2014 OUTCROP ZONE REPORT

FRUITLAND FORMATION OUTCROP ZONE
ARCHULETA COUNTY, COLORADO

DECEMBER 2014

Prepared for:

PETROX RESOURCES, INC.
Meeker, Colorado

and

ELM RIDGE RESOURCES, INC.
Dallas, Texas

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EXECUTIVE SUMMARY

This 2014 Outcrop Zone Report meets the requirements set forth by the United States Forest Service (USFS) and the Bureau of Land Management (BLM) in Decision Point 5 of the Record of Decision (ROD) in order to obtain approval of an application for permit to drill (APD) for coalbed methane (CBM) production of federal minerals in the Project Area. The Project Area includes approximately 18 miles of the Fruitland Formation (Kf) outcrop starting on the west end at the La Plata County-Archuleta County boundary near Beaver Creek and extends southeast along the Kf outcrop to the Southern Ute Indian Tribe (SUIT) Reservation boundary at Cabezon Canyon. In addition to the Kf outcrop, the Project Area includes a 1.5-mile buffer inward from the Kf and Kirtland Shale (Kk) boundary, known collectively as the "outcrop zone".

The ROD was developed in response to the 2006 Final Environmental Impact Statement (FEIS) for the Northern San Juan Basin (NSJB). In July, 2011, Petrox Resources, Inc. (Petrox) drilled a horizontal lateral of the Candelaria 10U#3 CBM production well from fee minerals through 172 feet of federal minerals within the Kf in the northeast quarter of the northwest quarter of Section 15U, Township 34 North, Range 5 West in Archuleta County, Colorado. The APD for the Candelaria 10U#3 CBM production well was approved February 2, 2012.

Petrox subsequently submitted an APD to the BLM/USFS for the FGU 9U#3 CBM production well that was proposed to be installed on a federal lease within the Project Area. The APD was approved in April 2013 and drilling was initially scheduled for mid-June 2013. The USFS was not able to complete the required wildlife surveys until early July 2013. Drilling had been tentatively rescheduled for Spring 2014. Due to additional delays, drilling of the FGU 9U#3 has been tentatively rescheduled for 2015. When the well is drilled, the producing zone of the lateral portion of the well will not be drilled within the outcrop zone and as a result, will no longer be included in this study.

In addition to compliance with the ROD, the monitoring program detailed in this report meets the requirements of Sections 1, 2, and 4 of the Conditions of Approval (COA) for the Candelaria 10U#3 fee CBM production well (Permit), issued by the Colorado Oil and Gas Conservation Commission (COGCC).

Currently, Elm Ridge does not have any active CBM production wells nor do they have any APDs planned within the outcrop zone.

The objective of the 2014 Outcrop Zone Report is to characterize the Project Area and evaluate the existing conditions of current and future CBM production of federal minerals in the Fosset Gulch Unit within the outcrop zone. The 2014 reconnaissance survey represents the fourth evaluation of the Project Area for development of the Fosset Gulch Unit.

Baseline conditions within the Project Area indicate conditions have not changed within the Project Area since 2004, despite ongoing CBM production since 1990 by Elm Ridge Resources, Inc. (Elm Ridge) in the nearby Pargin Mountain Unit. As stated in Decision Point 5 of the ROD, oil and gas producers are allowed to monitor-as-you-go after CBM wells are drilled and begin production. This approach appears warranted as there are 11 years of outcrop monitoring baseline data, the construction and monitoring of seven COGCC monitoring wells, the

installation and monitoring of BLM soil vapor tubes, and historical/ongoing reservoir pressure data which all provide sufficient monitoring of the Kf outcrop, which has concluded there is virtually no methane seeping to the ground surface or active coal fires.

Throughout the lifecycle of CBM production in the Fosset Gulch Unit (FGU), Petrox and Elm Ridge will evaluate conditions to determine if production is contributing to methane seepage, coal fires, surface water depletion, or pressure changes in monitoring wells at or near the Kf outcrop. If CBM production is determined to be adversely impacting any of these conditions, Petrox and/or Elm Ridge will evaluate the mitigation strategies discussed in the ROD and work with the BLM, USFS, and/or COGCC to implement effective mitigation measures.

Based on the monitoring results, evaluation of this report, and technical working group (TWG) (comprised of comprised of the BLM, USFS, COGCC, the SUIT, Petrox, and LT Environmental, Inc. (LTE]) meetings, LTE, Petrox, and Elm Ridge recommend the following to monitor the Project Area:

- Conduct annual surveys of methane flux at the ground surface where surface water transects the Kf outcrop utilizing 400-foot grid spacing during those years that the regional reconnaissance is not conducted. During regional reconnaissance years (conducted in 2014), grid spacing will reduced to the previously conducted 200-foot spacing flux survey;

- Measure methane flux at nearby abandoned production wells, specifically the Big Horn-Schomburg #1 abandoned production well;

- Identify and sample natural springs along the Kf outcrop on an annual basis;

- Field verify suspect methane seeps along the Kf outcrop using scheduled regional reconnaissance methods of aerial fly-over and field verification on a 3-year cycle (conducted in 2014 and next scheduled for 2017);

- Conduct abandoned coal mine surveys on an annual basis. The next annual survey is tentatively scheduled for Summer 2015;

- Summation and evaluation of the BLM soil vapor monitoring tube data, if available, with statistical analysis using the Mann-Kendell test;

- Summation and evaluation of the COGCC monitoring well pressure data with an emphasis on monitoring wells Fosset Gulch MW 34-5-14-1 (API 05-007-06264) and Fosset Gulch MW 34-5-14-2 (API 05-007-06265);

- Summation and evaluation of annual natural gas and water production data from each Petrox/Elm Ridge CBM production well within the Fosset Gulch Unit; and

- Present this Outcrop Zone Report, prepared by LTE, to the TWG during its annual review.

In addition to modified monitoring plans developed through the TWG, the following action items were discussed and agreed to:

- No new monitoring wells will be required at this time;
- Petrox will incorporate water chemistry data from new production wells drilled prior to bringing them online per the COGCC COA. The data will be presented in subsequent outcrop zone reports;
- Petrox will collect and provide initial downhole pressure data for all new drill production wells within the outcrop zone prior to bringing them online. The data will be used in evaluating reservoir production efficiency and in evaluating the Mansoori modeling efforts. Modeling data will be incorporated into subsequent outcrop zone reports;
- Petrox will evaluate reservoir pressure data from new drill production wells as they occur within the outcrop and conduct periodic model runs similar to the initial Mansoori effort to monitor the actual reservoir behavior in comparison to the initial predictive effort. The frequency of this activity will be dependent on the data available. Results, when available, will be presented in subsequent outcrop zone reports;
- Petrox will commit to utilizing the 10U#4 or other existing/proposed CBM production wells for pressure monitoring for a period of no more the three months following completion of the well within the outcrop zone. The data will be provided to the TWG for evaluation. The data will also be incorporated into the outcrop zone report; and
- The outcrop zone reports and subsequent monitoring will be utilized for all APDs for Petrox and Elm Ridge within the Fosset Gulch Unit.

1.0 INTRODUCTION

This 2014 Outcrop Zone Report has been prepared at the request of Petrox Resources, Inc. (Petrox) and Elm Ridge Resources, Inc. (Elm Ridge) for the Project Area within the eastern half of the Northern San Juan Basin (NSJB) in Archuleta County, Colorado. The Project Area includes approximately 18 miles of the Fruitland Formation (Kf) outcrop starting on the west end at the Archuleta County-La Plata County boundary near Beaver Creek and extends southeast along the Fruitland Formation (Kf) outcrop to the Southern Ute Indian Tribe (SUIT) Reservation boundary at Cabezon Canyon. In addition to the Kf outcrop, the Project Area includes a 1.5-mile buffer from the Kf and Kirtland Shale (Kk) boundary, known collectively as the "outcrop zone". Figure 1 illustrates the Project Area.

1.1 BACKGROUND

This report meets the requirements set forth by the United States Forest Service (USFS) and the Bureau of Land Management (BLM) in Decision Point 5 of the Record of Decision (ROD) in order to obtain approval of an application for permit to drill (APD) for coalbed methane (CBM) production of federal minerals in the Project Area. The ROD was developed in response to the 2006 Final Environmental Impact Statement (FEIS) for the NSJB.

In July, 2011, Petrox drilled a horizontal lateral of the Candelaria 10U#3 CBM production well from fee minerals through 172 feet of federal minerals in the northeast quarter of the northwest quarter of Section 15U, Township 34 North, Range 5 West in Archuleta County, Colorado. The APD from the BLM for the Candelaria 10U#3 was approved February 2, 2012.

Petrox subsequently submitted an APD to the BLM/USFS for the FGU 9U#3 CBM production well that was proposed to be installed on a federal lease within the Project Area. The APD was approved in April 2013 and drilling was initially scheduled for mid-June 2013. The USFS was not able to complete the required wildlife surveys until early July 2013. Drilling had been tentatively rescheduled for Spring 2014. Due to additional delays, drilling of the FGU 9U#3 has been tentatively rescheduled for 2015. When the well is drilled, the producing zone of the lateral portion of the well will not be drilled within the outcrop zone and as a result, will no longer be included in this study.

In addition to compliance to the ROD, the monitoring program detailed in this report meets the requirements of Sections 1, 2, and 4 of the Conditions of Approval (COA) for the Candelaria 10U#3 CBM production well (Permit), issued by the Colorado Oil and Gas Conservation Commission (COGCC). Outcrop monitoring has been conducted by Petrox and Elm Ridge in Archuleta County since 2004.

Currently, Elm Ridge does not have any active CBM production wells nor do they have any APDs planned within the outcrop zone.

As stipulated in the ROD, the technical working group (TWG), comprised of the BLM, USFS, COGCC, the SUIT, Petrox, and LT Environmental, Inc. (LTE), met in September 2012, December 2012, and March 2013 to discuss the 2011 and 2012 Outcrop Zone reports as well as

future plans Petrox has for drilling within the outcrop zone. The next TWG meeting is tentatively scheduled for December 2014.

1.2 PROJECT OBJECTIVE

The objective of the 2014 Outcrop Zone Report is to continue to characterize the Project Area and evaluate the existing conditions for current and future CBM production of federal minerals within the outcrop zone. This 2014 Outcrop Zone Report marks the fourth year of evaluating the Project Area conditions based on the BLM Decision Point 5 of the ROD and will continue to be revised annually as new CBM production wells are drilled and monitoring continues. As discussed in Decision Point 5 of the ROD, Project Area conditions will be evaluated through a monitor-as-you-go approach, which allows the oil and gas producer to monitor the Project Area while they drill and produce CBM production wells. The 2014 monitoring event marks the 11th year of monitoring the Kf outcrop per Sections 1, 2, and 4 of the COA for the Permit approved by the COGCC.

1.3 SCOPE OF WORK

The scope of work for this 2014 Outcrop Zone Report included the following tasks:

- Document changes to baseline conditions, if any, within the Project Area, which could include reservoir, geological, and/or hydrological data;
- Describe the monitoring and mitigation programs for the Project Area;
- Summarize the monitor-as-you-go results for the current monitoring program (2014);
- Evaluate the Project Area as it relates to CBM production of federal minerals;
- Prepare this report; and
- Discuss, evaluate, and assess the 2014 Outcrop Zone Report with the TWG.

1.4 ORGANIZATION OF REPORT

This report is organized into six sections including this introduction (Section 1.0). The documentation of project baseline conditions is described in Section 2.0. The monitoring and mitigation programs are discussed in Section 3.0. The monitor-as-you-go results are summarized in Section 4.0. The outcrop evaluation is detailed in Section 5.0. References are presented in Section 6.0. Figures, tables, and appendices follow the text in separate sections.

2.0 DOCUMENTATION OF PROJECT BASELINE CONDITIONS

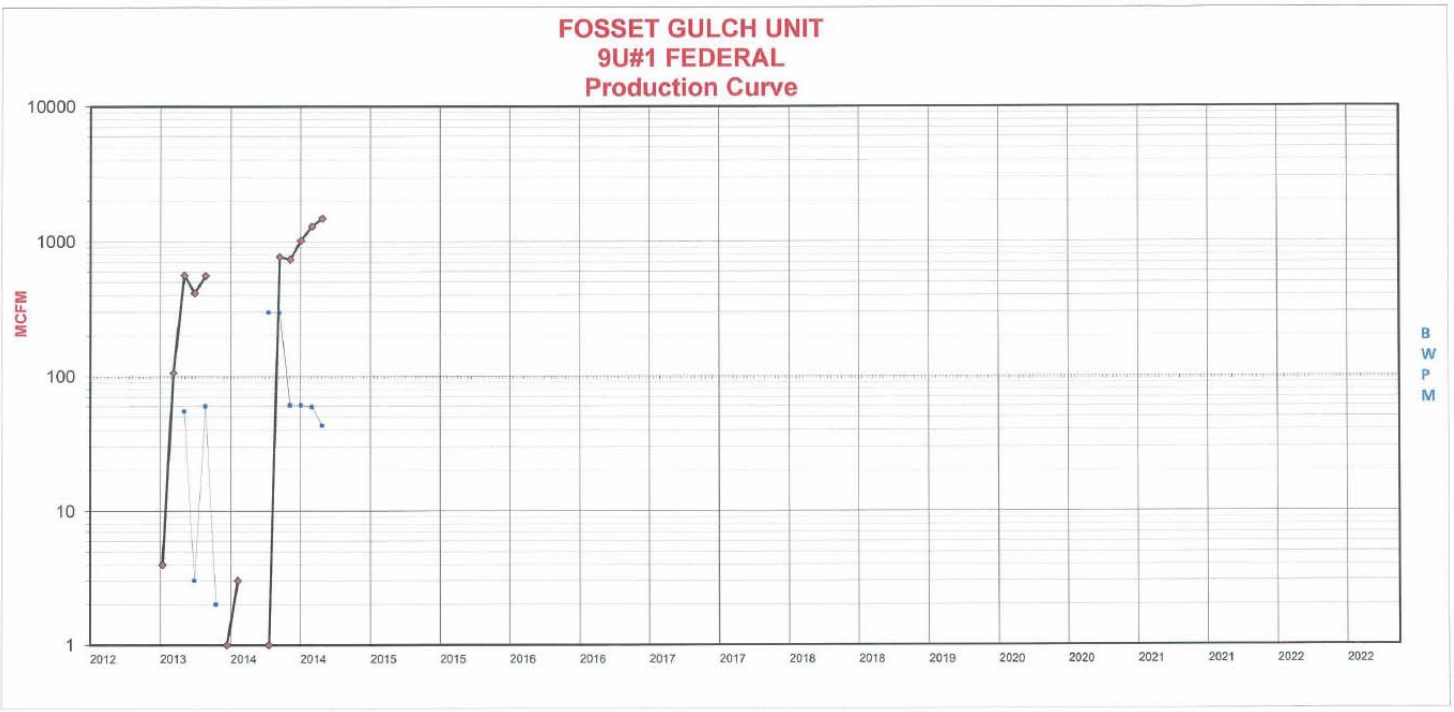
Baseline conditions have been described in detail in the previous three Outcrop Zone Reports, which can be viewed on the COGCC website at http://cogcc.state.co.us/ .

As stated in Decision Point 5 of the ROD, reporting of monthly gas and production data is to be included in the outcrop zone report. The table below summarizes total gas production rates and total produced water rates for the four Petrox CBM production wells (FGU 9U#1, FGU 9U#4, Candelaria 10U#3 (lateral), and FGU 9U#2) within the Fosset Gulch Unit (FGU) in Archuleta County from May 2014 through October 2014:

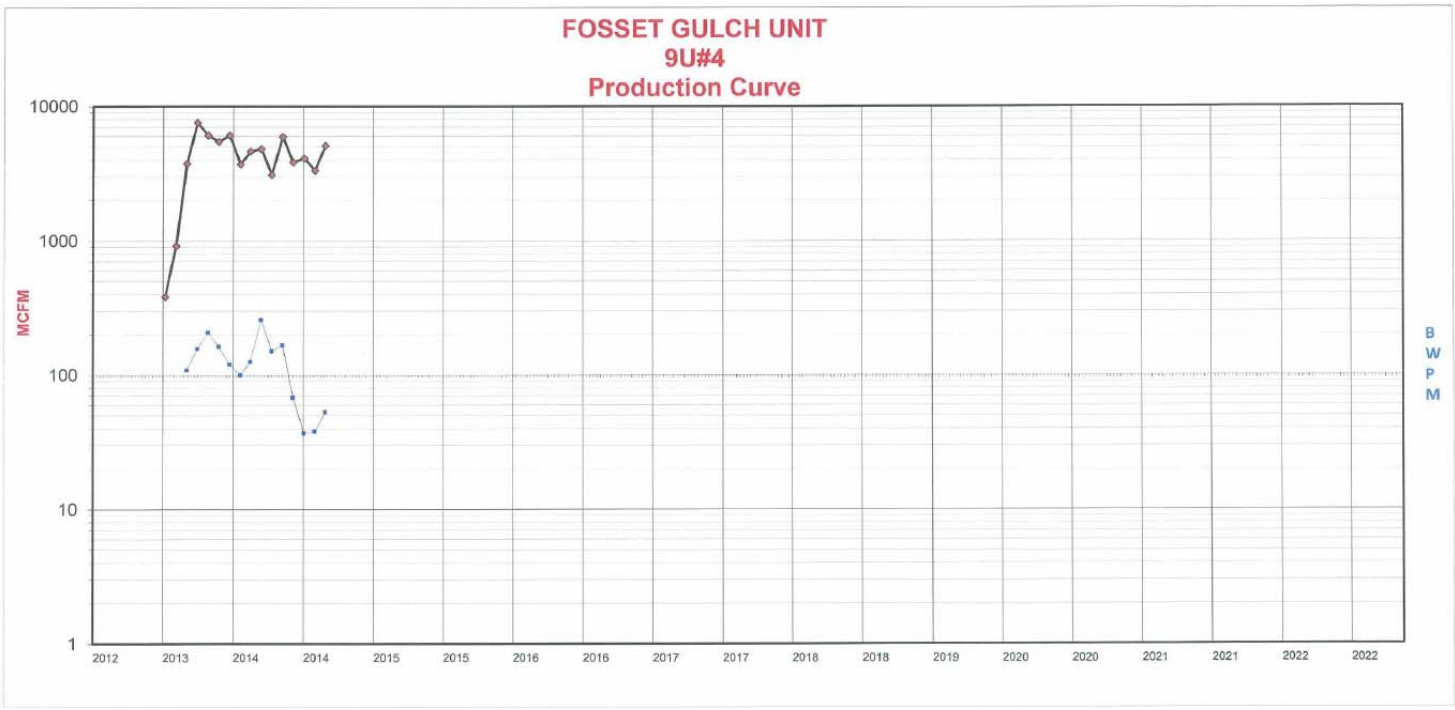
2014 Gas and Produced Water Production Rates, FGU, Archuleta County, Colorado

Month	Gas Production (Thousand Cubic Feet Per Month)	Water Production (Barrels per Month)
May	12,548	922
June	25,403	963
July	26,278	492
August	22,921	478
September	19,973	462
October	21,707	462

