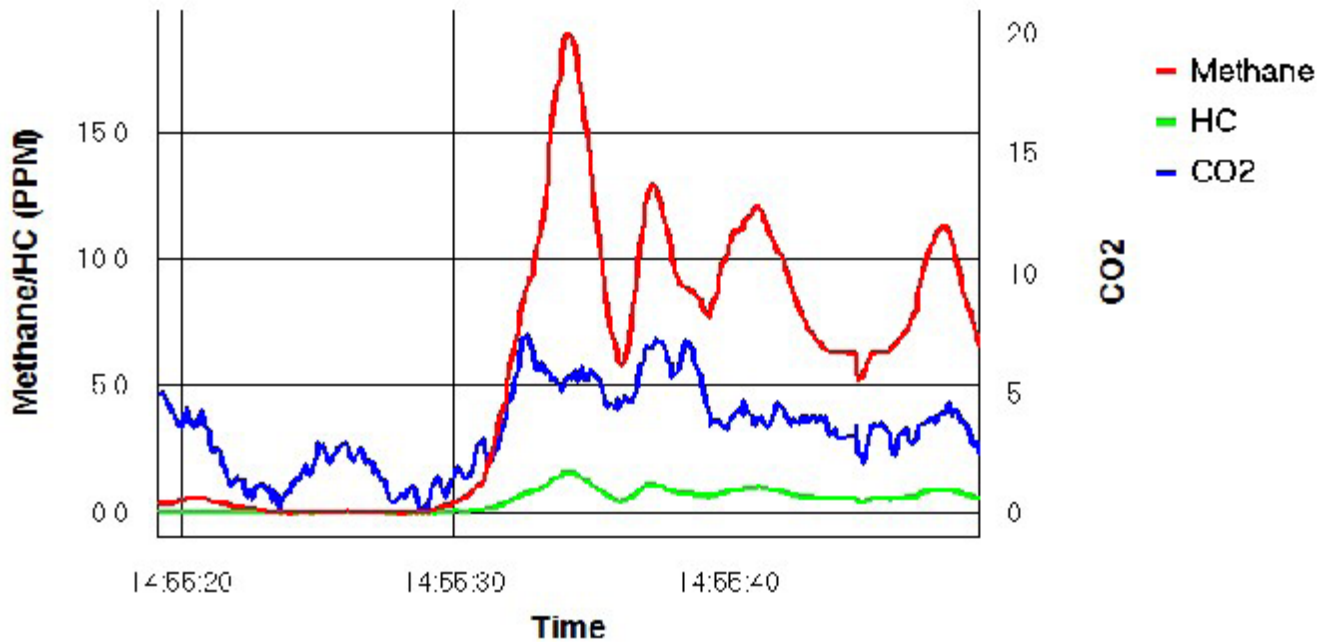
Lon: -104.890271

Altitude: 7085 ft.

Vehicle Speed: 48 mph

Operator: MGM

Comments: Near 1021, also upwind was some gas lines rising up. Suspect that to be the source of the leak.



LDS Leak Report

ID: L-1050

Project Name: 2011-04_LT

Date/Time Found: 04/28/2011 15:05

Max Methane Conc: 1.27 PPM

HC:CH₄ Ratio: 0.09 R² = 0.92

Address: Not Found

Lat: 37.139387

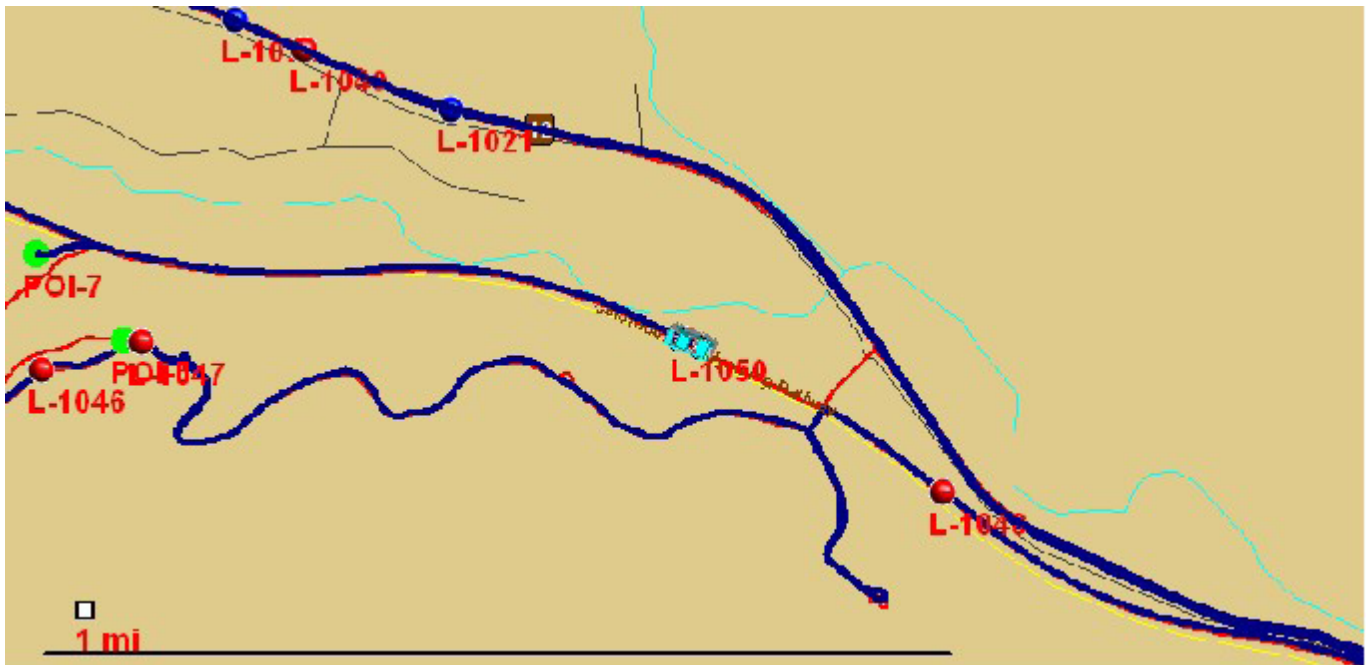
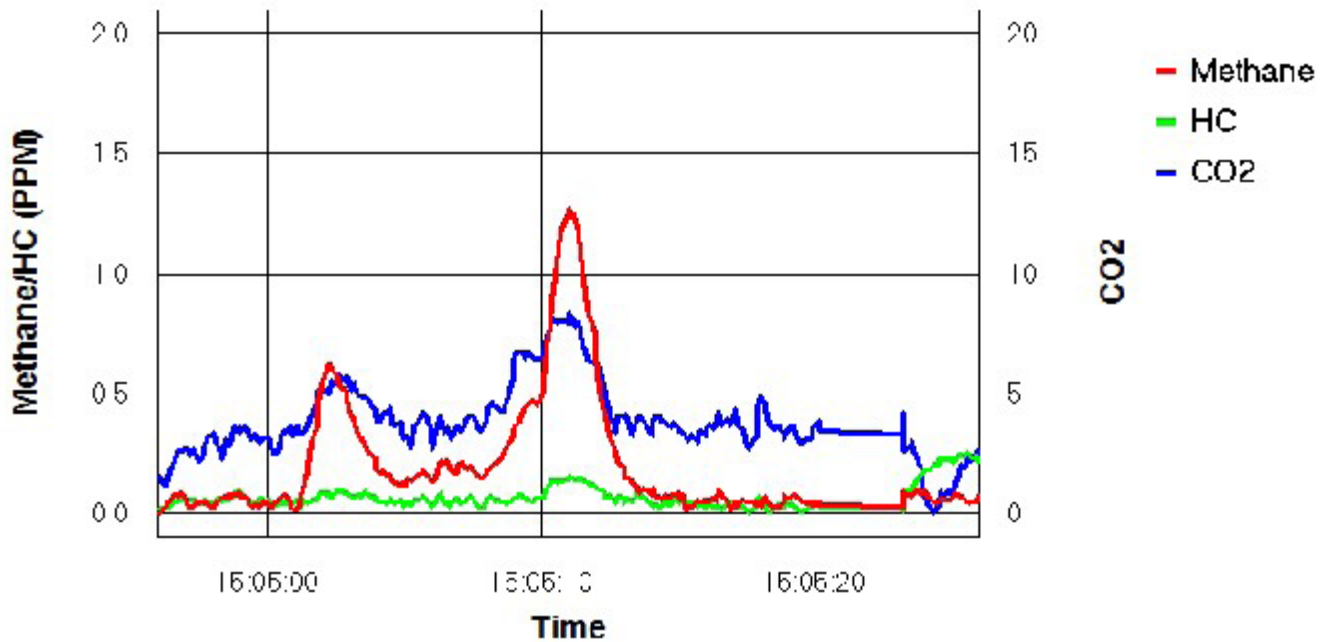
Lon: -104.883391

Altitude: 7051 ft.

Vehicle Speed: 25 mph

Operator: MGM

Comments: 2 leaks, or maybe coming up out the ground in two places? Did not observe any gas production nearby.



APPENDIX D
SUBSURFACE GAS MEASUREMENT DATA



APPENDIX D
SUBSURFACE GAS MEASUREMENTS

LOCATION	Sub_CH4_Co	Sub_O2_Con	Sub_H2S_Co	Sub_CO_Con	Flow	Max_PDOP	Corr_Type	GPS_Date	GPS_Time	GPS_Height	Northing	Easting
CIR AREA 1	0	20.4	0	1	0.00	10.2	Postprocessed Code	8/11/2011	09:01:46am	7234.429	1167141.727	3189765.968
CIR AREA 1	0	20.3	0	1	0.00	4.8	Postprocessed Code	8/11/2011	09:11:11am	7206.795	1167040.642	3189877.822
CIR AREA 1	0	20.4	0	0	0.00	8.9	Postprocessed Code	8/11/2011	09:15:14am	7201.722	1167185.396	3189903.036
CIR AREA 1	0	20.6	0	0	0.00	5.1	Postprocessed Code	8/11/2011	09:18:02am	7190.417	1167126.868	3190030.443
CIR AREA 2	0	20.5	0	0	0.00	3.7	Postprocessed Code	8/11/2011	09:23:17am	7156.613	1166745.434	3189717.922
CIR AREA 2	0	20.3	0	0	0.00	2.9	Postprocessed Code	8/11/2011	09:27:00am	7154.460	1166605.580	3189611.227
CIR AREA 2	0	20.2	0	0	0.00	5.1	Postprocessed Code	8/11/2011	09:29:21am	7157.951	1166534.086	3189541.016
CIR AREA 2	0	20.2	0	0	0.00	5.3	Postprocessed Code	8/11/2011	09:32:24am	7154.707	1166364.496	3189621.728
CIR AREA 2	0	20.1	0	0	0.00	4.2	Postprocessed Code	8/11/2011	09:35:06am	7142.829	1166204.155	3189768.461
CIR AREA 3	0	19.9	0	0	0.00	4.5	Postprocessed Code	8/11/2011	09:43:28am	7167.257	1166125.769	3189205.827
CIR AREA 4	0	19.8	0	0	0.00	3.7	Postprocessed Code	8/11/2011	09:54:28am	7189.011	1165666.258	3188918.546
CIR AREA 4	0	19.7	0	0	0.00	5.0	Postprocessed Code	8/11/2011	10:03:03am	7257.415	1165551.676	3188593.769
CIR AREA 4	0	19.7	0	0	0.00	6.0	Postprocessed Code	8/11/2011	10:08:09am	7196.701	1165452.251	3188893.348
CIR AREA 4	0	19.6	0	0	0.00	4.5	Postprocessed Code	8/11/2011	10:13:27am	7196.812	1165276.895	3188724.681
CIR AREA 5	0	19.6	0	0	0.00	6.0	Postprocessed Code	8/11/2011	10:16:15am	7209.679	1165124.800	3188744.834
CIR AREA 5	0	19.6	0	0	0.00	12.4	Postprocessed Code	8/11/2011	10:19:20am	7214.227	1164900.100	3188659.305
SPRING01	0	19.5	0	1	0.00	5.4	Postprocessed Code	8/15/2011	07:35:04am	8184.328	1161070.355	3148132.266
SPRING01	0	19.5	0	2	0.00	4.3	Postprocessed Code	8/15/2011	07:38:11am	8185.182	1161041.958	3148096.703
SPRING01	0	19.5	0	2	0.00	4.9	Postprocessed Code	8/15/2011	07:40:49am	8186.591	1161032.207	3148134.894
SPRING01	0	19.3	0	0	0.00	5.0	Postprocessed Code	8/15/2011	07:43:41am	8183.706	1161057.661	3148171.589

APPENDIX E
FLUX METER DATA



APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
623-L99_01	623-L99		1184487.965000000000	3160002.736000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001644450000	0.000000000000	A	777.0	36.2	15-08-2011 15:04:30	0.000000000000	0.007000000000	-0.157000000000	0.234921000000
623-L99_02	623-L99		1184540.295000000000	3160039.267000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.002109520000	0.000000000000	A	777.0	36.9	15-08-2011 15:07:41	-0.738000000000	0.009000000000	-0.552000000000	0.234391000000
623-L99_03	623-L99		1184509.007000000000	3160139.872000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001402090000	0.276913000000	A	776.9	37.8	15-08-2011 15:11:20	-0.429000000000	0.006000000000	1.185000000000	0.233682000000
623-L99_04	623-L99		1184464.762000000000	3160172.280000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000699336000	0.247565000000	A	776.5	38.4	15-08-2011 15:14:08	-0.605000000000	0.003000000000	1.062000000000	0.233112000000
623-L99_05	623-L99		1184418.086000000000	3160217.264000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001163470000	0.577546000000	A	776.6	39.0	15-08-2011 15:17:46	-0.018000000000	0.005000000000	2.482000000000	0.232694000000
623-L99_06	623-L99		1184413.349000000000	3160160.242000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001393660000	0.269208000000	A	776.2	39.4	15-08-2011 15:20:31	-2.196000000000	0.006000000000	1.159000000000	0.232276000000
623-L99_07	623-L99		1184409.171000000000	3160107.282000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001161610000	0.186788000000	A	777.1	39.7	15-08-2011 15:23:02	0.000000000000	0.005000000000	0.804000000000	0.232323000000
623-L99_08	623-L99		1184448.286000000000	3160093.250000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000000000000	0.129421000000	A	776.8	40.1	15-08-2011 15:27:16	0.000000000000	-0.001000000000	0.558000000000	0.231937000000
623-L99_09	623-L99		1184391.149000000000	3160067.499000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001622730000	0.402205000000	A	776.9	40.3	15-08-2011 15:30:02	-0.711000000000	0.007000000000	1.735000000000	0.231818000000
623-L99_10	623-L99		1184371.081000000000	3160107.896000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000695101000	0.247919000000	A	777.0	40.5	15-08-2011 15:33:01	-0.518000000000	0.003000000000	1.070000000000	0.231700000000
623-L99_11	623-L99		1184363.118000000000	3160171.675000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000925678000	0.298068000000	A	776.8	40.8	15-08-2011 15:36:04	-0.396000000000	0.004000000000	1.288000000000	0.231419000000
623-L99_12	623-L99		1184330.156000000000	3160237.099000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001387100000	0.222398000000	A	776.5	41.0	15-08-2011 15:38:32	-0.064000000000	0.006000000000	0.962000000000	0.231183000000
623-L99_13	623-L99		1184389.959000000000	3160251.480000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001385060000	0.305406000000	A	776.1	41.3	15-08-2011 15:41:34	-0.409000000000	0.006000000000	1.323000000000	0.230843000000
623-L99_14	623-L99		1184322.409000000000	3160282.898000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001153190000	0.133539000000	A	775.9	41.5	15-08-2011 15:46:33	-0.804000000000	0.005000000000	0.579000000000	0.230637000000
623-L99_15	623-L99		1184248.564000000000	3160259.323000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000922200000	0.208878000000	A	776.1	41.7	15-08-2011 15:49:49	-0.894000000000	0.004000000000	0.906000000000	0.230550000000
623-L99_16	623-L99		1184315.397000000000	3160209.726000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000691876000	0.183116000000	A	776.6	41.0	15-08-2011 15:52:39	-0.388000000000	0.006000000000	0.794000000000	0.230625000000
623-L99_17	623-L99		1184262.567000000000	3160193.990000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000922446000	0.164195000000	A	776.8	41.9	15-08-2011 15:55:15	-0.452000000000	0.004000000000	0.712000000000	0.230611000000
623-L99_18	623-L99		1184273.411000000000	3160134.396000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001613980000	0.101219000000	A	776.9	42.0	15-08-2011 15:57:59	-0.150000000000	0.007000000000	0.439000000000	0.230568000000
623-L99_19	623-L99		1184221.786000000000	3160083.090000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001153430000	1.026560000000	A	777.3	42.0	15-08-2011 16:01:04	-0.338000000000	0.005000000000	4.450000000000	0.230687000000
623-L99_20	623-L99		1184176.965000000000	3160080.435000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001614290000	0.676389000000	A	777.3	42.1	15-08-2011 16:03:22	0.000000000000	0.007000000000	2.933000000000	0.230613000000
623-L99_21	623-L99		1184121.660000000000	3160116.365000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001614290000	0.277659000000	A	777.3	42.1	15-08-2011 16:05:44	0.000000000000	0.007000000000	1.204000000000	0.230613000000
623-L99_22	623-L99		1184098.687000000000	3160229.597000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000691621000	0.124031000000	A	777.3	42.2	15-08-2011 16:10:06	-0.474000000000	0.003000000000	0.538000000000	0.230540000000
623-L99_23	623-L99		1184148.012000000000	3160289.709000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001151670000	0.407463000000	A	777.1	42.4	15-08-2011 16:12:58	-0.510000000000	0.005000000000	1.769000000000	0.230335000000
623-L99_24	623-L99		1184414.865000000000	3160019.919000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000690526000	1.480490000000	A	777.3	42.7	15-08-2011 16:18:52	0.000000000000	0.003000000000	6.432000000000	0.230175000000
623-L99_25	623-L99		1184549.325000000000	3159861.903000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.000919172000	0.086402200000	A	776.5	42.9	15-08-2011 16:21:50	-0.471000000000	0.004000000000	0.376000000000	0.229793000000
623-L99_26	623-L99		1184390.985000000000	3159968.530000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.002527900000	0.384930000000	A	776.8	43.0	15-08-2011 16:24:37	-1.039000000000	0.011000000000	1.675000000000	0.229809000000
623-L99_27	623-L99		1184341.795000000000	3159990.054000000000	0.000000000000	0.000000000000	8/15/2011			0.000000000000	0.001608570000	0.709379000000	A	777.0	43.1	15-08-2011 16:27:03	-0.877000000000	0.007000000000	3.087000000000	0.229796000000
L1021_01	L1021		1174236.866000000000	3178822.986000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000248367000	0.607248000000	A	791.2	24.8	13-08-2011 14:45:53	0.000000000000	0.001000000000	-0.469000000000	0.248367000000
L1021_02	L1021		1174218.780000000000	3178895.778000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000991221000	0.362539000000	A	791.0	25.4	13-08-2011 14:48:29	0.000000000000	0.004000000000	1.463000000000	0.247805000000
L1021_03	L1021		1174050.428000000000	3178841.796000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000988902000	0.050928500000	A	791.0	26.1	13-08-2011 14:51:25	-1.201000000000	0.004000000000	0.206000000000	0.247226000000
L1021_04	L1021		1173934.667000000000	3178819.352000000000	0.000000000000	0.000000000000	8/13/2011			375.656000000000	0.000246722000	6.779440000000	A	791.5	26.9	13-08-2011 14:56:01	1522.580000000000	0.001000000000	27.478000000000	0.246722000000
L1021_05	L1021		1173911.887000000000	3178856.858000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000985508000	0.062826200000	A	792.5	27.7	13-08-2011 14:59:15	-0.236000000000	0.004000000000	0.255000000000	0.246371000000
L1021_06	L1021		1173965.879000000000	3178874.428000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.001229690000	0.000000000000	A	792.4	28.2	13-08-2011 15:02:06	0.000000000000	0.005000000000	-0.052000000000	0.245937000000
L1021_07	L1021		1173963.550000000000	3178816.845000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.003435950000	0.778980000000	A	791.8	28.6	13-08-2011 15:04:20	0.000000000000	0.014000000000	3.174000000000	0.245425000000
L1021_08	L1021		1173961.747000000000	3178776.614000000000	0.000000000000	0.000000000000	8/13/2011			0.544884000000	0.001960900000	0.529442000000	A	792.1	29.1	13-08-2011 15:07:13	2.223000000000	0.008000000000	2.160000000000	0.245112000000
L1021_09	L1021		1174011.503000000000	3178809.850000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.002690550000	0.041092100000	A	792.0	29.7	13-08-2011 15:09:23	-3.190000000000	0.011000000000	0.168000000000	0.244596000000
L1021_10	L1021		1174013.871000000000	3178766.253000000000	0.000000000000	0.000000000000	8/13/2011			0.338412000000	0.001219940000	0.061729100000	A	791.6	30.3	13-08-2011 15:12:27	1.387000000000	0.005000000000	0.253000000000	0.243989000000
L1021_11	L1021		1174014.744000000000	3178713.665000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.002921130000	0.018257000000	A							

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
L1023_01	L1023		1179307.64400000000	3168126.07500000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00000000000	0.00000000000	A	785.2	32.7	16-08-2011 13:43:17	0.00000000000	-0.00100000000	-0.10500000000	0.24011700000
L1023_02	L1023		1179260.51400000000	3168137.10300000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00095832800	0.00000000000	A	785.5	33.5	16-08-2011 13:46:33	0.00000000000	0.00400000000	-67.29200000000	0.23958200000
L1023_03	L1023		1179303.05000000000	3168186.32100000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00095626700	33.70560000000	A	785.6	34.2	16-08-2011 13:49:49	-0.46100000000	0.00400000000	140.98800000000	0.23906700000
L1023_04	L1023		1179381.63900000000	3168116.16000000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00286394000	41.27870000000	A	785.8	34.8	16-08-2011 13:52:39	-0.69400000000	0.01200000000	172.95900000000	0.23866200000
L1023_05	L1023		1179460.12800000000	3168075.24300000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00166729000	0.00000000000	A	785.5	35.3	16-08-2011 13:55:23	-1.11000000000	0.00700000000	-280.41500000000	0.23818400000
L1023_06	L1023		1179336.33200000000	3168071.55500000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00237875000	0.19553400000	A	785.5	35.7	16-08-2011 13:57:41	0.00000000000	0.01000000000	0.82200000000	0.23787500000
L1023_07	L1023		1179316.58400000000	3168027.09400000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00213949000	0.00000000000	A	785.5	35.9	16-08-2011 13:59:50	0.00000000000	0.00900000000	-39.16000000000	0.23772200000
L1023_08	L1023		1179182.00400000000	3168124.49700000000	0.00000000000	0.00000000000	8/16/2011			0.00000000000	0.00118806000	103.48700000000	A	785.9	36.2	16-08-2011 14:02:13	-1.97000000000	0.00500000000	435.53000000000	0.23761200000
L-1025_01	L1025		1164606.45200000000	3152909.21400000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.32504700000	A	764.7	23.9	10-08-2011 08:38:54	-0.20100000000	-0.00100000000	1.35000000000	0.24077600000
L-1025_02	L1025		1164557.56700000000	3152810.92400000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00168065000	0.18967400000	A	765.1	24.9	10-08-2011 08:41:52	-0.25800000000	0.00700000000	0.79000000000	0.24009300000
L-1025_03	L1025		1164456.48200000000	3152858.02300000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.24838400000	A	765.1	25.9	10-08-2011 08:44:48	-1.99900000000	0.00000000000	1.03800000000	0.23929100000
L-1025_04	L1025		1164467.29900000000	3152959.53300000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00119255000	0.37303000000	A	764.9	26.8	10-08-2011 08:47:27	-0.89700000000	0.00500000000	1.56400000000	0.23851900000
L-1025_05	L1025		1164544.70900000000	3152957.56000000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00166501000	0.36487500000	A	765.1	27.7	10-08-2011 08:50:19	0.00000000000	0.00700000000	1.53400000000	0.23785900000
L-1025_06	L1025		1164508.99600000000	3152908.40100000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00071168400	0.11197200000	A	765.1	28.5	10-08-2011 08:52:51	0.00000000000	0.00300000000	0.47200000000	0.23722800000
L-1025_07	L1025		1164512.71400000000	3152857.00600000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00047335800	0.09041130000	A	765.1	29.2	10-08-2011 08:55:24	-0.49600000000	0.00200000000	0.38200000000	0.23667900000
L-1025_08	L1025		1164560.10000000000	3152864.47900000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00047238800	0.00047238800	A	765.3	29.9	10-08-2011 08:58:00	0.00000000000	0.00200000000	0.07600000000	0.23619400000
L-1025_09	L1025		1164559.74800000000	3152915.77600000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.00000000000	A	765.1	30.6	10-08-2011 09:00:40	0.00000000000	0.00000000000	0.00000000000	0.23558800000
L1027_01	L1027		1172595.52000000000	3169301.79900000000	0.00000000000	0.00000000000	8/10/2011			0.00048073900	0.00000000000	0.05384270000	A	779.6	30.2	10-08-2011 09:36:49	0.00200000000	0.00000000000	0.22400000000	0.24036900000
L1027_02	L1027		1172658.71000000000	3169306.26900000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00047935100	0.23008900000	A	779.4	31.0	10-08-2011 09:39:30	0.00000000000	0.00200000000	0.96000000000	0.23967600000
L1027_03	L1027		1172651.48200000000	3169351.31200000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00023913900	0.18605000000	A	779.7	31.8	10-08-2011 09:42:20	0.00000000000	0.00100000000	0.77800000000	0.23913900000
L1027_04	L1027		1172633.08800000000	3169360.21800000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00047687000	0.07248430000	A	779.7	32.7	10-08-2011 09:45:41	0.00000000000	0.00200000000	0.30400000000	0.23843500000
L1027_05	L1027		1172556.67800000000	3169385.05000000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00071413800	2.45616000000	A	779.7	33.2	10-08-2011 09:48:14	0.00000000000	0.00300000000	10.31800000000	0.23804600000
L1027_06	L1027		1172551.74500000000	3169421.76100000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00118814000	0.20032000000	A	779.6	33.7	10-08-2011 09:50:35	0.00000000000	0.00500000000	0.84300000000	0.23762800000
L1027_07	L1027		1172526.57900000000	3169339.13300000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00071227800	0.11040300000	A	779.7	34.0	10-08-2011 09:53:13	0.00000000000	0.00300000000	0.46500000000	0.23742600000
L1027_08	L1027		1172602.76700000000	3169254.55300000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00071107800	0.02915420000	A	779.4	34.4	10-08-2011 09:55:52	0.00000000000	0.00300000000	0.12300000000	0.23702600000
L1030_01	L1030		1146096.89900000000	3164855.09900000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00095355500	0.00000000000	A	777.0	31.7	10-08-2011 13:47:37	0.00000000000	0.00400000000	-0.01300000000	0.23838900000
L1030_02	L1030		1146203.51800000000	3164669.64800000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.00546540000	A	776.8	32.6	10-08-2011 13:51:16	0.00000000000	-0.00400000000	0.02300000000	0.23762600000
L1030_03	L1030		1146261.84400000000	3164652.84400000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.05886120000	A	777.4	33.2	10-08-2011 13:53:47	0.00000000000	-0.00100000000	0.24800000000	0.23734400000
L1030_04	L1030		1146307.70900000000	3164648.27800000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.09334260000	A	777.5	33.8	10-08-2011 13:56:25	0.00000000000	-0.00200000000	0.39400000000	0.23691000000
L1030_05	L1030		1146314.17900000000	3164711.96800000000	0.00000000000	0.00000000000	8/10/2011			0.43842300000	0.00000000000	0.10647100000	A	777.5	34.2	10-08-2011 13:59:13	1.85300000000	0.00000000000	0.45000000000	0.23660200000
L1030_06	L1030		1146258.56700000000	3164708.80900000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00070856200	0.75296500000	A	777.4	34.7	10-08-2011 14:02:06	0.00000000000	0.00300000000	3.18800000000	0.23618700000
L1030_07	L1030		1146254.17000000000	3164754.14400000000	0.00000000000	0.00000000000	8/10/2011			7.03778000000	0.00000000000	0.36203000000	A	777.3	35.1	10-08-2011 14:04:59	29.84000000000	0.00000000000	1.53500000000	0.23585000000
L1030_08	L1030		1146262.53000000000	3164808.52500000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.02992390000	A	777.3	35.4	10-08-2011 14:07:48	0.00000000000	-0.00100000000	0.12700000000	0.23562100000
L1030_09	L1030		1146202.07400000000	3164808.43400000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.08942600000	A	777.1	35.7	10-08-2011 14:10:47	-0.91500000000	-0.00200000000	0.38000000000	0.23533200000
L1030_10	L1030		1146208.84100000000	3164761.53300000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00094059700	0.22315700000	A	777.0	35.9	10-08-2011 14:13:44	0.00000000000	0.00400000000	0.94900000000	0.23514900000
L1030_11	L1030		1146210.97200000000	3164707.42300000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00140998000	0.33322600000	A	777.0	36.1	10-08-2011 14:16:22	-0.49100000000	0.00600000000	1.41800000000	0.23499700000
L1030_12	L1030		1146313.58200000000	3164806.48500000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00000000000	0.37354800000	A	777.3	36.3	10-08-2011 14:19:27	-0.72500000000	-0.00100000000	1.59000000000	0.23493600000
L1030_13	L1030		1146309.62400000000	3164761.42300000000	0.00000000000	0.00000000000	8/10/2011			0.38677400000	0.00046938600	0.88995600000	A	777.5	36.7	10-08-2011 14:23:57	1.64800000000	0.00200000000	3.79200000000	0.23469300000
L1030_14	L1030		1146361.71600000000	3164809.09300000000	0.00000000000	0.00000000000	8/10/2011			0.00000000000	0.00070330700	0.09260210000	A	777.4	37.0	10-08-2011 14:27:31	-0.00200000000	0.00300000000	0.39500000000	0.23443600000
L1030_15	L1030		1146356.01900000000	3164762.85100000000	0															