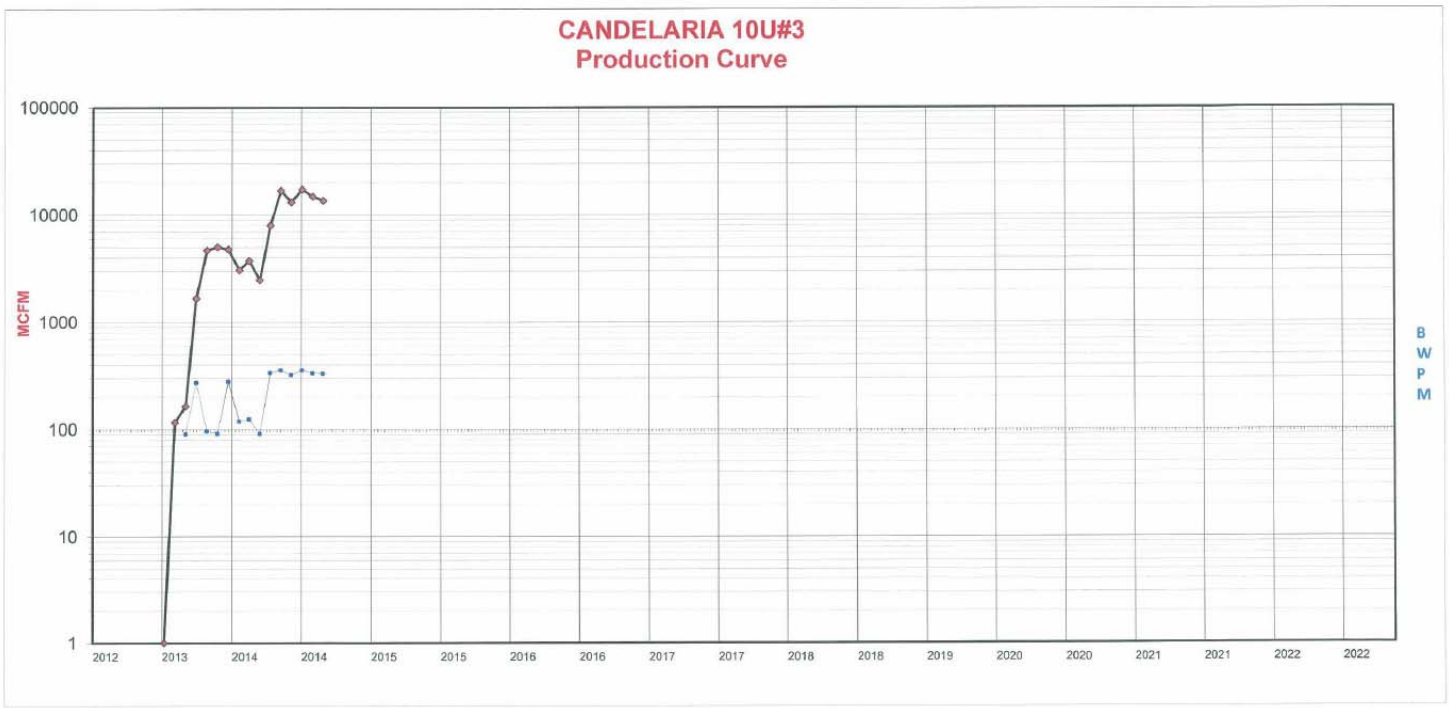
Below are graphical representations of monthly gas and water production rates for each FGU production well:



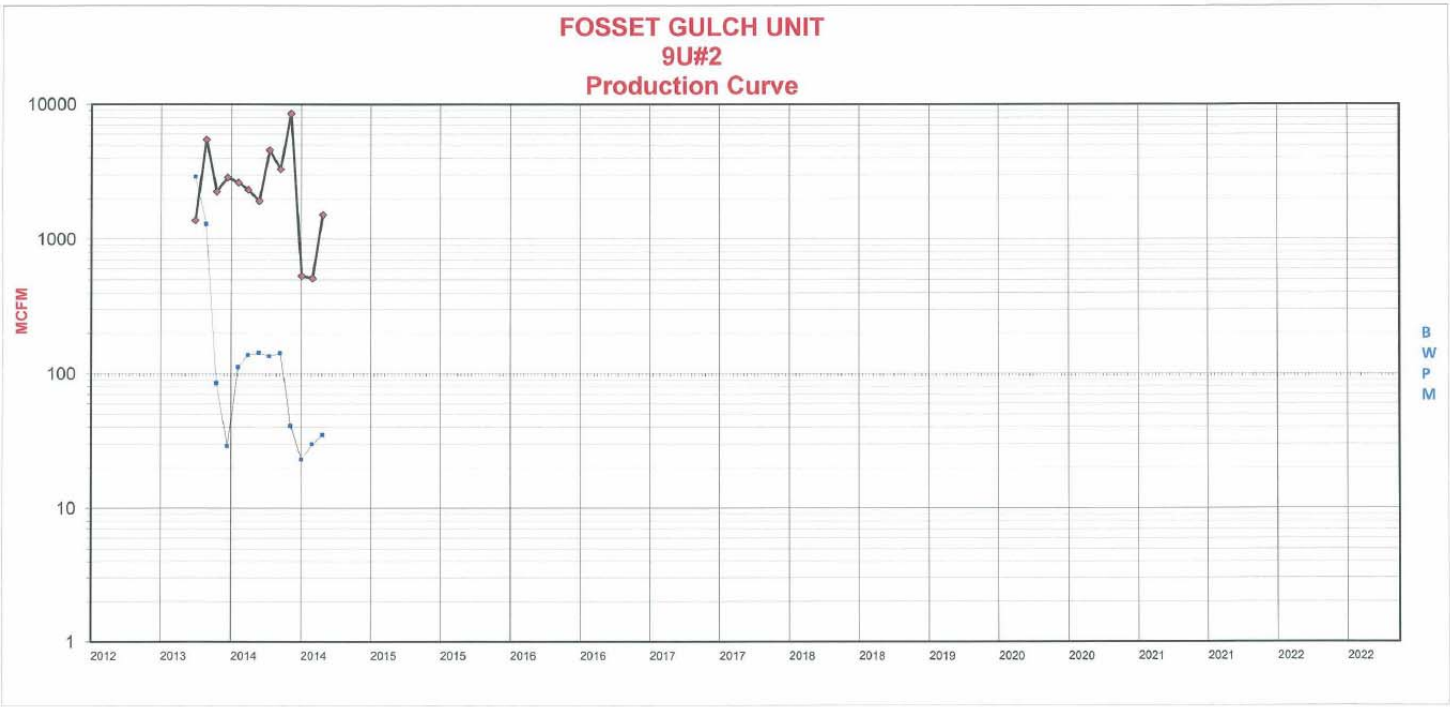
Notes:
MCFM – thousand cubic feet per month
BWPM – barrels of water per month



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The water production rates for the four Fosset Gulch Unit CBM production wells continues to agree with the theory that the Kf is recharged by surface water infiltration of face cleats at the Kf outcrop. Face cleats tend to be parallel to the Kf outcrop in the Project Area, are resistive (sealed), and allow for limited recharge of the aquifer as seen by the limited water production.

3.0 MONITORING AND MITIGATION

Monitoring of the Kf outcrop has been in conducted since 2004 and is currently conducted using a variety of methods to characterize baseline conditions and identify changes if they occur. These data collection systems provide a consistent and repeatable data set with which changes to Kf outcrop conditions can be easily identified should they occur. The current program is being conducted with the approval of the COGCC and the TWG.

Petrox and Elm Ridge have contracted LTE to conduct the following monitoring tasks to comply with the Permit:

- Conduct annual surveys of methane flux at the ground surface where surface water transects along the Kf outcrop;
- Measure methane flux at nearby abandoned production wells, specifically the Big Horn-Schomburg #1 abandoned production well;
- Identify and sample natural springs along the Kf outcrop; and
- Field verify suspect methane seeps along the Kf outcrop using scheduled regional reconnaissance methods of aerial fly-overs for CIR imagery acquisition and field verification on a 3-year cycle.

In 2011, abandoned coal mines were surveyed by LTE for the presence or absence of methane and/or coal fires. This task was conducted in response to Decision Point 5 of the ROD. Additionally, COGCC monitoring well data and BLM soil vapor tube (SVT) data were evaluated by LTE. These tasks have been incorporated into the annual monitoring program and are discussed in detail in subsequent sections of this report.

3.1 MONITORING HISTORY

Below is a brief summary of monitoring activities that have occurred to-date in the Project Area:

- In September 2004, LTE conducted an initial investigation of the Kf outcrop in Archuleta County, which consisted of an aerial fly-over reconnaissance and field inspections of identified suspect areas defined by stressed and dead vegetation;
- In 2005, similar data were collected with the addition of color infrared (CIR) aerial imagery acquisition and sampling of natural springs along the Kf outcrop;
- In 2006, additional inspections of surface water in drainage transects of the Kf outcrop, collection of subsurface gas measurements from gas monitoring probes, and soil gas surveys at two abandoned production well sites were included to expand the data set;

- Since 2007, equipment capable of measuring the flux of soil gas moving across the soil surface to the atmosphere has been used in conjunction with the above described monitoring to quantify changes in methane seepage volumes;

- Since 2011, BLM soil vapor tube data and COGCC monitoring well pressure data have been reviewed and evaluated;

- TWG meetings have been held in September 2012, December 2012, and March 2013. The meetings included members of Petrox, COGCC, SUIT, BLM, USFS, and LTE. Summaries of the TWG meetings are included in Appendix A.

Detailed information for each year can be reviewed in the respective yearly report, which is available on the COGCC website at http://cogcc.state.co.us/ .

3.2 DETAILED MAPPING

3.2.1 Property Access

Prior to conducting field activities, land information is obtained from the Archuleta County Assessor's office. Parcel data is cross-referenced with the Kf outcrop geometry to identify owners of parcels located on the Kf outcrop. Much of the outcrop land is federal land with unrestricted access. An attempt to contact private landowners along the Kf outcrop in the Project Area is made prior to the initiation of field activities.

3.2.2 Drainage Transects

LTE conducts drainage transects surveys along the Kf outcrop in the Project Area (Figure 1) at the following locations:

- Beaver Creek;
- Squaw Creek;
- Little Squaw Creek;
- Pole Gulch;
- Peterson Gulch (West and East);
- Candelaria Ranch;
- Piedra River;
- Stollsteimer Creek; and
- Cabezon Canyon.

In the past, drainage transect surveys have been limited and/or not conducted at the Candelaria Ranch, Piedra River, and Cabezon Canyon due to property access denial.

3.2.3 Field Mapping

The grids for detailed mapping areas consist of a varying number of squares, ranging in area from 2,500 square feet (ft^2) to 40,000 ft^2. From 2007 to 2012, a 200-foot grid spacing was used for drainage transect mapping and a 50-foot grid spacing is used for the Big Horn-Schomburg #1 abandoned production well survey. The grid mapping system has proven to be systematic, consistent, repeatable, representative, and successful in delineating the lateral extent of seepage for similar projects within the NSJB. Since methane flux has limited over the past six years, the TWG determined that an expansion in grid size and overall reduction in sample collection points was warranted. As a result, grid spacing was expanded to a 400-foot spacing for 2013 and subsequent years when regional reconnaissance events are not conducted. During regional reconnaissance years (conducted in 2014), grid spacing is reduced to the 200-foot spacing as conducted from 2007 to 2012. This approach is cost efficient and effective in achieving early methane seepage detection, if it ever becomes present. A detailed description of the flux meter and mapping process can be found in the 2013 Outcrop Zone Report. Specifications of flux mapping equipment are included in Appendix B.

LTE conducted detailed flux mapping along six locations where surface water drainages transect the Kf outcrop in the Project Area from July 14 through August 1, 2014. Results of the 2014 mapping event are discussed in Section 4.2.

3.3 ABANDONED PRODUCTION WELL SURVEY

In 2005, LTE conducted an initial subsurface soil gas survey and installed a permanent gas monitoring probe in the vicinity of the Big Horn-Schomburg #1 abandoned production well located near the Kf outcrop in the southeast quarter of Section 14U, Township 34 North, Range 5 West (Figure 1). The production well was drilled and abandoned in 1961 and reference information indicates the Kf is close to, or outcrops at, this location (USFS/BLM, 2006). Geologic maps from the FEIS indicate the abandoned production well is located in the transition zone between the Kf and the Kk.

Since 2010, LTE has conducted an annual soil gas flux survey at the Big Horn-Schomburg #1 abandoned production well. LTE personnel collect methane flux points in the same manner as flux surveys conducted for the drainage transects. If methane is detected in soil, the seep area is then delineated in all four directions. Additionally, flux points are collected next to the abandoned production well utilizing the flux meter. A permanent gas monitoring probe exists nearby, which is monitored.

The 2014 abandoned production well survey was conducted on July 14, 2014. Results of the 2014 event are discussed in Section 4.3.

3.4 REGIONAL RECONNAISSANCE

Regional reconnaissance surveys of the Kf outcrop reconnaissance are conducted every three years (2004, 2008, 2011, and 2014) to supplement the detailed mapping of drainage transects. Reconnaissance includes low altitude, high-resolution CIR aerial imagery to map the vegetation along the outcrop and identify suspect areas for further field investigation. Additionally, CIR imagery is used to assist in the scheduled regional reconnaissance monitoring of the Kf outcrop

to identify potential locations of methane seepage or coal fires in between detailed mapping areas. While the imagery cannot identify specific seeps for coal fires, it can be useful in identifying areas of dead and/or stressed vegetation that may or may not be attributable to methane and/or coal fires. The regional reconnaissance is primarily utilized to identify potential methane seep areas, but anomalies from coal fires can be identified on the CIR imagery as well.

Suspect areas are defined as areas observed within the CIR image that appear anomalous when compared to the surrounding areas. For example, a light gray area surrounded by bright red areas would be considered a suspect area. The natural features that often produce such suspect areas include areas of dead/stressed vegetation, shadows, rocky outcrops, exposed surface soil, water bodies, and/or coal fires. A detailed description of the regional reconnaissance process is discussed in the 2011 Outcrop Zone Report.

The 2014 regional reconnaissance field inspection and verification survey was conducted from August 11 through August 29, 2014. Results of the 2014 event are discussed in Section 4.4.

3.5 ABANDONED COAL MINE SURVEYS

Abandoned coal mine surveys were implemented in 2011 to comply with Decision Point 5 of the ROD. The purpose of surveying the abandoned coal mines along the Kf outcrop is to monitor mines as a potential preferential pathway for methane seepage and locations of surface and/or near-surface coal fires. The surveys are conducted using traditional subsurface soil gas techniques as described in previous reports. Locations of abandoned coal mine survey sites are illustrated on Figure 1.

Abandoned coal mine surveys have been conducted on an annual basis since 2011. Based on the third TWG meeting, the frequency of surveys was increased to quarterly in 2013. After one year of quarterly monitoring has been completed, the results indicated that the frequency of subsequent surveys should be reduced to annually. If during subsequent surveys data suggests inconsistent readings, the TWG will convene to discuss the data and possible additional actions. Results of the 2013 supplemental quarterly abandoned coal mine surveys for 2013 are include as separate covers.

The 2014 abandoned coal mine surveys were conducted from August 5 to August 7, 2014. The results of the 2014 event are discussed in Section 4.5.

3.6 NATURAL SPRING SURVEY

At each accessible and flowing natural spring, field personnel collect water samples and monitor for methane near the natural springs using the portable flux meter. Field personnel locate the position of the natural spring using the GPS. An estimated water discharge rate is measured using a graduated cylinder and stopwatch. When possible, water quality measurements, including pH, electrical conductivity (EC), and temperature are collected at each sampled natural spring.

Laboratory analytical water samples are collected at each accessible and flowing natural spring in bottles and containers prepared by the subcontracted analytical laboratories. Each sample bottle is labeled, indicating project and sample identification, and the date and time of sample

collection. Samples are delivered directly or shipped to the laboratories under chain-of-custody protocols.

Water samples from the natural springs are collected and analyzed for the following:

- Major cations [dissolved sodium (Na), calcium (Ca), magnesium (Mg), potassium (K), and iron (Fe)] by United States Environmental Protection Agency (EPA) Method 200.7/4500;
- Alkalinity (carbonate/bicarbonate) by EPA Method 2320 B;
- Major anions [chloride (Cl), sulfate (SO_4), bromide (Br), and fluoride (F)] by EPA Method 200.7/4500;
- pH by EPA Method150.1;
- Specific conductance by EPA Method 120.1;
- Nitrate/Nitrite as Nitrogen (N) by EPA Method 353.3;
- Total dissolved solids (TDS) by EPA Method 2540 C;
- Dissolved methane by Method RSK 175; and
- Sodium Adsorption Ratio (SAR) by United States Department of Agriculture (USDA) Handbook 60.

Natural spring water samples are collected and then submitted to Four Corners Geoscience, Inc. for analysis of dissolved methane. General water chemistry samples are submitted to Green Analytical Laboratories. Figure 1 depicts the locations of known natural springs within the Kf outcrop in the Project Area.

The 2014 natural springs sampling event was conducted in May 2014. Results are discussed in Section 4.6.

3.7 COGCC MONITORING WELL DATA ANALYSIS

In 2008, the COGCC initiated a Kf reservoir pressure monitoring well program in the Chimney Rock Area of Archuleta County with the cooperation of the USFS. The monitoring wells supplement data produced by an existing monitoring well network in La Plata County and on the SUIT Reservation. The Archuleta County monitoring wells measure formation pressures in the coal seams in the Kf and were installed to establish baseline conditions prior to initiation of CBM development. There are four monitoring well sites within the Project Area (Figure 1). The COGCC measures monitoring well pressures twice daily with permanently installed pressure transducers, data loggers, and telemetry. The data are documented and interpreted by the COGCC in annual reports available for public review.

Results for the 2014 COGCC monitoring well evaluation are included in Section 4.7.

3.8 BLM/USFS SOIL VAPOR TUBE DATA

The BLM has been collecting subsurface methane concentrations from 67 permanent monitoring SVT probes located along eight transects running perpendicular to the Kf outcrop in Archuleta County (Figure 1). SVT data collection began in November 2001 at the Beaver Meadows and Yellow Jacket Pass transects. The first SVT data were collected from the other six transects in August or October 2004. Subsequent measurements have been collected approximately every other month. The most recent SVT data available to LTE at the time of this report were collected from July 2012 through August 2013. SVT data collection at the Candelaria Pasture transect ended in August 2006 when the BLM was denied access to the property. Analysis of the BLM SVT monitoring data is conducted using the Mann-Kendall test included in the Excel® template application MAKESENS. Results of the 2014 analysis are discussed in Section 4.8.

3.9 MITIGATION ALTERNATIVES

The monitoring programs outlined above and detailed in previous Outcrop Zone Reports (found on the COGCC website) provide early detection of potential methane seepage, coal fires, and/or affected natural springs on or adjacent to the Kf outcrop within the Project Area. Since field crews walk the major drainages annually and traverse large sections of the outcrop as part of the regional reconnaissance, observations of vegetative conditions, excessive heat emanating from the ground, smoke, and olfactory observations that may indicate the presence of a methane seepage and/or coal fire can be detected at the early onset of such impacts. Natural springs are sampled during the spring season when most of the natural springs tend to flow.

As agreed upon in the third TWG meeting, triggers for TWG convening to discuss produced water issues will be either high produced water volumes (greater than (>)100 BWPD/well), fresh water composition (less than (<)1,000 ppm), or both. Additional triggers will be developed as CBM production evolves in the Fosset Gulch Unit. Mitigation alternatives will be developed on a case-by-case basis.

In the event methane seepage is identified along the Kf outcrop in Archuleta County, reasonable mitigation efforts, such as reduced or suspended gas production, if clearly demonstrated that such efforts will be effective in mitigating adverse impacts to water resources, vegetation, and/or public health and safety due to fugitive methane gas seeping to the ground surface will be implemented. LTE has direct experience in conducting mitigation of active methane seeps to address impacts to vegetation, public health and safety, and from unrecovered resources in La Plata County. If appropriate, Petrox will implement similar measures as necessary to mitigate such impacts, should they occur. The measures may include one or more of the potential options discussed in the *Preliminary Evaluation of Methane Seepage Mitigation Alternatives* report (LTE, 2006).

As agreed upon in the third TWG meeting, triggers for TWG convening to discuss potential/known methane seepage include, but are not limited to, methane seepage identified during drainage transect surveys or regional reconnaissance surveys, changes in reservoir permeability, and changes in drainage pattern. Mitigation alternatives will be developed on a case-by-case basis.

Evidence of coal fires have not been observed during the past 11 years of monitoring activities. The treatment of coal fires is both very dangerous and expensive. Near-surface coal fires can be extinguished by an extensive network of injection wells drilled into the affected seam where water, mud, or concrete slurries are used to smother the fire in a conjunction with near-surface excavation activities. In La Plata County, efforts to extinguish active coal fires via injection near the Kf outcrop have been ineffective until recently, when one coal fire was extinguished within the SUIT reservation. Petrox and LTE will look into the SUIT's success in extinguishing their coal fire and evaluate the technical feasibility in the event a coal fire ignites along the Kf outcrop in Archuleta County and Petrox is deemed the responsible party.

The TWG will convene if monitoring of the Kf outcrop in the Project Area indicates a potential for surface and/or near-surface coal fires or if coal fires are observed during field activities. Mitigation alternatives will be evaluated on a case-by-case basis.

4.0 MONITOR-AS-YOU-GO RESULTS

This section presents the 2014 monitoring results for the Project Area.

4.1 PROPERTY ACCESS

LTE personnel were denied access to several properties; as a result, no monitoring activities were conducted on these properties during the 2014 monitoring event. The 2014 status of access to parcels is illustrated on Figure 2 and presented in Table 1.