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
L1033_21	L1033		1167810.636000000000	3188454.228000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.013650100000	0.084960300000	A	792.5	41.8	11-08-2011 11:38:45	-0.005000000000	0.058000000000	0.361000000000	0.235347000000
L1033_22	L1033		1167812.598000000000	3188508.606000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.011068300000	0.330871000000	A	793.0	41.8	11-08-2011 11:44:28	-0.096000000000	0.047000000000	1.405000000000	0.235496000000
L1033_23	L1033		1167765.648000000000	3188522.174000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.013894200000	0.253158000000	A	793.0	41.8	11-08-2011 11:49:28	-0.010000000000	0.059000000000	1.075000000000	0.235496000000
L1033_24	L1033		1167704.103000000000	3188507.337000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.009181450000	0.187631000000	A	792.5	41.7	11-08-2011 11:54:45	0.000000000000	0.039000000000	0.797000000000	0.235422000000
L1033_25	L1033		1167728.857000000000	3188467.760000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.014366200000	0.332070000000	A	792.8	41.7	11-08-2011 11:57:43	-1.054000000000	0.061000000000	1.410000000000	0.235511000000
L1033_26	L1033		1167712.961000000000	3188411.764000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.008005350000	0.158223000000	A	792.6	41.7	11-08-2011 12:00:49	0.000000000000	0.034000000000	0.672000000000	0.235452000000
L1036_01	L1036		1165766.320000000000	3186889.079000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.000253970000	0.000000000000	A	793.3	19.0	12-08-2011 07:02:45	0.000000000000	0.001000000000	-0.090000000000	0.253970000000
L1036_02	L1036		1165713.604000000000	3186922.831000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.002784740000	0.033923200000	A	793.2	19.9	12-08-2011 07:05:35	0.000000000000	0.011000000000	0.134000000000	0.253158000000
L1036_03	L1036		1165815.363000000000	3187037.705000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.002272220000	0.092656100000	A	793.2	20.7	12-08-2011 07:08:40	0.000000000000	0.009000000000	0.367000000000	0.252469000000
L1036_04	L1036		1165953.051000000000	3187016.465000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.003021900000	0.059178900000	A	793.6	21.6	12-08-2011 07:12:04	0.000000000000	0.012000000000	0.235000000000	0.251825000000
L1036_05	L1036		1166098.816000000000	3187129.290000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.002007710000	0.013803000000	A	793.3	22.5	12-08-2011 07:15:35	0.000000000000	0.008000000000	0.055000000000	0.250964000000
L1036_06	L1036		1166217.617000000000	3187219.453000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.001001100000	0.000000000000	A	793.0	23.2	12-08-2011 07:18:42	-0.153000000000	0.004000000000	-0.085000000000	0.250276000000
L1036_07	L1036		1166309.046000000000	3187332.064000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.001496610000	0.114989000000	A	793.0	24.2	12-08-2011 07:22:28	0.000000000000	0.006000000000	0.461000000000	0.249434000000
L1036_08	L1036		1166109.227000000000	3187210.288000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.002735620000	0.060929600000	A	793.3	25.2	12-08-2011 07:26:39	-0.001000000000	0.011000000000	0.245000000000	0.248692000000
L1036_09	L1036		1166127.875000000000	3187036.689000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.000992773000	0.101015000000	A	793.3	25.8	12-08-2011 07:29:42	0.000000000000	0.004000000000	0.407000000000	0.248193000000
L1039_01	L1039		1164398.580000000000	3185915.923000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.000000000000	0.110047000000	A	792.3	29.2	12-08-2011 07:47:17	0.000000000000	-0.034000000000	0.449000000000	0.245093000000
L1039_02	L1039		1164484.752000000000	3185881.704000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.001712120000	0.000000000000	A	792.5	29.9	12-08-2011 07:50:56	-1.052000000000	0.007000000000	-0.222000000000	0.244589000000
L1039_03	L1039		1164617.285000000000	3185973.788000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.002926820000	0.000000000000	A	792.1	30.6	12-08-2011 07:53:52	-0.297000000000	0.012000000000	-0.120000000000	0.243902000000
L1039_04	L1039		1164643.010000000000	3186066.490000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.002192610000	0.024606000000	A	792.5	31.1	12-08-2011 07:56:33	-0.953000000000	0.009000000000	0.101000000000	0.243624000000
L1039_05	L1039		1164575.208000000000	3186168.008000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.005103710000	0.075340500000	A	792.4	31.8	12-08-2011 07:59:28	-0.895000000000	0.021000000000	0.310000000000	0.243034000000
L1039_06	L1039		1164507.978000000000	3186215.545000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.003151970000	0.078314300000	A	792.6	32.6	12-08-2011 08:03:28	-0.963000000000	0.013000000000	0.323000000000	0.242459000000
L1039_07	L1039		1164419.182000000000	3186168.383000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.007984480000	0.043067800000	A	792.5	33.2	12-08-2011 08:06:17	0.000000000000	0.033000000000	0.178000000000	0.241954000000
L1039_08	L1039		1164378.564000000000	3186044.389000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.010870200000	0.131892000000	A	792.5	33.7	12-08-2011 08:08:39	0.000000000000	0.045000000000	0.546000000000	0.241560000000
L1040_01	L1040		1149450.656000000000	3183953.084000000000	0.000000000000	0.000000000000	8/11/2011			0.344805000000	0.008187360000	0.454749000000	A	764.7	32.6	11-08-2011 14:26:02	1.944000000000	0.035000000000	1.944000000000	0.233925000000
L1040_02	L1040		1149404.096000000000	3184005.703000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.015145700000	0.025631100000	A	764.7	33.8	11-08-2011 14:30:19	-2.723000000000	0.065000000000	0.110000000000	0.233010000000
L1040_03	L1040		1149467.334000000000	3184001.180000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.014647200000	0.016274700000	A	765.0	34.6	11-08-2011 14:32:59	0.000000000000	0.063000000000	0.070000000000	0.232495000000
L1040_04	L1040		1149512.750000000000	3184010.884000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.007422000000	0.145425000000	A	764.9	35.3	11-08-2011 14:36:32	0.000000000000	0.032000000000	0.627000000000	0.231938000000
L1040_05	L1040		1149506.135000000000	3183958.052000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.022436800000	0.180420000000	A	764.8	36.1	11-08-2011 14:39:23	-0.308000000000	0.097000000000	0.780000000000	0.231307000000
L1040_06	L1040		1149512.920000000000	3183905.878000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.021234800000	0.448239000000	A	764.4	36.6	11-08-2011 14:42:20	0.000000000000	0.092000000000	1.942000000000	0.230813000000
L1040_07	L1040		1149458.176000000000	3183904.046000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.000000000000	0.095080200000	A	764.4	37.4	11-08-2011 14:46:48	0.000000000000	0.000000000000	0.413000000000	0.230219000000
L1040_08	L1040		1149409.100000000000	3183905.487000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.011039800000	0.147198000000	A	764.4	37.7	11-08-2011 14:49:28	0.000000000000	0.048000000000	0.640000000000	0.229996000000
L1040_09	L1040		1149406.503000000000	3183956.318000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.011945200000	0.229485000000	A	764.2	38.0	11-08-2011 14:51:50	0.000000000000	0.052000000000	0.999000000000	0.229714000000
L1040_10	L1040		1149472.100000000000	3184066.541000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.009868910000	0.109247000000	A	764.5	38.4	11-08-2011 14:55:43	-0.360000000000	0.043000000000	0.476000000000	0.229510000000
L1040_11	L1040		1149483.780000000000	3184134.924000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.008492560000	0.000000000000	A	765.3	38.7	11-08-2011 14:58:19	0.000000000000	0.037000000000	-0.606000000000	0.229529000000
L1040_12	L1040		1149336.225000000000	3183949.000000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.000917298000	0.000000000000	A	765.6	39.1	11-08-2011 15:02:18	-1.722000000000	0.004000000000	-0.505000000000	0.229325000000
L1040_13	L1040		1149189.900000000000	3184007.062000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.006861860000	0.139753000000	A	764.1	39.3	11-08-2011 15:04:42	-0.972000000000	0.030000000000	0.611000000000	0.228729000000
L1040_14	L1040		1149289.180000000000	3183869.855000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.005942710000	0.019656700000	A	763.8	39.4	11-08-2011 15:07:00	0.000000000000	0.026000000000	0.086000000000	0.228560000000
L1041_01	L1041		1141123.213000000000	3175157.224000000000	0.000000000000	0.000000000000	8/11/2011			0.000000000000	0.006438530000	0.156824000000	A	757.6	35.0	11-08-2011 12:47:50	0.000000000000	0.028000000000	0.682000000000	0.22994800000

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
L1044_08	L1044		1166715.278000000000	3168429.107000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00091862900	0.05557710000 A		761.8	37.1	10-08-2011 11:16:49	0.000000000000	0.004000000000	0.242000000000	0.22965700000
L1044_09	L1044		1166642.876000000000	3168440.081000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00045901900	0.03396740000 A		761.8	37.3	10-08-2011 11:18:40	0.000000000000	0.002000000000	0.148000000000	0.22950900000
L1045_01	L1045		1170292.535000000000	3164914.966000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.000000000000	0.000000000000 A		779.6	35.6	10-08-2011 10:10:39	-0.001000000000	0.000000000000	-0.002000000000	0.23616500000
L1045_02	L1045		1170241.854000000000	3164892.858000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00140663000	0.29375000000 A		774.9	36.0	10-08-2011 10:13:55	0.000000000000	0.006000000000	1.253000000000	0.23443800000
L1045_03	L1045		1170225.365000000000	3164854.116000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00164000000	0.32167500000 A		774.9	36.2	10-08-2011 10:16:31	0.000000000000	0.007000000000	1.373000000000	0.23428600000
L1045_04	L1045		1170229.547000000000	3164802.396000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00070199600	0.14695100000 A		774.7	36.5	10-08-2011 10:19:01	0.000000000000	0.003000000000	0.628000000000	0.23399900000
L1045_05	L1045		1170279.151000000000	3164788.774000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00023386300	0.02034610000 A		775.0	36.8	10-08-2011 10:21:40	0.000000000000	0.001000000000	0.087000000000	0.23386300000
L1045_06	L1045		1170352.488000000000	3164771.035000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00233637000	0.25489800000 A		775.0	37.1	10-08-2011 10:24:40	-1.944000000000	0.010000000000	1.091000000000	0.23363700000
L1045_07	L1045		1170393.223000000000	3164845.492000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.00093352300	0.00023338100 A		774.9	37.4	10-08-2011 10:27:19	0.000000000000	0.004000000000	0.001000000000	0.23338100000
L1045_08	L1045		1170354.605000000000	3164895.447000000000	0.000000000000	0.000000000000	8/10/2011			0.000000000000	0.000000000000	0.02308980000 A		774.9	37.6	10-08-2011 10:29:45	-0.303000000000	0.000000000000	0.099000000000	0.23323100000
L1047_01	L1047		1172671.145000000000	3176789.988000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000000000000	0.000000000000 A		n.a.	21.7	13-08-2011 07:03:08	0.000000000000	-0.009000000000	2.412000000000	0.00000000000
L1047_02	L1047		1172730.965000000000	3176808.458000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000000000000	0.12907600000 A		787.4	22.4	13-08-2011 07:05:49	0.000000000000	0.000000000000	0.518000000000	0.24918100000
L1047_03	L1047		1172667.372000000000	3176831.135000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00024854000	0.19013300000 A		787.5	23.2	13-08-2011 07:08:41	-0.072000000000	0.001000000000	0.765000000000	0.24854000000
L1047_04	L1047		1172608.136000000000	3176751.505000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00024792300	0.12693700000 A		787.4	23.9	13-08-2011 07:11:26	0.000000000000	0.001000000000	0.512000000000	0.24792300000
L1047_05	5, 8, 9 & L1046		1172620.663000000000	3176620.658000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00024727700	0.27892900000 A		787.2	24.6	13-08-2011 07:14:05	0.000000000000	0.001000000000	1.128000000000	0.24727700000
L1047_06	L1047		1172539.925000000000	3176758.426000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000000000000	0.20821300000 A		787.2	25.3	13-08-2011 07:16:44	0.000000000000	0.000000000000	0.844000000000	0.24669700000
L1047_07	L1047		1172511.376000000000	3176864.689000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00123132000	0.10293900000 A		787.4	25.9	13-08-2011 07:18:58	-0.005000000000	0.005000000000	0.418000000000	0.24626500000
L1047_08	L1047		1172502.935000000000	3177003.179000000000	0.000000000000	0.000000000000	8/13/2011			0.18973000000	0.000000000000	0.00393222000 A		787.9	26.7	13-08-2011 07:22:36	0.772000000000	0.000000000000	0.016000000000	0.24576400000
L1047_09	L1047		1172510.662000000000	3177061.073000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00024511000	0.28138600000 A		787.9	27.5	13-08-2011 07:25:47	0.000000000000	0.001000000000	1.148000000000	0.24511000000
L1047_10	L1047		1172564.846000000000	3177063.551000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00024449100	0.01295800000 A		788.0	28.3	13-08-2011 07:29:14	0.000000000000	0.001000000000	0.053000000000	0.24449100000
L1047_11	L1047		1172555.286000000000	3177006.236000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00048817100	0.03270750000 A		788.0	28.8	13-08-2011 07:31:20	0.000000000000	0.002000000000	0.134000000000	0.24408600000
L1047_12	L1047		1172556.208000000000	3176959.764000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00048746400	0.07970030000 A		787.9	29.2	13-08-2011 07:33:24	-0.089000000000	0.002000000000	0.327000000000	0.24373200000
L1047_13	L1047		1172508.233000000000	3176962.718000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00048684400	0.05939500000 A		788.2	29.7	13-08-2011 07:35:45	-0.001000000000	0.002000000000	0.244000000000	0.24342200000
L1047_14	L1047		1172458.457000000000	3176960.638000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00024295900	0.15938100000 A		788.0	30.2	13-08-2011 07:37:50	0.000000000000	0.001000000000	0.656000000000	0.24295900000
L1047_15	L1047		1172462.611000000000	3177011.115000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00024255900	0.13219500000 A		788.0	30.7	13-08-2011 07:40:02	-0.122000000000	0.001000000000	0.545000000000	0.24255900000
L1047_16	L1047		1172458.338000000000	3177063.007000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000000000000	0.02180160000 A		788.0	31.1	13-08-2011 07:41:56	-0.019000000000	-0.001000000000	0.090000000000	0.24224000000
L1047_17	L1047		1172516.069000000000	3177138.110000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00096786300	0.16526300000 A		788.4	31.6	13-08-2011 07:44:07	-0.004000000000	0.004000000000	0.683000000000	0.24196600000
L1048_01	L1048		1171740.869000000000	3181541.166000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.00860543000	1.13855000000 A		791.9	36.7	12-08-2011 10:45:13	0.000000000000	0.036000000000	4.763000000000	0.23904000000
L1048_02	L1048		1171641.526000000000	3181554.045000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.01574000000	0.23562200000 A		792.1	37.5	12-08-2011 10:48:45	0.000000000000	0.066000000000	0.988000000000	0.23848400000
L1048_03	L1048		1171765.077000000000	3181482.009000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.01522290000	0.38295100000 A		791.8	38.2	12-08-2011 10:51:39	0.000000000000	0.064000000000	1.610000000000	0.23785800000
L1048_04	L1048		1171713.072000000000	3181436.886000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.01614730000	0.27023000000 A		792.0	38.8	12-08-2011 10:54:29	-0.063000000000	0.068000000000	1.138000000000	0.23746000000
L1048_05	L1048		1171832.020000000000	3181727.633000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.01231720000	0.01208030000 A		791.8	39.5	12-08-2011 10:58:50	0.000000000000	0.052000000000	0.051000000000	0.23686900000
L1048_06	L1048		1171740.368000000000	3181838.116000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.00615694000	0.03315270000 A		792.6	39.9	12-08-2011 11:01:25	0.000000000000	0.026000000000	0.140000000000	0.23680500000
L1048_07	L1048		1171610.992000000000	3181791.214000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.00685859000	0.08348560000 A		792.6	40.3	12-08-2011 11:04:15	0.000000000000	0.029000000000	0.353000000000	0.23650300000
L1048_08	L1048		1171539.887000000000	3181767.593000000000	0.000000000000	0.000000000000	8/12/2011			0.99408400000	0.01321980000	4.46594000000 A		791.9	40.6	12-08-2011 11:07:15	4.211000000000	0.056000000000	18.918000000000	0.23606800000
L1048_09	L1048		1171509.606000000000	3181757.263000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.00660316000	1.00887000000 A		792.1	41.0	12-08-2011 11:10:54	-0.021000000000	0.028000000000	4.278000000000	0.23582700000
L1048_10	L1048		1171506.704000000000	3181710.086000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.01413610000	0.27094300000 A		792.1	41.3	12-08-2011 11:13:44	-0.073000000000	0.060000000000	1.150000000000	0.23560200000
L1048_11	L1048		1171562.524000000000	3181711.581000000000	0.000000000000	0.000000000000	8/12/2011			0.000000000000	0.00659101000	0.01506520000 A		791.9	41.5	12-08-2011 11:16:02	-0.066000000000	0.028000000000	0.064000000000	0.23539300000
L1048_12	L1048		1171610.356000000000	3181718.580000000000	0.000000000000															

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep05_07	5, 8, 9 & L1046		1172566.377000000000	3176355.186000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00095354900	0.408596000000	A	787.7	35.9	13-08-2011 08:29:09	0.000000000000	0.004000000000	1.714000000000	0.238387000000
Seep05_08	5, 8, 9 & L1046		1172563.675000000000	3176305.975000000000	0.000000000000	0.000000000000	8/13/2011			0.377695000000	0.000000000000	0.440128000000	A	787.9	36.1	13-08-2011 08:34:06	1.585000000000	0.000000000000	1.847000000000	0.238294000000
Seep05_09	5, 8, 9 & L1046		1172563.446000000000	3176257.970000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00071441900	0.605351000000	A	787.9	36.3	13-08-2011 08:37:22	0.000000000000	0.003000000000	2.542000000000	0.238140000000
Seep05_10	5, 8, 9 & L1046		1172562.226000000000	3176210.812000000000	0.000000000000	0.000000000000	8/13/2011			0.296873000000	0.00047575800	0.523095000000	A	787.8	36.6	13-08-2011 08:41:01	1.248000000000	0.002000000000	2.199000000000	0.237879000000
Seep05_11	5, 8, 9 & L1046		1172464.228000000000	3176209.573000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00023755800	0.093597900000	A	787.5	36.9	13-08-2011 08:44:00	-1.177000000000	0.001000000000	0.394000000000	0.237558000000
Seep05_12	5, 8, 9 & L1046		1172459.055000000000	3176159.226000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00023720800	0.391630000000	A	787.1	37.2	13-08-2011 08:46:38	0.000000000000	0.001000000000	1.651000000000	0.237208000000
Seep05_13	5, 8, 9 & L1046		1172516.693000000000	3176156.741000000000	0.000000000000	0.000000000000	8/13/2011			0.933998000000	0.00047435100	1.012030000000	A	787.5	37.4	13-08-2011 08:49:32	3.938000000000	0.002000000000	4.267000000000	0.237176000000
Seep05_14	5, 8, 9 & L1046		1172562.027000000000	3176156.937000000000	0.000000000000	0.000000000000	8/13/2011			0.268886000000	0.00047422700	0.919763000000	A	787.8	37.6	13-08-2011 08:53:12	1.134000000000	0.002000000000	3.879000000000	0.237113000000
Seep05_15	5, 8, 9 & L1046		1172607.217000000000	3176162.280000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00094808400	0.244606000000	A	788.0	37.8	13-08-2011 08:55:44	-1.025000000000	0.004000000000	1.032000000000	0.237021000000
Seep05_16	5, 8, 9 & L1046		1172611.309000000000	3176207.959000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000000000000	0.070390500000	A	788.2	37.9	13-08-2011 08:58:17	-0.508000000000	0.000000000000	0.297000000000	0.237005000000
Seep05_17	5, 8, 9 & L1046		1172612.283000000000	3176250.775000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00071037800	0.057303800000	A	788.0	38.1	13-08-2011 09:01:49	-0.308000000000	0.003000000000	0.242000000000	0.236793000000
Seep05_18	5, 8, 9 & L1046		1172611.251000000000	3176311.085000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00094674600	0.327101000000	A	787.9	38.2	13-08-2011 09:04:29	-0.408000000000	0.004000000000	1.382000000000	0.236686000000
Seep05_19	5, 8, 9 & L1046		1172609.292000000000	3176354.170000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00165669000	0.670251000000	A	788.1	38.3	13-08-2011 09:07:17	0.000000000000	0.007000000000	2.832000000000	0.236670000000
Seep05_20	5, 8, 9 & L1046		1172663.089000000000	3176315.821000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00047318900	0.195900000000	A	788.1	38.4	13-08-2011 09:10:11	0.000000000000	0.002000000000	0.828000000000	0.236595000000
Seep05_21	5, 8, 9 & L1046		1172770.802000000000	3176326.102000000000	0.000000000000	0.000000000000	8/13/2011			0.492037000000	0.00070932800	0.283731000000	A	788.1	38.6	13-08-2011 09:15:49	2.081000000000	0.003000000000	1.200000000000	0.236443000000
Seep05_22	5, 8, 9 & L1046		1172806.187000000000	3176362.093000000000	0.000000000000	0.000000000000	8/13/2011			0.328707000000	0.00023614000	0.459528000000	A	788.1	39.0	13-08-2011 09:21:08	1.392000000000	0.001000000000	1.946000000000	0.236140000000
Seep05_23	5, 8, 9 & L1046		1172850.393000000000	3176360.026000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00141548000	0.635078000000	A	788.1	39.3	13-08-2011 09:24:03	0.000000000000	0.006000000000	2.692000000000	0.235913000000
Seep05_24	5, 8, 9 & L1046		1172856.139000000000	3176408.638000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00141493000	0.281571000000	A	788.3	39.5	13-08-2011 09:26:56	-0.193000000000	0.006000000000	1.194000000000	0.235822000000
Seep05_25	5, 8, 9 & L1046		1172808.142000000000	3176407.485000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00164844000	0.899575000000	A	788.2	39.9	13-08-2011 09:29:53	0.000000000000	0.007000000000	3.820000000000	0.235491000000
Seep05_26	5, 8, 9 & L1046		1172758.220000000000	3176411.484000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00094022500	0.689655000000	A	787.5	40.2	13-08-2011 09:33:10	0.000000000000	0.004000000000	2.934000000000	0.235056000000
Seep05_27	5, 8, 9 & L1046		1172750.542000000000	3176358.555000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00164445000	0.218477000000	A	787.8	40.5	13-08-2011 09:35:56	0.000000000000	0.007000000000	0.930000000000	0.234921000000
Seep05_28	5, 8, 9 & L1046		1172707.033000000000	3176364.030000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00093878600	0.217798000000	A	787.8	40.8	13-08-2011 09:38:44	-1.098000000000	0.004000000000	0.928000000000	0.234696000000
Seep05_29	5, 8, 9 & L1046		1172704.090000000000	3176304.088000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00258002000	0.569949000000	A	787.8	41.0	13-08-2011 09:41:35	0.000000000000	0.011000000000	2.430000000000	0.234547000000
Seep05_30	5, 8, 9 & L1046		1172701.954000000000	3176260.796000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00140612000	0.084601500000	A	787.9	41.3	13-08-2011 09:44:19	-0.019000000000	0.006000000000	0.361000000000	0.234353000000
Seep05_31	5, 8, 9 & L1046		1172764.148000000000	3176257.285000000000	0.000000000000	0.000000000000	8/13/2011			0.665162000000	0.00046825900	0.211887000000	A	787.9	41.6	13-08-2011 09:46:54	2.841000000000	0.002000000000	0.905000000000	0.234130000000
Seep05_32	5, 8, 9 & L1046		1172803.843000000000	3176265.145000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00023390700	0.093562700000	A	787.9	41.9	13-08-2011 09:49:44	-0.060000000000	0.001000000000	0.400000000000	0.233907000000
Seep05_33	5, 8, 9 & L1046		1172798.777000000000	3176310.854000000000	0.000000000000	0.000000000000	8/13/2011			0.368987000000	0.00093473700	0.381606000000	A	787.9	42.2	13-08-2011 09:53:09	1.579000000000	0.004000000000	1.633000000000	0.233684000000
Seep05_34	5, 8, 9 & L1046		1172851.812000000000	3176310.524000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00186841000	0.174463000000	A	788.2	42.5	13-08-2011 09:55:57	0.000000000000	0.008000000000	0.747000000000	0.233551000000
Seep05_35	5, 8, 9 & L1046		1172852.816000000000	3176259.104000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00070092000	0.093456000000	A	789.0	42.7	13-08-2011 09:59:19	0.000000000000	0.003000000000	0.400000000000	0.233640000000
Seep05_36	5, 8, 9 & L1046		1172848.855000000000	3176208.808000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00093379200	0.175086000000	A	789.1	43.0	13-08-2011 10:01:58	0.000000000000	0.004000000000	0.750000000000	0.233448000000
Seep05_37	5, 8, 9 & L1046		1172802.306000000000	3176207.773000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00093267000	0.050597300000	A	788.9	43.3	13-08-2011 10:05:51	0.000000000000	0.004000000000	0.217000000000	0.233167000000
Seep05_38	5, 8, 9 & L1046		1172755.728000000000	3176216.266000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00093119300	0.148060000000	A	787.9	43.4	13-08-2011 10:08:37	0.000000000000	0.004000000000	0.636000000000	0.232798000000
Seep05_39	5, 8, 9 & L1046		1172706.612000000000	3176216.023000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.000232740000	0.383555000000	A	788.2	43.6	13-08-2011 10:12:06	-0.479000000000	0.010000000000	1.648000000000	0.232740000000
Seep05_40	5, 8, 9 & L1046		1172806.340000000000	3176468.239000000000	0.000000000000	0.000000000000	8/13/2011			1.548840000000	0.00162815000	1.339270000000	A	788.2	43.8	13-08-2011 10:16:31	6.659000000000	0.007000000000	5.758000000000	0.232593000000
Seep05_41	5, 8, 9 & L1046		1172851.770000000000	3176463.266000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00209241000	0.108340000000	A	788.1	43.9	13-08-2011 10:19:05	0.000000000000	0.009000000000	0.466000000000	0.232490000000
Seep05_42	5, 8, 9 & L1046		1172851.316000000000	3176514.574000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00209109000	0.105019000000	A	788.1	44.1	13-08-2011 10:22:47	0.000000000000	0.009000000000	0.452000000000	0.232344000000
Seep05_43	5, 8, 9 & L1046		1172808.789000000000	3176508.009000000000	0.000000000000	0.000000000000	8/13/2011			0.595309000000	0.00116135000	0.635956000000	A	788.1	44.2	13-08-2011 10:26:36	2.563000000000			

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep05_77	5, 8, 9 & L1046		1172142.195000000000	3175988.566000000000	0.000000000000	0.000000000000	8/13/2011			0.000000000000	0.00048188700	0.47971900000 A		786.1	32.0	13-08-2011 13:23:39	0.000000000000	0.002000000000	1.991000000000	0.240944000000
Seep05_78	5, 8, 9 & L1046		1172155.082000000000	3175920.525000000000	0.000000000000	0.000000000000				0.000000000000	0.000000000000	0.000000000000					0.000000000000	0.000000000000	0.000000000000	0.000000000000
Seep07_01	7		1173922.651000000000	3174914.199000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00216058000	0.70986900000 A		791.7	35.3	17-08-2011 12:37:37	-0.054000000000	0.009000000000	2.957000000000	0.240064000000
Seep07_02	7		1173849.827000000000	3174945.624000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00191730000	0.06710540000 A		791.4	35.7	17-08-2011 12:40:14	-0.017000000000	0.008000000000	0.280000000000	0.239662000000
Seep07_03	7		1173793.535000000000	3174944.887000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00143640000	0.00215459000 A		791.3	36.0	17-08-2011 12:42:41	-0.002000000000	0.006000000000	0.009000000000	0.239399000000
Seep07_04	7		1173708.795000000000	3174982.443000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00239077000	0.05092330000 A		791.0	36.3	17-08-2011 12:44:59	-0.579000000000	0.010000000000	0.213000000000	0.239077000000
Seep07_05	7		1173634.364000000000	3174754.042000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00382082000	0.18172800000 A		790.6	36.5	17-08-2011 12:47:57	-0.560000000000	0.016000000000	0.761000000000	0.238801000000
Seep07_06	7		1173690.929000000000	3174638.921000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00262313000	0.34863270000 A		790.0	36.7	17-08-2011 12:51:17	-0.509000000000	0.011000000000	1.462000000000	0.238466000000
Seep07_07	7		1173502.962000000000	3174695.908000000000	0.000000000000	0.000000000000	8/17/2011			0.00166755000	0.00452621000	0.20749100000 A		789.7	36.9	17-08-2011 12:54:07	0.007000000000	0.019000000000	0.871000000000	0.238222000000
Seep07_08	7		1173384.740000000000	3174790.856000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00452304000	0.08355710000 A		789.4	37.0	17-08-2011 12:56:30	-0.186000000000	0.019000000000	0.351000000000	0.238055000000
Seep07_09	7		1173413.788000000000	3174839.618000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00499684000	0.25745600000 A		789.8	37.3	17-08-2011 12:59:09	-0.174000000000	0.021000000000	1.082000000000	0.237945000000
Seep07_10	7		1173713.275000000000	3174727.577000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00166326000	0.00000000000 A		789.7	37.7	17-08-2011 13:03:59	-0.479000000000	0.000000000000	-0.097000000000	0.237609000000
Seep07_11	7		1173795.106000000000	3174763.712000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00380144000	0.04941870000 A		790.4	38.0	17-08-2011 13:06:18	-0.035000000000	0.016000000000	0.208000000000	0.237590000000
Seep07_12	7		1173867.922000000000	3175049.867000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00805836000	0.09693740000 A		790.5	38.8	17-08-2011 13:12:31	-0.079000000000	0.034000000000	0.409000000000	0.237011000000
Seep07_13	7		1173805.224000000000	3175125.320000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00995873000	0.17190700000 A		791.6	39.1	17-08-2011 13:15:01	-0.227000000000	0.042000000000	0.725000000000	0.237113000000
Seep07_14	7		1173739.921000000000	3175227.391000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00639589000	0.03932290000 A		791.6	39.4	17-08-2011 13:17:32	0.000000000000	0.027000000000	0.166000000000	0.236865000000
Seep07_15	7		1174092.017000000000	3175028.723000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00023604000	0.01439840000 A		791.3	40.4	17-08-2011 13:26:32	-2.297000000000	0.001000000000	0.061000000000	0.236040000000
Seep07_16	7		1174140.026000000000	3174958.474000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.000000000000 A		791.3	40.8	17-08-2011 13:29:10	-0.015000000000	-0.003000000000	-0.113000000000	0.235739000000
Seep07_17	7		1174113.437000000000	3175100.304000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.000000000000 A		792.1	41.1	17-08-2011 13:31:22	0.000000000000	0.000000000000	-0.014000000000	0.235752000000
Seep07_18	7		1174004.282000000000	3175198.301000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.01743240000 A		792.0	41.3	17-08-2011 13:32:43	-0.026000000000	-0.001000000000	0.074000000000	0.235573000000
Seep07_19	7		1173833.694000000000	3175276.947000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00070631100	0.000000000000 A		792.3	41.6	17-08-2011 13:36:26	-0.168000000000	0.003000000000	-0.009000000000	0.235437000000
Seep07_20	7		1173804.186000000000	3175358.871000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00047007000	0.000000000000 A		791.7	41.9	17-08-2011 13:39:14	-0.081000000000	0.002000000000	-0.027000000000	0.235035000000
Seep07_21	7		1173754.399000000000	3175362.774000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00047054300	0.000000000000 A		793.0	42.1	17-08-2011 13:41:34	-0.122000000000	0.002000000000	-0.650000000000	0.235271000000
Seep07_22	7		1173742.691000000000	3175468.525000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.000000000000 A		791.6	42.4	17-08-2011 13:43:58	-0.129000000000	-0.001000000000	-0.014000000000	0.234633000000
Seep07_23	7		1173676.712000000000	3175500.887000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00046959100	0.000000000000 A		792.4	42.5	17-08-2011 13:46:15	-0.251000000000	0.002000000000	-0.242000000000	0.234796000000
Seep07_24	7		1173630.427000000000	3175382.553000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.01007710000 A		791.4	42.7	17-08-2011 13:49:09	-0.342000000000	-0.001000000000	0.043000000000	0.234351000000
Seep07_25	7		1173573.198000000000	3175353.131000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00070229600	0.000000000000 A		791.3	43.0	17-08-2011 13:53:48	-1.007000000000	0.003000000000	-0.380000000000	0.234099000000
Seep07_26	7		1173539.493000000000	3175294.748000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00163662000	0.07621980000 A		790.8	43.2	17-08-2011 13:59:36	0.000000000000	0.007000000000	0.326000000000	0.233803000000
Seep07_27	7		1173487.678000000000	3175260.998000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00163517000	0.06821000000 A		790.1	43.2	17-08-2011 14:01:56	-0.018000000000	0.007000000000	0.292000000000	0.233596000000
Seep07_28	7		1173424.552000000000	3175312.956000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00280386000	0.08061100000 A		790.3	43.2	17-08-2011 14:04:14	0.000000000000	0.012000000000	0.345000000000	0.233655000000
Seep07_29	7		1173452.016000000000	3175150.269000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00140158000	0.03620740000 A		790.1	43.2	17-08-2011 14:07:09	-0.015000000000	0.006000000000	0.155000000000	0.233596000000
Seep07_30	7		1173456.143000000000	3174970.600000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00864250000	0.11258600000 A		789.8	43.1	17-08-2011 14:09:30	-0.023000000000	0.037000000000	0.482000000000	0.233581000000
Seep07_31	7		1173572.198000000000	3175006.785000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00210396000	0.05820960000 A		790.2	43.0	17-08-2011 14:12:17	-0.017000000000	0.009000000000	0.249000000000	0.233773000000
Seep07_32	7		1173764.474000000000	3175182.461000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00514334000	0.10590600000 A		790.0	42.9	17-08-2011 14:15:53	0.000000000000	0.022000000000	0.453000000000	0.233788000000
Seep08_01	5, 8, 9 & L1046		1173378.535000000000	3176004.233000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00047867800	0.51840800000 A		791.1	36.0	17-08-2011 14:50:33	0.000000000000	0.002000000000	2.166000000000	0.239339000000
Seep08_02	5, 8, 9 & L1046		1173343.226000000000	3175961.915000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00119584000	0.00191334000 A		791.3	36.3	17-08-2011 14:53:27	0.000000000000	0.005000000000	0.008000000000	0.239167000000
Seep08_03	5, 8, 9 & L1046		1173337.621000000000	3175895.920000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00119384000	0.21918900000 A		791.0	36.7	17-08-2011 14:56:26	0.000000000000	0.005000000000	0.918000000000	0.238768000000
Seep08_04	5, 8, 9 & L1046		1173292.345000000000	3175876.473000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	1.94778000000 A		790.4	37.2	17-08-2011 15:01:46	0.000000000000	-0.001000000000	8.177000000000	0.238202000000
Seep08_05	5, 8, 9 & L1046		1173213.638000000000	3175898.809000000000	0.000000000000	0.000000000000														

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep09_11	5, 8, 9 & L1046		1172859.507000000000	3175860.921000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.00487123000	0.52122200000 A		793.6	31.6	18-08-2011 08:30:48	-0.009000000000	0.020000000000	2.140000000000	0.24356200000
Seep09_12	5, 8, 9 & L1046		1172965.427000000000	3175931.150000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.00121440000	0.05319080000 A		791.9	31.8	18-08-2011 08:33:29	-0.079000000000	0.005000000000	0.219000000000	0.24288100000
Seep09_13	5, 8, 9 & L1046		1173030.471000000000	3176012.074000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.00267007000	0.04199290000 A		792.2	32.1	18-08-2011 08:36:10	-0.007000000000	0.011000000000	0.173000000000	0.24273400000
Seep09_14	5, 8, 9 & L1046		1173092.762000000000	3176203.496000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.00242710000	0.24440900000 A		792.9	32.4	18-08-2011 08:39:04	-0.180000000000	0.010000000000	1.007000000000	0.24271000000
Seep11_01	11		1146305.938000000000	3166956.135000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000000000000	0.23242600000 A		782.8	17.6	16-08-2011 06:06:59	0.000000000000	-0.001000000000	0.923000000000	0.25181500000
Seep11_02	11		1146331.394000000000	3166924.856000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000000000000	0.21805800000 A		781.8	20.6	16-08-2011 06:19:39	0.000000000000	-0.005000000000	0.876000000000	0.24892500000
Seep11_03	11		1146303.933000000000	3166898.314000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000000000000	0.13563600000 A		781.8	21.2	16-08-2011 06:22:41	0.000000000000	0.000000000000	0.546000000000	0.24841800000
Seep11_04	11		1146195.334000000000	3166982.966000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000000000000	0.000000000000 A		782.1	22.5	16-08-2011 06:29:49	-0.153000000000	-0.001000000000	-0.115000000000	0.24742000000
Seep11_05	11		1146065.189000000000	3166990.036000000000	0.000000000000	0.000000000000	8/16/2011			0.03898830000	0.00024676100	0.03281930000 A		781.6	23.1	16-08-2011 06:33:58	0.158000000000	0.001000000000	0.133000000000	0.24676100000
Seep11_06	11		1146062.431000000000	3167036.920000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00024618000	0.01378610000 A		781.6	23.8	16-08-2011 06:36:46	-0.009000000000	0.001000000000	0.056000000000	0.24618000000
Seep11_07	11		1146110.529000000000	3167039.621000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00024588000	0.05655240000 A		781.7	24.2	16-08-2011 06:39:21	0.000000000000	0.001000000000	0.230000000000	0.24588000000
Seep11_08	11		1146111.491000000000	3166991.645000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00049126400	0.12306200000 A		781.7	24.5	16-08-2011 06:41:58	-0.067000000000	0.002000000000	0.501000000000	0.24563200000
Seep11_09	11		1146110.593000000000	3166940.307000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00024538500	0.15876400000 A		781.7	24.8	16-08-2011 06:44:26	-0.223000000000	0.001000000000	0.647000000000	0.24538500000
Seep11_10	11		1146058.026000000000	3166941.855000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00073467500	0.39158200000 A		781.7	25.4	16-08-2011 06:48:19	0.000000000000	0.003000000000	1.599000000000	0.24489200000
Seep11_11	11		1146012.086000000000	3166935.273000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00024422500	0.00195380000 A		781.4	26.1	16-08-2011 06:53:08	-0.002000000000	0.001000000000	0.008000000000	0.24422500000
Seep11_12	11		1146007.009000000000	3166989.339000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00024380500	0.000000000000 A		781.1	26.5	16-08-2011 06:56:00	0.000000000000	0.000000000000	-0.010000000000	0.24380500000
Seep11_13	11		1145962.420000000000	3166930.471000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00073016100	0.00876193000 A		780.8	26.9	16-08-2011 06:58:28	0.000000000000	0.003000000000	0.036000000000	0.24338700000
Seep11_14	11		1145930.218000000000	3166885.626000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00048616300	0.19738200000 A		780.6	27.2	16-08-2011 07:01:26	0.000000000000	0.002000000000	0.812000000000	0.24308200000
Seep11_15	11		1145931.579000000000	3166851.537000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00048530500	0.03494190000 A		780.0	27.5	16-08-2011 07:03:52	-0.036000000000	0.002000000000	0.144000000000	0.24265200000
Seep11_16	11		1145864.465000000000	3166822.008000000000	0.000000000000	0.000000000000	8/16/2011			0.14425900000	0.000000000000	0.02048090000 A		779.6	28.1	16-08-2011 07:07:46	0.596000000000	0.000000000000	0.020000000000	0.24204500000
Seep11_17	11		1145856.442000000000	3166863.724000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00120791000	0.00579796000 A		779.4	28.6	16-08-2011 07:10:25	-0.017000000000	0.005000000000	0.024000000000	0.24158200000
Seep11_18	11		1145904.428000000000	3166864.605000000000	0.000000000000	0.000000000000	8/16/2011			0.09915130000	0.00120622000	0.01881700000 A		779.6	29.1	16-08-2011 07:13:21	0.411000000000	0.005000000000	0.078000000000	0.24124400000
Seep11_19	11		1145901.415000000000	3166809.341000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00072163700	0.05364160000 A		779.4	29.9	16-08-2011 07:16:59	0.000000000000	0.003000000000	0.223000000000	0.24054500000
Seep11_20	11		1145896.422000000000	3166768.229000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00048048300	0.07327370000 A		779.7	30.4	16-08-2011 07:19:55	0.000000000000	0.002000000000	0.305000000000	0.24024200000
Seep11_21	11		1145849.011000000000	3166764.496000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00047993900	0.02855640000 A		780.1	30.9	16-08-2011 07:22:39	0.000000000000	0.002000000000	0.119000000000	0.23997000000
Seep11_22	11		1145805.210000000000	3166765.821000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00095744300	0.10699400000 A		779.4	31.4	16-08-2011 07:25:15	0.000000000000	0.004000000000	0.447000000000	0.23936100000
Seep11_23	11		1145747.463000000000	3166773.406000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00095557400	0.14429200000 A		778.9	31.8	16-08-2011 07:27:52	0.000000000000	0.004000000000	0.604000000000	0.23889300000
Seep11_24	11		1145820.777000000000	3166805.410000000000	0.000000000000	0.000000000000	8/16/2011			0.04532130000	0.00023853300	0.03577990000 A		779.0	32.3	16-08-2011 07:31:47	0.190000000000	0.001000000000	0.150000000000	0.23853300000
Seep11_25	11		1145761.282000000000	3166813.367000000000	0.000000000000	0.000000000000	8/16/2011			0.06692210000	0.00047631400	0.10121700000 A		779.3	32.9	16-08-2011 07:35:53	0.281000000000	0.002000000000	0.425000000000	0.23815700000
Seep11_26	11		1145702.211000000000	3166762.271000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00023750600	0.05153870000 A		779.2	33.7	16-08-2011 07:40:33	0.000000000000	0.001000000000	0.217000000000	0.23750600000
Seep11_27	11		1145710.310000000000	3166813.569000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00165941000	0.03223990000 A		779.0	34.2	16-08-2011 07:43:14	0.000000000000	0.007000000000	0.136000000000	0.23705800000
Seep11_28	11		1145708.941000000000	3166857.082000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00213115000	0.18659400000 A		779.4	34.7	16-08-2011 07:46:02	0.000000000000	0.009000000000	0.788000000000	0.23679500000
Seep11_29	11		1145755.878000000000	3166860.882000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00142002000	0.03218710000 A		780.0	35.1	16-08-2011 07:48:23	-0.007000000000	0.006000000000	0.136000000000	0.23667000000
Seep11_30	11		1145805.132000000000	3166861.295000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00141800000	0.04348520000 A		779.9	35.5	16-08-2011 07:51:00	-0.174000000000	0.006000000000	0.184000000000	0.23633300000
Seep11_31	11		1145858.155000000000	3166910.882000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00188505000	0.04665490000 A		779.6	36.3	16-08-2011 07:56:23	-0.054000000000	0.008000000000	0.198000000000	0.23563100000
Seep11_32	11		1145905.876000000000	3166914.314000000000	0.000000000000	0.000000000000	8/16/2011			0.07582850000	0.00141295000	0.13682100000 A		780.4	36.8	16-08-2011 08:00:08	0.322000000000	0.006000000000	0.581000000000	0.23549200000
Seep11_33	11		1145852.243000000000	3166952.716000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00187933000	0.10782700000 A		780.5	37.6	16-08-2011 08:04:15	0.000000000000	0.008000000000	0.459000000000	0.23491600000
Seep11_34	11		1145901.761000000000	3166963.206000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.00234839000	0.10215500000 A		781.5	38.1	16-08-2011 08:07:40	0.000000000000	0.010000000000	0.435000000000	0.23483900000
Seep11_35	11		1145960.127000000000	3166963.674000000000	0.000000000000	0.000000000000	8/16/2011													

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep13_20	13 & L1026		1174654.341000000000	3164264.799000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001199280000	0.175094000000	A	784.6	32.8	14-08-2011 07:59:04	0.000000000000	0.005000000000	0.730000000000	0.239855000000
Seep13_21	13 & L1026		1174611.184000000000	3164258.730000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001197400000	0.118783000000	A	784.4	33.2	14-08-2011 08:02:02	-0.006000000000	0.005000000000	0.496000000000	0.239481000000
Seep13_22	13 & L1026		1174608.085000000000	3164212.115000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002150720000	0.093914700000	A	784.0	33.7	14-08-2011 08:06:50	-0.173000000000	0.009000000000	0.393000000000	0.238969000000
Seep13_23	13 & L1026		1174504.620000000000	3164211.166000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000238550000	0.011211800000	A	783.9	34.2	14-08-2011 08:11:04	-0.045000000000	0.001000000000	0.047000000000	0.238550000000
Seep13_24	13 & L1026		1174478.676000000000	3164283.257000000000	0.000000000000	0.000000000000	8/14/2011			0.118541000000	0.000954052000	0.064637000000	A	784.8	34.6	14-08-2011 08:14:31	0.497000000000	0.004000000000	0.271000000000	0.238513000000
Seep13_25	13 & L1026		1174480.158000000000	3164235.638000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001906110000	0.082915900000	A	785.0	35.0	14-08-2011 08:17:28	0.000000000000	0.008000000000	0.348000000000	0.238264000000
Seep13_26	13 & L1026		1174425.035000000000	3164235.318000000000	0.000000000000	0.000000000000	8/14/2011			0.095182100000	0.001427730000	0.177991000000	A	785.0	35.4	14-08-2011 08:20:17	0.400000000000	0.006000000000	0.748000000000	0.237955000000
Seep13_27	13 & L1026		1174428.262000000000	3164180.883000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001662570000	0.010212900000	A	784.8	35.9	14-08-2011 08:23:25	0.000000000000	0.007000000000	0.043000000000	0.237510000000
Seep13_28	13 & L1026		1174373.097000000000	3164186.902000000000	0.000000000000	0.000000000000	8/14/2011			0.108116000000	0.000711288000	0.043625600000	A	784.7	36.4	14-08-2011 08:26:42	0.456000000000	0.003000000000	0.184000000000	0.237096000000
Seep13_29	13 & L1026		1174432.452000000000	3164129.273000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.003783780000	0.022229700000	A	784.2	37.0	14-08-2011 08:29:33	-0.039000000000	0.016000000000	0.094000000000	0.236486000000
Seep13_30	13 & L1026		1174375.287000000000	3164140.947000000000	0.000000000000	0.000000000000	8/14/2011			0.077753400000	0.000708997000	0.024342200000	A	784.7	37.4	14-08-2011 08:32:51	0.329000000000	0.003000000000	0.103000000000	0.236332000000
Seep13_31	13 & L1026		1174434.706000000000	3164081.202000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000707767000	0.008917870000	A	784.6	37.9	14-08-2011 08:35:31	-0.025000000000	0.003000000000	0.378000000000	0.235922000000
Seep13_32	13 & L1026		1174389.545000000000	3164083.255000000000	0.000000000000	0.000000000000	8/14/2011			0.193221000000	0.001649450000	0.110277000000	A	784.4	38.2	14-08-2011 08:38:07	0.820000000000	0.007000000000	0.468000000000	0.235635000000
Seep13_33	13 & L1026		1174435.655000000000	3164036.448000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002118530000	0.110870000000	A	784.6	38.6	14-08-2011 08:41:52	-0.116000000000	0.009000000000	0.471000000000	0.235393000000
Seep13_34	13 & L1026		1174380.006000000000	3164036.302000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002115010000	0.039950200000	A	784.3	39.0	14-08-2011 08:44:21	0.000000000000	0.009000000000	0.170000000000	0.235001000000
Seep13_35	13 & L1026		1174330.825000000000	3164034.675000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000939102000	0.009391230000	A	784.3	39.3	14-08-2011 08:46:46	0.000000000000	0.004000000000	0.101000000000	0.234776000000
Seep13_36	13 & L1026		1174333.670000000000	3164085.633000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000702752000	0.267983000000	A	784.3	40.0	14-08-2011 08:52:26	0.000000000000	0.003000000000	1.144000000000	0.234251000000
Seep13_37	13 & L1026		1174331.484000000000	3164130.320000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001639750000	0.029984100000	A	784.3	40.0	14-08-2011 08:52:57	0.000000000000	0.007000000000	0.128000000000	0.234251000000
Seep13_38	13 & L1026		1174333.672000000000	3164183.555000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000701856000	0.179207000000	A	784.3	40.4	14-08-2011 08:56:41	-0.002000000000	0.003000000000	0.766000000000	0.233952000000
Seep13_39	13 & L1026		1174331.384000000000	3164230.012000000000	0.000000000000	0.000000000000	8/14/2011			0.157849000000	0.000934019000	0.120722000000	A	783.8	40.8	14-08-2011 09:01:13	0.676000000000	0.004000000000	0.517000000000	0.233505000000
Seep13_40	13 & L1026		1174273.264000000000	3164177.211000000000	0.000000000000	0.000000000000	8/14/2011			0.000466534000	0.001632870000	0.125498000000	A	783.5	41.0	14-08-2011 09:04:37	0.002000000000	0.007000000000	0.538000000000	0.233267000000
Seep13_41	13 & L1026		1174282.193000000000	3164230.656000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002563480000	0.017245200000	A	783.0	41.1	14-08-2011 09:07:25	-0.012000000000	0.011000000000	0.074000000000	0.233044000000
Seep13_42	13 & L1026		1174279.953000000000	3164290.484000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002795810000	0.000000000000	A	782.8	41.1	14-08-2011 09:10:12	-0.147000000000	0.012000000000	-0.874000000000	0.232984000000
Seep13_43	13 & L1026		1174320.843000000000	3164277.063000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002562670000	0.156556000000	A	783.0	41.2	14-08-2011 09:12:36	-0.036000000000	0.011000000000	0.672000000000	0.232970000000
Seep13_44	13 & L1026		1174372.418000000000	3164233.837000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002096730000	0.051486300000	A	783.0	41.2	14-08-2011 09:15:43	0.000000000000	0.009000000000	0.221000000000	0.232970000000
Seep13_45	13 & L1026		1174376.382000000000	3164281.554000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001865900000	0.070437700000	A	783.9	41.2	14-08-2011 09:18:11	0.000000000000	0.008000000000	0.302000000000	0.233237000000
Seep13_46	13 & L1026		1174425.526000000000	3164278.625000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002800280000	0.087042000000	A	784.3	41.2	14-08-2011 09:20:42	0.000000000000	0.012000000000	0.373000000000	0.233356000000
Seep13_47	13 & L1026		1174424.995000000000	3164329.071000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000933010000	0.020759500000	A	784.2	41.3	14-08-2011 09:23:37	-0.256000000000	0.004000000000	0.089000000000	0.233253000000
Seep13_48	13 & L1026		1174438.269000000000	3164389.952000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002333710000	0.052508600000	A	784.6	41.3	14-08-2011 09:26:36	-0.675000000000	0.010000000000	0.225000000000	0.233371000000
Seep13_49	13 & L1026		1174480.927000000000	3164386.699000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002332970000	0.055058200000	A	784.6	41.4	14-08-2011 09:29:13	-0.046000000000	0.010000000000	0.236000000000	0.233297000000
Seep13_50	13 & L1026		1174490.972000000000	3164483.830000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001865790000	0.089790900000	A	784.6	41.5	14-08-2011 09:32:28	-0.086000000000	0.008000000000	0.385000000000	0.233223000000
Seep13_51	13 & L1026		1174485.163000000000	3164529.762000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001398540000	0.042888500000	A	784.4	41.6	14-08-2011 09:34:56	-0.151000000000	0.006000000000	0.184000000000	0.233090000000
Seep13_52	13 & L1026		1174533.053000000000	3164536.471000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.003962280000	0.222120000000	A	784.6	41.7	14-08-2011 09:37:17	-0.036000000000	0.017000000000	0.953000000000	0.233075000000
Seep13_53	13 & L1026		1174533.710000000000	3164490.179000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.003030360000	0.304435000000	A	784.7	41.7	14-08-2011 09:39:28	-0.020000000000	0.013000000000	1.306000000000	0.233105000000
Seep13_54	13 & L1026		1174579.026000000000	3164538.827000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001398010000	0.104151000000	A	784.6	41.8	14-08-2011 09:41:51	-0.155000000000	0.006000000000	0.447000000000	0.233001000000
Seep13_55	13 & L1026		1174643.789000000000	3164525.513000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000698825000	0.023993000000	A	784.4	41.8	14-08-2011 09:44:10	-0.407000000000	0.003000000000	0.103000000000	0.232942000000
Seep13_56	13 & L1026		1174640.991000000000	3164480.864000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000465824000	0.023058300000	A	784.3	41.8	14-08-2011 09:48:54	-0.212000000000	0.002000000000	0.099000000000	0.232912000000
Seep14_01	14		1169118.861000000000	3156564.524000000000	0.000000000000</															