4.2 DRAINAGE TRANSECTS SURVEY

During 2014, LTE conducted inspections from July 14 to August 1, 2014, at the following six accessible locations where surface water drainages transect the Kf outcrop in Archuleta County:

- Beaver Creek;
- Squaw Creek and Little Squaw Creek;
- Pole Gulch;
- Peterson Gulch;
- Piedra River; and
- Stollsteimer Creek.

4.2.1 Water Surface Inspections

Methane was not observed being discharged as bubbles on the water surface at the six drainage transects inspected during the 2014 monitoring event.

4.2.2 Soil Gas Flux Measurements

Using the flux meter, LTE personnel collected soil gas flux measurements along the six drainage transects during the 2014 monitoring event. Reportable methane flux (greater than 0.2 $mol/m^2 \cdot day$) was not recorded at any of the 642 measurement points. Results of the soil gas flux measurement surveys indicate there are low background levels of methane present at the ground surface along the Kf outcrop in Archuleta County.

4.2.3 Total Methane Volumetric Flux Estimation

There was no reportable methane detected in Archuleta County during the 2014 flux survey and as a result, the total methane volumetric flux is 0.0 thousand cubic feet per day (MCFD).

The methane flux measurements for the six drainage transects are presented on Figure 3. Flux data is summarized in Table 2. The methane data are presented Appendix C.

4.2.4 Historical Methane Flux Data Comparison

From 2007 to 2009, total volumetric methane flux was calculated using all methane flux values recorded in the field, regardless of the technical limitations of the flux meter. However, methane flux values below the reporting limit of 0.2 mol/m^2·day are not considered accurate and/or repeatable by the manufacturer of the flux meter. Therefore, the total volumetric methane flux reported in prior years appears to be inflated with inaccurate data. In 2010, only two methane flux values were detected above the reporting limit. As a result, limited data points with reportable methane flux values cannot be used to accurately calculate total reportable methane volumetric flux. An attempt to calculate the total reportable methane volumetric flux with limited data points would ultimately lead to results that might not reflect the actual methane volumetric flux within Archuleta County.

Reportable methane flux was detected in five locations in 2007 and 2008, and then dropped to three locations in 2009. Reportable methane flux was not recorded in any locations during the 2010 survey. In 2011, only two locations detected reportable methane flux. Every location sampled in 2012, 2013, and 2014 were below the reportable detection limit. Limited reportable methane flux values and low historical volumetric methane fluxes detected in Archuleta County appear to be associated with background levels.

4.2.5 Total Carbon Dioxide Volumetric Flux Estimation

As with estimating the total flux of methane at each drainage transect using data collected with the flux meter, LTE interpolated and gridded carbon dioxide flux data along each of the six drainage transect areas, and then contours and processes the data to estimate total flux. Carbon dioxide flux contours and values are included on Figure D1 in Appendix D.

For a better perspective of the 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 7,000 feet amsl. For carbon dioxide flux, the calculation is as follows:

$$\frac{\text{mol } CO_2}{\text{day}} \times \frac{44.01 \text{ g } CO_2}{\text{mol } CO_2} \times \frac{0.0253 \text{ ft}^3 CO_2}{\text{g } CO_2} = \frac{\text{ft}^3 CO_2}{\text{day}}$$

For example,

$$1.0 \text{ mol/day } CO_2 = 1.11 \text{ CFD } CO_2$$

Notes:
mol – mole CO_2 – carbon dioxide g – gram ft^3 – cubic feet

Due to low concentrations of methane detected along the drainage transects, the carbon dioxide flux values do not appear to correlate with methane concentrations. It appears that carbon dioxide is naturally occurring along the drainage transects and as a result, carbon dioxide data is not discussed for each transect. Carbon dioxide flux data are included in Appendix C.

4.3 ABANDONED PRODUCTION WELL SURVEY

LTE conducted the 2014 Big Horn-Schomburg #1 abandoned production well site survey on July 14, 2014. LTE collected 19 flux measurements with no reportable methane detected. A single reportable methane flux point was detected in 2007, 2009, and 2011. Figure 3 presents the results of the Big Horn-Schomburg #1 abandoned production well survey. The methane flux data are presented in Table 2 and included in Appendix C.

4.4 REGIONAL RECONNAISSANCE

The 2014 regional reconnaissance event included CIR aerial imagery and review for stressed vegetation, followed by field verification with the collection of subsurface soil gas concentration measurements within identified suspect areas. The 2014 regional reconnaissance included similar CIR imagery review and field verification tasks as conducted in 2005, 2008, and 2011.

Methane was not detected at the measurement points within the suspect areas in 2014. In general, poor vegetation health in suspect areas was a function of surface physical conditions, such as poor soil development on coal and rock outcrops and/or steep slopes. Based on field verification activities and the lack of measurable methane, it appears no new methane seeps were identified from the regional reconnaissance activities in 2014. Figure 4 illustrates the locations of the suspect seep areas where field verification was conducted. A summary of sub gas measurements for the suspect seep areas is included in Appendix E.

4.5 ABANDONED COAL MINE SURVEYS

In 2011, LTE identified seven abandoned coal mines along the Kf outcrop. Due to continued property access denial, the Unnamed Abandoned Mine, Cabezon Project mine, and Chimney Rock Coal mine were not surveyed in 2014. Below is a summary of subsurface soil gas surveys for four abandoned coal mines along the Kf outcrop. The abandoned coal mine surveys were conducted from August 6 to August 8, 2014. Figures 5 through 10 illustrate subsurface soil gas and temperature measurements. Subsurface soil gas and temperature measurements are presented in Appendix F.

Methane was not detected at any of the abandoned coal mines. Carbon monoxide is a by-product of coal combustion. With limited carbon monoxide and low subsurface temperatures, there does not appear to be active combustion/fires in the vicinity of these four coal mines. As additional verification, LTE did not observe other potential indicators of underground coal fires such as dead vegetation, charred ground, or visible smoke or steam during these surveys.

4.6 NATURAL SPRINGS SURVEY

4.6.1 Sampling Status

A total of 35 potential natural springs were identified in 2014 on or near the Kf outcrop in Archuleta County. Of the 35 natural springs, 6 natural springs were sampled in 2014. Those natural springs that were not sampled were due to property access denial by landowners or the natural spring was dry at the time of sampling.

The locations of natural springs are presented on Figure 11. A summary of the natural springs sampled in 2014, along with past sampling status, is presented in Table 3.

4.6.2 Field Measurements and Observations

Field observations and measurements of temperature, pH, and EC are collected at the sampled natural springs. The 2014 field observations and measurements for the natural springs, including historical measurements, are summarized in Table 4.

Natural spring discharge rates were calculated by dividing the known volume of a container by the time required to fill the container. The flow rates measured in 2014 are similar to the low flow rates measured during previous monitoring events. Natural spring discharge rates, including historical data, are presented in Table 5.

4.6.3 Natural Spring Sampling and Analysis

The COGCC uses 2 milligrams per liter (mg/L) for methane in domestic water systems as the threshold to identify water for further investigation of the origin of the methane in the water. The COGCC considers water systems containing dissolved methane concentrations above 2 mg/L have an increased risk of desorption from the water and create potentially explosive conditions in confined spaces. All concentrations of dissolved methane in the natural spring water samples were below the 2 mg/L threshold in 2014. Laboratory analytical results for dissolved methane in natural spring waters, including historical results, are summarized in Table 6.

All natural springs sampled are calcium bicarbonate waters in makeup. Major ion chemistry of the natural springs is summarized in Table 7.

Analytical results are presented in Appendix G.

4.6.4 Subsurface Soil Gas Measurements

One set of subsurface soil gas measurements, using traditional subsurface soil gas sampling techniques, was collected at the six natural springs in 2014. Methane was not detected in the subsurface at any of the six natural spring locations.

4.7 COGCC MONITORING WELL DATA ANALYSIS

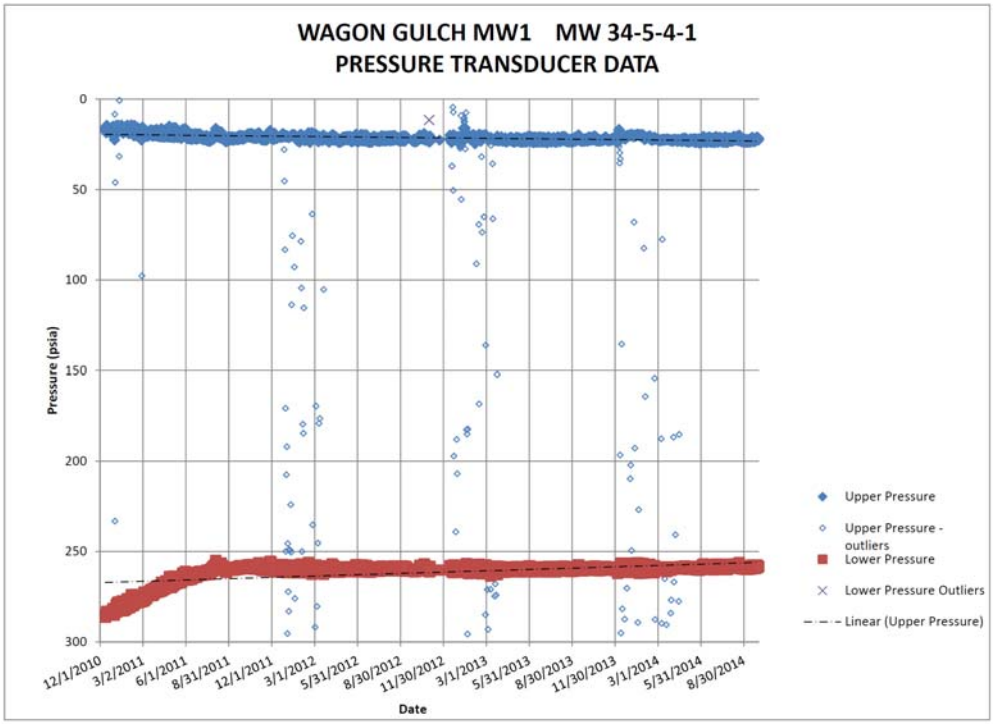
The COGCC provided LTE with twice-daily monitoring well pressure and temperature data from December 2010 through October 1, 2014, for each of the 4M/Archuleta monitoring wells. Historical data have been discussed in several reports on 4M project monitoring posted on the COGCC website. A general analysis of results for each well is discussed in the subsequent sections of this report. In general, all monitoring wells indicate the presence of free gas at the outcrop with no surface methane seeps. The locations of the COGCC monitoring wells are depicted on Figure 1.

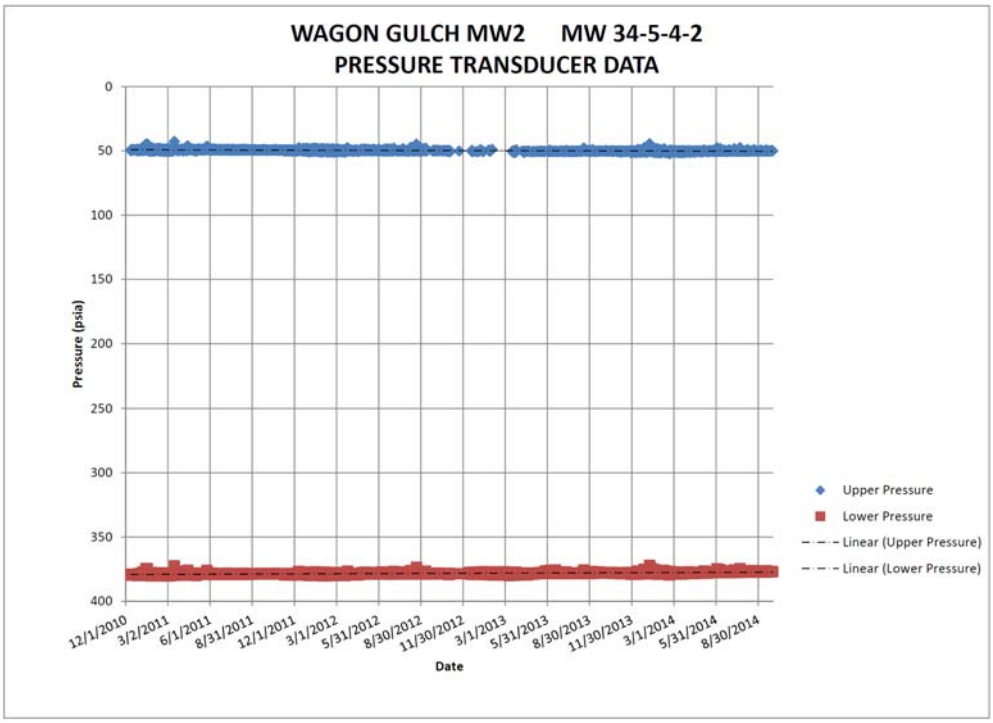
4.7.1 Wagon Gulch

Wagon Gulch monitoring wells MW 34-5-4-1 and MW 34-5-4-2, located in Section 4 of Township 34 North, Range 5 West adjacent to the north central part of the Petrox Fosset Gulch Unit, have been monitored since December 2, 2008.

Monitoring well MW 35-5-4-1 did not reach an initial stable pressure for approximately three weeks following installation. From January 2008 through mid-November 2010, wellhead pressures declined following stabilization. At that time, the trend reversed and the wellhead pressure increased slightly through July 2011. From July 2011 to September 2013, the wellhead pressures have remained relatively stable. The graphs below depict upper (wellhead) and lower (bottomhole) transducer data from January 2011 to September 2013. A number of spurious readings in the winter months (January through March and December in 2011, 2012, and 2013, and January through May 2014 have been plotted as outliers. The majority of those readings were collected in the early morning hours, and the erroneous readings are attributed to overnight freezing of the transducer, which is externally mounted. Downhole pressures (from the "lower transducer") remained stable through 2014. The previous increase in bottomhole pressure from December 2008 to November 2010 indicates a net water level rise in the monitoring well since installation. Between November 2010 and November 2011, water levels decreased by approximately 20 feet and have been relatively stable since that time.

Monitoring well MW 34-5-4-2 was shut in for monitoring on December 4, 2008, but stable pressure transducer readings were not obtained until April 2009. From February 2009 to April 23, 2009, no data were available due to pressure transducer malfunction as a result of freeze damage. At this time, the water level inside the open wellhead was at a height of 2.5 feet above ground level. After the well was shut in following repairs, wellhead pressure buildup returned rapidly. The well has shown a relatively constant wellhead pressure of 47 to 48 pounds per square inch, absolute (psia), and a bottomhole pressure of 375 psia between April and October 2009. In 2013 several data gaps were observed at the upper transducer, particularly in February and the first half of March 2013, which may also be due to freezing of the transducer. However, all the measured upper pressures have remained steady with a very slight rise to a range of 48 to 50 psia at the wellhead. A very slight downward trend in the bottomhole pressures has been observed since 2011, with an average bottomhole pressure of approximately 379 psia in January 2011 decreasing to an average of approximately 377 psia in the latter part of 2014.



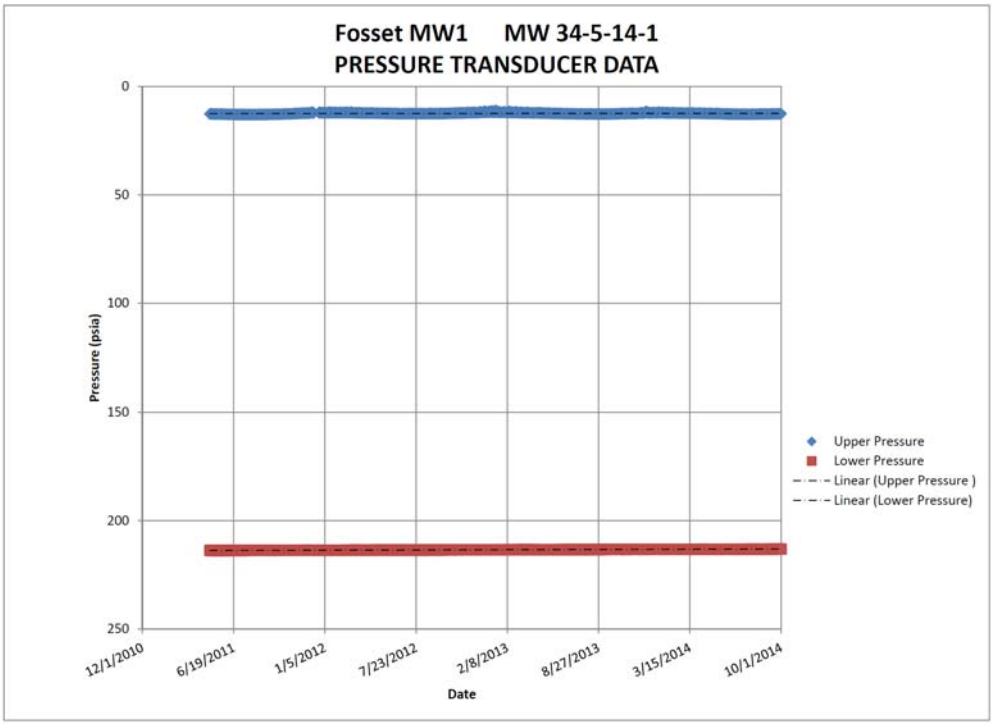


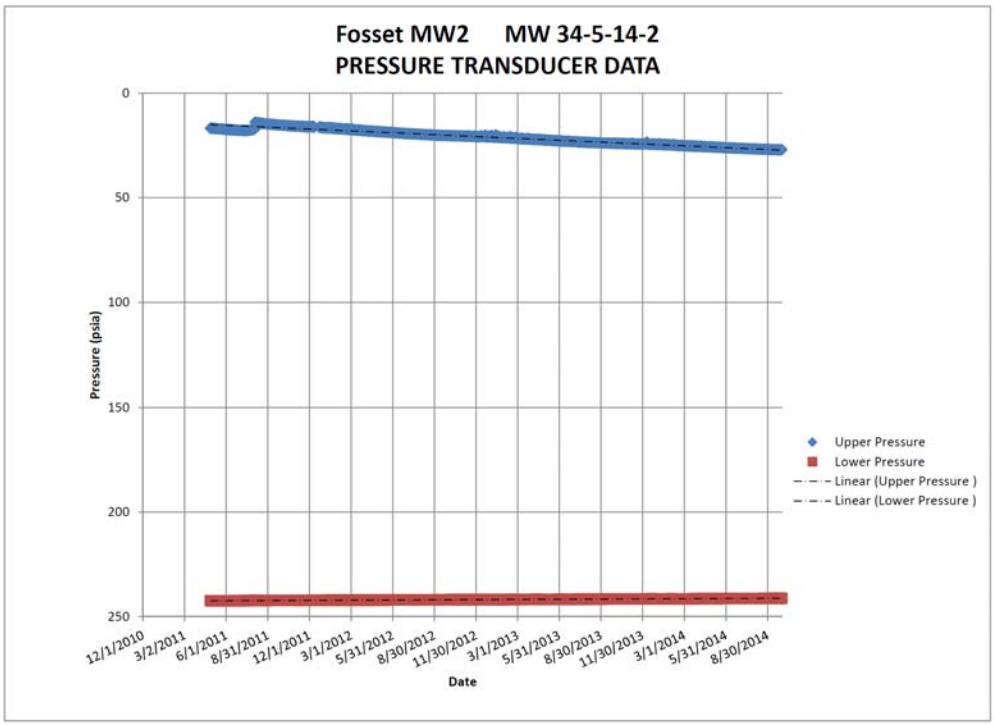
4.7.2 Fosset Gulch

Fosset Gulch monitoring wells MW 34-5-14-1 and MW 34-5-14-2, located in Section 14 of Township 34 North, Range 5 West adjacent to the south central part of the Petrox Fosset Gulch Unit, have been monitored by the COGCC since December 4, 2008. Historical data provided in COGCC annual reports indicate a relatively constant wellhead pressure in MW 34-5-14-1 until

November 2009 when the water level began a gradual decline of about 8 feet until July 2010. The well was vented in August 2010 and water levels nearly recovered to previous levels. Pressure data from April 2011 through September 2014 are presented in the graphs below and exhibit a very slight annual fluctuation from 13 psia in the summertime to 12 psia in the winter months, and a very gradual decline in bottomhole pressure from 214 to 213 psia over the period from 2011 to 2014.

Monitoring well MW 34-5-14-2 initially displayed wellhead pressure drops immediately corresponding to rises in water levels each time the well was vented to the atmosphere. The most recent venting event took place on August 3, 2011. Wellhead pressures for 2012, 2013, and 2014 do not indicate that any subsequent venting has taken place. From August 2011 to September 2014, the bottomhole pressure has decreased very slightly from approximately 242.4 to 241.2 psia, and the wellhead pressure has gradually increased from approximately 14 psia to 27 psia.

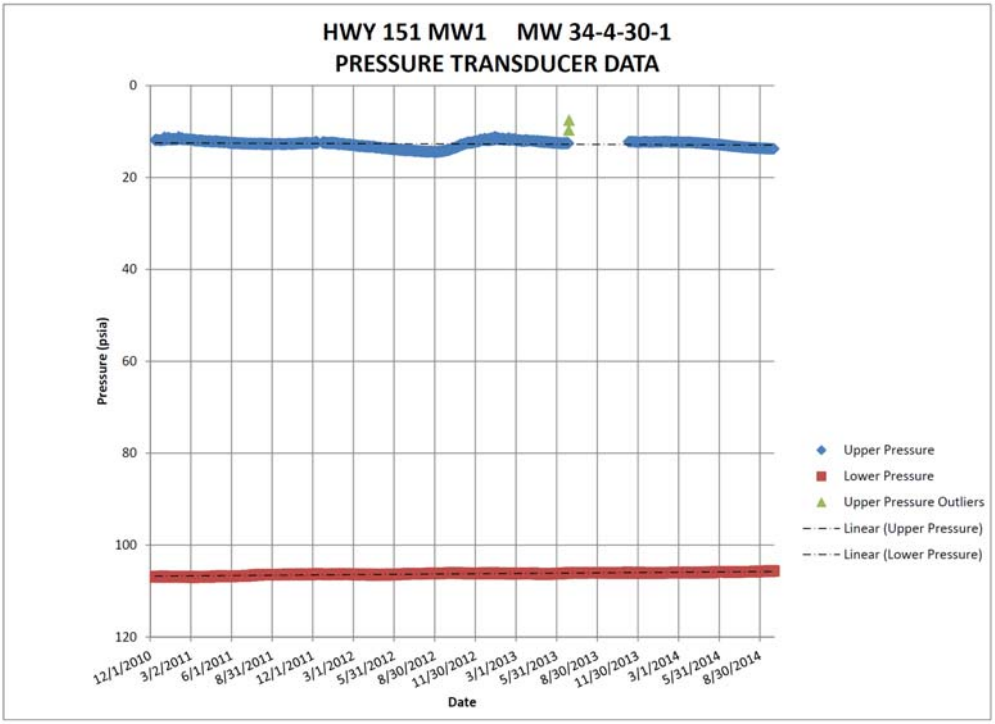


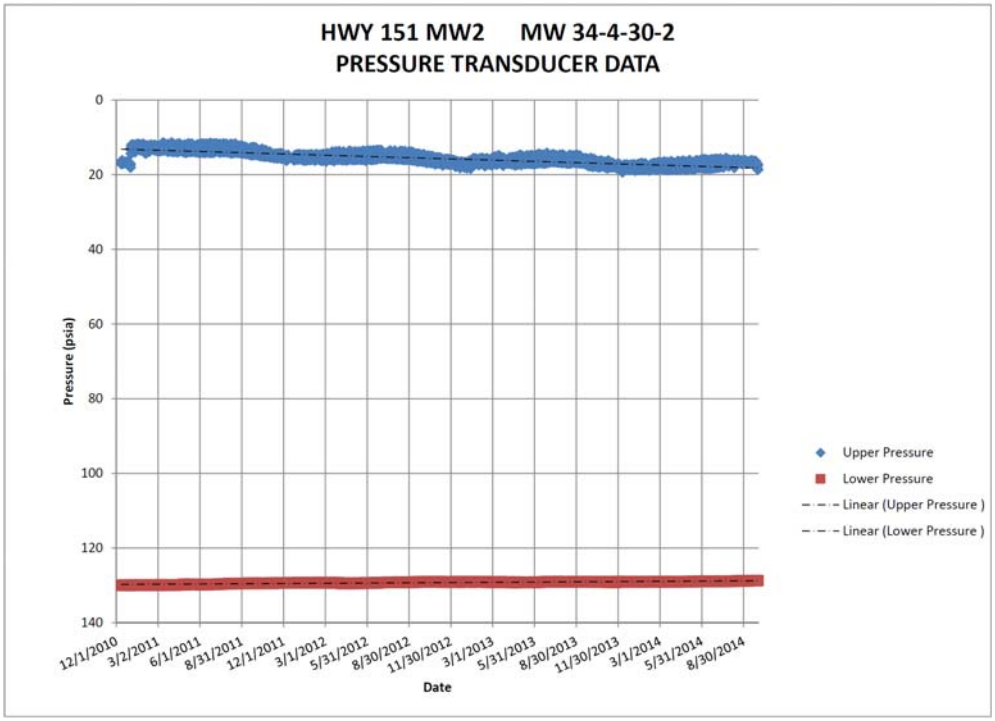


4.7.3 Highway 151

Monitoring wells MW 34-4-30-1 and MW 34-4-31-2, located in Section 30 of Township 34 North, Range West adjacent to the north end of the Petrox Fosset Gulch Unit, have been monitored since December 3, 2008. A small drop in wellhead pressure was observed on June 2, 2010, corresponding to wellhead venting. Pressure data from January 2011 through September 2014 are displayed in the graphs below. Wellhead pressures in monitoring well MW 34-4-30-1 have displayed some seasonal fluctuation, with lower values observed in winter months and somewhat higher values in summer. Overall the fluctuations range between approximately 11.5 psia and 14.5 psia. The upper transducer readings became erratic in June 2013 and ceased altogether in July 2013. Readings from this transducer resumed on November 26, 2013. A very slight decrease in bottomhole pressure has been observed over the period from 2011 to 2014, declining from approximately 106.8 psia to 105.6 psia between January 2011 and September 2014.

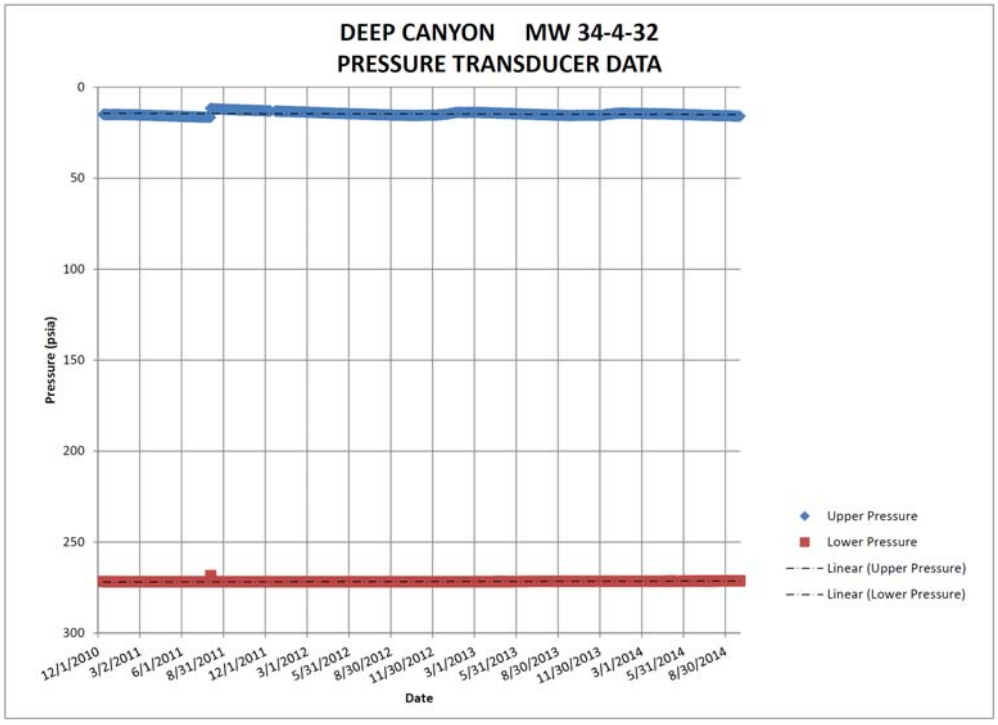
Monitoring well MW 34-4-30-2 displays a very slight decline in bottomhole pressure, from approximately 130 psia to 129 psia, over the period from 2011 to 2014. Wellhead pressures display slight annual fluctuations (on the order of 2 psia), with lower values in the fall and higher values in the spring. There is an overall upward trend over the period from 2011 to 2014, from an average of approximately 13 to 18 psia.


HWY 151 MW1 MW 34-4-30-1
PRESSURE TRANSDUCER DATA
Pressure (psia)
0
20
40
60
80
100
120
12/1/2010
3/2/2011
6/1/2011
8/31/2011
12/1/2011
3/1/2012
5/31/2012
8/30/2012
11/30/2012
3/1/2013
5/31/2013
8/30/2013
11/30/2013
3/1/2014
5/31/2014
8/30/2014
Date
Upper Pressure
Lower Pressure
Upper Pressure Outliers
Linear (Upper Pressure)
Linear (Lower Pressure)


HWY 151 MW2 MW 34-4-30-2
PRESSURE TRANSDUCER DATA
Pressure (psia)
0
20
40
60
80
100
120
140
12/1/2010
3/2/2011
6/1/2011
8/31/2011
12/1/2011
3/1/2012
5/31/2012
8/30/2012
11/30/2012
3/1/2013
5/31/2013
8/30/2013
11/30/2013
3/1/2014
5/31/2014
8/30/2014
Date
Upper Pressure
Lower Pressure
Linear (Upper Pressure)
Linear (Lower Pressure)

4.7.4 Deep Canyon

The Deep Canyon monitoring well MW 34-4-32-1 came online in June 2010. The well pressure stabilized six days after the well was shut in, and then displayed a nearly constant bottomhole pressure of 271.5 psia through September 2014. A change in the bottomhole pressure was observed on August 3, 2011, corresponding to a venting event, with recovery of bottomhole pressure within one day. Wellhead pressures have increased gradually from June 2010 to August 3, 2011, when pressures dropped from 16.5 to 11.5 psia. Wellhead pressures have recovered very slowly over the subsequent 12 months. From October 2012 to February 2013 wellhead pressures fell from approximately 15.5 psia to 14 psia, and then recovered to 15.5 psia in September 2013. It appears that another venting event occurred in November 2013, with wellhead pressures recovering to approximately 16 psia in September 2014.



4.7.5 Overall COGCC Monitoring Well Analysis

All COGCC monitoring wells installed within the Kf outcrop as part of the 4M/Archuleta Project Area exhibit free gas. This free gas is not produced by withdrawing water out of the Kf and is able to build pressure back after venting. The COGCC monitoring well data indicate free gas is present at the Kf outcrop at depth. This conclusion is consistent with observations of pressure data for Petrox CBM production wells in the area, gas production without dewatering in existing production wells, and the Mansoori modeling results.

4.8 BLM/USFS SOIL VAPOR TUBE DATA ANALYSIS

SVT monitoring data was obtained from the BLM for the period from July 2012 through August 2013 and found that no new methane concentration data had been collected from transects during that period of time. As a result, statistical analysis of the SVT data could not be conducted for this 2013 Outcrop Zone Report. The BLM indicated that they had tentatively scheduled a monitoring event for the fall of 2014. If LTE receives the 2014 data from the BLM, a statistical analysis of the data will be analyzed and submitted under separate cover as an addendum to this 2014 Outcrop Zone Report.

Historically, methane has been detected in the SVTs, with no methane flux measured in the vicinity of the SVTs, supports the data reported herein demonstrating free gas is present at depth in the Kf outcrop; however, it is not migrating to the surface as a seep.

5.0 OUTCROP EVALUATION

This 2014 outcrop evaluation is based on past work within the Project Area and current conditions documented during the 2014 monitoring event. Outcrop evaluations from the previous three Outcrop Zone Reports can be viewed on the COGCC website at http://cogcc.state.co.us/ .

Based on reservoir, geological, and hydrogeological characteristics of the Kf and specifically within the Project Area, the potential for CBM development of federal minerals within the outcrop zone to adversely affect the Project Area appears low with regards to methane seepage and/or coal fires.

Baseline conditions within the Project Area indicate there is no methane seeping to the surface. Conditions have not changed within the Project Area since 2004 despite the presence of free gas in the subsurface at the outcrop. As stated in Decision Point 5 of the ROD, oil and gas producers are allowed to monitor-as-you-go. This approach appears warranted as there are 11 years of baseline data in conjunction with monitoring wells, descriptive reservoir openhole logs, a drainage and performance simulation study, and pressure data history. If methane seeps begin to develop and/or coal fires are observed during the production of CBM within the outcrop zone, then the mitigation strategies discussed in this report and the NSJB ROD will be reviewed and implemented where applicable.

Based on the monitoring results and evaluation of this report, LTE, Petrox, and Elm Ridge recommend the following:

- Conduct annual surveys of methane flux at the ground surface where surface water transects the Kf outcrop utilizing a 400-foot grid spacing during those years that the regional reconnaissance is not conducted. During regional reconnaissance years (next event in 2017), grid spacing will be reduced to the previously conducted 200-foot spacing flux survey;

- Measure methane flux at nearby abandoned production wells, specifically the Big Horn-Schomburg #1 abandoned production well;

- Identify and sample natural springs along the Kf outcrop;

- Field verify suspect methane seeps along the Kf outcrop using scheduled regional reconnaissance methods of aerial fly-overs and field verification on a 3-year cycle (next event in 2017);

- Conduct abandoned coal mine surveys on annual basis and a re-evaluation of frequency to be discussed during the subsequent TWG meeting there the inconsistency of data is observed. The next annual survey is tentatively scheduled for June/July 2015;

- Summation and evaluation of the BLM SVT data, if available, with statistical analysis using the Mann-Kendell test;

- Summation and evaluation of the COGCC monitoring well pressure data with an emphasis on monitoring wells Fosset Gulch MW 34-5-14-1 (API 05-007-06264) and Fosset Gulch MW 34-5-14-2 (API 05-007-06265);
- Summation and evaluation of annual natural gas and water production data from each Petrox/Elm Ridge CBM production well within the Fosset Gulch Unit; and
- Present this Outcrop Zone Report to the TWG during an annual review session.

In addition to modified monitoring plans developed through the TWG, the following action items were discussed and agreed to:

- No new monitoring wells will be required at this time;
- Petrox will incorporate water chemistry data from new production wells drilled prior to bringing them online per the COGCC COAs. The data will be presented in subsequent outcrop zone reports;
- Petrox will collect and provide initial downhole pressure data for all new drill production wells within the outcrop zone prior to bringing them online. The data will be used in evaluating reservoir production efficiency and in evaluating the Mansoori modeling efforts. Modeling data will be incorporated into subsequent outcrop zone reports;
- Petrox will evaluate reservoir pressure data from new drill production wells as they occur and conduct periodic model runs similar to the initial Mansoori effort to monitor the actual reservoir behavior in comparison to the initial predictive effort. The frequency of this activity will be dependent on the data available. Results, when available, will be presented in subsequent outcrop zone reports;
- Petrox will commit to utilizing the Candelaria 10U#4, or other existing/planned production wells for pressure monitoring for a period of no more the three months following completion of the well within the outcrop zone. The data will be provided in the outcrop zone report; and
- The outcrop zone reports and subsequent monitoring will be utilized for all APDs for Petrox and Elm Ridge within the Fosset Gulch Unit.

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FIGURES

RAMONA SPRING
RAMONA LEONARD SPRING (MONA)
TRIPLE S MINE
BEAVER CREEK
WOOD/CORRIGAN SPRING
CORRIGAN SPRING
WATSON WELL SPRING
GRASSY SPRING
COLUMBINE MINE
CRAIN SPRING
FEDERAL USA 1
(API: 05-007-06009)
USA AMOCO COM AC-1
(API: 05-007-06118)
MUNGER SPRING 1
MUNGER SPRING 2
MUNGER SPRING 3
MUNGER SPRING 4
160
DEEP SPRING
WELL SPRING #1
YELLOW JACKET PASS
THICK SPRING
WAGON GULCH MW 34-5-4 1
(API: 05-007-06261)
WAGON GULCH MW 34-5-4 2
(API: 05-007-06268)
TOWNSEND SPRING
VANCE SPRING #1
VANCE MEADOW SPRING
SQUAW CREEK/
LITTLE SQUAW CREEK
GOVT #1
BIG HOLE SPRING
POLE GULCH
POLE CREEK
WILLOW SPRING
SECTION 7A SPRING (REICH)
PETERSON GULCH WEST
WAYPOINT 0003 SPRING
MID PETERSON GULCH
NW JOHN GRUB SPRING
SE JOHN GRUB SPRING
PETERSON GULCH EAST
FOSSET,GULCH 9U 1A
(API: 05-007-06056)
FOSSET,GULCH UNIT 9U 2
(API: 05-007-06211)
FGU 9U #3
(API: 05-007-06314)
FOSSET,GULCH UNIT 9U 4
(API: 05-007-06235)
CANDELARIA 33-5 FEE 10U #3
(API: 05-007-06215)
SECTION 10U SPRING
FOSSET,GULCH 16U #1
(API: 05-007-06238)
FOSSET,GULCH UNIT 16U 2
(API: 05-007-06194)
FOSSET,GULCH UNIT 15U 1
(API: 05-007-06237)
FOSSET,GULCH UNIT 15U 2
(API: 05-007-06195)
FOSSET,GULCH UNIT 15U #4
(API: 05-007-06236)
FOSSET,GULCH UNIT 14U 3
(API: 05-007-06193)
SPRING 1212
FGU CANDELARIA 14U 1
(API: 05-007-06234)
PARGIN MOUNTAIN 23U #1
(API: 05-007-06192)
UNNAMED ABANDONED MINE
SPRING 3434
CANDELARIA RANCH
CANDELARIA A SPRING
CANDELARIA B SPRING
PIEDRA RIVER
CANDELARIA PASTURE
STOLLSTEIMER CREEK
HWY 151 34-4-30 MW 2
(API: 05-007-06270)
HWY 151 34-4-30 MW 1
(API: 05-007-06271)
STOLLSTEIMER CREEK SITE
CHIMNEY ROCK MINE
CHIMNEY ROCK COAL
151
CABEZON PROJECT
CABEZON CANYON
VAUGHN SPRING
DEEP CANYON MW 34-3-32 1
(API: 05-007-06293)
FOSSET,GULCH MW 34-5-14 2
(API: 05-007-06264)
BIG HORN-SCHOMBURG #1
(API: 05-007-05100)
FOSSET,GULCH MW 34-5-14 1
(API: 05-007-06264)
S4N-W
S3N-W
S5N-W
S6N-W
S7N-W
S8N-W
S9N-W
S10N-W
S11N-W
S12N-W
S13N-W
S14N-W
S15N-W
S16N-W
S17N-W
S18N-W
S19N-W
S20N-W
S21N-W
S22N-W
S23N-W
S24N-W
S25N-W
S26N-W
S27N-W
S28N-W
S29N-W
S30N-W
S31N-W
S32N-W
S33N-W
S34N-W
S35N-W
S36N-W
160
151

IMAGE COURTESY OF ESRI

LEGEND

- NATURAL SPRING
- ABANDONED PRODUCTION WELL
- SOIL VAPOR TUBE
- COLORADO OIL & GAS CONSERVATION COMMISSION WELL

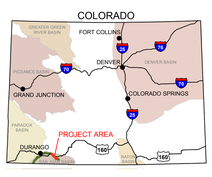
COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL

- HIGHWAY
- SURFACE WATER
- AREA OF INTEREST
- TOWNSHIP AND RANGE LINES
- BUREAU OF LAND MANAGEMENT OUTCROP ZONE (1.5 MILES INWARD FROM Kf-Kk CONTACT)

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- QUATERNARY GRAVEL (Qg)
- QUATERNARY ALLUVIUM (Qa)
- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION TONGUE (Kpct)
- FRUITLAND FORMATION TONGUE (Kft)
- PICTURED CLIFFS FORMATION (Kpc)