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep14_34	14		1169000.901000000000	3156451.688000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001633660000	0.102920000000	A	772.4	36.4	14-08-2011 13:16:18	-1.249000000000	0.007000000000	0.441000000000	0.233379000000
Seep14_35	14		1169052.370000000000	3156455.755000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001631230000	0.271017000000	A	772.0	36.7	14-08-2011 13:18:50	0.000000000000	0.007000000000	1.163000000000	0.233033000000
Seep14_36	14		1169053.041000000000	3156410.462000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001861490000	0.181496000000	A	771.6	37.0	14-08-2011 13:21:26	-0.097000000000	0.008000000000	0.780000000000	0.232687000000
Seep14_37	14		1169002.195000000000	3156412.588000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001162680000	0.134174000000	A	771.6	37.2	14-08-2011 13:23:47	-1.540000000000	0.005000000000	0.577000000000	0.232537000000
Seep14_38	14		1169005.458000000000	3156358.716000000000	0.000000000000	0.000000000000	8/14/2011			0.069269300000	0.002789370000	0.190374000000	A	771.8	37.4	14-08-2011 13:26:36	0.298000000000	0.012000000000	0.819000000000	0.232447000000
Seep14_39	14		1168951.881000000000	3156354.194000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000464354000	0.094263900000	A	771.4	37.6	14-08-2011 13:30:43	-0.849000000000	0.002000000000	0.406000000000	0.232177000000
Seep14_40	14		1168960.836000000000	3156402.348000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002088250000	0.066592000000	A	771.4	37.8	14-08-2011 13:33:29	-1.051000000000	0.009000000000	0.287000000000	0.232028000000
Seep14_41	14		1168958.733000000000	3156450.760000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001393160000	0.201686900000	A	772.2	37.9	14-08-2011 13:35:40	-0.000000000000	0.006000000000	0.934000000000	0.232194000000
Seep14_42	14		1168896.348000000000	3156449.155000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.000232165000	0.199430000000	A	772.6	38.1	14-08-2011 13:37:39	0.000000000000	0.001000000000	0.859000000000	0.232165000000
Seep14_43	14		1168907.985000000000	3156396.212000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001392000000	0.132240000000	A	772.3	38.2	14-08-2011 13:40:35	-0.113000000000	0.006000000000	0.570000000000	0.232000000000
Seep14_44	14		1168896.809000000000	3156353.677000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002317150000	0.144127000000	A	771.6	38.3	14-08-2011 13:42:47	0.000000000000	0.010000000000	0.622000000000	0.231715000000
Seep14_45	14		1168778.493000000000	3156374.154000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001157680000	0.897899000000	A	771.5	38.5	14-08-2011 13:46:08	-1.022000000000	0.005000000000	3.878000000000	0.231537000000
Seep14_46	14		1168696.243000000000	3156316.195000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002780070000	0.092205700000	A	772.2	38.6	14-08-2011 13:48:29	-0.339000000000	0.012000000000	0.398000000000	0.231672000000
Seep14_47	14		1168607.302000000000	3156424.539000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.002548080000	0.182072000000	A	772.6	38.8	14-08-2011 13:51:00	-0.456000000000	0.011000000000	0.786000000000	0.231644000000
Seep14_48	14		1168739.177000000000	3156502.532000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.003009830000	0.091684100000	A	772.7	39.0	14-08-2011 13:53:12	-0.804000000000	0.013000000000	0.396000000000	0.231525000000
Seep14_49	14		1169018.333000000000	3156585.009000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001851260000	0.201222000000	A	772.8	39.2	14-08-2011 13:57:29	-2.099000000000	0.008000000000	2.167000000000	0.231407000000
Seep14_50	14		1169040.590000000000	3156649.080000000000	0.000000000000	0.000000000000	8/14/2011			0.000000000000	0.001388540000	0.611419000000	A	773.1	39.3	14-08-2011 13:59:57	0.000000000000	0.006000000000	2.642000000000	0.231423000000
Seep15_01	15		1146501.735000000000	3161363.229000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000705843000	0.130816000000	A	779.7	36.8	16-08-2011 09:21:39	0.000000000000	0.003000000000	0.556000000000	0.235281000000
Seep15_02	15		1146509.389000000000	3161310.783000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001879700000	0.235432000000	A	779.9	37.3	16-08-2011 09:24:07	0.000000000000	0.008000000000	1.002000000000	0.234962000000
Seep15_03	15		1146504.237000000000	3161260.254000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001641670000	0.201222000000	A	779.7	37.8	16-08-2011 09:27:33	-0.647000000000	0.007000000000	0.858000000000	0.234524000000
Seep15_04	15		1146501.433000000000	3161208.112000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000467995000	0.102959000000	A	779.7	38.5	16-08-2011 09:30:25	-0.808000000000	0.002000000000	0.440000000000	0.233998000000
Seep15_05	15		1146507.554000000000	3161159.999000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000700779000	0.151602000000	A	779.6	39.0	16-08-2011 09:32:48	0.000000000000	0.003000000000	0.649000000000	0.233593000000
Seep15_06	15		1146455.176000000000	3161015.755000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001166100000	0.152292000000	A	779.6	39.5	16-08-2011 09:35:52	-0.738000000000	0.005000000000	0.653000000000	0.233219000000
Seep15_07	15		1146563.088000000000	3161010.289000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.002094140000	0.420922000000	A	778.8	39.9	16-08-2011 09:39:23	-0.150000000000	0.009000000000	1.809000000000	0.232682000000
Seep15_08	15		1146565.934000000000	3161110.010000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001859080000	0.079940600000	A	778.8	40.3	16-08-2011 09:42:45	-1.003000000000	0.008000000000	0.344000000000	0.232385000000
Seep15_09	15		1146560.086000000000	3161170.586000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000696890000	0.074799600000	A	779.0	40.5	16-08-2011 09:45:25	-0.509000000000	0.003000000000	0.322000000000	0.232297000000
Seep15_10	15		1146568.926000000000	3161222.500000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000464298000	0.025536400000	A	779.0	40.7	16-08-2011 09:48:14	-0.511000000000	0.002000000000	0.110000000000	0.232149000000
Seep15_11	15		1146568.995000000000	3161276.658000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000696003000	0.092336400000	A	779.0	40.9	16-08-2011 09:51:25	-0.481000000000	0.003000000000	0.398000000000	0.232001000000
Seep15_12	15		1146562.414000000000	3161318.099000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000696049000	0.083061900000	A	779.3	41.0	16-08-2011 09:53:57	0.000000000000	0.003000000000	0.358000000000	0.232016000000
Seep15_13	15		1146558.602000000000	3161368.325000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000928128000	0.115552000000	A	779.6	41.1	16-08-2011 09:56:56	-2.011000000000	0.004000000000	0.498000000000	0.232032000000
Seep15_14	15		1146542.002000000000	3161608.855000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001390950000	0.055406100000	A	779.4	41.3	16-08-2011 10:00:15	-1.040000000000	0.006000000000	0.239000000000	0.231825000000
Seep15_15	15		1146454.372000000000	3161577.588000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001159200000	0.034080500000	A	779.7	41.4	16-08-2011 10:03:42	0.000000000000	0.005000000000	0.147000000000	0.231840000000
Seep15_16	15		1146401.883000000000	3161677.823000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.002549280000	0.035689900000	A	779.9	41.6	16-08-2011 10:08:01	-0.987000000000	0.011000000000	0.154000000000	0.231752000000
Seep15_17	15		1146308.826000000000	3161619.718000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000000000000	0.094073700000	A	780.0	41.7	16-08-2011 10:11:15	-0.873000000000	-0.004000000000	0.406000000000	0.231709000000
Seep15_18	15		1146269.769000000000	3161476.773000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001158690000	0.060251900000	A	780.1	41.7	16-08-2011 10:13:45	-1.031000000000	0.005000000000	0.260000000000	0.231738000000
Seep15_19	15		1146302.529000000000	3161303.938000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001622070000	0.373771000000	A	780.3	41.8	16-08-2011 10:17:02	-1.113000000000	0.007000000000	1.613000000000	0.231724000000
Seep15_20	15		1146267.673000000000	3161113.227000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.000925952000	0.127318000000	A	780.0	42.0	16-08-2011 10:20:08	-0.449000000000	0.004000000000	0.550000000000	0.231488000000
Seep15_21	15		1146308.666000000000	3161023.813000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001157220000	0.155993000000	A	780.1	42.1	16-08-2011 10:22:43	0.000000000000	0.005000000000	0.674000000000	0.231444000000
Seep15_22	15		1146405.313000000000	3161192.9690000000																

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep17_31	17		1144915.681000000000	3159117.928000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00092562100	0.120099000000	A	777.0	40.9	17-08-2011 10:56:07	0.000000000000	0.004000000000	0.519000000000	0.231405000000
Seep17_32	17		1144803.357000000000	3159132.117000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.001388070000	0.055985700000	A	776.8	40.9	17-08-2011 10:59:01	-0.793000000000	0.006000000000	0.242000000000	0.231346000000
Seep17_33	17		1144872.989000000000	3159215.527000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00092473100	0.828097000000	A	776.5	41.0	17-08-2011 11:01:45	-0.404000000000	0.004000000000	3.582000000000	0.231183000000
Seep17_34	17		1144941.577000000000	3159185.218000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.001155990000	0.234435000000	A	776.8	41.1	17-08-2011 11:04:23	0.000000000000	0.005000000000	1.014000000000	0.231199000000
Seep17_35	17		1144983.384000000000	3159124.873000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000925095000	0.676244000000	A	777.3	41.2	17-08-2011 11:06:48	0.000000000000	0.004000000000	2.924000000000	0.231274000000
Seep17_36	17		1145019.148000000000	3159182.246000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00161882000	0.348740000000	A	777.5	41.3	17-08-2011 11:09:30	-0.629000000000	0.007000000000	1.508000000000	0.231260000000
Seep17_37	17		1145048.446000000000	3159241.899000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00184938000	1.188220000000	A	777.7	41.5	17-08-2011 11:12:13	-1.448000000000	0.008000000000	5.140000000000	0.231172000000
Seep17_38	17		1145054.155000000000	3159308.950000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00138490000	0.086094900000	A	777.0	41.7	17-08-2011 11:14:34	0.000000000000	0.006000000000	0.373000000000	0.230817000000
Seep18_01	18		1144414.306000000000	3158725.745000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.047123500000	A	776.9	15.2	17-08-2011 06:17:19	0.000000000000	-0.001000000000	0.187000000000	0.251998000000
Seep18_02	18		1144362.908000000000	3158612.846000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.170304000000	A	775.8	17.0	17-08-2011 06:24:14	0.000000000000	-0.002000000000	0.681000000000	0.250080000000
Seep18_03	18		1144389.007000000000	3158510.702000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000224996000	36.192200000000	A	777.3	17.7	17-08-2011 06:26:52	0.000000000000	0.001000000000	144.792000000000	0.249960000000
Seep18_04	18		1144471.546000000000	3158481.832000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.080104500000	A	775.2	18.3	17-08-2011 06:29:32	0.000000000000	0.000000000000	0.322000000000	0.248772000000
Seep18_05	18		1144592.378000000000	3158418.598000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.034282100000	A	775.7	18.9	17-08-2011 06:32:02	-0.026000000000	0.000000000000	0.138000000000	0.248421000000
Seep18_06	18		1144596.075000000000	3158317.970000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00024784700	0.077576200000	A	775.5	19.5	17-08-2011 06:34:56	0.000000000000	0.001000000000	0.313000000000	0.247847000000
Seep18_07	18		1144543.383000000000	3158292.226000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00049440700	0.070205800000	A	775.6	20.3	17-08-2011 06:38:38	0.000000000000	0.002000000000	0.284000000000	0.247204000000
Seep18_08	18		1144494.619000000000	3158293.293000000000	0.000000000000	0.000000000000	8/17/2011			0.027613800000	0.000000000000	0.034763800000	A	775.4	21.0	17-08-2011 06:42:17	0.112000000000	0.000000000000	0.141000000000	0.246552000000
Seep18_09	18		1144543.500000000000	3158246.018000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00073749400	0.056541200000	A	775.5	21.9	17-08-2011 06:45:28	-0.516000000000	0.003000000000	0.230000000000	0.245831000000
Seep18_10	18		1144498.931000000000	3158243.161000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00024523800	0.051745100000	A	775.2	22.5	17-08-2011 06:48:21	-0.029000000000	0.001000000000	0.211000000000	0.245238000000
Seep18_11	18		1144458.003000000000	3158243.896000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00048938000	0.197465000000	A	775.3	23.2	17-08-2011 06:51:15	-0.023000000000	0.002000000000	0.807000000000	0.244690000000
Seep18_12	18		1144446.374000000000	3158296.266000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.128203000000	A	775.3	23.8	17-08-2011 06:53:30	0.000000000000	0.000000000000	0.525000000000	0.244195000000
Seep18_13	18		1144452.866000000000	3158356.333000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.096506400000	A	775.3	24.4	17-08-2011 06:56:32	0.000000000000	0.000000000000	0.396000000000	0.243703000000
Seep18_14	18		1144500.896000000000	3158344.397000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00024324400	0.103865000000	A	775.4	25.0	17-08-2011 06:59:05	0.000000000000	0.001000000000	0.427000000000	0.243244000000
Seep18_15	18		1144551.826000000000	3158356.361000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00097167200	0.112471000000	A	775.4	25.4	17-08-2011 07:01:35	0.000000000000	0.004000000000	0.463000000000	0.242918000000
Seep18_16	18		1144709.659000000000	3158332.872000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00024251900	0.055294300000	A	776.2	26.2	17-08-2011 07:06:24	-0.008000000000	0.001000000000	0.228000000000	0.242519000000
Seep18_17	18		1144781.960000000000	3158454.570000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.123743000000	A	776.6	26.8	17-08-2011 07:10:07	-0.152000000000	0.000000000000	0.511000000000	0.242158000000
Seep18_18	18		1144795.139000000000	3158570.635000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.087236200000	A	777.3	27.7	17-08-2011 07:15:41	-0.197000000000	-0.001000000000	0.361000000000	0.241652000000
Seep18_19	18		1144754.930000000000	3158634.908000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000224048400	0.113268000000	A	777.4	29.2	17-08-2011 07:25:58	0.000000000000	0.001000000000	0.471000000000	0.240484000000
Seep18_20	18		1144736.401000000000	3158733.313000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.232910000000	A	775.6	29.9	17-08-2011 07:30:17	0.000000000000	0.000000000000	0.973000000000	0.239373000000
Seep18_21	18		1144763.383000000000	3158840.066000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00023941000	0.133830000000	A	777.0	30.4	17-08-2011 07:33:46	0.000000000000	0.001000000000	0.559000000000	0.239410000000
Seep18_22	18		1144694.564000000000	3158867.667000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00023903300	0.037050100000	A	776.8	30.8	17-08-2011 07:37:03	0.000000000000	0.001000000000	0.155000000000	0.239033000000
Seep18_23	18		1144613.075000000000	3158839.063000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.000000000000	0.171529000000	A	776.3	31.2	17-08-2011 07:41:01	-0.025000000000	0.000000000000	0.719000000000	0.238565000000
Seep18_24	18		1144597.456000000000	3158783.091000000000	0.000000000000	0.000000000000	8/17/2011			0.246321000000	0.00023822200	0.618900000000	A	776.2	31.6	17-08-2011 07:45:24	1.034000000000	0.001000000000	2.598000000000	0.238222000000
Seep18_25	18		1144553.347000000000	3158781.472000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00095163700	0.145363000000	A	776.2	32.0	17-08-2011 07:48:57	-0.069000000000	0.004000000000	0.611000000000	0.237900000000
Seep18_26	18		1144558.847000000000	3158725.767000000000	0.000000000000	0.000000000000	8/17/2011			0.031131500000	0.00095058000	0.168728000000	A	776.1	32.3	17-08-2011 07:51:25	0.131000000000	0.004000000000	0.710000000000	0.237645000000
Seep18_27	18		1144608.986000000000	3158742.167000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00071232700	0.150064000000	A	776.2	32.6	17-08-2011 07:54:01	0.000000000000	0.003000000000	0.632000000000	0.237442000000
Seep18_28	18		1144655.546000000000	3158737.432000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00023721000	0.262117000000	A	776.2	32.9	17-08-2011 07:57:45	-0.076000000000	0.001000000000	1.105000000000	0.237210000000
Seep18_29	18		1144678.312000000000	3158785.686000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00047404400	0.245792000000	A	776.6	33.3	17-08-2011 08:00:40	0.000000000000	0.002000000000	1.037000000000	0.237022000000
Seep18_30	18		1144656.733000000000	3158831.736000000000	0.000000000000	0.000000000000	8/17/2011			0.000000000000	0.00023666800	0.141291000000	A	776.2	33.6	17-08-2011 08:03:43	0.000000000000	0.001000000000	0.597000000000	0.236668000000
Seep18_31	18		1144557.446000000000	3158833.970000000000	0.0000000000															

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep19_23	19		1146249.219000000000	3159082.463000000000	0.000000000000	0.000000000000	8/16/2011			0.000000000000	0.001391660000	0.000000000000	A	779.3	41.1	16-08-2011 12:37:27	-0.352000000000	0.006000000000	-0.056000000000	0.231943000000
Seep21-617_01	21, 33, 617, & L100		1179465.808000000000	3165175.491000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.000467903000	1.527240000000	A	785.3	40.8	18-08-2011 11:58:40	-0.018000000000	0.002000000000	6.528000000000	0.233952000000
Seep21-617_02	21, 33, 617, & L100		1179459.485000000000	3165232.046000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.004437730000	1.036560000000	A	785.5	41.4	18-08-2011 12:01:57	-0.012000000000	0.019000000000	4.438000000000	0.233565000000
Seep21-617_03	21, 33, 617, & L100		1179464.461000000000	3165294.889000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.005364150000	0.273805000000	A	785.6	41.9	18-08-2011 12:04:35	0.000000000000	0.023000000000	1.174000000000	0.233224000000
Seep21-617_04	21, 33, 617, & L100		1179473.695000000000	3165343.875000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.007686630000	0.091307800000	A	785.6	42.3	18-08-2011 12:07:13	0.000000000000	0.033000000000	0.392000000000	0.232928000000
Seep21-617_05	21, 33, 617, & L100		1179518.237000000000	3165189.896000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.001628850000	0.000000000000	A	785.8	42.7	18-08-2011 12:10:10	-0.069000000000	0.007000000000	-1.566000000000	0.232692000000
Seep21-617_06	21, 33, 617, & L100		1179571.162000000000	3165208.578000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.000000000000	0.000000000000	A	785.4	43.2	18-08-2011 12:15:22	0.000000000000	-0.002000000000	-10.796000000000	0.232206000000
Seep21-617_07	21, 33, 617, & L100		1179620.523000000000	3165196.076000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.009039410000	0.406541000000	A	784.7	43.5	18-08-2011 12:18:35	0.000000000000	0.039000000000	1.754000000000	0.231780000000
Seep21-617_08	21, 33, 617, & L100		1179621.142000000000	3165146.753000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.003010650000	0.000000000000	A	784.3	43.6	18-08-2011 12:20:57	-0.010000000000	0.013000000000	-1.173000000000	0.231588000000
Seep21-617_09	21, 33, 617, & L100		1179770.616000000000	3165351.012000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.006248940000	0.000000000000	A	784.3	43.8	18-08-2011 12:24:18	0.000000000000	0.027000000000	-4.426000000000	0.231442000000
Seep21-617_10	21, 33, 617, & L100		1179610.801000000000	3165302.262000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.003931270000	0.200957000000	A	783.9	43.9	18-08-2011 12:27:18	-0.007000000000	0.017000000000	0.869000000000	0.231251000000
Seep21-617_11	21, 33, 617, & L100		1179617.188000000000	3165374.553000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.004394070000	0.000000000000	A	784.2	44.0	18-08-2011 12:29:41	-0.011000000000	0.019000000000	-6.242000000000	0.231267000000
Seep21-617_12	21, 33, 617, & L100		1179605.202000000000	3165412.621000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.003929290000	0.000000000000	A	784.0	44.1	18-08-2011 12:31:36	-0.106000000000	0.017000000000	0.000000000000	0.231135000000
Seep21-617_13	21, 33, 617, & L100		1179624.202000000000	3165477.357000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.005544780000	0.000000000000	A	783.9	44.2	18-08-2011 12:33:36	0.000000000000	0.024000000000	-1.070000000000	0.231033000000
Seep21-617_14	21, 33, 617, & L100		1179567.695000000000	3165476.955000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.004160180000	0.028890100000	A	784.2	44.2	18-08-2011 12:36:45	0.000000000000	0.018000000000	0.125000000000	0.231121000000
Seep21-617_15	21, 33, 617, & L100		1179569.297000000000	3165314.476000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.006469350000	0.028433260000	A	784.2	44.3	18-08-2011 12:40:33	0.000000000000	0.028000000000	0.365000000000	0.231048000000
Seep32_01	32 & L1049	Seep32	1174334.899000000000	3177710.133000000000	0.000000000000	0.000000000000	8/18/2011			2.366590000000	0.001185900000	128.566000000000	A	789.8	38.3	18-08-2011 13:27:21	9.978000000000	0.005000000000	542.060000000000	0.237181000000
Seep32_02	32 & L1049	Seep32	1174361.117000000000	3177660.358000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.001183100000	0.000000000000	A	789.7	39.0	18-08-2011 13:30:18	0.000000000000	0.005000000000	-1.064000000000	0.236619000000
Seep32_03	32 & L1049	Seep32	1174410.264000000000	3177658.146000000000	0.000000000000	0.000000000000	8/18/2011			11.703900000000	0.000708543000	0.000000000000	A	789.5	39.5	18-08-2011 13:33:04	49.555000000000	0.003000000000	-171.331000000000	0.236181000000
Seep32_04	32 & L1049	Seep32	1174407.886000000000	3177611.235000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.000000000000	0.000000000000	A	789.5	40.0	18-08-2011 13:35:25	0.000000000000	0.009000000000	-190.105000000000	0.235804000000
Seep32_05	32 & L1049	Seep32	1174364.652000000000	3177610.205000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.001177520000	0.801652000000	A	789.5	40.4	18-08-2011 13:38:57	0.000000000000	0.005000000000	3.404000000000	0.235503000000
Seep32_06	32 & L1049	Seep32	1174465.212000000000	3177607.588000000000	0.000000000000	0.000000000000	8/18/2011			7.627710000000	0.002117500000	1.772110000000	A	789.5	40.7	18-08-2011 13:41:50	32.420000000000	0.009000000000	7.532000000000	0.235278000000
Seep32_07	32 & L1049	Seep32	1174461.342000000000	3177559.641000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.001645690000	0.000000000000	A	789.4	40.9	18-08-2011 13:44:24	0.000000000000	0.007000000000	0.000000000000	0.235098000000
Seep32_08	32 & L1049	Seep32	1174412.352000000000	3177564.800000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.000235053000	0.000000000000	A	789.5	41.0	18-08-2011 13:46:47	-0.415000000000	0.001000000000	-18.722000000000	0.235035000000
Seep32_09	32 & L1049	Seep32	1174516.226000000000	3177553.322000000000	0.000000000000	0.000000000000	8/18/2011			3.768310000000	0.001174220000	2.324960000000	A	789.3	41.2	18-08-2011 13:49:27	16.046000000000	0.005000000000	9.900000000000	0.234844000000
Seep32_10	32 & L1049	Seep32	1174461.634000000000	3177511.199000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.001174000000	0.000000000000	A	789.4	41.3	18-08-2011 13:51:53	0.000000000000	0.005000000000	0.000000000000	0.234799000000
Seep32_100	32 & L1049	Seep32	1175218.281000000000	3176674.430000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000476826000	0.129220000000	A	786.0	35.2	19-08-2011 07:34:39	-1.743000000000	0.002000000000	0.542000000000	0.238413000000
Seep32_101	32 & L1049	Seep32	1175274.113000000000	3176667.684000000000	0.000000000000	0.000000000000	8/19/2011			9.843880000000	0.000714775000	1.052390000000	A	786.0	35.4	19-08-2011 07:36:38	41.316000000000	0.003000000000	4.417000000000	0.238258000000
Seep32_102	32 & L1049	Seep32	1175266.959000000000	3176616.472000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.000000000000	A	785.9	35.5	19-08-2011 07:39:05	-86.644000000000	0.000000000000	-0.330000000000	0.238151000000
Seep32_103	32 & L1049	Seep32	1175223.656000000000	3176621.299000000000	0.000000000000	0.000000000000	8/19/2011			2.135170000000	0.000714262000	0.799260000000	A	786.2	35.7	19-08-2011 07:41:08	8.968000000000	0.003000000000	3.357000000000	0.238087000000
Seep32_104	32 & L1049	Seep32	1175169.651000000000	3176615.562000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000238010000	0.000000000000	A	786.2	35.8	19-08-2011 07:43:54	-6.122000000000	0.001000000000	-3.404000000000	0.238010000000
Seep32_105	32 & L1049	Seep32	1175167.924000000000	3176571.136000000000	0.000000000000	0.000000000000	8/19/2011			1.893850000000	0.000476081000	0.774584000000	A	786.3	35.8	19-08-2011 07:45:51	7.956000000000	0.002000000000	3.254000000000	0.238041000000
Seep32_106	32 & L1049	Seep32	1175114.521000000000	3176574.263000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000714073000	0.122106000000	A	786.5	35.9	19-08-2011 07:47:47	0.000000000000	0.003000000000	0.513000000000	0.238024000000
Seep32_107	32 & L1049	Seep32	1175119.005000000000	3176618.091000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000238024000	0.660279000000	A	786.5	35.9	19-08-2011 07:50:27	0.000000000000	0.001000000000	2.774000000000	0.238024000000
Seep32_108	32 & L1049	Seep32	1175121.273000000000	3176523.901000000000	0.000000000000	0.000000000000	8/19/2011			9.808660000000	0.000713842000	1.226380000000	A	786.5	36.0	19-08-2011 07:52:42	41.222000000000	0.003000000000	5.154000000000	0.237947000000
Seep32_109	32 & L1049	Seep32	1175067.252000000000	3176520.945000000000	0.000000000000	0.000000000000	8/19/2011			4.015430000000	0.000238008000	0.490534000000	A	786.7	36.0	19-08-2011 07:54:59	16.871000000000	0.001000000000	2.061000000000	0.238008000000
Seep32_11	32 & L1049	Seep32	1174512.443000000000	3177506.686000000000	0.00000000000															