N

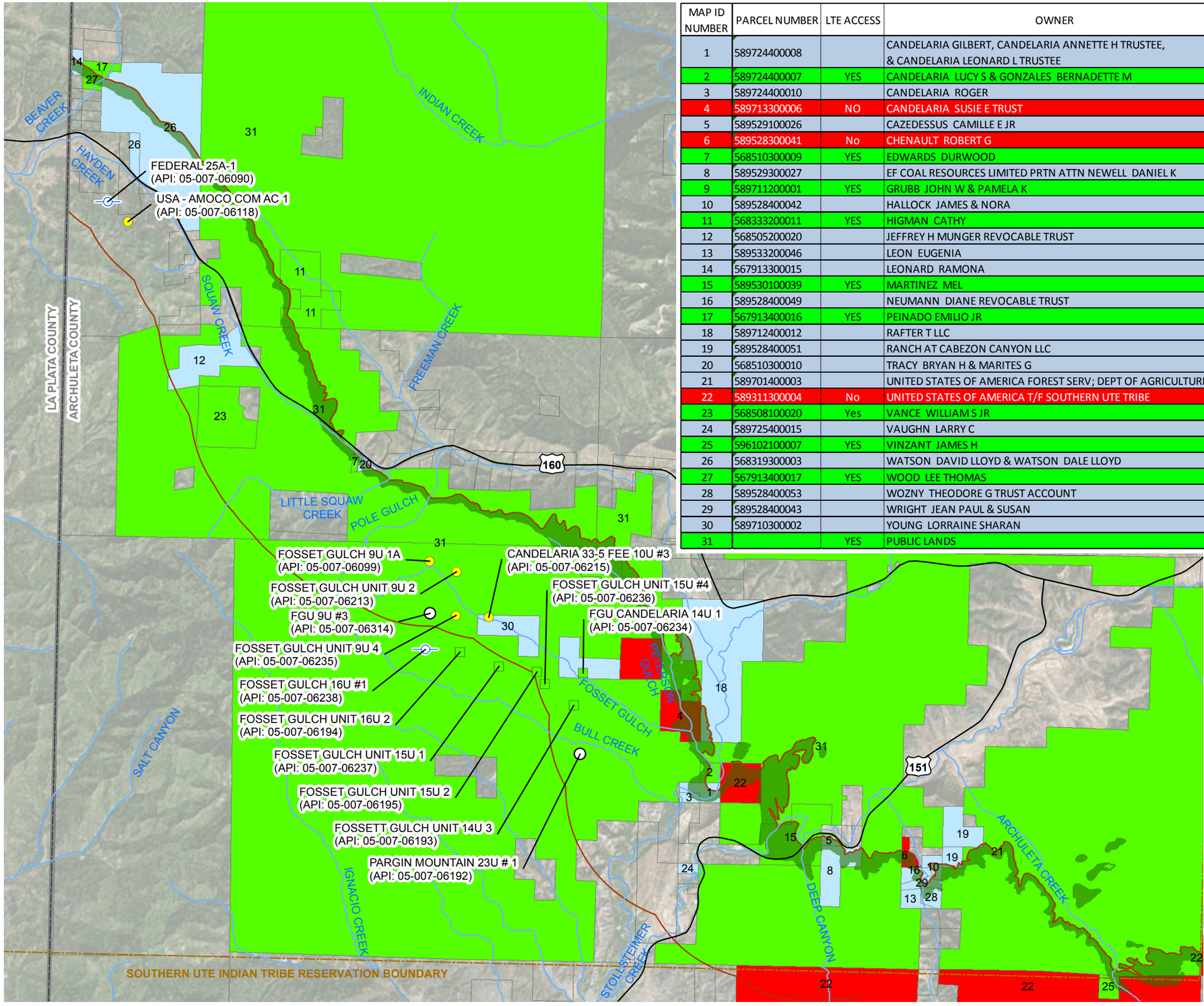
0 1,500 3,000

Feet

FIGURE 1
PROJECT AREA MAP
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 01 PROJECT AREA MAP.mxd



MAP ID NUMBER	PARCEL NUMBER	LTE ACCESS	OWNER
1	589724400008		CANDELARIA GILBERT, CANDELARIA ANNETTE H TRUSTEE, & CANDELARIA LEONARD L TRUSTEE
2	589724400007	YES	CANDELARIA LUCY S & GONZALES BERNADETTE M
3	589724400010		CANDELARIA ROGER
4	589713300006	NO	CANDELARIA SUSIE E TRUST
5	589529100026		CAZEDESSUS CAMILLE E JR
6	589528300041	No	CHENAULT ROBERT G
7	568510300009	YES	EDWARDS DURWOOD
8	589529300027		EF COAL RESOURCES LIMITED PRTN ATTN NEWELL DANIEL K
9	589711200001	YES	GRUBB JOHN W & PAMELA K
10	589528400042		HALLOCK JAMES & NORA
11	568333200011	YES	HIGMAN CATHY
12	568505200020		JEFFREY H MUNGER REVOCABLE TRUST
13	589533200046		LEON EUGENIA
14	567913300015		LEONARD RAMONA
15	589530100039	YES	MARTINEZ MEL
16	589528400049		NEUMANN DIANE REVOCABLE TRUST
17	567913400016	YES	PEINADO EMILIO JR
18	589712400012		RAFTER T LLC
19	589528400051		RANCH AT CABEZON CANYON LLC
20	568510300010		TRACY BRYAN H & MARITES G
21	589701400003		UNITED STATES OF AMERICA FOREST SERV; DEPT OF AGRICULTURE
22	589311300004	No	UNITED STATES OF AMERICA T/F SOUTHERN UTE TRIBE
23	568508100020	Yes	VANCE WILLIAM S JR
24	589725400015		VAUGHN LARRY C
25	596102100007	YES	VINZANT JAMES H
26	568319300003		WATSON DAVID LLOYD & WATSON DALE LLOYD
27	567913400017	YES	WOOD LEE THOMAS
28	589528400053		WOZNY THEODORE G TRUST ACCOUNT
29	589528400043		WRIGHT JEAN PAUL & SUSAN
30	589710300002		YOUNG LORRAINE SHARAN
31		YES	PUBLIC LANDS

LEGEND

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- HIGHWAY
- SURFACE WATER
- SOUTHERN UTE INDIAN TRIBE RESERVATION BOUNDARY
- COUNTY BOUNDARY
- BUREAU OF LAND MANAGEMENT OUTCROP ZONE (1.5 MILES INWARD FROM Kf-Kk CONTACT)

2014 PROPERTY ACCESS STATUS

- ACCESS APPROVED
- ACCESS DENIED
- NO RESPONSE

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- FRUITLAND FORMATION (Kf)

IMAGE COURTESY OF ESRI

0 1.25 2.5
Miles

N

FIGURE 2
PROPERTY ACCESS MAP
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 06 ACCESS.mxd

BEAVER CREEK
SQUAW CREEK
LITTLE SQUAW CREEK
POLE GULCH
PETERSON GULCH WEST
PETERSON GULCH EAST
BIG HORN-
SCHOMBURG #1
PIEDRA RIVER
STOLLSTEIMER
CREEK
RAMONA LEONARD SPRING (MONA)
RAMONA SPRING
TRIPLE S MINE
WOODCORRIGAN SPRING
CORRIGAN SPRING
WATSON WELL SPRING
GRASSY SPRING
CRAIN SPRING
COLUMBINE MINE
FEDERAL 25A-1 (API: 05-007-06090)
USA - AMOCO.COM AC-1 (API: 05-007-06118)
MUNGER SPRING 3
MUNGER SPRING 1
MUNGER SPRING 2
MUNGER SPRING 4
THICK SPRING
BEEP SPRING
RATT SPRING #1
TOWNSEND SPRING
VANCE SPRING #1
VANCE MEADOW SPRING
160
FOSSET,GULCH 9U,1A (API: 05-007-06099)
FOSSET,GULCH UNIT 9U 2 (API: 05-007-06213)
FGU 9U #3 (API: 05-007-06314)
FOSSET,GULCH UNIT 9U 4 (API: 05-007-06230)
CANDELARIA 33-5 FEE 10U #3 (API: 05-007-06215)
SECTION 10U SPRING
FOSSET,GULCH 16U #1 (API: 05-007-06238)
FOSSET,GULCH UNIT 16U 2 (API: 05-007-06194)
FOSSET,GULCH UNIT 15U 1 (API: 05-007-06237)
FOSSET,GULCH UNIT 15U 2 (API: 05-007-06195)
FOSSET,GULCH UNIT 15U #4 (API: 05-007-06236)
FOSSETT,GULCH UNIT 14U 3 (API: 05-007-06193)
FGU CANDELARIA 14U 1 (API: 05-007-06234)
SPRING 1212
PARGIN MOUNTAIN 23U # 1 (API: 05-007-06192)
BIG HORN-SCHOMBURG #1 (API: 05-007-05100)
GOV-01
BIG HOLE SPRING
WILLOW SPRING
SECTION 14 SPRING (REICH)
WAYPOINT_0003 SPRING
NW JOHN GRUB SPRING
SE JOHN GRUB SPRING
GOV-02
UNNAMED ABANDONED MINE
SPRING 3424
CANDELARIA A SPRING
CANDELARIA B SPRING
161
STOLLSTEIMER CREEK SITE
CHIMNEY ROCK MINE
CHIMNEY ROCK COAL
CABEZON PROJECT
VAUGHN SPRING
S33N-09W
S34N-09W
S35N-09W
S36N-09W
S33N-10W
S34N-10W
S35N-10W
S36N-10W
S33N-11W
S34N-11W
S35N-11W
S36N-11W

LEGEND

METHANE FLUX MEASUREMENT (mol/m ^{2} • 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 - 200.0000

mol/m^2 • day: MOLES PER SQUARE METER PER DAY

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL

- NATURAL SPRING
- ABANDONED MINE
- ABANDONED PRODUCTION WELL
- PROPERTY BOUNDARY (WHITE)
- HIGHWAY
- SURFACE WATER

- BUREAU OF LAND MANAGEMENT OUTCROP ZONE (1.5 MILES INWARD FROM Kf-Kk CONTACT)
- DRAINAGE TRANSECT
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION (Kpc)

IMAGE COURTESY OF ESRI

N

0 1,500 3,000
Feet

FIGURE 3
DRAINAGE TRANSECTS SURVEY
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 07 DRAINAGE TRANSECTS.mxd

LEGEND

SUBSURFACE METHANE MEASUREMENT

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

ppm: PARTS PER MILLION

%: PERCENT

ONLY MEASUREMENTS GREATER THAN 0 ppm ARE LABELED

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- ABANDONED PRODUCTION WELL
- ABANDONED MINE
- NATURAL SPRING
- PROPERTY BOUNDARY (WHITE)
- HIGHWAY
- SURFACE WATER
- 2014 SUSPECT SEEP AREA
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- FRUITLAND FORMATION (Kf)

IMAGE COURTESY OF ESRI

COLOR INFRARED (CIR) IMAGE COURTESY OF AGRO ENGINEERING, 2014

N

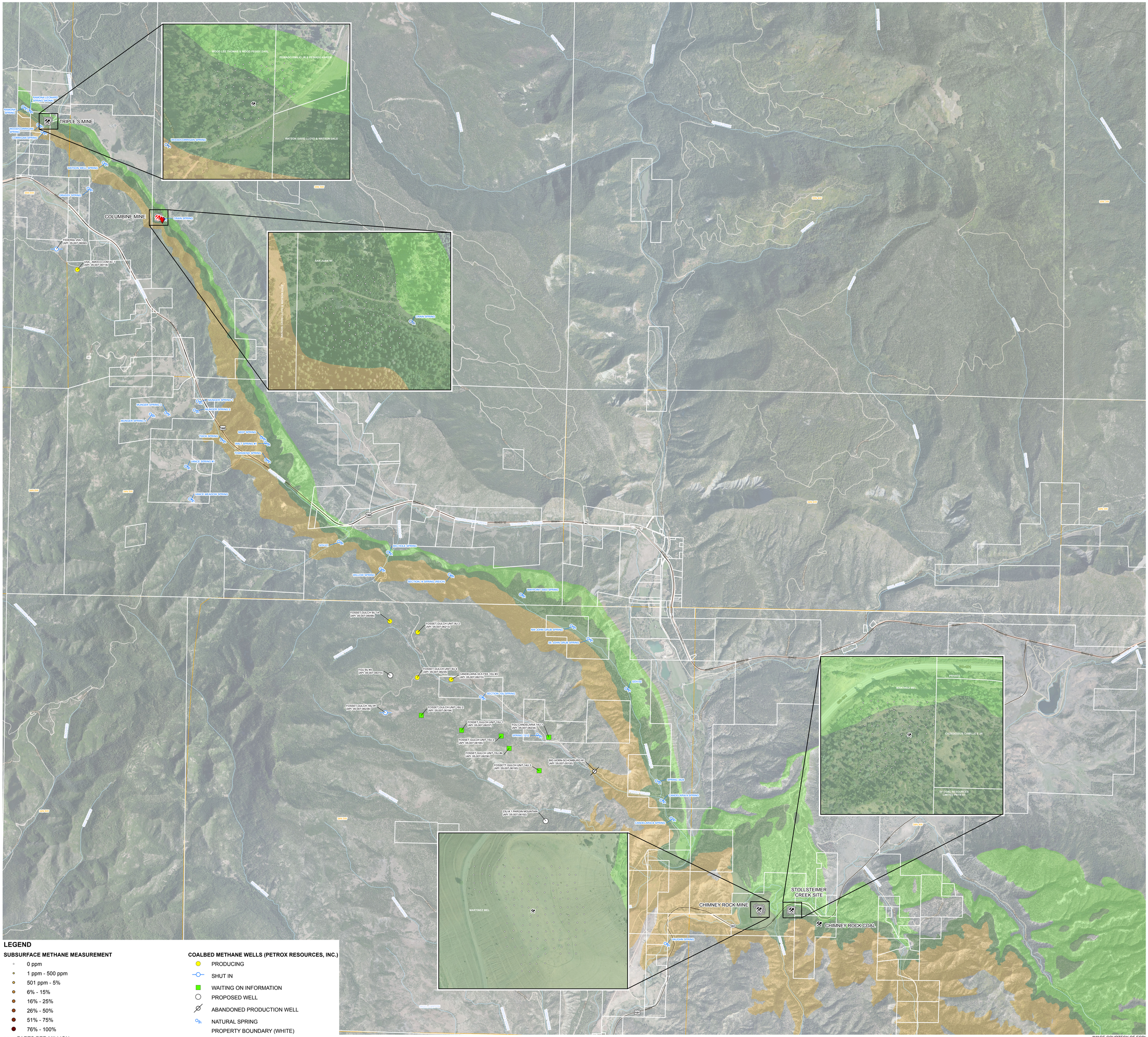
0 1,500 3,000

Feet

FIGURE 4
SUSPECT SEEP LOCATION MAP
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 08 CIR SUSPECT SEEP.mxd



LEGEND

SUBSURFACE METHANE MEASUREMENT

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

ppm: PARTS PER MILLION

%: PERCENT

ONLY MEASUREMENTS GREATER THAN 0 ppm ARE LABELED

- MINE ENTRANCE
- COLLAPSED MINE ENTRANCE
- COLLAPSED SHAFT

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- ABANDONED PRODUCTION WELL
- NATURAL SPRING
- PROPERTY BOUNDARY (WHITE)
- HIGHWAY
- SURFACE WATER
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION (Kpc)

IMAGE COURTESY OF ESRI

N

0 1,500 3,000

Feet

FIGURE 5
METHANE SOIL GAS MEASUREMENTS ABANDONED COAL MINES
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO
PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 09 MINES CH4.mxd

TRIPLE S MINE

COLUMBINE MINE

CHIMNEY ROCK MINE

STOLLSTEIMER CREEK SITE

CHIMNEY ROCK COAL

RAMONA LEONARD SPRING (MON)

RAMONA SPRING

WOODCORRIGAN SPRING

CORRIGAN SPRING

WATSON WELL SPRING

GRASSY SPRING

CRAIN SPRING

FEDERAL 25A-1 (API: 05-007-06090)

USA - AMOCO COM AC 1 (API: 05-007-06118)

MUNGER SPRING 1

MUNGER SPRING 2

MUNGER SPRING 3

MUNGER SPRING 4

SEEP SPRING

THICK SPRING

WALT SPRING #1

TOWNSEND SPRING

VANCE SPRING #1

VANCE MEADOW SPRING

GOV-01

BIG HOLE SPRING

WILLOW SPRING

SECTION 14 SPRING (REICH)

WAYPOINT 0003 SPRING

NW JOHN GRUB SPRING

SE JOHN GRUB SPRING

GOV-02

SECTION 10U SPRING

SPRING 1312

SPRING 3424

CANDELARIAA SPRING

CANDELARIA B SPRING

VAUGHN SPRING

FOSSET,GULCH 9U 1A (API: 05-007-06099)

FOSSET,GULCH UNIT 9U 2 (API: 05-007-06213)

FGU 9U #3 (API: 05-007-06314)

FOSSET GULCH UNIT 9U 4 (API: 05-007-06235)

CANDELARIA 33-5 FEE 10U #3 (API: 05-007-06214)

FOSSET,GULCH 16U #1 (API: 05-007-06238)

FOSSET,GULCH UNIT 16U 2 (API: 05-007-06194)

FOSSET,GULCH UNIT 15U 1 (API: 05-007-06237)

FOSSET GULCH UNIT 15U 2 (API: 05-007-06195)

FOSSET,GULCH UNIT 15U #4 (API: 05-007-06236)

FOSSETT,GULCH UNIT 14U 3 (API: 05-007-06193)

FGU,CANDELARIA 14U 1 (API: 05-007-06234)

BIG HORN-SCHOMBURG #1 (API: 05-007-06100)

23U # 1 PARGIN MOUNTAIN (API: 05-007-06192)

WOOD LEE THOMAS & WOOD PEGGY DARL

PERRADO EMILIO JR & PERRADO KAREN

WATSON DAVID LLOYD & WATSON DALE

SAN JUAN NF

MARTINEZ MEL

PRIVATE

CAZEDESSUS CAMILLE E JR

EF COAL RESOURCES LIMITED PRTN ET

T35N R3W

T35N R2W

T34N R3W

T34N R2W

T33N R3W

T33N R2W

160

151

LEGEND

SUBSURFACE CARBON MONOXIDE MEASUREMENT

- 0 ppm
- 0.1 - 1.0 ppm
- 1.1 - 5.0 ppm
- 5.1 - 10.0 ppm
- 10.1 - 20.0 ppm

ppm: PARTS PER MILLION

ONLY MEASUREMENTS GREATER THAN 0ppm ARE LABELED

- MINE ENTRANCE
- COLLAPSED MINE ENTRANCE
- COLLAPSED SHAFT

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- ABANDONED PRODUCTION WELL
- NATURAL SPRING
- PROPERTY BOUNDARY (WHITE)
- HIGHWAY
- SURFACE WATER
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION (Kpc)