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep32_140	32 & L1049	Seep32	1174751.103000000000	3176961.119000000000	0.000000000000	0.000000000000	8/19/2011			1.313590000000	0.001657670000	1.264330000000	A	787.3	37.8	19-08-2011 09:15:01	5.547000000000	0.007000000000	5.339000000000	0.236810000000
Seep32_141	32 & L1049	Seep32	1174755.383000000000	3177011.980000000000	0.000000000000	0.000000000000	8/19/2011			2.299370000000	0.002839900000	0.844396000000	A	787.3	38.0	19-08-2011 09:17:21	9.716000000000	0.012000000000	3.568000000000	0.236658000000
Seep32_142	32 & L1049	Seep32	1174810.167000000000	3177005.418000000000	0.000000000000	0.000000000000	8/19/2011			6.632080000000	0.000946088000	1.197270000000	A	787.1	38.1	19-08-2011 09:19:55	28.040000000000	0.004000000000	5.062000000000	0.236522000000
Seep32_143	32 & L1049	Seep32	1174818.225000000000	3177055.498000000000	0.000000000000	0.000000000000	8/19/2011			3.203510000000	0.003071440000	1.786870000000	A	787.0	38.4	19-08-2011 09:22:14	13.559000000000	0.013000000000	7.563000000000	0.236264000000
Seep32_144	32 & L1049	Seep32	1174769.705000000000	3177071.162000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000708428000	0.812567000000	A	787.1	38.6	19-08-2011 09:25:16	-0.707000000000	0.003000000000	3.441000000000	0.236143000000
Seep32_145	32 & L1049	Seep32	1174766.256000000000	3177124.955000000000	0.000000000000	0.000000000000	8/19/2011			0.754930000000	0.000471831000	1.001930000000	A	787.1	38.9	19-08-2011 09:27:54	3.200000000000	0.002000000000	4.247000000000	0.235916000000
Seep32_146	32 & L1049	Seep32	1174822.268000000000	3177104.277000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.407114000000	A	787.0	39.1	19-08-2011 09:30:08	-2.148000000000	-0.001000000000	1.727000000000	0.235735000000
Seep32_147	32 & L1049	Seep32	1174719.487000000000	3177129.084000000000	0.000000000000	0.000000000000	8/19/2011			1.123970000000	0.003533760000	1.089340000000	A	787.0	39.3	19-08-2011 09:32:32	4.771000000000	0.015000000000	4.624000000000	0.235584000000
Seep32_148	32 & L1049	Seep32	1174719.246000000000	3177176.344000000000	0.000000000000	0.000000000000	8/19/2011			2.677190000000	0.000471046000	0.432420000000	A	787.3	39.5	19-08-2011 09:35:21	11.367000000000	0.002000000000	1.836000000000	0.235523000000
Seep32_149	32 & L1049	Seep32	1174674.756000000000	3177174.370000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.275463000000	A	787.1	39.8	19-08-2011 09:38:33	-1.441000000000	-0.002000000000	1.171000000000	0.235237000000
Seep32_15	32 & L1049	Seep32	1174460.525000000000	3177411.196000000000	0.000000000000	0.000000000000	8/18/2011			4.924050000000	0.000234322000	0.877069000000	A	789.3	41.9	18-08-2011 14:05:04	21.014000000000	0.001000000000	3.743000000000	0.234322000000
Seep32_150	32 & L1049	Seep32	1174664.493000000000	3177123.073000000000	0.000000000000	0.000000000000	8/19/2011			1.005020000000	0.000000000000	0.539662000000	A	787.3	40.0	19-08-2011 09:41:31	4.274000000000	0.000000000000	2.295000000000	0.235147000000
Seep32_151	32 & L1049	Seep32	1174614.838000000000	3177118.685000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.003525400000	0.200713000000	A	787.4	40.2	19-08-2011 09:44:57	-8.099000000000	0.015000000000	0.854000000000	0.235026000000
Seep32_152	32 & L1049	Seep32	1174613.923000000000	3177165.835000000000	0.000000000000	0.000000000000	8/19/2011			0.708704000000	0.001879850000	0.283623000000	A	787.5	40.3	19-08-2011 09:46:48	3.016000000000	0.008000000000	1.207000000000	0.234981000000
Seep32_153	32 & L1049	Seep32	1174614.987000000000	3177210.733000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.263951000000	A	787.5	40.5	19-08-2011 09:49:12	-0.805000000000	-0.003000000000	1.124000000000	0.234832000000
Seep32_154	32 & L1049	Seep32	1174671.861000000000	3177215.733000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.197850000000	A	787.3	40.6	19-08-2011 09:51:09	0.000000000000	0.000300000000	0.843000000000	0.234617000000
Seep32_155	32 & L1049	Seep32	1174567.589000000000	3177207.834000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001642360000	0.000000000000	A	787.3	40.7	19-08-2011 09:53:36	-1.081000000000	0.007000000000	-0.510000000000	0.234622000000
Seep32_156	32 & L1049	Seep32	1174566.008000000000	3177162.616000000000	0.000000000000	0.000000000000	8/19/2011			6.237444000000	0.002346670000	3.654930000000	A	787.7	40.8	19-08-2011 09:56:22	26.580000000000	0.010000000000	15.575000000000	0.234667000000
Seep32_157	32 & L1049	Seep32	1174575.575000000000	3177110.305000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.678224000000	A	787.7	41.0	19-08-2011 09:58:54	-30.993000000000	-0.002000000000	2.892000000000	0.234517000000
Seep32_158	32 & L1049	Seep32	1174589.437000000000	3177063.589000000000	0.000000000000	0.000000000000	8/19/2011			4.536700000000	0.000000000000	0.944335000000	A	787.7	41.1	19-08-2011 10:00:40	19.351000000000	-0.001000000000	4.028000000000	0.234414300000
Seep32_159	32 & L1049	Seep32	1174624.757000000000	3177064.157000000000	0.000000000000	0.000000000000	8/19/2011			13.367800000000	0.002108780000	2.226870000000	A	787.5	41.2	19-08-2011 10:03:08	57.052000000000	0.009000000000	9.504000000000	0.234309000000
Seep32_16	32 & L1049	Seep32	1174465.412000000000	3177358.114000000000	0.000000000000	0.000000000000	8/18/2011			0.353949000000	0.000234248000	0.433593000000	A	789.3	42.0	18-08-2011 14:08:11	1.511000000000	0.001000000000	1.851000000000	0.234248000000
Seep32_160	32 & L1049	Seep32	1174624.395000000000	3177016.522000000000	0.000000000000	0.000000000000	8/19/2011			1.326530000000	0.000000000000	1.613200000000	A	787.4	41.3	19-08-2011 10:06:40	5.664000000000	-0.001000000000	6.888000000000	0.234204000000
Seep32_161	32 & L1049	Seep32	1174630.626000000000	3176969.815000000000	0.000000000000	0.000000000000	8/19/2011			1.985980000000	0.000000000000	0.222615000000	A	787.5	41.5	19-08-2011 10:09:01	8.484000000000	0.000000000000	0.951000000000	0.234085000000
Seep32_162	32 & L1049	Seep32	1174616.174000000000	3176906.833000000000	0.000000000000	0.000000000000	8/19/2011			1.507370000000	0.003511500000	1.787350000000	A	787.8	41.6	19-08-2011 10:11:45	6.439000000000	0.015000000000	7.635000000000	0.234100000000
Seep32_163	32 & L1049	Seep32	1174669.496000000000	3176853.889000000000	0.000000000000	0.000000000000	8/19/2011			1.291660000000	0.001403980000	0.233528000000	A	787.7	41.7	19-08-2011 10:14:06	5.520000000000	0.006000000000	0.998000000000	0.233996000000
Seep32_164	32 & L1049	Seep32	1174706.159000000000	3176812.061000000000	0.000000000000	0.000000000000	8/19/2011			3.817100000000	0.000467724000	2.438250000000	A	787.5	41.8	19-08-2011 10:16:57	16.322000000000	0.002000000000	10.426000000000	0.233862000000
Seep32_165	32 & L1049	Seep32	1174646.947000000000	3176812.119000000000	0.000000000000	0.000000000000	8/19/2011			0.868743000000	0.000935389000	1.839440000000	A	787.7	41.9	19-08-2011 10:19:41	3.715000000000	0.004000000000	7.866000000000	0.233847000000
Seep32_166	32 & L1049	Seep32	1174704.147000000000	3176757.644000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.243201000000	A	787.7	41.9	19-08-2011 10:22:03	-0.664000000000	-0.005000000000	1.040000000000	0.233847000000
Seep32_167	32 & L1049	Seep32	1174710.174000000000	3176713.494000000000	0.000000000000	0.000000000000	8/19/2011			0.907565000000	0.000000000000	0.000000000000	A	787.5	41.9	19-08-2011 10:24:52	3.882000000000	-0.007000000000	-2.037000000000	0.233788000000
Seep32_168	32 & L1049	Seep32	1174752.755000000000	3176701.629000000000	0.000000000000	0.000000000000	8/19/2011			4.318930000000	0.001636930000	1.491480000000	A	787.7	41.9	19-08-2011 10:27:10	18.469000000000	0.007000000000	6.378000000000	0.233847000000
Seep32_169	32 & L1049	Seep32	1174753.864000000000	3176653.398000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.000000000000	A	787.4	41.9	19-08-2011 10:29:32	-47.307000000000	-0.001000000000	-2.386000000000	0.233758000000
Seep32_17	32 & L1049	Seep32	1174450.846000000000	3177304.504000000000	0.000000000000	0.000000000000	8/18/2011			2.112650000000	0.000374583000	1.146220000000	A	789.1	42.1	18-08-2011 14:10:59	9.024000000000	0.016000000000	4.896000000000	0.234114000000
Seep32_170	32 & L1049	Seep32	1174799.130000000000	3176633.296000000000	0.000000000000	0.000000000000	8/19/2011			50.627000000000	0.000935152000	0.936321000000	A	787.5	41.9	19-08-2011 10:32:05	216.551000000000	0.004000000000	4.005000000000	0.233788000000
Seep32_171	32 & L1049	Seep32	1174804.343000000000	3176583.840000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	1.359560000000	A	787.3	41.8	19-08-2011 10:34:47	0.000000000000	-0.003000000000	5.815000000000	0.233803000000
Seep32_172	32 & L1049	Seep32	1174865.854000000000	3176589.545000000000	0.000000000000	0.000000000000	8/19/2011			3.450520000000	0.000467487000	1.306390000000	A	787.1	41.8	19-08-2011 10:37:44	14.762000000000	0.002000000000	5.589000000000	0.233743000000
Seep32_173	32 & L1049	Seep32	1174849.782000000000	3176540.887000000000	0.000000000000	0.000000000000	8/19/2011			1.886590000000	0.000935924000									

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep32_204	32 & L1049	Seep32	1174651.124000000000	3177670.303000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000964086000	0.187274000000 A		787.9	32.6	19-08-2011 13:35:38	-0.008000000000	0.004000000000	0.777000000000	0.241021000000
Seep32_205	32 & L1049	Seep32	1174604.149000000000	3177714.250000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000722264000	0.095338800000 A		787.8	32.9	19-08-2011 13:37:36	-0.012000000000	0.003000000000	0.396000000000	0.240755000000
Seep32_206	32 & L1049	Seep32	1174504.760000000000	3177665.586000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000962756000	0.000000000000 A		788.1	33.1	19-08-2011 13:39:44	0.000000000000	0.004000000000	-0.138000000000	0.240689000000
Seep32_207	32 & L1049	Seep32	1174505.434000000000	3177614.819000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000721832000	0.062318100000 A		788.1	33.2	19-08-2011 13:42:36	0.000000000000	0.003000000000	0.259000000000	0.240610000000
Seep32_208	32 & L1049	Seep32	1174555.523000000000	3177567.069000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000240532000	0.085388800000 A		788.1	33.3	19-08-2011 13:57:32	0.000000000000	0.001000000000	0.355000000000	0.240532000000
Seep32_209	32 & L1049	Seep32	1174609.824000000000	3177560.304000000000	0.000000000000	0.000000000000	8/19/2011			5.257880000000	0.001203840000	1.599420000000 A		788.1	33.0	19-08-2011 14:00:15	21.838000000000	0.005000000000	6.643000000000	0.240768000000
Seep32_21	32 & L1049	Seep32	1174557.804000000000	3177364.248000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.002118330000	0.358234000000 A		788.3	40.1	18-08-2011 14:55:05	-0.896000000000	0.009000000000	1.522000000000	0.235370000000
Seep32_210	32 & L1049	Seep32	1174659.168000000000	3177562.218000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000722172000	0.027683300000 A		787.7	32.9	19-08-2011 14:03:12	-1.264000000000	0.003000000000	0.115000000000	0.240724000000
Seep32_211	32 & L1049	Seep32	1174657.169000000000	3177516.112000000000	0.000000000000	0.000000000000	8/19/2011			14.869200000000	0.001443610000	0.674166000000 A		787.3	32.9	19-08-2011 14:05:26	61.800000000000	0.006000000000	2.802000000000	0.240602000000
Seep32_212	32 & L1049	Seep32	1174716.415000000000	3177518.687000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000963526000	0.581970000000 A		787.7	32.7	19-08-2011 14:11:42	-5.337000000000	0.004000000000	2.416000000000	0.240882000000
Seep32_213	32 & L1049	Seep32	1174711.409000000000	3177465.914000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001925970000	1.954380000000 A		787.0	32.6	19-08-2011 14:14:50	-0.015000000000	0.008000000000	8.118000000000	0.240746000000
Seep32_214	32 & L1049	Seep32	1174712.437000000000	3177569.146000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000722330000	1.358460000000 A		787.1	32.6	19-08-2011 14:18:12	0.000000000000	0.003000000000	5.642000000000	0.240771000000
Seep32_215	32 & L1049	Seep32	1174759.918000000000	3177562.495000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.002407030000	1.068480000000 A		786.6	32.5	19-08-2011 14:21:19	-0.008000000000	0.010000000000	4.439000000000	0.240703000000
Seep32_216	32 & L1049	Seep32	1174760.030000000000	3177512.648000000000	0.000000000000	0.000000000000	8/19/2011			1.599020000000	0.001684700000	0.124909000000 A		786.5	32.5	19-08-2011 14:23:55	6.644000000000	0.007000000000	0.519000000000	0.240672000000
Seep32_217	32 & L1049	Seep32	1174797.215000000000	3177512.366000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001443560000	0.083485800000 A		786.5	32.6	19-08-2011 14:26:57	-1.267000000000	0.006000000000	0.347000000000	0.240593000000
Seep32_218	32 & L1049	Seep32	1174798.780000000000	3177561.826000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.002404400000	0.690785000000 A		786.0	32.6	19-08-2011 14:29:38	-0.009000000000	0.010000000000	2.873000000000	0.240440000000
Seep32_219	32 & L1049	Seep32	1174797.102000000000	3177468.958000000000	0.000000000000	0.000000000000	8/19/2011			1.329240000000	0.001441440000	2.190980000000 A		785.6	32.7	19-08-2011 14:32:56	5.533000000000	0.006000000000	9.120000000000	0.240239000000
Seep32_22	32 & L1049	Seep32	1174552.425000000000	3177408.510000000000	0.000000000000	0.000000000000	8/18/2011			1.214150000000	0.000704671000	1.560380000000 A		788.2	40.7	18-08-2011 14:57:32	5.169000000000	0.003000000000	6.643000000000	0.234890000000
Seep32_220	32 & L1049	Seep32	1174761.302000000000	3177466.781000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001202180000	1.280800000000 A		786.5	32.8	19-08-2011 14:36:05	-0.586000000000	0.005000000000	5.327000000000	0.240436000000
Seep32_221	32 & L1049	Seep32	1174799.298000000000	3177417.152000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.002404180000	0.306293000000 A		786.7	32.9	19-08-2011 14:38:42	-0.037000000000	0.010000000000	1.274000000000	0.240418000000
Seep32_222	32 & L1049	Seep32	1174757.870000000000	3177419.063000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.003846700000	0.590708000000 A		786.7	32.9	19-08-2011 14:40:48	-0.145000000000	0.016000000000	2.457000000000	0.240418000000
Seep32_223	32 & L1049	Seep32	1174708.373000000000	3177410.234000000000	0.000000000000	0.000000000000	8/19/2011			4.659930000000	0.002644410000	0.844529000000 A		786.9	33.0	19-08-2011 14:43:05	19.384000000000	0.011000000000	3.513000000000	0.240401000000
Seep32_224	32 & L1049	Seep32	1174656.065000000000	3177413.487000000000	0.000000000000	0.000000000000	8/19/2011			1.536580000000	0.000961413000	0.545842000000 A		787.0	33.1	19-08-2011 14:45:54	6.393000000000	0.004000000000	2.271000000000	0.240353000000
Seep32_225	32 & L1049	Seep32	1174606.761000000000	3177411.985000000000	0.000000000000	0.000000000000	8/19/2011			2.220740000000	0.001922930000	0.503087000000 A		787.3	33.2	19-08-2011 14:47:58	9.239000000000	0.008000000000	2.093000000000	0.240366000000
Seep32_226	32 & L1049	Seep32	1174656.662000000000	3177457.414000000000	0.000000000000	0.000000000000	8/19/2011			4.788200000000	0.002162040000	1.509830000000 A		787.1	33.3	19-08-2011 14:50:27	19.932000000000	0.009000000000	6.285000000000	0.240227000000
Seep32_227	32 & L1049	Seep32	1174607.761000000000	3177510.050000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001441360000	0.097291800000 A		787.1	33.3	19-08-2011 14:53:20	-0.911000000000	0.006000000000	0.405000000000	0.240227000000
Seep32_228	32 & L1049	Seep32	1174604.507000000000	3177461.839000000000	0.000000000000	0.000000000000	8/19/2011			1.045130000000	0.002401480000	2.101540000000 A		787.1	33.4	19-08-2011 14:55:46	4.352000000000	0.010000000000	8.751000000000	0.240148000000
Seep32_229	32 & L1049	Seep32	1174555.895000000000	3177456.403000000000	0.000000000000	0.000000000000	8/19/2011			15.404900000000	0.001921050000	4.825430000000 A		787.3	33.5	19-08-2011 14:58:12	64.152000000000	0.008000000000	20.950000000000	0.240131000000
Seep32_23	32 & L1049	Seep32	1174607.797000000000	3177355.506000000000	0.000000000000	0.000000000000	8/18/2011			1.943490000000	0.002109180000	0.780630000000 A		787.9	41.3	18-08-2011 15:00:00	8.293000000000	0.009000000000	3.331000000000	0.234353000000
Seep32_230	32 & L1049	Seep32	1174507.582000000000	3177455.878000000000	0.000000000000	0.000000000000	8/19/2011			31.304600000000	0.001680800000	1.770840000000 A		787.5	33.6	19-08-2011 15:00:45	130.374000000000	0.007000000000	7.375000000000	0.240114000000
Seep32_231	32 & L1049	Seep32	1174561.913000000000	3177507.102000000000	0.000000000000	0.000000000000	8/19/2011			9.865940000000	0.000480071000	3.700390000000 A		787.5	33.7	19-08-2011 15:04:47	41.102000000000	0.002000000000	15.416000000000	0.240036000000
Seep32_232	32 & L1049	Seep32	1174457.454000000000	3177658.415000000000	0.000000000000	0.000000000000	8/19/2011			9.932670000000	0.002159070000	0.471876000000 A		787.3	33.8	19-08-2011 15:08:11	41.404000000000	0.009000000000	1.967000000000	0.239896000000
Seep32_233	32 & L1049	Seep32	1174455.707000000000	3177705.904000000000	0.000000000000	0.000000000000	8/19/2011			42.004300000000	0.002158910000	1.142780000000 A		787.5	33.9	19-08-2011 15:10:20	175.106000000000	0.009000000000	4.764000000000	0.239879000000
Seep32_234	32 & L1049	Seep32	1174404.635000000000	3177706.543000000000	0.000000000000	0.000000000000	8/19/2011			28.561500000000	0.002638670000	1.603830000000 A		787.5	33.9	19-08-2011 15:12:18	119.066000000000	0.011000000000	6.686000000000	0.239879000000
Seep32_235	32 & L1049	Seep32	1174357.910000000000	3177706.579000000000	0.000000000000	0.000000000000	8/19/2011			1.420460000000	0.003118210000	2.698450000000 A		787.7	34.0	19-08-2011 15:14:17	5.922000000000	0.013000000000	11.250000000000	0.239862000000
Seep32_236	32 & L1049	Seep32	1174356.961000000000	3177760.557000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.002159030000	1.099670000000 A		787.8	34.0	19-08-2011 15:16:49	-0.598000000000	0.009000000000	4.584000000000	0.239892000000
Seep32_237	32 & L1049	Seep32	1174408.151000000000	3177757.286000000000	0.000000000000	0.000000000000	8/19/2011			6.068650000000	0.001199010000									

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep32_268	32 & L1049	Seep32	1174758.993000000000	3177660.163000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001203750000	0.145413000000	A	786.5	32.4	19-08-2011 18:37:38	-0.029000000000	0.005000000000	0.604000000000	0.240751000000
Seep32_269	32 & L1049	Seep32	1174759.142000000000	3177611.822000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000962391000	0.094554900000	A	786.0	32.4	19-08-2011 18:40:13	-0.006000000000	0.004000000000	0.393000000000	0.240598000000
Seep32_27	32 & L1049	Seep32	1174615.173000000000	3177258.204000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.002560950000	0.074267500000	A	788.2	43.5	18-08-2011 15:10:51	-1.498000000000	0.011000000000	0.319000000000	0.232813000000
Seep32_270	32 & L1049	Seep32	1174848.147000000000	3177507.950000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000962706000	0.044284500000	A	786.0	32.3	19-08-2011 18:44:36	-0.001000000000	0.004000000000	0.184000000000	0.240676000000
Seep32_271	32 & L1049	Seep32	1174849.313000000000	3177462.859000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000721478000	0.106057000000	A	785.4	32.3	19-08-2011 18:47:44	-0.033000000000	0.003000000000	0.441000000000	0.240493000000
Seep32_272	32 & L1049	Seep32	1174853.142000000000	3177421.581000000000	0.000000000000	0.000000000000	8/19/2011			0.278526000000	0.000481047000	0.546950000000	A	785.5	32.3	19-08-2011 18:50:59	1.158000000000	0.002000000000	2.274000000000	0.240523000000
Seep32_273	32 & L1049	Seep32	1174858.294000000000	3177360.637000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.000000000000	0.677640000000	A	785.9	32.2	19-08-2011 18:55:38	-0.199000000000	0.000000000000	2.815000000000	0.240725000000
Seep32_274	32 & L1049	Seep32	1174900.697000000000	3177360.826000000000	0.000000000000	0.000000000000	8/19/2011			0.998893000000	0.000000000000	0.177196000000	A	786.0	32.2	19-08-2011 18:58:44	4.149000000000	0.000000000000	0.736000000000	0.240755000000
Seep32_275	32 & L1049	Seep32	1174906.274000000000	3177422.529000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001203860000	0.076806500000	A	785.8	32.1	19-08-2011 19:01:53	-0.407000000000	0.005000000000	0.319000000000	0.240773000000
Seep32_276	32 & L1049	Seep32	1174907.827000000000	3177464.096000000000	0.000000000000	0.000000000000	8/19/2011			0.000000000000	0.001202640000	0.117618000000	A	785.0	32.1	19-08-2011 19:04:16	-0.476000000000	0.005000000000	0.489000000000	0.240528000000
Seep32_277	32 & L1049	Seep32	1174880.633000000000	3176399.921000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000254376000	0.693429000000	A	789.4	17.1	20-08-2011 05:49:49	0.000000000000	0.001000000000	2.726000000000	0.254376000000
Seep32_278	32 & L1049	Seep32	1174882.086000000000	3176289.449000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000000000000	0.000000000000	A	789.1	17.9	20-08-2011 05:53:16	-0.355000000000	0.000000000000	-2.239000000000	0.253580000000
Seep32_279	32 & L1049	Seep32	1174994.116000000000	3176283.836000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000758011000	0.625107000000	A	788.7	18.8	20-08-2011 05:56:48	0.000000000000	0.003000000000	2.474000000000	0.252670000000
Seep32_28	32 & L1049	Seep32	1174670.913000000000	3177259.118000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.000696897000	0.045995200000	A	787.7	44.0	18-08-2011 15:13:12	-0.360000000000	0.003000000000	0.198000000000	0.232299000000
Seep32_280	32 & L1049	Seep32	1174931.480000000000	3176288.204000000000	0.000000000000	0.000000000000	8/20/2011			9.864490000000	0.000755977000	0.310455000000	A	788.2	19.4	20-08-2011 06:00:25	39.146000000000	0.003000000000	1.232000000000	0.251992000000
Seep32_281	32 & L1049	Seep32	1174925.628000000000	3176090.047000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000503017000	0.000000000000	A	788.3	20.0	20-08-2011 06:03:48	-37.296000000000	0.002000000000	-4.157000000000	0.251509000000
Seep32_282	32 & L1049	Seep32	1175021.712000000000	3176084.519000000000	0.000000000000	0.000000000000	8/20/2011			3.597420000000	0.000754071000	0.000000000000	A	788.9	20.4	20-08-2011 06:07:39	14.312000000000	0.003000000000	-3.835000000000	0.251357000000
Seep32_283	32 & L1049	Seep32	1175130.581000000000	3176082.685000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000501521000	0.000000000000	A	788.1	20.8	20-08-2011 06:11:01	-20.726000000000	0.002000000000	-0.388000000000	0.250760000000
Seep32_284	32 & L1049	Seep32	1175133.100000000000	3175784.552000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000249689000	0.403746000000	A	786.6	21.5	20-08-2011 06:20:17	-4.230000000000	0.001000000000	1.617000000000	0.249689000000
Seep32_285	32 & L1049	Seep32	1175022.657000000000	3175772.666000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000249371000	0.000000000000	A	786.4	21.8	20-08-2011 06:24:06	-0.148000000000	0.001000000000	-0.068000000000	0.249371000000
Seep32_286	32 & L1049	Seep32	1174912.502000000000	3175769.361000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000499270000	0.274599000000	A	788.3	22.2	20-08-2011 06:28:26	-3.660000000000	0.002000000000	1.100000000000	0.249635000000
Seep32_287	32 & L1049	Seep32	1175086.243000000000	3176281.436000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000747325000	0.503199000000	A	789.3	23.2	20-08-2011 06:39:20	-1.952000000000	0.003000000000	2.020000000000	0.249108000000
Seep32_288	32 & L1049	Seep32	1175145.116000000000	3176395.921000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000992322000	0.000000000000	A	787.9	23.9	20-08-2011 06:46:38	-1.708000000000	0.004000000000	-2.616000000000	0.248081000000
Seep32_289	32 & L1049	Seep32	1175228.567000000000	3176476.299000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000000000000	0.662709000000	A	787.5	24.6	20-08-2011 06:53:07	0.000000000000	-0.001000000000	2.679000000000	0.247371000000
Seep32_29	32 & L1049	Seep32	1174673.290000000000	3177306.865000000000	0.000000000000	0.000000000000	8/18/2011			8.210440000000	0.001391250000	2.144140000000	A	787.5	44.5	18-08-2011 15:16:05	35.409000000000	0.006000000000	9.247000000000	0.231874000000
Seep32_290	32 & L1049	Seep32	1175328.539000000000	3176542.548000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000741435000	0.000000000000	A	788.1	25.1	20-08-2011 06:56:18	-1.740000000000	0.003000000000	-5.977000000000	0.247145000000
Seep32_291	32 & L1049	Seep32	1175270.157000000000	3176543.103000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000740690000	0.000000000000	A	788.1	25.4	20-08-2011 06:58:53	-1.536000000000	0.003000000000	-1.479000000000	0.246897000000
Seep32_292	32 & L1049	Seep32	1175201.430000000000	3176525.335000000000	0.000000000000	0.000000000000	8/20/2011			3.259380000000	0.000986345000	1.331070000000	A	787.9	25.7	20-08-2011 07:01:10	13.218000000000	0.004000000000	5.398000000000	0.246586000000
Seep32_293	32 & L1049	Seep32	1175135.749000000000	3176468.611000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.001478290000	0.856423000000	A	788.3	26.1	20-08-2011 07:03:33	-1.741000000000	0.006000000000	3.476000000000	0.246382000000
Seep32_294	32 & L1049	Seep32	1175087.035000000000	3176434.131000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.001969080000	1.111790000000	A	788.3	26.4	20-08-2011 07:05:53	-1.449000000000	0.008000000000	4.517000000000	0.246135000000
Seep32_295	32 & L1049	Seep32	1175074.184000000000	3176357.394000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.001474650000	0.044485400000	A	788.2	26.8	20-08-2011 07:08:16	-1.100000000000	0.006000000000	0.181000000000	0.245776000000
Seep32_296	32 & L1049	Seep32	1175389.806000000000	3176613.969000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000977238000	0.693350000000	A	788.2	28.6	20-08-2011 07:18:17	-0.022000000000	0.004000000000	2.838000000000	0.244309000000
Seep32_297	32 & L1049	Seep32	1175367.948000000000	3176703.671000000000	0.000000000000	0.000000000000	8/20/2011			3.702050000000	0.000730619000	1.300990000000	A	787.8	29.4	20-08-2011 07:23:05	15.201000000000	0.003000000000	5.342000000000	0.243540000000
Seep32_298	32 & L1049	Seep32	1175497.693000000000	3176720.746000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000972577000	0.000000000000	A	787.3	29.7	20-08-2011 07:26:17	-20.015000000000	0.004000000000	-3.817000000000	0.243144000000
Seep32_299	32 & L1049	Seep32	1175504.839000000000	3176605.554000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.001213900000	0.000000000000	A	786.9	30.0	20-08-2011 07:29:06	0.000000000000	0.005000000000	-0.122000000000	0.242780000000
Seep32_30	32 & L1049	Seep32	1174667.638000000000	3177359.139000000000	0.000000000000	0.000000000000	8/18/2011			1.634900000000	0.003008300000	0.534089000000	A	787.4	45.1	18-08-2011 15:18:52	7.065000000000	0.013000000000	2.308000000000	0.231408000000
Seep32_300	32 & L1049	Seep32	1175400.356000000000	3176810.189000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000485697000	0.0740687								