IMAGE COURTESY OF ESRI

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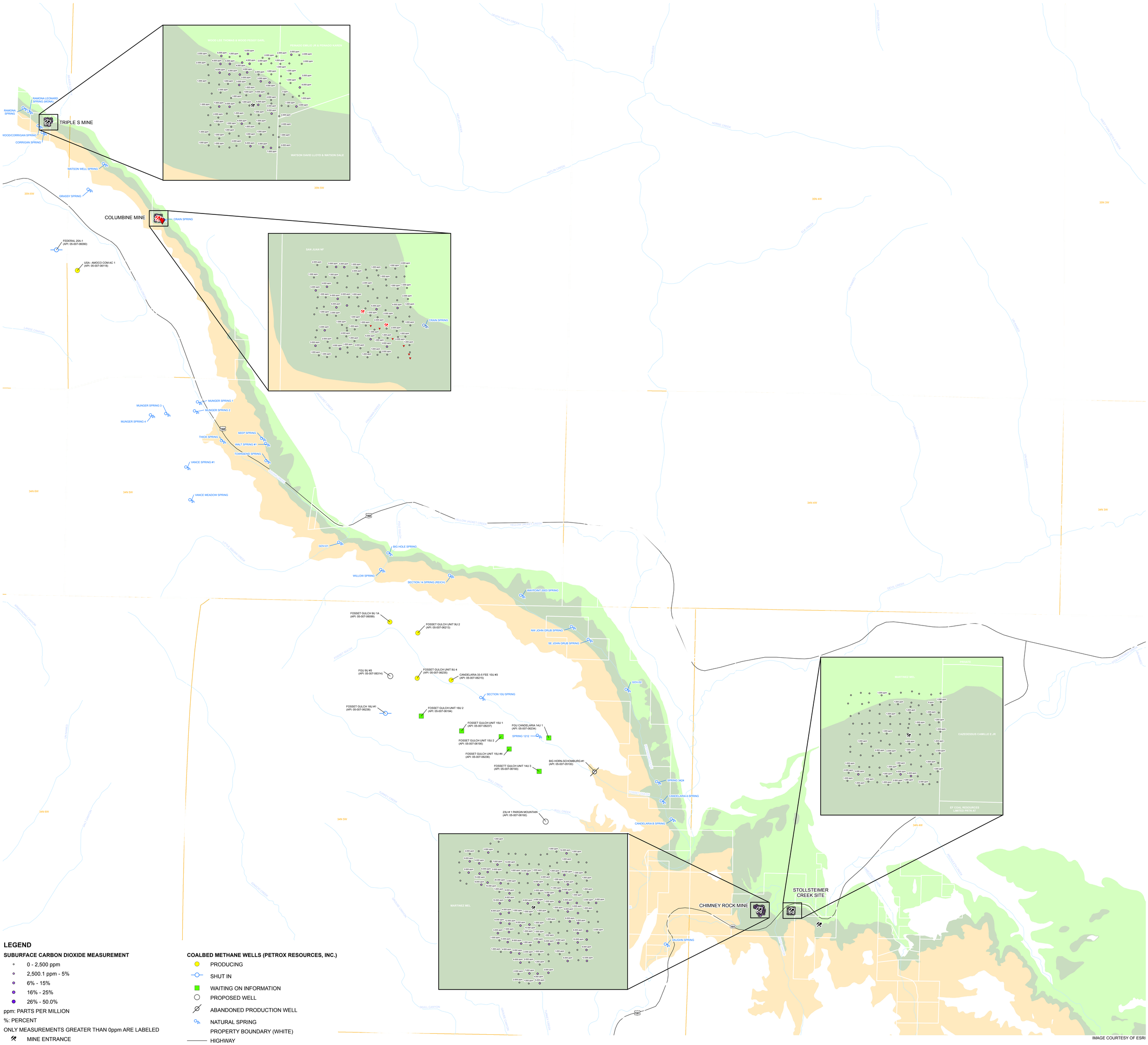
0 1,500 3,000

Feet

FIGURE 6
CARBON MONOXIDE SOIL GAS MEASUREMENTS ABANDONED COAL MINES 2014 OUTCROP ZONE REPORT ARCHULETA COUNTY, COLORADO

PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 10 MINES CO.mxd



LEGEND

SUBSURFACE CARBON DIOXIDE MEASUREMENT

- 0 - 2,500 ppm
- 2,500.1 ppm - 5%
- 6% - 15%
- 16% - 25%
- 26% - 50.0%

ppm: PARTS PER MILLION

%: PERCENT

ONLY MEASUREMENTS GREATER THAN 0ppm ARE LABELED

- MINE ENTRANCE
- COLLAPSED MINE ENTRANCE
- COLLAPSED SHAFT

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- ABANDONED PRODUCTION WELL
- NATURAL SPRING
- PROPERTY BOUNDARY (WHITE)
- HIGHWAY
- SURFACE WATER
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION (Kpc)

IMAGE COURTESY OF ESRI

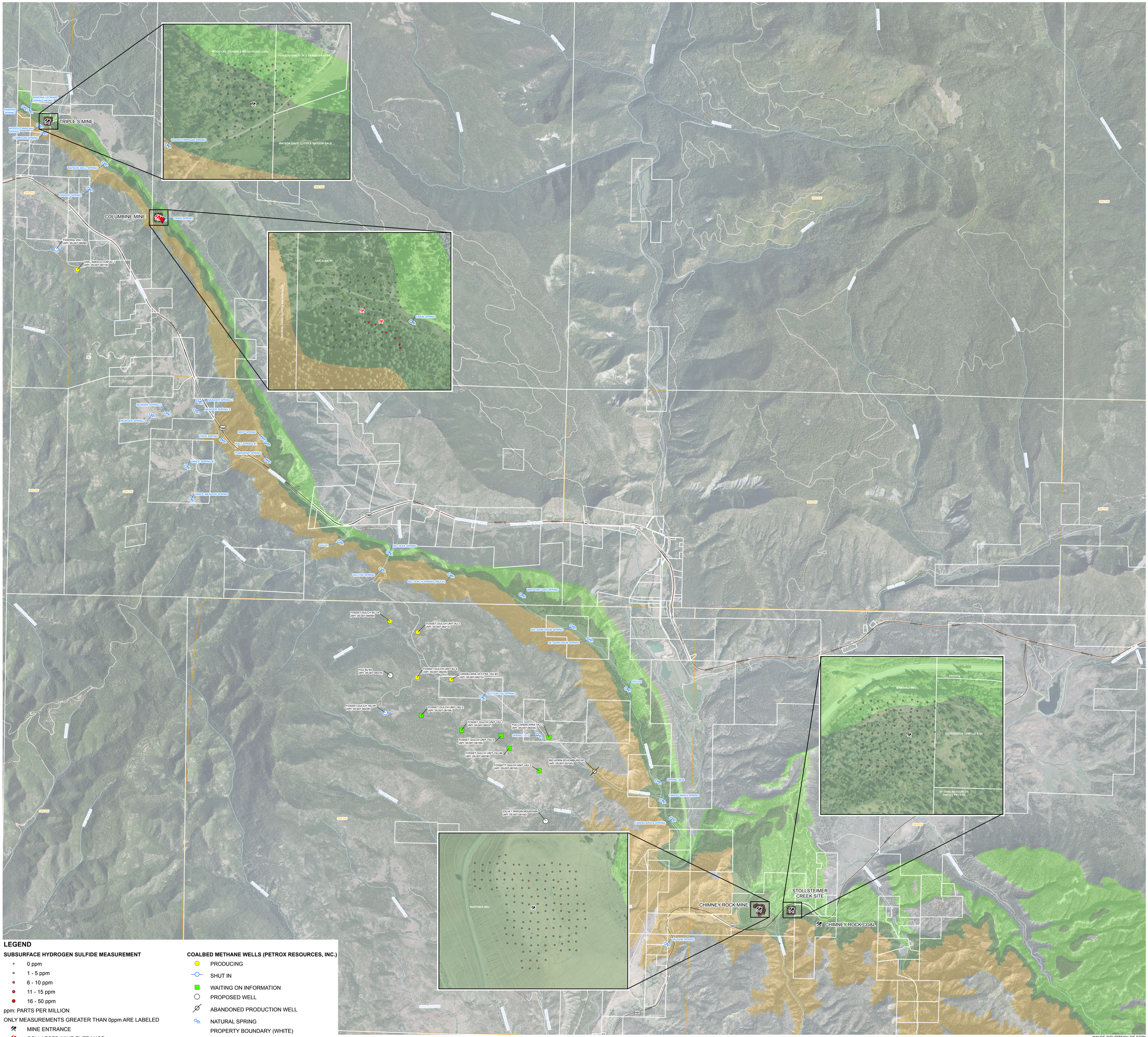
N

0 1,500 3,000

Feet

FIGURE 7
CARBON DIOXIDE SOIL GAS MEASUREMENTS
ABANDONED COAL MINES
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO
PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 11 MINES CO2.mxd



LEGEND

SUBSURFACE HYDROGEN SULFIDE MEASUREMENT

- 0 ppm
- 1 - 5 ppm
- 6 - 10 ppm
- 11 - 15 ppm
- 16 - 50 ppm

ppm: PARTS PER MILLION

ONLY MEASUREMENTS GREATER THAN 0ppm ARE LABELED

- MINE ENTRANCE
- COLLAPSED MINE ENTRANCE
- COLLAPSED SHAFT

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- ABANDONED PRODUCTION WELL
- NATURAL SPRING
- PROPERTY BOUNDARY (WHITE)
- HIGHWAY
- SURFACE WATER
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION (Kpc)

IMAGE COURTESY OF ESRI

N

0 1,500 3,000

Feet

FIGURE 8
HYDROGEN SULFIDE SOIL GAS MEASUREMENTS
ABANDONED COAL MINES
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO
PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 12 MINES H2S.mxd

TRIPLE S MINE

COLUMBINE MINE

CHIMNEY ROCK MINE

STOLLSTEIMER CREEK SITE

CHIMNEY ROCK COAL

RAMONA LEONARD SPRING (MONA)

RAMONA SPRING

WOOD/CORRIGAN SPRING

CORRIGAN SPRING

WATSON WELL SPRING

GRABER SPRING

CRAIN SPRING

FEDERAL 25A-1 (API: 05-007-06090)

USA - AMOCO COM AC 1 (API: 05-007-06118)

MUNGER SPRING 3

MUNGER SPRING 1

MUNGER SPRING 2

MUNGER SPRING 4

THICK SPRING

BEEP SPRING

WILT SPRING #1

TOWNSEND SPRING

VANCE SPRING #1

VANCE MEADOW SPRING

BIG HOLE SPRING

WILLOW SPRING

SECTION 14 SPRING (REICH)

WAYPOINT.0003 SPRING

FOSSET,GULCH 9U 1A (API: 05-007-06099)

FOSSET,GULCH UNIT 9U 2 (API: 05-007-06213)

NW JOHN GRUB SPRING

SE JOHN GRUB SPRING

FGU 9U #3 (API: 05-007-06314)

FOSSET,GULCH UNIT 9U 4 (API: 05-007-06235)

CANDELARIA 33-5 FEE 10U #3 (API: 05-007-06215)

SECTION 35U SPRING

FOSSET,GULCH 16U #1 (API: 05-007-06238)

FOSSET,GULCH UNIT 16U 2 (API: 05-007-06194)

FOSSET,GULCH UNIT 15U 1 (API: 05-007-06237)

FOSSET GULCH UNIT 15U 2 (API: 05-007-06195)

FOSSET,GULCH UNIT 15U #4 (API: 05-007-06236)

FOSSETT GULCH UNIT-14U 3 (API: 05-007-06193)

FGU CANDELARIA 14U 1 (API: 05-007-06234)

SPRING 1212

BIG HORN-SCHOMBURG #1 (API: 05-007-06192)

SPRING 3434

CANDELARIA A SPRING

CANDELARIA B SPRING

23U # 1 PARGIN MOUNTAIN (API: 05-007-06192)

VAUGHN SPRING

GOV.01

GOV.02

WOOD LEE THOMAS & WOOD PEGGY DARL

PEINADO EMILIO JR & PEINADO KAREN

WATSON DAVID LLOYD & WATSON DALE

SAN JUAN NF

PRIVATE

MARTINEZ MEL

CAZEDESSUS CAMILLE E JR

EF COAL RESOURCES LIMITED PRTN AT

SSN-SW

SSN-NW

SSN-SE

SSN-NE

SMN-SW

SMN-NW

SMN-SE

SMN-NE

SAN-SW

SAN-NW

SAN-SE

SAN-NE

160

161

151

LEGEND

SUBSURFACE OXYGEN MEASUREMENT

- 0% - 5%
- 6% - 10%
- 11% - 15%
- 16% - 19%
- 20% - 22%

%: PERCENT

ONLY MEASUREMENTS LESS THAN 19.5% OXYGEN ARE LABELED

- MINE ENTRANCE
- COLLAPSED MINE ENTRANCE
- COLLAPSED SHAFT

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- ABANDONED PRODUCTION WELL
- NATURAL SPRING
- PROPERTY BOUNDARY (WHITE)
- HIGHWAY
- SURFACE WATER
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION (Kpc)

IMAGE COURTESY OF ESRI

N

0 1,500 3,000

Feet

FIGURE 9
OXYGEN SOIL GAS MEASUREMENTS
ABANDONED COAL MINES
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO
PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 13 MINES O2.mxd

TRIPLE S MINE

COLUMBINE MINE

CHIMNEY ROCK MINE

STOLLSTEIMER CREEK SITE

WOOD LEE THOMAS & WOOD PEGGY DARL

PEINADO EMILIO JR & PEINADO KAREN

WATSON DAVID LLOYD & WATSON DALE

SAN JUAN NF

MARTINEZ MEL

PRIVATE

CAZEDESSUS CAMILLE E JR

EF COAL RESOURCES LIMITED PRTN AT

RAMONA LEONARD SPRING (MONA)

RAMONA SPRING

WOOD/CORRIGAN SPRING 1

CORRIGAN SPRING

WOOD/CORRIGAN SPRING

WATSON WELL SPRING

GRABER SPRING

CRAIN SPRING

FEDERAL 25A-1 (API: 05-007-06090)

USA - AMOCO COM AC 1 (API: 05-007-06118)

MUNGER SPRING 3

MUNGER SPRING 4

MUNGER SPRING 1

MUNGER SPRING 2

THICK SPRING

BEEP SPRING

WALT SPRING #1

TOWNSEND SPRING

VANCE SPRING #1

VANCE MEADOW SPRING

GOV-01

BIG HOLE SPRING

WILLOW SPRING

SECTION 14 SPRING (REICH)

WAYPOINT.0003 SPRING

FOSSET,GULCH 9U 1A (API: 05-007-06099)

FOSSET,GULCH UNIT 9U 2 (API: 05-007-06213)

NW JOHN GRUB SPRING

SE JOHN GRUB SPRING

FGU 9U #3 (API: 05-007-06314)

FOSSET,GULCH UNIT 9U 4 (API: 05-007-06235)

CANDELARIA 33-5 FEE 10U #3 (API: 05-007-06215)

SECTION 33U SPRING

FOSSET,GULCH 16U #1 (API: 05-007-06238)

FOSSET,GULCH UNIT 16U 2 (API: 05-007-06194)

FOSSET,GULCH UNIT 15U 1 (API: 05-007-06237)

FOSSET GULCH UNIT 15U 2 (API: 05-007-06195)

FOSSET,GULCH UNIT 15U #4 (API: 05-007-06236)

FOSSETT GULCH UNIT-14U 3 (API: 05-007-06193)

FGU CANDELARIA 14U 1 (API: 05-007-06234)

SPRING 1212

BIG HORN-SCHOMBURG #1 (API: 05-007-05100)

SPRING 3434

CANDELARIA A SPRING

CANDELARIA B SPRING

23U # 1 PARGIN MOUNTAIN (API: 05-007-06192)

GOV-02

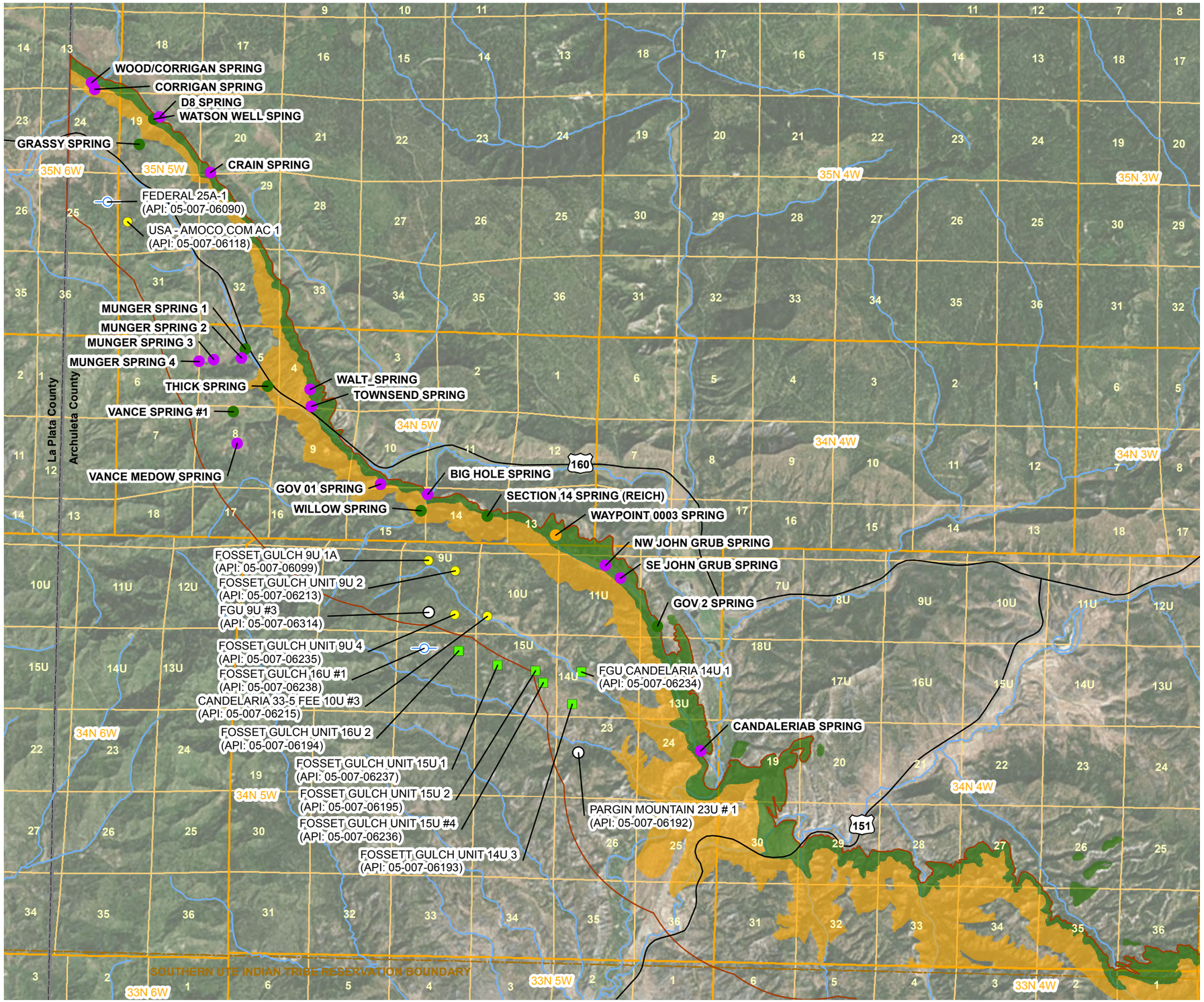
VAUGHN SPRING

GOV-03

SAN JUAN COUNTY

SAN JUAN COUNTY

SAN JUAN COUNTY



LEGEND

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL

2014 NATURAL SPRING STATUS

- SAMPLED
- DRY
- NOT LOCATED
- HIGHWAY
- SURFACE WATER
- COUNTY BOUNDARY
- SOUTHERN UTE INDIAN TRIBE RESERVATION BOUNDARY
- TOWNSHIP AND RANGE LINES
- SECTION
- BUREAU OF LAND MANAGEMENT OUTCROP ZONE

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- FRUITLAND FORMATION (Kf)
- KIRKLAND FORMATION (Kk)

SUBSURFACE METHANE MEASUREMENTS WERE COLLECTED FROM TEMPORARY SOIL PROBES ADVANCED WITH A SLIDE HAMMER AT EACH SAMPLED NATURAL SPRING LOCATION. THE CONCENTRATION OF SUBSURFACE METHANE WAS 0.0 PARTS PER MILLION METHANE FOR ALL MEASUREMENTS TAKEN.

IMAGE COURTESY OF ESRI

0 1.25 2.5
Miles

N

FIGURE 11
NATURAL SPRINGS STATUS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG 15 SPRING STATUS.mxd

TABLES

TABLE 1
PROPERTY OWNER AND ACCESS INFORMATION
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES, INC. AND ELM RIDGE RESOURCES, INC.