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep32_332	32 & L1049	Seep32	1174679.961000000000	3176486.837000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00354723000	0.04847880000	A	790.0	39.3	20-08-2011 09:49:24	-0.006000000000	0.015000000000	0.205000000000	0.23648200000
Seep32_333	32 & L1049	Seep32	1174666.201000000000	3176336.228000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00070903900	0.00496327000	A	789.8	39.4	20-08-2011 09:52:17	-0.192000000000	0.003000000000	0.021000000000	0.23634600000
Seep32_334	32 & L1049	Seep32	1174538.760000000000	3176247.987000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00141798000	0.23302200000	A	790.0	39.5	20-08-2011 09:56:52	-0.035000000000	0.006000000000	0.096000000000	0.23633000000
Seep32_335	32 & L1049	Seep32	1174455.202000000000	3176258.872000000000	0.000000000000	0.000000000000	8/20/2011			1.23072000000	0.00496545000	1.39175000000	A	790.4	39.5	20-08-2011 09:58:41	5.205000000000	0.021000000000	5.886000000000	0.23645000000
Seep32_336	32 & L1049	Seep32	1174523.131000000000	3176183.189000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00165462000	0.02600120000	A	790.4	39.6	20-08-2011 10:01:28	-1.146000000000	0.007000000000	0.110000000000	0.23637500000
Seep32_337	32 & L1049	Seep32	1174447.288000000000	3176176.143000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00283649000	0.04585670000	A	790.4	39.6	20-08-2011 10:03:19	-0.412000000000	0.012000000000	0.194000000000	0.23637500000
Seep32_338	32 & L1049	Seep32	1174373.990000000000	3176172.999000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00472809000	0.12789500000	A	790.5	39.6	20-08-2011 10:05:23	-0.053000000000	0.020000000000	0.541000000000	0.23640400000
Seep32_339	32 & L1049	Seep32	1174376.620000000000	3176262.002000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00520090000	0.54443900000	A	790.5	39.6	20-08-2011 10:07:24	-0.384000000000	0.022000000000	2.303000000000	0.23640400000
Seep32_34	32 & L1049	Seep32	1174761.020000000000	3177300.624000000000	0.000000000000	0.000000000000	8/18/2011			1.35890000000	0.00345308000	1.44109000000	A	787.0	46.6	18-08-2011 15:29:03	5.903000000000	0.015000000000	6.260000000000	0.23020500000
Seep32_340	32 & L1049	Seep32	1174375.789000000000	3176335.527000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00330924000	0.10376800000	A	790.4	39.6	20-08-2011 10:09:46	-0.117000000000	0.014000000000	0.439000000000	0.23637500000
Seep32_341	32 & L1049	Seep32	1174459.865000000000	3176342.915000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00472960000	0.11303700000	A	790.5	39.5	20-08-2011 10:11:46	-0.376000000000	0.020000000000	0.478000000000	0.23648000000
Seep32_342	32 & L1049	Seep32	1174541.835000000000	3176335.626000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00165473000	0.06240700000	A	790.2	39.5	20-08-2011 10:14:36	-0.014000000000	0.007000000000	0.264000000000	0.23639000000
Seep32_343	32 & L1049	Seep32	1174573.067000000000	3176718.386000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00354496000	0.07964340000	A	790.0	39.5	20-08-2011 10:18:13	-0.085000000000	0.015000000000	0.337000000000	0.23633000000
Seep32_344	32 & L1049	Seep32	1174547.279000000000	3176849.140000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00189088000	0.03947220000	A	790.1	39.5	20-08-2011 10:20:30	-0.342000000000	0.008000000000	0.167000000000	0.23636000000
Seep32_345	32 & L1049	Seep32	1174686.326000000000	3176596.301000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00307170000	0.40419200000	A	790.1	39.6	20-08-2011 10:23:20	-0.014000000000	0.013000000000	1.701000000000	0.23628500000
Seep32_346	32 & L1049	Seep32	1174395.595000000000	3176898.699000000000	0.000000000000	0.000000000000	8/20/2011			3.02023000000	0.00684966000	1.00548000000	A	789.8	39.6	20-08-2011 10:27:15	12.787000000000	0.029000000000	4.257000000000	0.23619500000
Seep32_347	32 & L1049	Seep32	1174393.603000000000	3176793.657000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00165409000	0.00496228000	A	790.4	39.7	20-08-2011 10:32:19	-1.741000000000	0.007000000000	0.021000000000	0.23629900000
Seep32_348	32 & L1049	Seep32	1174301.236000000000	3176793.861000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00170020000	0.00000000000	A	790.1	31.1	20-08-2011 12:13:52	-0.205000000000	0.007000000000	-0.001000000000	0.24288600000
Seep32_349	32 & L1049	Seep32	1174306.507000000000	3176904.690000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00726894000	0.00000000000	A	790.0	31.8	20-08-2011 12:16:10	0.000000000000	0.030000000000	-1.281000000000	0.24229800000
Seep32_35	32 & L1049	Seep32	1174762.575000000000	3177247.606000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.00299100000	0.05399910000	A	787.3	46.9	18-08-2011 15:31:50	0.000000000000	0.013000000000	2.347000000000	0.23007700000
Seep32_350	32 & L1049	Seep32	1174311.569000000000	3177011.810000000000	0.000000000000	0.000000000000	8/20/2011			1.31575000000	0.00725466000	1.20403000000	A	790.0	32.4	20-08-2011 12:18:08	5.441000000000	0.030000000000	4.979000000000	0.24182200000
Seep32_351	32 & L1049	Seep32	1174403.660000000000	3177015.292000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00940712000	0.20020300000	A	789.8	33.1	20-08-2011 12:20:20	-0.231000000000	0.039000000000	0.830000000000	0.24120800000
Seep32_352	32 & L1049	Seep32	1174456.924000000000	3176964.964000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.000000000000	0.09402420000	A	789.7	34.0	20-08-2011 12:23:31	0.000000000000	-0.006000000000	0.391000000000	0.24047100000
Seep32_353	32 & L1049	Seep32	1174214.158000000000	3176905.204000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00599887000	0.02327560000	A	789.8	34.7	20-08-2011 12:26:20	-0.140000000000	0.025000000000	0.097000000000	0.23995500000
Seep32_354	32 & L1049	Seep32	1174207.391000000000	3177020.952000000000	0.000000000000	0.000000000000	8/20/2011			0.75850600000	0.00263537000	1.13824000000	A	790.1	35.3	20-08-2011 12:29:21	3.166000000000	0.011000000000	4.751000000000	0.23957900000
Seep32_355	32 & L1049	Seep32	1174203.120000000000	3177113.033000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00454610000	0.80920600000	A	790.1	35.7	20-08-2011 12:31:27	-0.216000000000	0.019000000000	3.382000000000	0.23926900000
Seep32_356	32 & L1049	Seep32	1174318.634000000000	3177109.545000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00095571500	0.10751800000	A	790.0	36.1	20-08-2011 12:34:48	-0.048000000000	0.004000000000	0.450000000000	0.23892900000
Seep32_357	32 & L1049	Seep32	1174103.149000000000	3177022.097000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00333895000	0.00000000000	A	790.1	36.7	20-08-2011 12:38:34	-0.441000000000	0.014000000000	-0.613000000000	0.23849600000
Seep32_358	32 & L1049	Seep32	1174098.301000000000	3176903.219000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00381370000	0.05815890000	A	790.4	37.0	20-08-2011 12:41:28	-0.064000000000	0.016000000000	0.244000000000	0.23835600000
Seep32_359	32 & L1049	Seep32	1174109.747000000000	3177119.487000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00285751000	1.09347000000	A	790.4	37.3	20-08-2011 12:44:32	-0.084000000000	0.012000000000	4.592000000000	0.23812600000
Seep32_36	32 & L1049	Seep32	1174803.851000000000	3177299.117000000000	0.000000000000	0.000000000000	8/18/2011			0.000000000000	0.00068919500	0.71791100000	A	787.1	47.3	18-08-2011 15:35:02	-5.006000000000	0.003000000000	3.125000000000	0.22973200000
Seep32_360	32 & L1049	Seep32	1174131.127000000000	3177377.257000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00071377800	0.54080600000	A	790.5	37.6	20-08-2011 12:48:38	-0.037000000000	0.003000000000	2.273000000000	0.23792600000
Seep32_361	32 & L1049	Seep32	1174109.922000000000	3177765.285000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00404033000	0.40522120000	A	790.4	37.9	20-08-2011 12:52:23	-0.025000000000	0.017000000000	1.705000000000	0.23766600000
Seep32_362	32 & L1049	Seep32	1174212.997000000000	3177758.074000000000	0.000000000000	0.000000000000	8/20/2011			4.31537000000	0.00332500000	1.19486000000	A	790.1	38.0	20-08-2011 12:54:27	18.170000000000	0.014000000000	5.031000000000	0.23750000000
Seep32_363	32 & L1049	Seep32	1174211.150000000000	3177658.208000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00427063000	0.67072600000	A	789.8	38.2	20-08-2011 12:56:47	-1.191000000000	0.018000000000	2.827000000000	0.23725700000
Seep32_364	32 & L1049	Seep32	1174200.199000000000	3177860.969000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00521930000	0.05409100000	A	790.0	38.3	20-08-2011 12:59:21	-0.031000000000	0.022000000000	0.228000000000	0.23724100000
Seep32_365	32 & L1049	Seep32	1174108.695000000000	3177962.679000000000	0.000000000000	0.000000000000	8/20/2011			0.000000000000	0.00094878000	0.02063600000	A	790.1	38.4	20-08-2011 13:02:07	-0.958000000000	0.004000000000	0.087000000000	0.237

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
Seep32_62	32 & L1049	Seep32	1174921.563000000000	3176974.554000000000	0.000000000000	0.000000000000	8/19/2011			0.69006900000	0.00073751600	1.10062000000 A		786.3	26.0	19-08-2011 06:02:10	2.80700000000	0.00300000000	4.47700000000	0.24583900000
Seep32_63	32 & L1049	Seep32	1174930.834000000000	3176923.794000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00000000000	0.00000000000 A		786.3	26.3	19-08-2011 06:04:46	-4.30000000000	0.00000000000	-2.78200000000	0.24559200000
Seep32_64	32 & L1049	Seep32	1174883.443000000000	3176925.482000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00049104400	0.41370500000 A		786.6	26.5	19-08-2011 06:07:01	0.00000000000	0.00200000000	1.68500000000	0.24552200000
Seep32_65	32 & L1049	Seep32	1174973.531000000000	3176920.584000000000	0.000000000000	0.000000000000	8/19/2011			0.52694300000	0.00049017900	1.35976000000 A		786.0	26.8	19-08-2011 06:09:41	2.15000000000	0.00200000000	5.54800000000	0.24509000000
Seep32_66	32 & L1049	Seep32	1174979.556000000000	3176868.423000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024484500	0.00000000000 A		786.0	27.1	19-08-2011 06:12:59	-1.24700000000	0.00100000000	-1.17100000000	0.24484500000
Seep32_67	32 & L1049	Seep32	1174934.176000000000	3176869.750000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00097914800	0.18187700000 A		786.6	27.4	19-08-2011 06:15:25	0.00000000000	0.00400000000	0.74300000000	0.24478700000
Seep32_68	32 & L1049	Seep32	1175025.311000000000	3176867.362000000000	0.000000000000	0.000000000000	8/19/2011			5.87754000000	0.00097812400	0.81404300000 A		786.3	27.6	19-08-2011 06:17:50	24.03600000000	0.00400000000	3.32900000000	0.24453100000
Seep32_69	32 & L1049	Seep32	1175025.203000000000	3176817.127000000000	0.000000000000	0.000000000000	8/19/2011			6.87265000000	0.00097772200	1.30746000000 A		786.5	27.8	19-08-2011 06:19:51	28.11700000000	0.00400000000	5.34900000000	0.24443100000
Seep32_70	32 & L1049	Seep32	1174976.566000000000	3176815.495000000000	0.000000000000	0.000000000000	8/19/2011			12.59240000000	0.00048859900	1.07101000000 A		786.6	28.0	19-08-2011 06:22:12	51.54500000000	0.00200000000	4.38400000000	0.24429900000
Seep32_71	32 & L1049	Seep32	1174931.215000000000	3176817.176000000000	0.000000000000	0.000000000000	8/19/2011			1.50981000000	0.00048837400	0.95648100000 A		786.5	28.1	19-08-2011 06:24:17	6.18300000000	0.00200000000	3.91700000000	0.24418700000
Seep32_72	32 & L1049	Seep32	1174882.598000000000	3176816.594000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024408700	0.22626900000 A		786.7	28.3	19-08-2011 06:27:21	0.00000000000	0.00100000000	0.92700000000	0.24408700000
Seep32_73	32 & L1049	Seep32	1174885.473000000000	3176863.913000000000	0.000000000000	0.000000000000	8/19/2011			1.67260000000	0.00024392500	0.32881100000 A		786.7	28.5	19-08-2011 06:29:57	6.85700000000	0.00100000000	1.34800000000	0.24392200000
Seep32_74	32 & L1049	Seep32	1174828.654000000000	3176810.688000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024376400	0.22036200000 A		786.7	28.7	19-08-2011 06:32:33	0.00000000000	0.00100000000	0.90400000000	0.24376400000
Seep32_75	32 & L1049	Seep32	1174835.731000000000	3176861.204000000000	0.000000000000	0.000000000000	8/19/2011			0.91227900000	0.00073099300	0.35355700000 A		786.9	28.9	19-08-2011 06:34:49	3.74400000000	0.00300000000	1.45100000000	0.24366400000
Seep32_76	32 & L1049	Seep32	1174833.028000000000	3176910.720000000000	0.000000000000	0.000000000000	8/19/2011			0.26486400000	0.00024344100	0.79167100000 A		786.7	29.1	19-08-2011 06:37:38	1.08800000000	0.00100000000	3.25200000000	0.24344100000
Seep32_77	32 & L1049	Seep32	1174832.786000000000	3176968.658000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00048693100	1.04788000000 A		787.3	29.3	19-08-2011 06:39:47	-2.80600000000	0.00200000000	4.30400000000	0.24346600000
Seep32_78	32 & L1049	Seep32	1174780.211000000000	3176965.350000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00048658500	0.40435200000 A		787.0	29.4	19-08-2011 06:41:54	0.00000000000	0.00200000000	1.66200000000	0.24329200000
Seep32_79	32 & L1049	Seep32	1174786.944000000000	3176915.731000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00048644900	0.94127900000 A		787.3	29.6	19-08-2011 06:44:29	-1.07500000000	0.00200000000	3.87000000000	0.24322400000
Seep32_80	32 & L1049	Seep32	1174785.232000000000	3176864.825000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00048600400	0.14944600000 A		787.1	29.8	19-08-2011 06:46:27	-0.10200000000	0.00200000000	0.61500000000	0.24300200000
Seep32_81	32 & L1049	Seep32	1174789.318000000000	3176805.170000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00072876600	0.45037700000 A		787.1	29.9	19-08-2011 06:49:11	-0.19800000000	0.00300000000	1.85400000000	0.24292200000
Seep32_82	32 & L1049	Seep32	1174888.549000000000	3176766.912000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024276200	0.00000000000 A		787.1	30.1	19-08-2011 06:52:14	-1.99900000000	0.00100000000	-1.50400000000	0.24276200000
Seep32_83	32 & L1049	Seep32	1174935.792000000000	3176767.934000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024244800	0.40100800000 A		786.6	30.3	19-08-2011 06:53:59	0.00000000000	0.00100000000	1.65400000000	0.24244800000
Seep32_84	32 & L1049	Seep32	1174986.179000000000	3176765.981000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024233700	0.48249300000 A		786.5	30.4	19-08-2011 06:56:02	0.00000000000	0.00100000000	1.99100000000	0.24233700000
Seep32_85	32 & L1049	Seep32	1175035.046000000000	3176760.665000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00048423200	0.30216100000 A		786.3	30.6	19-08-2011 06:58:01	0.00000000000	0.00200000000	1.24800000000	0.24211600000
Seep32_86	32 & L1049	Seep32	1175085.843000000000	3176765.145000000000	0.000000000000	0.000000000000	8/19/2011			11.62970000000	0.00072573900	1.44978000000 A		785.9	30.7	19-08-2011 07:00:08	48.07400000000	0.00300000000	5.99300000000	0.24191300000
Seep32_87	32 & L1049	Seep32	1175093.460000000000	3176716.214000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024184600	0.10834700000 A		786.2	30.9	19-08-2011 07:02:16	0.00000000000	0.00100000000	0.44800000000	0.24184600000
Seep32_88	32 & L1049	Seep32	1175037.177000000000	3176714.662000000000	0.000000000000	0.000000000000	8/19/2011			1.81832000000	0.00000000000	0.56919100000 A		786.3	31.0	19-08-2011 07:04:33	7.52000000000	0.00000000000	2.35400000000	0.24179700000
Seep32_89	32 & L1049	Seep32	1174984.944000000000	3176714.051000000000	0.000000000000	0.000000000000	8/19/2011			0.76763900000	0.00000000000	0.85755100000 A		786.5	31.2	19-08-2011 07:07:08	3.17600000000	0.00000000000	3.54800000000	0.24170000000
Seep32_90	32 & L1049	Seep32	1174979.282000000000	3176657.350000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00072447800	0.04129520000 A		786.6	31.5	19-08-2011 07:09:28	-2.16000000000	0.00300000000	0.17100000000	0.24149300000
Seep32_91	32 & L1049	Seep32	1174930.869000000000	3176651.076000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00072400300	0.21527000000 A		786.6	31.7	19-08-2011 07:11:44	-0.47400000000	0.00300000000	0.89200000000	0.24133400000
Seep32_92	32 & L1049	Seep32	1174944.085000000000	3176713.534000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00000000000	0.21788000000 A		786.6	32.1	19-08-2011 07:14:15	-0.78200000000	0.00000000000	0.90400000000	0.24101800000
Seep32_93	32 & L1049	Seep32	1175036.207000000000	3176659.109000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024075100	0.51568800000 A		786.5	32.4	19-08-2011 07:16:38	-0.56500000000	0.00100000000	2.14200000000	0.24075100000
Seep32_94	32 & L1049	Seep32	1175105.501000000000	3176663.851000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00024045300	0.78171400000 A		786.3	32.7	19-08-2011 07:18:38	-1.84000000000	0.00100000000	3.25100000000	0.24045300000
Seep32_95	32 & L1049	Seep32	1175161.182000000000	3176661.885000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00048024400	0.00000000000 A		786.5	33.2	19-08-2011 07:21:49	-0.85400000000	0.00200000000	-0.04200000000	0.24012200000
Seep32_96	32 & L1049	Seep32	1175099.810000000000	3176811.669000000000	0.000000000000	0.000000000000	8/19/2011			6.37646000000	0.00071850100	0.96039600000 A		786.0	33.8	19-08-2011 07:25:10	26.62400000000	0.00300000000	4.01000000000	0.23950000000
Seep32_97	32 & L1049	Seep32	1175152.177000000000	3176766.657000000000	0.000000000000	0.000000000000	8/19/2011			4.07322000000	0.00071720100	0.74827900000 A		785.6	34.2	19-08-2011 07:27:15	17.03800000000	0.00300000000	3.13000000000	0.23906700000
Seep32_98	32 & L1049	Seep32	1175153.204000000000	3176713.675000000000	0.000000000000	0.000000000000	8/19/2011			0.00000000000	0.00071626800	0.41662900000 A		785.6	34.6	19-08-2011 07:29:37	-7.80000000000	0.00300000000	1.74500000000	0.23875600000
Seep32_99	32 & L1049	Seep32	1175204.921000000000	3176711.258000000000	0.000000000000	0.000000000000	8/19/2011			0.568546										

APPENDIX E
FLUX METER DATA

SitePt	Site	AreaAbbrev	Northing	Easting	UTM_X	UTM_Y	Date_	Time	DateTime	CH4flux	H2Sflux	CO2flux	ACCUMULATI	PRESSURE_	TEMP_DegC	TIME_	CH4slope	H2Sslope	CO2slope	AcK
SeepL109_13	SeepL109		1172776.70500000000	3161385.84300000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00095111600	0.88596400000	A	777.3	32.6	15-08-2011 13:48:01	0.00000000000	0.00400000000	3.72600000000	0.23777900000
SeepL109_14	SeepL109		1173185.64700000000	3161546.19900000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00047468700	0.06052260000	A	777.4	33.2	15-08-2011 13:51:22	0.00000000000	0.00200000000	0.25500000000	0.23734400000
SeepL109_15	SeepL109		1173226.32400000000	3161770.96600000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00023704800	0.03958710000	A	777.7	33.7	15-08-2011 13:54:17	0.00000000000	0.00100000000	0.16700000000	0.23704800000
SeepL109_16	SeepL109		1173265.39200000000	3161837.68600000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00070998800	0.03597270000	A	777.7	34.2	15-08-2011 13:56:45	0.00000000000	0.00300000000	0.15200000000	0.23666300000
SeepL109_17	SeepL109		1173331.02700000000	3161553.33400000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00047227900	0.00000000000	A	778.0	35.0	15-08-2011 14:02:11	-0.00100000000	0.00200000000	-0.03600000000	0.23613900000
SeepL109_18	SeepL109		1173349.03000000000	3161511.82000000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00047081800	0.01694940000	A	776.6	35.4	15-08-2011 14:05:15	-0.05000000000	0.00200000000	0.07200000000	0.23540900000
SeepL109_19	SeepL109		1173352.10900000000	3161472.98400000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00046990600	0.01080780000	A	776.1	35.8	15-08-2011 14:07:51	0.00000000000	0.00200000000	0.04600000000	0.23495300000
SeepL109_20	SeepL109		1173311.09600000000	3161434.48700000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00046917700	0.04222590000	A	775.9	36.2	15-08-2011 14:10:39	0.00000000000	0.00200000000	0.18000000000	0.23458900000
SeepL109_21	SeepL109		1173246.96800000000	3161412.10400000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00023422500	0.01990910000	A	775.7	36.6	15-08-2011 14:13:43	0.00000000000	0.00100000000	0.08500000000	0.23422500000
SeepL109_22	SeepL109		1173172.11900000000	3161351.20700000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00093557200	0.06993400000	A	776.1	37.2	15-08-2011 14:16:46	0.00000000000	0.00400000000	0.29900000000	0.23389300000
SeepL109_23	SeepL109		1173084.50700000000	3161339.42400000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00070005400	0.10010800000	A	775.8	37.8	15-08-2011 14:20:15	0.00000000000	0.00300000000	0.42900000000	0.23335100000
SeepL109_24	SeepL109		1172837.28900000000	3161627.90200000000	0.00000000000	0.00000000000	8/15/2011			0.00000000000	0.00139912000	0.05060160000	A	776.5	38.3	15-08-2011 14:24:14	0.00000000000	0.00600000000	0.21700000000	0.23318700000

APPENDIX F
VOLUMETRIC FLUX CALCULATIONS



Grid Volume Computations

Mon Aug 22 11:37:12 2011

Upper Surface

Grid File Name:	P:\XTO Energy\608\2011 Survey\Surfer\L1021.grd
Grid Size:	36 rows x 43 columns
X Minimum:	3178309.422
X Maximum:	3178945.778
X Spacing:	15.151333333337
Y Minimum:	1173758.551
Y Maximum:	1174286.866
Y Spacing:	15.094714285713
Z Minimum:	-45.45919573519
Z Maximum:	282.94258790239

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor:	0.0929
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Total Volumes by:

Trapezoidal Rule:	84046.116319329
Simpson's Rule:	83798.313355542
Simpson's 3/8 Rule:	82154.483791563

Cut & Fill Volumes

Positive Volume [Cut]:	114266.16332859
Negative Volume [Fill]:	30220.047009264
Net Volume [Cut-Fill]:	84046.116319329

Areas**Planar Areas**

Positive Planar Area [Cut]:	76328.240528224
Negative Planar Area [Fill]:	113725.65412237
Blanked Planar Area:	146142.52548945
Total Planar Area:	336196.42014004

Surface Areas

Positive Surface Area [Cut]:	77479.613431039
Negative Surface Area [Fill]:	113855.5065902