PID	ACCOUNT	LANDOWNER	ACCESS Y/N	DATE
589724400007	R016001	CANDELARIA LUCY S & GONZALES BERN	Y	5/15/14
568510300009	R002240	EDWARDS DURWOOD	Y	5/15/14
589711200001	R015986	GRUBB JOHN W & PAMELA K	Y	5/6/2014
568333200011 & 568333300012	R002224	HIGMAN MICHAEL W & HIGMAN CATHY	Y	5/15/14
589530100039	R015973	MARTINEZ MEL	Y	5/15/2014
567913400016	R002183	PEINADO EMILIO JR & PEINADO KAREN	Y	5/12/2014
568508100020	R002236	VANCE WILLIAM S JR	Y	5/6/2014
596102100007	R016098	VINZANT JAMES H, VINZANT MARK N, & VINZANT WHITNEY L	Y	5/15/14
567913400017	R002184	WOOD LEE THOMAS & WOOD PEGGY DARLENE	Y	5/15/14
589713300006	R015998	CANDELARIA SUSIE E TRUST	N	5/23/14
589528300041	R015959	CHENAULT ROBERT G	N	5/6/2014
589701400004		SOUTHERN UTE INDIAN TRIBE	N	5/6/2014
589311300004, 596116200005, & 589511200003	R015184	UNITED STATES OF AMERICA T/F SOUTHERN UTE TRIBE	N	5/6/2014
589724400008	R016002	CANDELARIA GILBERT, CANDELARIA ANNETTE H TRUSTEE, & CANDELARIA LEONARD L TRUSTEE	No Response	N/A
589724400010	R016003	CANDELARIA ROGER	No Response	N/A
589529100026	R015968	CAZEDESSUS CAMILLE E JR	No Response	N/A
589529300027	R015970	EF COAL RESOURCES LIMITED PRTN AT	No Response	N/A
589528400042	R015960	HALLOCK JAMES & NORA	No Response	N/A
568505200020	R002232	JEFFREY H MUNGER REVOCABLE TRUST	No Response	N/A
589533200046	R015976	LEON EUGENIA, WOZNY THEODORE G, & PALMA GUSTAVO I	No Response	N/A
567913300015	R002181	LEONARD RAMONA	No Response	N/A
589528400049	R015962	NEUMANN DIANE REVOCABLE TRUST	No Response	N/A
589712400012	R018233	RAFTER T LLC	No Response	N/A
589528400051 & 589528100052	R015964	RANCH AT CABEZON CANYON LLC	No Response	N/A
568510300010	R002241	TRACY BRYAN H & MARITES G	No Response	N/A
589701400003	R015982	UNITED STATES OF AMERICA FOREST SERV; DEPT OF AGRICULTURE ROCKY MOUNTAIN REGION	No Response	N/A
589725400015	R016008	VAUGHN LARRY C	No Response	N/A
568319300003 & 568319200034	R002206	WATSON DAVID LLOYD & WATSON DALE	No Response	N/A
589528400053	R015965	WOZNY THEODORE G TRUST ACCOUNT	No Response	N/A
589528400043	R015961	WRIGHT JEAN PAUL & SUSAN	No Response	N/A
589710300002 & 589710300002	R015985	YOUNG LORRAINE SHARAN & CANDELARIA ANNETTE H TRUSTEE	No Response	N/A

Notes:

Green indicates access was granted

Red indicated access was not granted

White indicates a response was not received and therefore was considered not granted

N/A - not applicable

TABLE 2
METHANE FLUX DATA
2014 FRUITLAND OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES, INC. AND ELM RIDGE RESOURCES, INC.

Mapping Area	Total Number of Methane Flux Points								Number of Sample Points with Methane greater than reporting limit[1]								Maximum Measurable Methane Flux[2] (moles/m^2·day)							Volumetric Methane Flux (MCFD)						
	2007	2008	2009	2010	2011	2012	2013	2014	2007	2008	2009	2010	2011	2012	2013	2014	2007	2008	2009	2010	2011	2013	2014	2008	2009	2010	2011	2012	2013	2014
Beaver Creek	14	53	46	48	48	54	13	51	1	0	0	0	1	0	0	0	0.2000	0.1579	0.0607	0.0740	**0.5347**	0.0	0.012237	0	0	0	NA	0.0	0.0	0.0
Little Squaw Creek	21	77	78	77	76	29	*	*	2	2	0	0	0	0	0	0	**0.2300**	**0.2911**	0.0268	0.0852	0.0830	*	*	0.27	0	0	0	0	0	0
Yellow Jacket Pass/ Squaw Creek	10	208	170	204	205	127	35	125	0	0	0	0	0	0	0	0	0.0700	0.0373	0.0970	0.0140	0.1366	0.0	0.016312	0	0	0	0	0	0	0
Pole Gulch	10	86	87	85	88	29	8	28	1	0	1	0	0	0	0	0	**0.3000**	0.1775	**0.2156**	0.1089	0.0117	0.0	0.0	0	0.02	0	0	0	0	0
Peterson Gulch	18	357	331	382	412	263	66	245	1	0	0	0	0	0	0	0	**0.2300**	0.1925	0.1733	0.0069	0.1991	0.0	0.048748	0	0	0	0	0	0	0
Piedra River	--	--	--	--	--	--	18	61	--	--	--	--	--	--	0	0	--	--	--	--	--	0.0	0.0	--	--	--	--	--	--	--
Stollsteimer Creek	11	201	203	176	195	122	34	131	0	3	2	0	1	0	0	0	0.1500	**0.3440**	0.3382	0.1493	**0.2997**	0.0	0.008768	0.38	0.50	0	NA	0.0	0.0	0.0
TOTAL	**84**	**982**	**915**	**972**	**1024**	**624**	**192**	**641**	**5**	**5**	**3**	**0**	**2**	**0**	**0**	**0**	--	--	--	--	--	--	--	**0.65**	**0.52**	**0**	**NA**	**0.0**	**0.0**	**0.0**
Abandoned Production Well																														
Big Horn-Schomburg #1	5	9	5	9	26	18	18	19	1	0	1	0	1	0	0	0	**0.2364**	0.0661	0.0055	0.0852	**0.2122**	0.0000	0.0000	NA	NA	NA	NA	NA	NA	NA

Notes:

moles/m^2·day - moles per meter squared per day
MCFD - thousand cubic feet per day
-- - No data available
> - greater than

[1]Only methane flux values that were greater than the portable flux meter reporting limit of 0.2 moles/m^2·day were used in calculations
Bold indicates methane flux values above the reporting limit
NA - Not applicable due to insufficient data points to calculate volumetric methane flux
*Little Squaw Creek and Yellow Jacket Pass/Squaw Creek have been combined into one

TABLE 3
NATURAL SPRINGS SAMPLING STATUS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES, INC. AND ELM RIDGE RESOURCES, INC.

NATURAL SPRING	MONTH AND YEAR										
	September 2005	**May/June 2006**	**October 2007**	**October 2008**	**May 2009**	**October 2009**	**July 2010**	**May 2011**	**May 2012**	**May 2013**	**May 2014**
Beaver Creek	Not Sampled	Not Sampled	Not Sampled	Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Discontinued*	Discontinued*
Big Hole Spring	Not Sampled	Sampled	Not Sampled	Dry	Not Located	Not Located	Dry	Dry	Not Sampled	Dry	Dry
Candelaria A Spring	Not Sampled	Not Sampled	Not Sampled	No Access	No Access	No Access	No Access	No Access	No Access	No Access	No Access
Candelaria B Spring	Not Sampled	Sampled	Not Sampled	No Access	No Access	No Access	No Access	No Access	No Access	Dry	Dry
Corrigan Spring	Not Sampled	Not Sampled	Not Sampled	Not Located	Sampled	Dry	Dry	Sampled	Sampled	Dry	Dry
Crain Spring	Not Sampled	Sampled	Not Sampled	Sampled	Sampled	Dry	Sampled	No Access	Sampled	Sampled	Dry
Gov-1 Spring	--	--	--	--	--	--	--	--	--	Dry	Dry
Gov-2 Spring	--	--	--	--	--	--	--	--	--	Sampled	Sampled
Gov-3 Spring	--	--	--	--	--	--	--	--	--	Not Located	Dry
Grassy Spring	Not Sampled	Sampled	Sampled	No Access	No Access	No Access	No Access	No Access	Sampled	Sampled	Sampled
High Watson Spring	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	Not Sampled	No Access	Not Sampled	Discontinued**	Discontinued**
Miser Spring & Pipeline	Not Sampled	Not Sampled	Not Sampled	No Access	No Access	No Access	No Access	No Access	No Access	Discontinued**	Discontinued**
Munger Spring 1	--	--	--	--	--	--	--	--	--	Dry	Sampled
Munger Spring 2	--	--	--	--	--	--	--	--	--	Sampled	Dry
Munger Spring 3	--	--	--	--	--	--	--	--	--	Dry	Dry
Munger Spring 4	--	--	--	--	--	--	--	--	--	Dry	Dry
NW John Grubb Spring	Sampled	Sampled	Sampled	Sampled	Sampled	Dry	Sampled	Sampled	Sampled	Dry	Dry
Ramona Leonard Spring (Mona)	Not Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	No Access	No Access	No Access	No Access	No Access
Ramona Spring	Not Sampled	Not Sampled	Not Sampled	Dry	Not Located	Not Located	No Access	No Access	No Access	No Access	No Access
SE John Grubb Spring	Sampled	Sampled	Sampled	Sampled	Sampled	Dry	Not Sampled	Sampled	Sampled	Dry	Dry
Section 10U Spring	Sampled	Sampled	Not Sampled	No Access	No Access	No Access	No Access	No Access	No Access	No Access	No Access
Section 14 (Reich) Spring	Sampled	Sampled	Sampled	Sampled	Sampled	Dry	Sampled	No Access	Not Sampled	Sampled	Sampled
Seep Spring	Not Sampled	Not Sampled	Not Sampled	Dry	Not Located	Not Located	Not Located	Not Located	Dry	Not Located	Not Located
Spring 1212	Sampled	Sampled	Not Sampled	No Access	No Access	No Access	No Access	No Access	No Access	No Access	No Access
Spring 3424	Sampled	Sampled	Not Sampled	No Access	No Access	No Access	No Access	No Access	No Access	No Access	No Access
Thick Spring	Not Sampled	Sampled	Sampled	Not Located	Sampled	Dry	Not Sampled	Sampled	Sampled	Sampled	Dry
Townsend Spring	Not Sampled	Not Sampled	Not Sampled	Dry	Dry	Dry	Dry	Dry	Dry	Dry	Dry
Vance Meadow Spring	Not Sampled	Sampled	Sampled	Sampled	Sampled	Dry	Dry	Sampled	Sampled	Dry	Dry
Vance Spring #1	Not Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled	Sampled
Vaughn Spring	Not Sampled	Not Sampled	Not Sampled	No Access	No Access	No Access	No Access	No Access	No Access	No Access	No Access
Walt Spring #1	Not Sampled	Sampled	Not Sampled	Dry	Dry	Dry	Dry	Sampled	Dry	Sampled	Dry
Watson Well Spring	Not Sampled	Sampled	Not Sampled	Sampled	Sampled	Sampled	Sampled	No Access	Sampled	Sampled	Sampled
Waypoint 0003 Spring	Not Sampled	NS	Not Sampled	Not Located	Not Located	Not Located	Not Sampled	Not Located	Dry	Not Located	Not Located
Willow Spring	Not Sampled	Sampled	Sampled	Sampled	Sampled	Dry	Sampled	Sampled	Sampled	Sampled	Sampled
Wood/Corrigan Spring	Not Sampled	Not Sampled	Not Sampled	Dry	Sampled	Dry	Not Sampled	Sampled	Dry	Dry	Dry

Note:
-- denotes not part of the sampling program for that year
* natural spring discontinued from sampling program due to its location in vicinity of Corrigan Spring
**natural spring discontinued from sampling program due to location of spring outside of Kf outcrop and/or BLM outcrop zone
Kf - Fruitland Formation
BLM - Bureau of Land Management

TABLE 4
NATURAL SPRINGS FIELD OBSERVATIONS AND MEASUREMENTS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES, INC. AND PETROX RESOURCES, INC.

Natural Spring	2014 Field Observations/ Notes	Date	Water Quality Field Measurements				
			Conductivity (µS/cm)	pH (Units)	ORP (mV)	Temperature (^{0}C)	TDS (ppm)
Beaver Creek	Discontinued*	September 2005	--	--	--	--	--
		May 2006	--	--	--	--	--
		October 2007	286.6	8.00	21	10.0	146.6
		October 2008	303.0	7.40	166.0	5.80	197
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	Discontinued*				
		May 2014	Discontinued*				
Big Hole Spring	Dry	September 2005	--	--	--	--	--
		May 2006	365.5	7.27	141	11.7	249.1
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Candelaria A Spring	Not Sampled due to access	September 2005	--	--	--	--	--
		May 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Candelaria B Spring	Dry	September 2005	--	--	--	--	--
		May 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Corrigan Spring	Dry	September 2005	--	--	--	--	--
		June 2006	170.3	6.08	122	17.7	109.7
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	253	6.83	97.4	22.5	126
		May 2012	162.3	6.53	-45.2	11.5	81.2
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Crain Spring	Dry	September 2005	--	--	--	--	--
		June 2006	570.3	7.5	-115	29.1	375.3
		October 2007	--	--	--	--	--
		October 2008	526.0	7.47	273.00	8.80	342
		May 2009	811	6.87	NM	7.5	--
		October 2009	--	--	--	--	--
		July 2010	482	6.8	--	11.8	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	668	7.7	--	20.5	334
		May 2014	--	--	--	--	--
Gov-1 Spring	Dry	May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Gov-2 Spring	Sampled	May 2013	659	7.0	17.4	10.2	328
		May 2014	510	6.9	--	13.1	--
Gov-3 Spring	Dry	May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Grassy Spring	Sampled	September 2005	--	--	--	--	--
		June 2006	570.3	7.5	-115	29.1	375.3
		October 2007	88.37	8.18	16	8.6	44.32
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	954	7.0	--	14.3	480
		May 2014	654	6.5	148	11.9	--
		September 2005	--	--	--	--	--
		June 2006	--	--	--	--	--

TABLE 4
NATURAL SPRINGS FIELD OBSERVATIONS AND MEASUREMENTS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES, INC. AND PETROX RESOURCES, INC.

Natural Spring	2014 Field Observations/ Notes	Date	Water Quality Field Measurements				
			Conductivity (µS/cm)	pH (Units)	ORP (mV)	Temperature (^{0}C)	TDS (ppm)
High Watson Spring	Discontinued**	October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	789	7.49	18.1	16.7	392
		May 2013	Discontinued**				
		May 2014	Discontinued**				
Miser Spring and Pipeline	Discontinued**	September 2005	--	--	--	--	--
		June 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	Discontinued**				
		May 2014	Discontinued**				
Munger Spring 1	Sampled	May 2013	--	--	--	--	--
		May 2014	107	7	185	13.9	--
Munger Spring 2	Dry	May 2013	358	7.4	--	18.9	176
		May 2014	--	--	--	--	--
Munger Spring 3	Dry	May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Munger Spring 4	Dry	May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
NW John Grub Spring	Dry	September 2005	415.8	6.97	--	15.8	282.3
		May 2006	421.7	7.83	108	27	275.9
		October 2007	292.2	7.28	-162	17.1	254.8
		October 2008	425	7.07	-15	15.68	276
		June 2009	339	8.7	--	14.5	--
		October 2009	--	--	--	--	--
		July 2010	441	5.91	--	16.4	--
		May 2011	561	7.08	21.7	21	278
		May 2012	540	6.77	20.3	22	271
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Ramona Leonard Spring (Mona)	Not Sampled due to access	September 2005	--	--	--	--	--
		May 2006	768.4	6.35	107	13.5	522.4
		October 2007	793.5	7.68	42	11.8	413.4
		October 2008	879	6.99	185.6	9.67	571
		May 2009	793	6.97	--	9.1	--
		October 2009	825	7.24	--	10	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Ramona Spring	Not sampled due to access	September 2005	--	--	--	--	--
		June 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
SE John Grub Spring	Dry	September 2005	524.5	7.04	--	15.6	358.5
		May 2006	509.5	7.86	-49	24.4	336.9
		October 2007	980.1	7.29	-68	18.4	513
		October 2008	528	7.18	63.5	12.37	342
		June 2009	542	6.58	12	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	428	7.08	16	23.6	213
		May 2012	341	7.13	-18.1	25.6	170
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Section 10U Spring	Not sampled due to access	September 2005	458.1	7.27	131	10.9	314.7
		May 2006	489.9	7.18	521	20.0	328.2
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
		September 2005	412.2	7.93	--	20.2	277.5

TABLE 4
NATURAL SPRINGS FIELD OBSERVATIONS AND MEASUREMENTS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES, INC. AND PETROX RESOURCES, INC.

Natural Spring	2014 Field Observations/ Notes	Date	Water Quality Field Measurements				
			Conductivity (µS/cm)	pH (Units)	ORP (mV)	Temperature (^{o}C)	TDS (ppm)
Section 14 (Reich) Spring	Sampled	May 2006	372.9	7.48	79	13.3	251.5
		October 2007	394.7	7.92	0	10.7	198.7
		October 2008	445.0	7.09	45.00	8.61	290
		June 2009	607	6.89	--	9	--
		October 2009	--	--	--	NM	--
		July 2010	404	6.77	--	10.7	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	661	7.3	37.4	8	329
		May 2014	464	6.6	--	8.5	--
Seep Spring	Not located	September 2005	--	--	--	--	--
		May 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Spring 1212	Not sampled due to access	October 2005	420	6.59	--	9.1	--
		June 2006	356.6	7.29	75	15.3	243.9
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Spring 3424	Not Sampled due to access	September 2005	725.2	6.86	71	16.5	504
		May 2006	641.5	7.97	-98	17.3	436.7
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Thick Spring	Dry	September 2005	--	--	--	--	--
		May 2006	325.6	7.80	120	11.7	214.6
		October 2007	376.5	7.74	32	12.9	192.2
		October 2008	--	--	--	--	--
		May 2009	54.6	7.52	--	12.3	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	408	7.01	40	11.4	203
		May 2012	457	6.51	22.6	7.12	229
		May 2013	836	7.1	69.7	12.4	448
		May 2014	--	--	--	--	--
Townsend Spring	Dry	September 2005	--	--	--	--	--
		May 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Vance Meadow Spring	Dry	September 2005	--	--	--	--	--
		June 2006	459.9	7.2	-60	16.5	310.9
		October 2007	389.8	7.2	-67	12.2	195.1
		October 2008	476.0	7.9	249.60	8.00	308
		June 2009	455	7.23	--	13.7	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	365	7.24	22.9	16.9	182
		May 2012	360	8.3	33.1	18.1	179
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Vance Spring #1	Sampled	September 2005	--	--	--	--	--
		May 2006	404	7.75	-12	11.6	269.6
		October 2007	417.1	7.34	519	9.6	213.2
		October 2008	464.0	7.2	120.30	7.20	302
		May 2009	399	7.88	--	12.8	--
		October 2009	481	7.41	--	6.8	--
		July 2010	421	7.13	--	15.8	--
		May 2011	298	6.72	6	10.7	151
		May 2012	332	6.86	51.2	8.72	166

TABLE 4
NATURAL SPRINGS FIELD OBSERVATIONS AND MEASUREMENTS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES, INC. AND PETROX RESOURCES, INC.

Natural Spring	2014 Field Observations/ Notes	Date	Water Quality Field Measurements				
			Conductivity (µS/cm)	pH (Units)	ORP (mV)	Temperature (^{0}C)	TDS (ppm)
		May 2013	505	6.9	30.9	15.4	253
		May 2014	324	7.8	67.8	15.9	--
Vaughn Spring	Not Sampled due to access	September 2005	--	--	--	--	--
		June 2006	730.7	7.55	521	20.1	509.5
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Walt Spring #1	Sampled	September 2005	--	--	--	--	--
		May 2006	524	7.9	86	12.1	345.4
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	207	7.41	93.2	11.4	155
		May 2012	--	--	--	--	--
		May 2013	512	6.9	92.7	13	242
		May 2014	--	--	--	--	--
Watson Well Spring	Sampled	September 2005	--	--	--	--	--
		June 2006	745.5	7.29	34	13.0	507.7
		October 2007	--	--	--	--	--
		October 2008	869.0	6.9	273.20	13.90	565
		May 2009	705	6.9	--	9.9	--
		October 2009	852	6.9	--	13.4	--
		July 2010	570	6.75	--	17.8	--
		May 2011	--	--	--	--	--
		May 2012	836	6.46	9.5	20.3	418
		May 2013	903	7.2	--	10.3	453
		May 2014	654	6.4	148	11.9	--
Waypoint 0003 Spring	Not Located	September 2005	--	--	--	--	--
		May 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		June 2009	--	--	--	--	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	--	--	--	--	--
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		May 2014	--	--	--	--	--
Willow Spring	Sampled	September 2005	--	--	--	--	--
		May 2006	252.9	7.39	122	14.0	178.7
		October 2007	318.3	7.42	508	13.9	161.4
		October 2008	325.0	7.09	243.40	6.60	211
		June 2009	285	7.54	--	10.4	--
		October 2009	--	--	--	--	--
		July 2010	284	6.7	--	12.4	--
		May 2011	277	6.3	116.5	10.4	139
		May 2012	335	6.79	29.5	10.56	167
		May 2013	341	7.2	35.9	14.2	172
		May 2014	263	7.2	298.2	7.4	--
Wood/Corrigan Spring	Dry	September 2005	--	--	--	--	--
		June 2006	--	--	--	--	--
		October 2007	--	--	--	--	--
		October 2008	--	--	--	--	--
		May 2009	480	6.96	--	7.5	--
		October 2009	--	--	--	--	--
		July 2010	--	--	--	--	--
		May 2011	476	7.13	279.2	12.1	241
		May 2012	--	--	--	--	--
		May 2013	--	--	--	--	--
		July 2014	--	--	--	--	--

Notes:

µS/cm - microSiemens per centimeter
^{0}C - degrees celsius
-- denotes not measured
ORP - oxidation reduction potential
TDS - total dissolved solids
mV - millivolts
ppm - parts per million

* natural spring discontinued from sampling program due to its location in vicinity of Corrigan Spring

**natural spring discontinued from sampling program due to location of spring outside of Kf outcrop and/or BLM outcrop zone

TABLE 5
NATURAL SPRINGS WATER FLOW RATE MEASURMENTS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES, INC. AND PETROX RESOURCES, INC.