Grid Volume Computations

Mon Aug 22 16:12:14 2011

Upper Surface

Grid File Name:	P:\XTO Energy\608\2011 Survey\Surfer\L1021_CH4notail.grd
Grid Size:	36 rows x 43 columns
X Minimum:	3178309.422
X Maximum:	3178945.778
X Spacing:	15.1513333333337
Y Minimum:	1173758.551
Y Maximum:	1174286.866
Y Spacing:	15.094714285713
Z Minimum:	0
Z Maximum:	282.94258790239

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor:	0.0929
-----------------	--------

Total Volumes by:

Trapezoidal Rule:	115809.16615935
Simpson's Rule:	115441.89351938
Simpson's 3/8 Rule:	115089.32367581

Cut & Fill Volumes

Positive Volume [Cut]:	115809.16615935
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	115809.16615935

Areas

Planar Areas

Positive Planar Area [Cut]:	190053.89465059
Negative Planar Area [Fill]:	0
Blanked Planar Area:	146142.52548945
Total Planar Area:	336196.42014004

Surface Areas

Positive Surface Area [Cut]:	191189.34906277
Negative Surface Area [Fill]:	0

Grid Volume Computations

Mon Aug 22 16:14:19 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\L1030_CH4notail.grd
Grid Size: 25 rows x 21 columns
X Minimum: 3164600
X Maximum: 3164905.099
X Spacing: 15.254949999996
Y Minimum: 1146046.899
Y Maximum: 1146411.716
Y Spacing: 15.200708333335
Z Minimum: 0
Z Maximum: 6.0918509068057

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 1954.4809920252
Simpson's Rule: 1946.630953542
Simpson's 3/8 Rule: 1949.8255708828

Cut & Fill Volumes

Positive Volume [Cut]: 1954.4809920252
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 1954.4809920252

Areas**Planar Areas**

Positive Planar Area [Cut]: 78029.654340885
Negative Planar Area [Fill]: 0
Blanked Planar Area: 33275.647542101
Total Planar Area: 111305.30188299

Surface Areas

Positive Surface Area [Cut]: 78030.104510557
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:15:04 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\L1033_CH4notail.grd
Grid Size: 100 rows x 92 columns
X Minimum: 3188411.764
X Maximum: 3188923.838
X Spacing: 5.6271868131871
Y Minimum: 1167256.016
Y Maximum: 1167813.697
Y Spacing: 5.6331414141401
Z Minimum: 0
Z Maximum: 0.30011479522189

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 17.615067509626
Simpson's Rule: 17.280568000681
Simpson's 3/8 Rule: 17.973445908319

Cut & Fill Volumes

Positive Volume [Cut]: 17.615067509626
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 17.615067509626

Areas**Planar Areas**

Positive Planar Area [Cut]: 285573.94039394
Negative Planar Area [Fill]: 0
Blanked Planar Area: 0
Total Planar Area: 285573.94039394

Surface Areas

Positive Surface Area [Cut]: 285573.9449834
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:18:56 2011

Upper Surface

Grid File Name:	P:\XTO Energy\608\2011 Survey\Surfer\L1040_CH4notail.grd
Grid Size:	29 rows x 25 columns
X Minimum:	3183819.855
X Maximum:	3184184.924
X Spacing:	15.211208333339
Y Minimum:	1149139.9
Y Maximum:	1149562.92
Y Spacing:	15.107857142858
Z Minimum:	0
Z Maximum:	0.28351786698755

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor:	0.0929
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Total Volumes by:

Trapezoidal Rule:	21.484343138875
Simpson's Rule:	22.360604553346
Simpson's 3/8 Rule:	18.434474171915

Cut & Fill Volumes

Positive Volume [Cut]:	21.484343138875
Negative Volume [Fill]:	0
Net Volume [Cut-Fill]:	21.484343138875

Areas

Planar Areas

Positive Planar Area [Cut]:	81926.823820674
Negative Planar Area [Fill]:	0
Blanked Planar Area:	72504.66455939
Total Planar Area:	154431.48838006

Surface Areas

Positive Surface Area [Cut]:	81926.826042295
Negative Surface Area [Fill]:	0

Grid Volume Computations

Mon Aug 22 16:23:41 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\L1048_CH4notail.grd
Grid Size: 36 rows x 41 columns
X Minimum: 3181336.886
X Maximum: 3181938.116
X Spacing: 15.03075
Y Minimum: 1171406.704
Y Maximum: 1171932.02
Y Spacing: 15.009028571432
Z Minimum: 0
Z Maximum: 0.87698692111434

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 240.69855549687
Simpson's Rule: 242.1695616107
Simpson's 3/8 Rule: 234.73475223551

Cut & Fill Volumes

Positive Volume [Cut]: 240.69855549687
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 240.69855549687

Areas**Planar Areas**

Positive Planar Area [Cut]: 111219.29940662
Negative Planar Area [Fill]: 0
Blanked Planar Area: 204616.43927344
Total Planar Area: 315835.73868006

Surface Areas

Positive Surface Area [Cut]: 111219.31246727
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:19:42 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\L1050_CH4notail.grd
Grid Size: 22 rows x 38 columns
X Minimum: 3179552.54
X Maximum: 3180109.507
X Spacing: 15.053162162167
Y Minimum: 1172438.364
Y Maximum: 1172758.286
Y Spacing: 15.234380952382
Z Minimum: 0
Z Maximum: 1.1414317479139

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 618.17684612712
Simpson's Rule: 620.60857946954
Simpson's 3/8 Rule: 609.7142792676

Cut & Fill Volumes

Positive Volume [Cut]: 618.17684612712
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 618.17684612712

Areas**Planar Areas**

Positive Planar Area [Cut]: 108471.01207147
Negative Planar Area [Fill]: 0
Blanked Planar Area: 69714.984502596
Total Planar Area: 178185.99657407

Surface Areas

Positive Surface Area [Cut]: 108471.05072287
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:26:05 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011
Survey\Surfer\Seep05_07_08_09_L1047_CH4notail.grd
Grid Size: 80 rows x 100 columns
X Minimum: 3174638.921
X Maximum: 3177138.11
X Spacing: 25.244333333331
Y Minimum: 1172142.195
Y Maximum: 1174140.026
Y Spacing: 25.289
Z Minimum: 0
Z Maximum: 1.0995900371945

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 1924.2756987363
Simpson's Rule: 1902.4156991527
Simpson's 3/8 Rule: 1978.1853562795

Cut & Fill Volumes

Positive Volume [Cut]: 1924.2756987363
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 1924.2756987363

Areas**Planar Areas**

Positive Planar Area [Cut]: 2478922.5210235
Negative Planar Area [Fill]: 0
Blanked Planar Area: 2514034.7380351
Total Planar Area: 4992957.2590586

Surface Areas

Positive Surface Area [Cut]: 2478922.6009927
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:27:00 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\Seep13_CH4notail.grd
Grid Size: 26 rows x 41 columns
X Minimum: 3163984.675
X Maximum: 3164588.827
X Spacing: 15.1038000000006
Y Minimum: 1174323.264
Y Maximum: 1174705.674
Y Spacing: 15.2964000000006
Z Minimum: 0
Z Maximum: 0.24319596677687

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 28.140169733196
Simpson's Rule: 25.718047196487
Simpson's 3/8 Rule: 29.530152537588

Cut & Fill Volumes

Positive Volume [Cut]: 28.140169733196
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 28.140169733196

Areas**Planar Areas**

Positive Planar Area [Cut]: 172120.15590853
Negative Planar Area [Fill]: 0
Blanked Planar Area: 58913.610411646
Total Planar Area: 231033.76632018

Surface Areas

Positive Surface Area [Cut]: 172120.15879246
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:27:58 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\Seep14_CH4notail.grd
Grid Size: 65 rows x 34 columns
X Minimum: 3156266.195
X Maximum: 3156768.384
X Spacing: 15.217848484856
Y Minimum: 1168557.302
Y Maximum: 1169520.419
Y Spacing: 15.048703125001
Z Minimum: 0
Z Maximum: 0.44618818694293

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 307.20823228087
Simpson's Rule: 294.01649022545
Simpson's 3/8 Rule: 306.25435161559

Cut & Fill Volumes

Positive Volume [Cut]: 307.20823228087
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 307.20823228087

Areas**Planar Areas**

Positive Planar Area [Cut]: 260841.11893278
Negative Planar Area [Fill]: 0
Blanked Planar Area: 222825.6441805
Total Planar Area: 483666.76311328

Surface Areas

Positive Surface Area [Cut]: 260841.13098498
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:37:30 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\Seep18_CH4_v3notail.grd
Grid Size: 194 rows x 205 columns
X Minimum: 3158143.161
X Maximum: 3159161.649
X Spacing: 4.9925882352959
Y Minimum: 1143928.167
Y Maximum: 1144895.139
Y Spacing: 5.0102176165807
Z Minimum: 0
Z Maximum: 0.2330661604499

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 3.9882013794782
Simpson's Rule: 4.5905089970061
Simpson's 3/8 Rule: 4.0832997227504

Cut & Fill Volumes

Positive Volume [Cut]: 3.9882013794782
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 3.9882013794782

Areas**Planar Areas**

Positive Planar Area [Cut]: 400598.46576394
Negative Planar Area [Fill]: 0
Blanked Planar Area: 584250.91257248
Total Planar Area: 984849.37833642

Surface Areas

Positive Surface Area [Cut]: 400598.46805999
Negative Surface Area [Fill]: 0

Grid Volume Computations

Mon Aug 22 16:43:59 2011

Upper Surface

Grid File Name: P:\XTO Energy\608\2011 Survey\Surfer\Seep32_v2_CH4notail.grd
Grid Size: 122 rows x 175 columns
X Minimum: 3175669.361
X Maximum: 3178273.221
X Spacing: 14.964712643677
Y Minimum: 1173793.17
Y Maximum: 1175604.839
Y Spacing: 14.97247107438
Z Minimum: 0
Z Maximum: 42.523944385976

Lower Surface

Level Surface defined by $Z = 0$

Volumes

Z Scale Factor: 0.0929

Total Volumes by:

Trapezoidal Rule: 271534.83486495
Simpson's Rule: 271550.99202991
Simpson's 3/8 Rule: 271568.85178869

Cut & Fill Volumes

Positive Volume [Cut]: 271534.83486495
Negative Volume [Fill]: 0
Net Volume [Cut-Fill]: 271534.83486495

Areas

Planar Areas

Positive Planar Area [Cut]: 2706965.5125927
Negative Planar Area [Fill]: 0
Blanked Planar Area: 2010366.929747
Total Planar Area: 4717332.4423398

Surface Areas

Positive Surface Area [Cut]: 2707101.2913896
Negative Surface Area [Fill]: 0

APPENDIX G

GAS COMPOSITION AND ISOTOPIC ANALYTICAL REPORT



ANALYSIS REPORT

Lab #: 218662 Job #: 16088
 Sample Name: Seep 18 Co. Lab#:
 Company: LT Environmental
 Date Sampled: 8/17/2011
 Container: Cali-5-Bond Bag
 Field/Site Name: XTO Rule 608 Compliance
 Location: Las Animas Co., CO
 Formation/Depth:
 Sampling Point:
 Date Received: 8/25/2011 Date Reported: 9/15/2011

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	δD ‰	$\delta^{15}\text{N}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	nd			
Hydrogen -----	nd			
Argon -----	0.953			
Oxygen -----	20.30			
Nitrogen -----	77.24			
Carbon Dioxide -----	0.89			
Methane -----	0.617	-12.12	-142.7	
Ethane -----	nd			
Ethylene -----	nd			
Propane -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 6
 Specific gravity, calculated: 1.001

nd = not detected. na = not analyzed. Isotopic composition of carbon is relative to VPDB. Isotopic composition of hydrogen is relative to VSMOW. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ANALYSIS REPORT

Lab #: 218663 Job #: 16088
 Sample Name: Seep 9 Co. Lab#:
 Company: LT Environmental
 Date Sampled: 8/19/2011
 Container: Cali-5-Bond Bag
 Field/Site Name: XTO Rule 608 Compliance
 Location: Las Animas Co., CO
 Formation/Depth:
 Sampling Point:
 Date Received: 8/25/2011 Date Reported: 9/15/2011

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	δD ‰	$\delta^{15}\text{N}$ ‰
Carbon Monoxide -----	na			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	na			
Argon -----	na			
Oxygen + Argon -----	na			
Nitrogen -----	na			
Carbon Dioxide -----	na			
Methane -----	na			
Ethane -----	na			
Ethylene -----	na			
Propane -----	na			
Iso-butane -----	na			
N-butane -----	na			
Iso-pentane -----	na			
N-pentane -----	na			
Hexanes + -----	na			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 0

Specific gravity, calculated: 0

Remarks: * Sample container compromised.

nd = not detected. na = not analyzed. Isotopic composition of carbon is relative to VPDB. Isotopic composition of hydrogen is relative to VSMOW. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

ANALYSIS REPORT

Lab #: 218664 Job #: 16088
 Sample Name: Seep 32 Co. Lab#:
 Company: LT Environmental
 Date Sampled: 8/19/2011
 Container: Cali-5-Bond Bag
 Field/Site Name: XTO Rule 608 Compliance
 Location: Las Animas Co., CO
 Formation/Depth:
 Sampling Point:
 Date Received: 8/25/2011 Date Reported: 9/15/2011

Component	Chemical mol. %	$\delta^{13}\text{C}$ ‰	δD ‰	$\delta^{15}\text{N}$ ‰
Carbon Monoxide -----	nd			
Hydrogen Sulfide -----	na			
Helium -----	na			
Hydrogen -----	nd			
Argon -----	nd			
Oxygen -----	21.82			
Nitrogen -----	77.18			
Carbon Dioxide -----	0.19			
Methane -----	0.809			
Ethane -----	nd			
Ethylene -----	nd			
Propane -----	nd			
Iso-butane -----	nd			
N-butane -----	nd			
Iso-pentane -----	nd			
N-pentane -----	nd			
Hexanes + -----	nd			

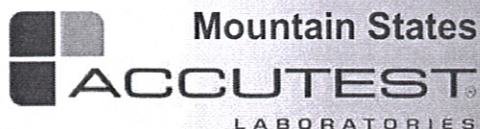
Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 8
 Specific gravity, calculated: 0.995

Remarks: * Sample container compromised.

nd = not detected. na = not analyzed. Isotopic composition of carbon is relative to VPDB. Isotopic composition of hydrogen is relative to VSMOW. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %.

APPENDIX H
NATURAL SPRING ANALYTICAL RESULTS





08/31/11

Technical Report for

LT Environmental

Rule 608 Compliance XTO Raton Basin

Accutest Job Number: D26583

Sampling Date: 08/15/11

Report to:

LT Environmental
2243 Main Avenue Suite #3
Durango, CO 81301
slarue@ltenv.com

ATTN: Sam LaRue

Total number of pages in report: 54



Test results contained within this data package meet the requirements of the National Environmental Laboratory Accreditation Conference and/or state specific certification programs as applicable.


John Hamilton
Laboratory Director

Client Service contact: Renea Jackson 303-425-6021

Certifications: CO, ID, NE, NM, ND (R-027) (PW) UT (NELAP CO00049)

This report shall not be reproduced, except in its entirety, without the written approval of Accutest Laboratories.
Test results relate only to samples analyzed.

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Sample Summary

LT Environmental

Job No: D26583

Rule 608 Compliance XTO Raton Basin

Sample Number	Collected Date	Time By	Received	Matrix Code Type	Client Sample ID
D26583-1	08/15/11	07:40 SL	08/16/11	AQ Surface Water	SPRING 01
D26583-1F	08/15/11	07:40 SL	08/16/11	AQ Surface H2O Filtered	SPRING 01

CASE NARRATIVE / CONFORMANCE SUMMARY

Client: LT Environmental

Job No D26583

Site: Rule 608 Compliance XTO Raton Basin

Report Dat 8/31/2011 8:49:36 AM

On 08/16/2011, 1 sample(s), 0 Trip Blank(s), and 0 Field Blank(s) were received at Accutest Mountain States (AMS) at a temperature of 3.1 °C. The samples were intact and properly preserved, unless noted below. An AMS Job Number of D26583 was assigned to the project. The lab sample ID, client sample ID, and date of sample collection are detailed in the report's Results Summary.

Specified quality control criteria were achieved for this job except as noted below. For more information, please refer to the analytical results and QC summary pages.

Volatiles by GC By Method RSK175 MOD

Matrix	AQ	Batch ID:	GFB142
--------	----	-----------	--------

- All samples were analyzed within the recommended method holding time.
- Sample(s) D26636-3MS, D26636-3MSD were used as the QC samples indicated.
- All method blanks for this batch meet method specific criteria.
- The matrix spike (MS) and matrix spike duplicate (MSD) recovery(s) of Methane are outside control limits. Outside control limits due to possible matrix interference. Confirmed by reanalysis.

Metals By Method EPA 200.8

Matrix	AQ	Batch ID:	MP5516
--------	----	-----------	--------

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26599-1MS, D26599-1MSD were used as the QC samples for the metals analysis.

Metals By Method SW846 6010B

Matrix	AQ	Batch ID:	MP5492
--------	----	-----------	--------

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26533-1FMS, D26533-1FMSD were used as the QC samples for the metals analysis.
- The matrix spike (MS) recovery(s) of Sodium are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

Matrix	AQ	Batch ID:	MP5548
--------	----	-----------	--------

- All samples were digested within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26511-1MS, D26511-1MSD were used as the QC samples for the metals analysis.

Wet Chemistry By Method EPA 300/SW846 9056

Matrix AQ	Batch ID: GP5209
------------------	-------------------------

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26581-IMS, D26581-IMSD were used as the QC samples for the Bromide, Chloride, Nitrogen, Nitrate, Nitrogen, Nitrite, Sulfate analysis.

Matrix AQ	Batch ID: GP5245
------------------	-------------------------

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26473-IMS, D26473-IMSD were used as the QC samples for the Fluoride analysis.

Wet Chemistry By Method HACH IRB-BART

Matrix AQ	Batch ID: T:MB4703
------------------	---------------------------

- The data for HACH IRB-BART meets quality control requirements.
- D26583-1 for Iron Reducing Bacteria: Analysis performed at Accutest Laboratories, Houston, TX.

Wet Chemistry By Method HACH SLYM-BART

Matrix AQ	Batch ID: T:MB4704
------------------	---------------------------

- The data for HACH SLYM-BART meets quality control requirements.
- D26583-1 for Slime Forming Bacteria: Analysis performed at Accutest Laboratories, Houston, TX.

Wet Chemistry By Method HACH SRB-BART

Matrix AQ	Batch ID: T:MB4702
------------------	---------------------------

- The data for HACH SRB-BART meets quality control requirements.
- D26583-1 for Sulfate Reducing Bacteria: Analysis performed at Accutest Laboratories, Houston, TX.

Wet Chemistry By Method SM18 4500NO3E

Matrix AQ	Batch ID: R9082
------------------	------------------------

- The data for SM18 4500NO3E meets quality control requirements.
- D26583-1 for Nitrogen, Nitrate + Nitrite: Calculated as: (Nitrogen, Nitrate) + (Nitrogen, Nitrite)

Wet Chemistry By Method SM20 2320B

Matrix AQ	Batch ID: GN11062
------------------	--------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26451-1ADUP, D26451-1AMS, D26451-1AMSD were used as the QC samples for the Alkalinity, Total as CaCO₃ analysis.

Matrix AQ	Batch ID: GN11075
------------------	--------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

Matrix AQ	Batch ID: GN11076
------------------	--------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

Wet Chemistry By Method SM20 2510B

Matrix AQ	Batch ID: GP5203
------------------	-------------------------

- All samples were prepared within the recommended method holding time.
- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26510-1DUP were used as the QC samples for the Specific Conductivity analysis.

Wet Chemistry By Method SM20 2540C

Matrix AQ	Batch ID: GN11168
------------------	--------------------------

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample(s) D26611-4DUP were used as the QC samples for the Solids, Total Dissolved analysis.

Wet Chemistry By Method USDA HANDBOOK 60

Matrix AQ	Batch ID: MP5548
------------------	-------------------------

- D26583-1 for Sodium Adsorption Ratio: Calculated as: $(\text{Na meq/L}) / \sqrt{[(\text{Ca meq/L}) + (\text{Mg meq/L})/2]}$

AMS certifies that data reported for samples received, listed on the associated custody chain or analytical task order, were produced to specifications meeting AMS's Quality System precision, accuracy and completeness objectives except as noted.

Estimated non-standard method measurement uncertainty data is available on request, based on quality control bias and implicit for standard methods. Acceptable uncertainty requires tested parameter quality control data to meet method criteria.

AMS is not responsible for data quality assumptions if partial reports are used and recommends that this report be used in its entirety. This report is authorized by AMS indicated via signature on the report cover.

SAMPLE DELIVERY GROUP CASE NARRATIVE**Client:** Accutest Mountain States**Job No** D26583**Site:** LTENCODU: Rule 608 Compliance XTO Raton Basin**Report Date** 8/30/2011 5:36:29 PM

1 Sample was collected on 08/15/2011 and received at Accutest Laboratories Gulf Coast on 08/18/2011 properly preserved, at 3.2 Deg. C and intact. The Sample received an Accutest job number of D26583. A listing of the Laboratory Sample ID, Client Sample ID and date of collection are presented in the Results Summary Section of this report.

Except as noted below, all method specified calibrations and quality control performance criteria were met for this job. For more information, please refer to QC summary pages.

Wet Chemistry By Method HACH IRB-BART**Matrix:** AQ**Batch ID:** MB4703

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample D26636-3DUP was used as the QC samples for Iron Reducing Bacteria.

Wet Chemistry By Method HACH SLYM-BART**Matrix:** AQ**Batch ID:** MB4704

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.
- Sample D26636-2DUP was used as the QC samples for Slime Forming Bacteria.

Wet Chemistry By Method HACH SRB-BART**Matrix:** AQ**Batch ID:** MB4702

- All samples were analyzed within the recommended method holding time.
- All method blanks for this batch meet method specific criteria.

Accutest Laboratories Gulf Coast (ALGC) certifies that this report meets the project requirements for analytical data produced for the samples as received at ALGC and as stated on the COC. ALGC certifies that the data meets the Data Quality Objectives for precision, accuracy and completeness as specified in the ALGC Quality Manual except as noted above. This report is to be used in its entirety. ALGC is not responsible for any assumptions of data quality if partial data packages are used



Sample Results

Report of Analysis

Report of Analysis

Page 1 of 1

3.1

3

Client Sample ID:	SPRING 01	Date Sampled:	08/15/11
Lab Sample ID:	D26583-1	Date Received:	08/16/11
Matrix:	AQ - Surface Water	Percent Solids:	n/a
Method:	RSK175 MOD		
Project:	Rule 608 Compliance XTO Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1	FB04484.D	1	08/23/11	CS	n/a	n/a	GFB142
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	0.277	0.00080	0.00080	mg/l	

CAS No.	Surrogate Recoveries	Run# 1	Run# 2	Limits
74-98-6	Propane	81%		70-130%

ND = Not detected MDL - Method Detection Limit
 RL = Reporting Limit
 E = Indicates value exceeds calibration range

J = Indicates an estimated value
 B = Indicates analyte found in associated method blank
 N = Indicates presumptive evidence of a compound

Report of Analysis

Page 1 of 1

3.1

3

Client Sample ID: SPRING 01	Date Sampled: 08/15/11
Lab Sample ID: D26583-1	Date Received: 08/16/11
Matrix: AQ - Surface Water	Percent Solids: n/a
Project: Rule 608 Compliance XTO Raton Basin	

SAR Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	2.46	2.0	mg/l	1	08/23/11	08/24/11 JM	SW846 6010B ¹	EPA 200.7 ²
Magnesium	< 1.0	1.0	mg/l	1	08/23/11	08/24/11 JM	SW846 6010B ¹	EPA 200.7 ²
Sodium	151	2.0	mg/l	1	08/23/11	08/24/11 JM	SW846 6010B ¹	EPA 200.7 ²

(1) Instrument QC Batch: MA1772

(2) Prep QC Batch: MP5548

RL = Reporting Limit

Report of Analysis

Client Sample ID: SPRING 01	Date Sampled: 08/15/11
Lab Sample ID: D26583-1	Date Received: 08/16/11
Matrix: AQ - Surface Water	Percent Solids: n/a
Project: Rule 608 Compliance XTO Raton Basin	

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC 332		5.0	mg/l	1	08/16/11	JK	SM20 2320B
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	08/16/11	JK	SM20 2320B
Alkalinity, Total as CaCO ₃	332	5.0	mg/l	1	08/16/11	JK	SM20 2320B
Bromide	< 0.20	0.20	mg/l	1	08/16/11 10:59	JML	EPA 300/SW846 9056
Chloride	3.7	0.50	mg/l	1	08/16/11 10:59	JML	EPA 300/SW846 9056
Fluoride	1.4	0.40	mg/l	2	08/18/11 15:40	NS	EPA 300/SW846 9056
Iron Reducing Bacteria ^a	9000	25	cfu/ml	1	08/19/11 14:30	ATX	HACH IRB-BART
Nitrogen, Nitrate	< 0.045	0.045	mg/l	1	08/16/11 10:59	JML	EPA 300/SW846 9056
Nitrogen, Nitrate + Nitrite ^b	< 0.11	0.11	mg/l	1	08/16/11 10:59	JML	SM18 4500NO3E
Nitrogen, Nitrite	< 0.061	0.061	mg/l	1	08/16/11 10:59	JML	EPA 300/SW846 9056
Slime Forming Bacteria ^a	350000	500	cfu/ml	1	08/19/11 14:30	ATX	HACH SLYM-BART
Sodium Adsorption Ratio ^c	22.2		ratio	1	08/24/11	JM	USDA HANDBOOK 60
Solids, Total Dissolved	420	10	mg/l	1	08/22/11	JD	SM20 2540C
Specific Conductivity	428	1.0	umhos/cm	1	08/16/11	JK	SM20 2510B
Sulfate	2.7	0.50	mg/l	1	08/16/11 10:59	JML	EPA 300/SW846 9056
Sulfate Reducing Bacteria ^a	700000	200	cfu/ml	1	08/19/11 14:30	ATX	HACH SRB-BART
pH	8.16		su	1	08/16/11 13:15	JK	SM20 4500H

(a) Analysis performed at Accutest Laboratories, Houston, TX.

(b) Calculated as: (Nitrogen, Nitrate) + (Nitrogen, Nitrite)

(c) Calculated as: (Na meq/L) / sqrt [(Ca meq/L) + (Mg meq/L)/2]

RL = Reporting Limit

Report of Analysis

Page 1 of 1

3.2

3

Client Sample ID:	SPRING 01	Date Sampled:	08/15/11
Lab Sample ID:	D26583-1F	Date Received:	08/16/11
Matrix:	AQ - Surface H2O Filtered	Percent Solids:	n/a
Project:	Rule 608 Compliance XTO Raton Basin		

Dissolved Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed By	Method	Prep Method
Calcium	2210	400	ug/l	1	08/17/11	08/18/11 JM	SW846 6010B ¹	SW846 3010A ³
Iron	3660	70	ug/l	1	08/17/11	08/18/11 JM	SW846 6010B ¹	SW846 3010A ³
Magnesium	520	200	ug/l	1	08/17/11	08/18/11 JM	SW846 6010B ¹	SW846 3010A ³
Manganese	126	2.0	ug/l	2	08/19/11	08/20/11 GJ	EPA 200.8 ²	EPA 200.8 ⁴
Potassium	1640	1000	ug/l	1	08/17/11	08/18/11 JM	SW846 6010B ¹	SW846 3010A ³
Selenium	< 0.80	0.80	ug/l	2	08/19/11	08/20/11 GJ	EPA 200.8 ²	EPA 200.8 ⁴
Sodium	136000	400	ug/l	1	08/17/11	08/18/11 JM	SW846 6010B ¹	SW846 3010A ³

(1) Instrument QC Batch: MA1757

(2) Instrument QC Batch: MA1763

(3) Prep QC Batch: MP5492

(4) Prep QC Batch: MP5516

RL = Reporting Limit



Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Chain of Custody



Accutest Laboratories Sample Receipt Summary

Accutest Job Number: D26583

Client: LTE

Immediate Client Services Action Required: No

Date / Time Received: 8/16/2011 8:20:00 AM

No. Coolers: 1

Client Service Action Required at Login: No

Project: RULE 608 COMPLIANCE XTO RATON BASIN

Airbill #s: Fedex

Cooler Security

Y or N

Y or N

- | | | | | | |
|---------------------------|-------------------------------------|--------------------------|-----------------------|-------------------------------------|--------------------------|
| 1. Custody Seals Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 3. COC Present: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Custody Seals Intact: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | 4. Smpl Dates/Time OK | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Cooler Temperature

Y or N

- | | | |
|------------------------------|-------------------------------------|--------------------------|
| 1. Temp criteria achieved: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Cooler temp verification: | Infrared gun | |
| 3. Cooler media: | Ice (bag) | |

Quality Control Preservation

Y or N N/A

- | | | | |
|---------------------------------|-------------------------------------|--------------------------|--------------------------|
| 1. Trip Blank present / cooler: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 2. Trip Blank listed on COC: | <input type="checkbox"/> | <input type="checkbox"/> | |
| 3. Samples preserved properly: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. VOCs headspace free: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Sample Integrity - Documentation

Y or N

- | | | |
|--|-------------------------------------|--------------------------|
| 1. Sample labels present on bottles: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. Container labeling complete: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Sample container label / COC agree: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |

Sample Integrity - Condition

Y or N

- | | | |
|----------------------------------|-------------------------------------|--------------------------|
| 1. Sample recvd within HT: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 2. All containers accounted for: | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| 3. Condition of sample: | Intact | |

Sample Integrity - Instructions

Y or N N/A

- | | | | |
|---|-------------------------------------|-------------------------------------|-------------------------------------|
| 1. Analysis requested is clear: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 2. Bottles received for unspecified tests | <input type="checkbox"/> | <input checked="" type="checkbox"/> | |
| 3. Sufficient volume rec'd for analysis: | <input checked="" type="checkbox"/> | <input type="checkbox"/> | |
| 4. Compositing instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |
| 5. Filtering instructions clear: | <input type="checkbox"/> | <input type="checkbox"/> | <input checked="" type="checkbox"/> |

Comments

Accutest Laboratories
V:(303) 425-6021

4036 Youngfield Street
F: (303) 425-6854

Wheat Ridge, CO
www.accutest.com

D26583: Chain of Custody

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**Industrial
LABORATORIES**

Industrial Laboratories is your independent,
third-party analytical testing laboratory

To: Accutest Mountain States (AMS)
4036 Youngfield St.

Wheat Ridge CO 80033

Attn: Renea Jackson

TEST REPORT

ACCUTEST - M

Date Received: 8/16/2011

Date Reported: 8/22/2011

PO Number: D26583X

Note: Sample test procedures conform to EPA 40CFR136 requirements.

Lab No.	Sample Description	Test Method	Result	Units	MDL	Analysis Date/By
110816010-01A	D26583X-1, 8/15/11, 7:40am	* Total Coliforms MPN	4 Fecal: 80 Total	MPN/100mL		RB 8/16/2011
		SM 9221 B				

• Scope Analysis

Subcontracted Analysis

MDL - Method Detection Limit

ND = Not Detected at the Method Detection Limit

Page: 1 of 1

Department Manager

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D26583: Chain of Custody
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GC Volatiles



QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Blank Spike Summaries
- Matrix Spike and Duplicate Summaries

Method Blank Summary

Page 1 of 1

Job Number: D26583

Account: LTENCODU LT Environmental

Project: Rule 608 Compliance XTO Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GFB142-MB	FB04479.D	1	08/23/11	CS	n/a	n/a	GFB142

The QC reported here applies to the following samples:

Method: RSK175 MOD

D26583-1

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.00080	0.00080	mg/l	

CAS No.	Surrogate Recoveries	Limits
74-98-6	Propane	88% 70-130%

5.1.1
5

Blank Spike Summary

Page 1 of 1

Job Number: D26583

Account: LTENCODU LT Environmental

Project: Rule 608 Compliance XTO Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GFB142-BS	FB04482.D	10	08/23/11	CS	n/a	n/a	GFB142

The QC reported here applies to the following samples:

Method: RSK175 MOD

D26583-1

CAS No.	Compound	Spike mg/l	BSP mg/l	BSP %	Limits
74-82-8	Methane	.5094	0.627	123	70-130

CAS No.	Surrogate Recoveries	BSP	Limits
74-98-6	Propane	88%	70-130%

5.2.1
5

Matrix Spike/Matrix Spike Duplicate Summary

Page 1 of 1

Job Number: D26583

Account: LTENCODU LT Environmental

Project: Rule 608 Compliance XTO Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
D26636-3MS	FB04501.D	10	08/23/11	CS	n/a	n/a	GFB142
D26636-3MSD	FB04502.D	10	08/23/11	CS	n/a	n/a	GFB142
D26636-3	FB04486.D	1	08/23/11	CS	n/a	n/a	GFB142

The QC reported here applies to the following samples:

Method: RSK175 MOD

D26583-1

CAS No.	Compound	D26636-3 mg/l	Spike Q	MS mg/l	MS %	MSD mg/l	MSD %	RPD	Limits Rec/RPD
74-82-8	Methane	ND		0.5094	0.676	133* a	0.666	131* a 2	70-130/30

CAS No.	Surrogate Recoveries	MS	MSD	D26636-3	Limits
74-98-6	Propane	94%	93%	84%	70-130%

(a) Outside control limits due to possible matrix interference. Confirmed by reanalysis.

Metals Analysis

6

QC Data Summaries

Includes the following where applicable:

- Method Blank Summaries
- Matrix Spike and Duplicate Summaries
- Blank Spike and Lab Control Sample Summaries
- Serial Dilution Summaries

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 08/17/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	100	5.9	5.9		
Antimony	30	3.1	3.1		
Arsenic	25	5.9	5.9		
Barium	10	1.1	1.1		
Beryllium	10	.44	.5		
Boron	50	4.8	4.8		
Cadmium	10	.27	.27		
Calcium	400	9.6	15	10.4	<400
Chromium	10	.18	.79		
Cobalt	5.0	.35	.35		
Copper	10	.85	2.8		
Iron	70	3.4	13	0.10	<70
Lead	50	1.6	2.1		
Lithium	2.0	.28	1.2		
Magnesium	200	5.8	10	4.1	<200
Manganese	5.0	.053	.31		
Molybdenum	10	.45	.87		
Nickel	30	.43	1		
Phosphorus	100	11	20		
Potassium	1000	55	55	53.8	<1000
Selenium	50	3.8	3.8		
Silicon	50	3.8	3.8		
Silver	30	.18	.31		
Sodium	400	110	110	140	<400
Strontium	5.0		.25		
Thallium	10	2.9	2.9		
Tin	50	5.5	9.9		
Titanium	10	.11	.31		
Uranium	50	1.5	3.5		
Vanadium	10	.16	.22		
Zinc	30	.28	1.8		

Associated samples MP5492: D26583-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

6.1.1

6

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
 Account: LTENCODU - LT Environmental
 Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
 Matrix Type: AQUEOUS

Methods: SW846 6010B
 Units: ug/l

Prep Date: 08/17/11

Metal	D26533-1F Original MS	Spikelot MPICPALL % Rec	QC Limits
-------	--------------------------	----------------------------	--------------

Aluminum					
Antimony					
Arsenic	anr				
Barium	anr				
Beryllium					
Boron					
Cadmium	anr				
Calcium	8810	36700	25000	111.6	75-125
Chromium	anr				
Cobalt					
Copper	anr				
Iron	5.9	5150	5000	102.9	75-125
Lead	anr				
Lithium					
Magnesium	230	26100	25000	103.5	75-125
Manganese	anr				
Molybdenum					
Nickel	anr				
Phosphorus	anr				
Potassium	652	26800	25000	104.6	75-125
Selenium	anr				
Silicon					
Silver	anr				
Sodium	289000	330000	25000	164.0(a)	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc	anr				

Associated samples MP5492: D26583-1F

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

6.1.2

6

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
 Account: LTENCODU - LT Environmental
 Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
 Matrix Type: AQUEOUS

Methods: SW846 6010B
 Units: ug/l

Prep Date: 08/17/11

Metal	D26533-1F Original MSD	Spikelot MPICPALL % Rec	MSD RPD	QC Limit
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium	8810	36500	25000 110.8	0.5 20
Chromium	anr			
Cobalt				
Copper	anr			
Iron	5.9	5110	5000 102.1	0.8 20
Lead	anr			
Lithium				
Magnesium	230	25800	25000 102.3	1.2 20
Manganese	anr			
Molybdenum				
Nickel	anr			
Phosphorus	anr			
Potassium	652	26400	25000 103.0	1.5 20
Selenium	anr			
Silicon				
Silver	anr			
Sodium	289000	322000	25000 132.0(a)	2.5 20
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	anr			

Associated samples MP5492: D26583-1F

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

6.1.2
6

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

- (N) Matrix Spike Rec. outside of QC limits
- (anr) Analyte not requested
- (a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

6.1.2

6

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 08/17/11

Metal	BSP Result	Spikelot MPICPALL	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	anr			
Barium	anr			
Beryllium				
Boron				
Cadmium	anr			
Calcium	27800	25000	111.2	80-120
Chromium	anr			
Cobalt				
Copper	anr			
Iron	4990	5000	99.8	80-120
Lead	anr			
Lithium				
Magnesium	25400	25000	101.6	80-120
Manganese	anr			
Molybdenum				
Nickel	anr			
Phosphorus	anr			
Potassium	25900	25000	103.6	80-120
Selenium	anr			
Silicon				
Silver	anr			
Sodium	25000	25000	100.0	80-120
Strontium				
Thallium				
Tin				
Titanium				
Uranium				
Vanadium				
Zinc	anr			

Associated samples MP5492: D26583-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

6.1.3

6

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5492
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

6.1.3

6

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5516
Matrix Type: AQUEOUS

Methods: EPA 200.8
Units: ug/l

Prep Date: 08/19/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	50	.28	4.8		
Antimony	0.40	.002	.022		
Arsenic	0.80	.098	.19		
Barium	2.0	.007	.11		
Beryllium	0.20	.015	.066		
Boron	40	1.9	1.5		
Cadmium	0.10	.045	.054		
Calcium	400	3.6	19		
Chromium	2.0	.041	.11		
Cobalt	0.20	.0065	.011		
Copper	2.0	.021	.2		
Iron	40	1.6	8.2		
Lead	0.50	.0024	.046		
Magnesium	100	.13	3.6		
Manganese	1.0	.014	.14	0.17	<1.0
Molybdenum	1.0	.0087	.05		
Nickel	2.0	.0057	.11		
Phosphorus	60	3.6			
Potassium	200	4	6.4		
Selenium	0.40	.15	.32	0.28	<0.40
Silver	0.10	.0016	.05		
Sodium	500	1.6	54		
Strontium	20	.0079	.028		
Thallium	0.20	.029	.034		
Tin	10	.012	.22		
Titanium	2.0	.069	.24		
Uranium	0.20	.00076	.031		
Vanadium	1.0	.1	.54		
Zinc	10	.077	.55		

Associated samples MP5516: D26583-1F

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5516
Matrix Type: AQUEOUS

Methods: EPA 200.8
Units: ug/l

Prep Date: 08/19/11

Metal	D26599-1 Original MS	Spikelot MPICPALL % Rec	QC Limits
Aluminum			
Antimony			
Arsenic	anr		
Barium			
Beryllium			
Boron			
Cadmium	anr		
Calcium			
Chromium	anr		
Cobalt			
Copper	anr		
Iron	anr		
Lead	anr		
Magnesium			
Manganese	117	214	100 97.0 70-130
Molybdenum	anr		
Nickel	anr		
Phosphorus			
Potassium			
Selenium	0.0	211	200 105.5 70-130
Silver	anr		
Sodium			
Strontium			
Thallium			
Tin			
Titanium			
Uranium			
Vanadium			
Zinc	anr		

Associated samples MP5516: D26583-1F

Results < IDL are shown as zero for calculation purposes

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

(anr) Analyte not requested

6.2.2
6

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
 Account: LTENCODU - LT Environmental
 Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5516
 Matrix Type: AQUEOUS

Methods: EPA 200.8
 Units: ug/l

Prep Date: 08/19/11

Metal	D26599-1 Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
-------	--------------------------	---------------------------	------------	-------------

Aluminum						
Antimony						
Arsenic	anr					
Barium						
Beryllium						
Boron						
Cadmium	anr					
Calcium						
Chromium	anr					
Cobalt						
Copper	anr					
Iron	anr					
Lead	anr					
Magnesium						
Manganese	117	214	100	97.0	0.0	10
Molybdenum	anr					
Nickel	anr					
Phosphorus						
Potassium						
Selenium	0.0	212	200	106.0	0.5	12
Silver	anr					
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Uranium						
Vanadium						
Zinc	anr					

Associated samples MP5516: D26583-1F

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (N) Matrix Spike Rec. outside of QC limits
 (anr) Analyte not requested

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26583
 Account: LTENCODU - LT Environmental
 Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5516
 Matrix Type: AQUEOUS

Methods: EPA 200.8
 Units: ug/l

Prep Date: 08/19/11

Metal	BSP Result	Spikelot MPICPAL % Rec	QC Limits
Aluminum			
Antimony			
Arsenic	anr		
Barium			
Beryllium			
Boron			
Cadmium	anr		
Calcium			
Chromium	anr		
Cobalt			
Copper	anr		
Iron	anr		
Lead	anr		
Magnesium			
Manganese	101	100	101.0 85-115
Molybdenum	anr		
Nickel	anr		
Phosphorus			
Potassium			
Selenium	213	200	106.5 85-115
Silver	anr		
Sodium			
Strontium			
Thallium			
Tin			
Titanium			
Uranium			
Vanadium			
Zinc	anr		

Associated samples MP5516: D26583-1F

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits
 (anr) Analyte not requested

6.2.3
 6

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date: 08/23/11

Metal	RL	IDL	MDL	MB raw	final
Aluminum	500	30	30		
Antimony	150	16	16		
Arsenic	130	30	30		
Barium	50	5.5	5.5		
Beryllium	50	2.2	2.5		
Boron	250	24	24		
Cadmium	50	1.4	1.4		
Calcium	2000	48	75	9.5	<2000
Chromium	50	.9	4		
Cobalt	25	1.8	1.8		
Copper	50	4.3	14		
Iron	350	17	65		
Lead	250	8	11		
Lithium	10	1.4	6		
Magnesium	1000	29	50	-1.5	<1000
Manganese	25	.27	1.6		
Molybdenum	50	2.3	4.4		
Nickel	150	2.2	5		
Phosphorus	500	55	100		
Potassium	5000	280	280		
Selenium	250	19	19		
Silicon	250	19	19		
Silver	150	.9	1.6		
Sodium	2000	570	570	-230	<2000
Strontium	25		1.3		
Thallium	50	15	15		
Tin	250	28	50		
Titanium	50	.55	1.6		
Uranium	250	7.5	18		
Vanadium	50	.8	1.1		
Zinc	150	1.4	9		

Associated samples MP5548: D26583-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

6.3.1

6

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
 Account: LTENCODU - LT Environmental
 Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
 Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
 Units: ug/l

Prep Date: 08/23/11

Metal	D26511-1 Original MS	Spikelot MPICPALL % Rec	QC Limits
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Aluminum					
Antimony					
Arsenic					
Barium					
Beryllium					
Boron					
Cadmium					
Calcium	50900	181000	125000	104.1	75-125
Chromium					
Cobalt					
Copper					
Iron					
Lead					
Lithium					
Magnesium	13900	138000	125000	99.3	75-125
Manganese					
Molybdenum					
Nickel					
Phosphorus					
Potassium					
Selenium					
Silicon					
Silver					
Sodium	41500	168000	125000	101.2	75-125
Strontium					
Thallium					
Tin					
Titanium					
Uranium					
Vanadium					
Zinc					

Associated samples MP5548: D26583-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

6.3.2

6

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
 Account: LTENCODU - LT Environmental
 Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
 Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
 Units: ug/l

Prep Date: 08/23/11

Metal	D26511-1 Original MSD	Spikelot MPICPAL % Rec	MSD RPD	QC Limit
-------	--------------------------	---------------------------	------------	-------------

Aluminum

Antimony

Arsenic

Barium

Beryllium

Boron

Cadmium

Calcium	50900	178000	125000	101.7	1.7	20
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Chromium

Cobalt

Copper

Iron

Lead

Lithium

Magnesium	13900	137000	125000	98.5	0.7	20
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Manganese

Molybdenum

Nickel

Phosphorus

Potassium

Selenium

Silicon

Silver

Sodium	41500	167000	125000	100.4	0.6	20
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Strontium

Thallium

Tin

Titanium

Uranium

Vanadium

Zinc

Associated samples MP5548: D26583-1

Results < IDL are shown as zero for calculation purposes
 (*) Outside of QC limits

6.3.2

6

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date:

Metal

(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested

6.3.2
6

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date: 08/23/11

Metal	BSP Result	Spikelot MPICPALL % Rec	QC Limits
Aluminum			
Antimony			
Arsenic			
Barium			
Beryllium			
Boron			
Cadmium			
Calcium	130000	125000	104.0 80-120
Chromium			
Cobalt			
Copper			
Iron			
Lead			
Lithium			
Magnesium	124000	125000	99.2 80-120
Manganese			
Molybdenum			
Nickel			
Phosphorus			
Potassium			
Selenium			
Silicon			
Silver			
Sodium	127000	125000	101.6 80-120
Strontium			
Thallium			
Tin			
Titanium			
Uranium			
Vanadium			
Zinc			

Associated samples MP5548: D26583-1

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

QC Batch ID: MP5548
Matrix Type: AQUEOUS

Methods: SW846 6010B, USDA HANDBOOK 60
Units: ug/l

Prep Date:

Metal

(anr) Analyte not requested

6.3.3

6

General Chemistry

QC Data Summaries

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Alkalinity, Bicarbonate as CaC	GN11075	5.0	3.1	mg/l	100	110	110.0	90-110%
Alkalinity, Carbonate	GN11076	5.0	0.0	mg/l	100	110	110.0	80-120%
Alkalinity, Total as CaCO3	GN11062	5.0	3.1	mg/l	100	110	110.0	90-110%
Bromide	GP5209/GN11072	0.20	0.0	mg/l	20	19.7	98.5	90-110%
Chloride	GP5209/GN11072	0.50	0.27	mg/l	20	19.8	99.0	90-110%
Fluoride	GP5245/GN11153	0.20	0.0	mg/l	10	9.28	92.8	90-110%
Nitrogen, Nitrate	GP5209/GN11072	0.045	0.0	mg/l	4.52	4.29	95.0	90-110%
Nitrogen, Nitrite	GP5209/GN11072	0.061	0.0	mg/l	6.09	5.97	98.0	90-110%
Phosphate, Ortho	GP5209/GN11072	0.065	0.0	mg/l	9.78	9.47	96.8	90-110%
Solids, Total Dissolved	GN11168	10	0.0	mg/l	400	401	100.3	90-110%
Specific Conductivity	GP5203/GN11057	1.0	<1.0	umhos/cm	99	92.3	93.2	90-110%
Sulfate	GP5209/GN11072	0.50	0.0	mg/l	30	29.2	97.3	90-110%
pH	GN11073			su	8.00	7.97	99.6	99.3-100

Associated Samples:

Batch GN11062: D26583-1
Batch GN11073: D26583-1
Batch GN11075: D26583-1
Batch GN11076: D26583-1
Batch GN11168: D26583-1
Batch GP5203: D26583-1
Batch GP5209: D26583-1
Batch GP5245: D26583-1
(*) Outside of QC limits

7.1

7

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Alkalinity, Total as CaCO ₃	GN11062	D26451-1A	mg/l	209	207	0.7	0-20%
Solids, Total Dissolved	GN11168	D26611-4	mg/l	502	498	0.8	0-25%
Specific Conductivity	GP5203/GN11057	D26510-1	umhos/cm	2430	2490	2.4	0-20%

Associated Samples:
Batch GN11062: D26583-1
Batch GN11168: D26583-1
Batch GP5203: D26583-1
(*) Outside of QC limits

7.2

7

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Alkalinity, Total as CaCO ₃	GN11062	D26451-1A	mg/l	209	100	304	95.2	80-120%
Bromide	GP5209/GN11072	D26581-1	mg/l	0.0	12.5	12.1	96.8	80-120%
Chloride	GP5209/GN11072	D26581-1	mg/l	78.3	50	129	101.4	80-120%
Fluoride	GP5245/GN11153	D26473-1	mg/l	0.63	2.5	2.8	86.8	80-120%
Nitrogen, Nitrate	GP5209/GN11072	D26581-1	mg/l	1.3	2.83	4.1	99.1	80-120%
Nitrogen, Nitrite	GP5209/GN11072	D26581-1	mg/l	0.0	1.52	1.5	98.5	80-120%
Phosphate, Ortho	GP5209/GN11072	D26581-1	mg/l	2.6	4.08	6.7	100.6	80-120%
Sulfate	GP5209/GN11072	D26581-1	mg/l	32.9	50	83.6	101.4	80-120%

Associated Samples:

Batch GN11062: D26583-1

Batch GP5209: D26583-1

Batch GP5245: D26583-1

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

7.3

7

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26583
Account: LTENCODU - LT Environmental
Project: Rule 608 Compliance XTO Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Alkalinity, Total as CaCO ₃	GN11062	D26451-1A	mg/l	209	100	298	1.9	20%
Bromide	GP5209/GN11072	D26581-1	mg/l	0.0	12.5	12.0	0.8	20%
Chloride	GP5209/GN11072	D26581-1	mg/l	78.3	50	129	0.0	20%
Fluoride	GP5245/GN11153	D26473-1	mg/l	0.63	2.5	2.8	0.0	20%
Nitrogen, Nitrate	GP5209/GN11072	D26581-1	mg/l	1.3	2.83	4.1	0.0	20%
Nitrogen, Nitrite	GP5209/GN11072	D26581-1	mg/l	0.0	1.52	1.5	0.0	20%
Phosphate, Ortho	GP5209/GN11072	D26581-1	mg/l	2.6	4.08	6.7	0.0	20%
Sulfate	GP5209/GN11072	D26581-1	mg/l	32.9	50	83.5	0.1	20%

Associated Samples:

Batch GN11062: D26583-1

Batch GP5209: D26583-1

Batch GP5245: D26583-1

(*) Outside of QC limits

(N) Matrix Spike Rec. outside of QC limits

7.4

7



Misc. Forms

Custody Documents and Other Forms

(Accutest Laboratories Gulf Coast, Inc.)

Includes the following where applicable:

- Chain of Custody

Accutest Job Number: D26583 Client: AMS Project: BART
 Date / Time Received: 8/18/2011 Delivery Method: _____ Airbill #'s: 456914761072
 No. Coolers: 1 Therm ID: IRGUN4 Temp Adjustment Factor: -0.1;
 Cooler Temps (Initial/Adjusted): #1: (3.3/3.2);

Cooler Security

	Y	or	N		Y	or	N
1. Custody Seals Present:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	3. COC Present:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Custody Seals Intact:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	4. Smpl Dates/Time OK	<input checked="" type="checkbox"/>		<input type="checkbox"/>

Cooler Temperature

	Y	or	N
1. Temp criteria achieved:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Cooler temp verification:	<u>IR Gun</u>		
3. Cooler media:	<u>Ice (Bag)</u>		

Quality Control Preservation

	Y	or	N	N/A	WTB	STB
1. Trip Blank present / cooler:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
2. Trip Blank listed on COC:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>		
3. Samples preserved properly:	<input checked="" type="checkbox"/>		<input type="checkbox"/>			
4. VOCs headspace free:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>		

Sample Integrity - Documentation

	Y	or	N
1. Sample labels present on bottles:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. Container labeling complete:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
3. Sample container label / COC agree:	<input checked="" type="checkbox"/>		<input type="checkbox"/>

Sample Integrity - Condition

	Y	or	N
1. Sample recvd within HT:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
2. All containers accounted for:	<input checked="" type="checkbox"/>		<input type="checkbox"/>
3. Condition of sample:	<u>Intact</u>		

Sample Integrity - Instructions

	Y	or	N	N/A
1. Analysis requested is clear:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
2. Bottles received for unspecified tests	<input type="checkbox"/>		<input checked="" type="checkbox"/>	
3. Sufficient volume recvd for analysis:	<input checked="" type="checkbox"/>		<input type="checkbox"/>	
4. Compositing instructions clear:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>
5. Filtering instructions clear:	<input type="checkbox"/>		<input type="checkbox"/>	<input checked="" type="checkbox"/>

Comments

GC 8/18/11

 Accutest Laboratories
 V: 713.271.4700

 10165 Harwin Drive
 F: 713.271.4770

 Houston, TX 77036
 www.accutest.com

D26583: Chain of Custody
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Sample Receipt Log

Page 2 of 2

 Job #: D26583

 Date / Time Received: 8/18/2011 9:45:00 AM

 Initials: EC

 Client: AMS

Cooler #	Sample ID:	Vol	Bot #	Location	Pres	pH	Therm ID	Initial Temp	Therm CF	Corrected Temp
1	D26583-1	Spec Cup	1	MICRO	Na2S2O3	Note #2 - Preservative check not applicable.	IRGUN4	3.3	-0.1	3.2

D26583: Chain of Custody

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General Chemistry

QC Data Summaries

(Accutest Laboratories Gulf Coast, Inc.)

Includes the following where applicable:

- Method Blank and Blank Spike Summaries
- Duplicate Summaries
- Matrix Spike Summaries

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26583
Account: ALMS - Accutest Mountain States
Project: LTENCODU: Rule 608 Compliance XTO Raton Basin

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Iron Reducing Bacteria	MB4703	25	<25	cfu/ml				
Slime Forming Bacteria	MB4704	500	<500	cfu/ml				
Sulfate Reducing Bacteria	MB4702	200	<200	cfu/ml				

Associated Samples:
Batch MB4702: D26583-1
Batch MB4703: D26583-1
Batch MB4704: D26583-1
(*) Outside of QC limits

9.1

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DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: D26583
Account: ALMS - Accutest Mountain States
Project: LTENCODU: Rule 608 Compliance XTO Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Iron Reducing Bacteria	MB4703	D26636-3	cfu/ml	9000	9000	0.0	0-%
Slime Forming Bacteria	MB4704	D26636-2	cfu/ml	350000	350000	0.0	0-%

Associated Samples:
Batch MB4702: D26583-1
Batch MB4703: D26583-1
Batch MB4704: D26583-1
(*) Outside of QC limits

9.2
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