NATURAL SPRING	FLOW RATES (Gallons/Minute)										
	September 2005	May/June 2006	October 2007	October 2008	May/June 2009	October 2009	July 2010	May 2011	May 2012	May 2013	May 2014
Beaver Creek	--	--	7	--	--	--	--	--	--	Discontinued*	--
Big Hole Spring	--	<1	--	--	--	--	--	--	--	--	--
Candelaria A Spring	--	--	--	--	--	--	--	--	--	--	--
Candelaria B Spring	--	--	--	--	--	--	--	--	--	--	--
Corrigan Spring	--	--	--	--	--	--	--	--	--	--	--
Crain Spring	--	--	--	0.2	2.66	--	2	--	--	0.04	--
Gov-1 Spring	--	--	--	--	--	--	--	--	--	--	--
Gov-2 Spring	--	--	--	--	--	--	--	--	--	0.35	--
Gov-3 Spring	--	--	--	--	--	--	--	--	--	--	--
Grassy Spring	--	--	<0.25	--	--	--	--	--	--	0.11	--
High Watson Spring	--	--	--	--	--	--	--	--	--	Discontinued**	--
Miser Spring & Pipeline	--	--	--	--	--	--	--	--	--	Discontinued**	--
Munger Spring 1	--	--	--	--	--	--	--	--	--	--	--
Munger Spring 2	--	--	--	--	--	--	--	--	--	0.16	--
Munger Spring 3	--	--	--	--	--	--	--	--	--	--	--
Munger Spring 4	--	--	--	--	--	--	--	--	--	--	--
NW John Grub Spring	0.1	<1	<0.5	0.9	--	--	--	--	--	--	--
Ramona Leonard Spring (Mona)	--	0.6	0.4	0.75	1.3	0.24	--	--	--	--	--
Ramona Spring	--	--	--	--	--	--	--	--	--	--	--
SE John Grub Spring	0.25	<1	<0.25	0	--	--	--	--	--	--	--
Section 10U Spring	0.9	1	--	--	--	--	--	--	--	--	--
Section 14 (Reich) Spring	--	<1	<0.5	0	1.5	--	1.3	--	--	2.18	--
Seep Spring	--	--	--	--	--	--	--	--	--	--	--
Spring 1212	--	5.28	--	--	--	--	--	--	--	--	--
Spring 3424	1	1	--	--	--	--	--	--	--	--	--
Thick Spring	--	2	<1	--	--	--	--	0.2	0.15	0.12	--
Townsend Spring	--			--	--	--	--	--	--	--	--
Vance Meadow Spring	--	<0.5	<0.5	0	--	--	0.27	0.2	--	--	--
Vance Spring #1	--	1	<0.5	0	1.9	0.2	--	0.4	0.53	0.14	--
Vaughn Spring	--	<1	--	--	--	--	--	--	--	--	--
Walt Spring #1	--	--	<1	--	--	--	--	0.4	--	0.14	--
Watson Well Spring	--	--	--	--	--	--	--	--	0.88	--	--
Waypoint 0003 Spring	--	--	--	--	--	--	--	--	--	--	--
Willow Spring	--	1	<0.25	0.03	0.6	--	0.5	0.3	1.06	0.24	--
Wood/Corrigan Spring	--	--	--	--	--	--	--	0.3	--	--	--

Notes:
-- denotes no measurement taken
< - less than designated flow rate
* natural spring discontinued from sampling program due to its location in vicinity of Corrigan Spring
**natural spring discontinued from sampling program due to location of spring outside of Kf outcrop and/or BLM outcrop zone

TABLE 6
NATURAL SPRINGS ANALYTICAL RESULTS - DISSOLVED METHANE
2013 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES, INC. AND PETROX RESOURCES, INC.

NATURAL SPRING	METHANE CONCENTRATIONS (mg/L)										
	September 2005	May/June 2006	October 2007	October 2008	May/June 2009	October 2009	July 2010	May 2011	May 2012	May 2013	May 2014
Beaver Creek	--	NS	<0.02	<0.02	--	--	--	--	--	Discontinued*	Discontinued*
Big Hole Spring	--	0.001	--	--	--	--	--	--	--	--	--
Candelaria A Spring	--	--	--	--	--	--	--	--	--	--	--
Candelaria B Spring	--	--	--	--	--	--	--	--	--	--	--
Corrigan Spring	--	<0.001	--	--	<0.02	--	--	<0.02	<0.02	--	--
Crain Spring	--	0.0067	--	<0.02	<0.02	--	<0.02	--	--	<0.02	--
Gov-1 Spring	--	--	--	--	--	--	--	--	--	--	--
Gov-2 Spring	--	--	--	--	--	--	--	--	--	<0.02	<0.02
Gov-3 Spring	--	--	--	--	--	--	--	--	--	--	--
Grassy Spring	--	--	<0.02	--	--	--	--	--	--	<0.02	<0.02
High Watson Spring	--	--	--	--	--	--	--	--	--	Discontinued**	Discontinued**
Miser Spring & Pipeline	--	--	--	--	--	--	--	--	--	Discontinued**	Discontinued**
Munger Spring 1	--	--	--	--	--	--	--	--	--	--	--
Munger Spring 2	--	--	--	--	--	--	--	--	--	<0.02	<0.02
Munger Spring 3	--	--	--	--	--	--	--	--	--	--	--
Munger Spring 4	--	--	--	--	--	--	--	--	--	--	--
NW John Grub Spring	0.015	0.0016	0.30	0.03	0.07	--	0.07	0.03	0.27	--	--
Ramona Leonard Spring (Mona)	<0.0005	<0.001	<0.02	<0.02	<0.02	<0.02	--	--	--	--	--
Ramona Spring	--					--	--	--	--	--	--
SE John Grub Spring	<0.0005	0.0025	0.65	<0.02	0.02	--	--	0.023	0.29	--	--
Section 10U Spring	<0.0005	0.0062	--	--	--	--	--	--	--	--	--
Section 14 (Reich) Spring	0.0006	<0.001	0.02	0.02	<0.02	--	--	--	--	<0.02	<0.02
Seep Spring	--	--	--	--	--	--	--	--	--	--	--
Spring 1212	0.0005	<0.001	--	--	--	--	--	--	--	--	--
Spring 3424	0.0017	0.023	--	--	--	--	--	--	--	--	--
Thick Spring	--	<0.001	<0.02	--	<0.02	--	--	<0.02	<0.02	<0.02	<0.02
Townsend Spring	--	--	--	--	--	--	--	--	--	--	--
Vance Meadow Spring	--	0.011	0.06	<0.02	<0.02	--	--	<0.02	<0.02	--	--
Vance Spring #1	--	0.022	<0.02	0.05	<0.02	<0.02	<0.02	<0.02	<0.02	<0.02	--
Vaughn Spring	--	0.0037	--	--	--	--	--	--	--	--	--
Walt Spring #1	--	<0.001	--	--	--	--	--	<0.02	--	<0.02	--
Watson Well Spring	--	0.016	--	<0.02	<0.02	<0.02	--	--	<0.02	--	<0.02
Waypoint 0003 Spring	--	--	--	--	--	--	--	--	--	--	--
Willow Spring	--	<0.001	<0.02	<0.02	<0.02	--	<0.02	--	<0.02	<0.02	<0.02
Wood/Corrigan Spring	--	--	--	--	--	--	--	--	--	--	--

Notes:
mg/L - milligrams per liter
'-- denotes a sample was not collected/analyzed
< - indicates not detected above the detection limit
* natural spring discontinued from sampling program due to its location in vicinity of Corrigan Spring
**natural spring discontinued from sampling program due to location of spring outside of Kf outcrop and/or BLM outcrop zone

TABLE 7
NATURAL SPRINGS ANALYTICAL RESULTS - MAJOR IONS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES, INC. AND ELM RIDGE RESOURCES, INC.

		Cations				Anions			
Natural Spring	**Date**	**Calcium (mg/L)**	**Magnesium (mg/L)**	**Sodium (mg/L)**	**Potassium (mg/L)**	**Carbonate (mg/L)**	**Bicarbonate (mg/L)**	**Sulfate (mg/L)**	**Chloride (mg/L)**
Beaver Creek	October 2008	35.0	10.7	8.6	1.9	<10	128	33	<10
	May 2009	--	--	--	--	--	--	--	--
	July 2010	--	--	--	--	--	--	--	--
	May/June 2011	--	--	--	--	--	--	--	--
	May 2012	--	--	--	--	--	--	--	--
	May 2013	Discontinued*							
	May 2014	Discontinued*							
Corrigan Spring	May/June 2011	31.9	7.6	7.2	0.5	<10	64.0	19.0	<10
	May 2012	21.9	5.02	4.23	1.10	<10	290	62	<10
	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--
Crain Spring	October 2008	65.6	18.8	15.2	1.6	<10	214	98	<10
	May 2009	74.7	21.1	19.6	1.4	<10	230	134	<10
	July 2010	68.3	18.3	14.4	1.9	<10	190	76	<10
	May 2011	--	--	--	--	--	--	--	--
	May 2012	--	--	--	--	--	--	--	--
	May 2013	79.5	21.9	22.5	2.55	<10	179	126	<10
	May 2014	--	--	--	--	--	--	--	--
Gov-1 Spring	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--
Gov-2 Spring	May 2013	80.9	24.6	16	1.50	<10	244	74.0	<10
	May 2014	87.7	25.2	15.9	1.23	<10.0	272	72.0	<10.0
Gov-3 Spring	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--
Grassy Spring	May 2012	95.1	27.9	23.8	2.89	12	246	158	<10
	May 2013	108	34.7	32.1	4.25	<10	216	250	<10
	May 2014	98.9	31	32.1	4.62	<10.0	248	176	50
Munger Spring 1	May 2014	73.7	15.9	20.9	2.76	<10.0	162	33	77
Munger Spring 2	May 2013	47.5	8.55	19.6	1.70	<10	117	19.0	36.0
	May 2014	--	--	--	--	--	--	--	--
NW John Grub Spring	October 2008	59.1	12.8	<0.5	0.6	<10	187	54	<10
	May 2009	30.9	16	11.3	0.6	<10	117	67	<10
	July 2010	66.1	14	12	0.8	<10	175	71	<10
	May 2011	72.9	18.7	14.5	1.6	<10	230	106	<10
	May 2012	84.7	21.9	16.7	2.27	<10	290	62	<10
	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--
Ramona Leonard Spring	October 2008	138	27.7	9.6	1.6	<10	200	340	<10
	May 2009	120	23.1	8.5	1.3	<10	181	250	<10
	July 2010	--	--	--	--	--	--	--	--
	May 2011	--	--	--	--	--	--	--	--
	May 2012	--	--	--	--	--	--	--	--
	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--
SE John Grub Spring	October 2008	65.3	16.9	14	0.7	<10	214	78	<10
	May 2009	72.2	16.6	14.3	0.6	10	238	57	<10
	July 2010	--	--	--	--	--	--	--	--
	May 2011	56.1	12.6	11.2	1.3	<10	171	60	<10
	May 2012	101	27.8	22	3.79	<10	300	108	<10
	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--
Section 14 (Reich) Spring	October 2008	48.8	6	27	0.6	<10	189	43	<10
	May 2009	62.8	6.7	24.5	1	10	188	61	<10
	July 2010	57.5	6.1	24.7	0.8	<10	169	55	<10
	May 2011	--	--	--	--	--	--	--	--
	May 2012	--	--	--	--	--	--	--	--
	May 2013	93.8	10.2	26.1	1.25	<10	240	75.0	<10
	May 2014	84.5	9.24	26.8	1.19	<10.0	222	66.0	<10.0
Thick Spring	October 2008	--	--	--	--	--	--	--	--
	May 2009	44.6	8.2	14.4	0.8	<10	124	28	22
	July 2010	--	--	--	--	--	--	--	--
	May 2011	48.7	9.7	15.6	<0.5	<10	136	31	32
	May 2012	51.6	10.5	16.2	1.39	<10	126	23	36
	May 2013	49.9	10.4	17.1	2.22	<10	131	25.0	40.0
	May 2014	--	--	--	--	--	--	--	--
Vance Meadow Spring	October 2008	68.3	9	14.4	2.6	<10	244	11	<10
	May 2009	66.7	8.2	14	2.7	<10	236	11	<10
	July 2010	--	--	--	--	--	--	--	--
	May 2011	50.1	6.7	12	2.2	<10	178	<10	<10
	May 2012	47.8	8.49	16.5	2.36	<10	144	27	<10
	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--
Vance Spring #1	October 2008	52.5	6.6	13.1	5.9	<10	182	19	<10
	May 2009	57.8	7.7	14.3	4.2	<10	208	<10	<10
	July 2010	63.4	8.4	14.9	5.8	<10	226	<10	<10
	May/June 2011	36.6	4.8	10.6	7.5	<10	133	16	<10
	May 2012	40.6	5.16	12.2	7.89	<10	125	25	<10
	May 2013	47.6	5.90	13.3	12.3	<10	98.0	73.0	<10
	May 2014	45.2	5.44	12.4	8.75	<10.0	152.0	26.0	<10.0
Walt Spring #1	May 2011	43.8	13.6	11.7	0.6	<10	141	65	<10
	May 2012	--	--	--	--	--	--	--	--
	May 2013	52.0	16.7	13.2	1.61	<10	149	84.0	<10
	May 2014	--	--	--	--	--	--	--	--
Watson Well Spring	October 2008	109	38.7	25.5	2.4	<10	394	134	<10
	May 2009	86.8	30.7	20.5	1.9	<10	288	94	<10
	July 2010	78.1	26.9	18.1	2.5	12	218	84	<10
	May 2011	--	--	--	--	--	--	--	--
	May 2012	102	39.4	21.4	2.04	<10	348	118	<10
	May 2013	104	41.2	20.0	2.35	<10	326	108	<10
	May 2014	103	40.1	20.4	2.36	<10.0	324	78	<10.0
Willow Spring	October 2008	39.3	5.8	16.5	1.4	<10	157	19	<10
	May 2009	34.5	5.1	16.1	1.4	<10	122	18	<10
	July 2010	39.2	5.7	16.3	1.8	<10	131	16	<10
	May 2011	32.7	5.2	14.9	1	<10	129	16	<10
	May 2012	38	5.81	16.9	1.17	<10	132	20	<10
	May 2013	35.7	5.72	17	1.23	<10	124	27.0	<10
	May 2014	--	--	--	--	--	--	--	--
Wood Spring	October 2008	--	--	--	--	--	--	--	--
	May 2009	65.7	11.6	10.7	1.6	<10	142	122	<10
	July 2010	--	--	--	--	--	--	--	--
	May 2011	66.9	12.8	10.4	0.8	<10	135	126	<10
	May 2012	21.9	5.02	4.23	1.1	<10	64	19	<10
	May 2013	--	--	--	--	--	--	--	--
	May 2014	--	--	--	--	--	--	--	--

Notes:
mg/L - milligrams per liter
-- denotes not sampled/analyzed
< - less than the laboratory reporting limit
* natural spring discontinued from sampling program due to its location in vicinity of Corrigan Spring

APPENDIX A

TWG MEETING MEMOS

MEMORANDUM

DATE: September 18, 2012 / Revised November 29, 2012

TO: Technical Working Group (TWG)

FROM: LT Environmental, Inc. (LTE)

SUBJECT: Technical Working Group Meeting #1 Summary

TECHNICAL WORKING GROUP MEETING #1

Meeting #1 represents the first TWG to discuss, evaluate, and assess Petrox Resources, Inc. (Petrox) and Elm Ridge Resources, Inc. (Elm Ridge) 2011 Outcrop Zone Report, which was developed in response to Decision Point 5 of the Record of Decision from the Northern San Juan Basin (NSJB) Final Environmental Impact Statement (FEIS), prepared by the Bureau of Land Management (BLM) and the United States Forest Service (USFS). Below is a list of action items that were agreed to at the end of meeting #1.

Outcrop Monitoring Plan

LTE will propose a modified outcrop monitoring plan based on the work conducted over the past 8 years. The plan will include:

- Annual methane gas seep monitoring in the major drainages using a modified grid spacing and grid extent;
- Regional reconnaissance every three years using infrared imagery and field verification;
- Annual natural spring sampling; and
- Quarterly mine surveys once Fosset Gulch Unit production begins for the first year followed by annual surveys unless results suggest otherwise.

Annual Reporting

LTE will prepare an annual Outcrop Zone Report to include the following components:

- Format in accordance with the April 2012 report;
- Annual outcrop monitoring results;
- Evaluation and analysis of new data and changes within the Project Area; and
- Gas and water production data from all Petrox coalbed methane (CBM) wells within the Fosset Gulch Unit.

Other Items of Discussion

The other key points of discussion during the meeting were as follows:

- No new monitoring wells will be required at this time;

- Petrox will incorporate water chemistry data from new production wells drilled prior to bringing them online per the COGCC conditions of approval. The data will be presented in the 2012 Outcrop Zone Report;
- Petrox will collect and provide initial downhole pressure data for all new drill production wells prior to bringing them online. The data will be used in evaluating reservoir production efficiency and in evaluating the Mansoori modeling efforts;
- The Outcrop Zone Report, dated April 2012, will be revised to include the edits to the executive summary, the coal desorption data, the 100 bwpd per well on page 2-9, and the specific edits in the last paragraph of the executive summary pertaining to mitigation as described by Pam Leschak (BLM) and Karen Spray (COGCC);
- Petrox will evaluate reservoir pressure data from new drills as they occur and conduct periodic model runs similar to the initial Mansoori effort to monitor the actual reservoir behavior in comparison to the initial predictive effort. The frequency of this activity will be dependent on the data available. Results will be presented in the Outcrop Zone Report when available;
- Petrox will commit to utilizing a new CBM production well such as the 10U#4 or the ~~16U#1~~ 9U#3 (revised by DRM on 11/29/2012) or an existing well for pressure monitoring for a period of no more the 3 months following completion of the well. The data will be provided to the TWG for review and evaluation. In addition, the data and TWG conclusions will be incorporated into the Outcrop Zone Report; and
- The Outcrop Zone Report and subsequent monitoring will be utilized for all Applications for Permits to Drill (APDs) within the Fosset Gulch Unit for Petrox.

MEMORANDUM

DATE: December 17, 2012

TO: Technical Working Group (TWG)

FROM: LT Environmental, Inc. (LTE)

SUBJECT: Technical Working Group Meeting #2 Summary

TECHNICAL WORKING GROUP MEETING #2

Attendees

Mike Clark – Petrox Resources, Inc. (Petrox)
Walt Brown – United States Forest Service (USFS)
John Pecor – United States Bureau of Land Management (BLM)
Pam Leschak – BLM
Kyle Siesser – Southern Ute Indian Tribe (SUIT)
Karen Spray – Colorado Oil and Gas Conservation Commission (COGCC)
Ivan Geroy – USFS
Daniel Moir – LTE

Mark Weems with the COGCC and Richard Rymerson with the BLM could not attend the meeting. Archuleta County was invited to have a representative attend the meeting; however, no representative for Archuleta County attended the meeting.

Meeting #2 represents the second meeting of the TWG to discuss, evaluate, and assess Petrox Resources, Inc. (Petrox) and Elm Ridge Resources, Inc. (Elm Ridge) coalbed methane (CBM) production wells within the mile and a half outcrop zone related to the Fruitland Formation (Kf) outcrop in Archuleta County, Colorado. The mile and a half outcrop zone was developed in the Record of Decision (ROD) for the Northern San Juan Basin (NSJB) Final Environmental Impact Statement (FEIS).

This meeting was convened to discuss topics related to the NSJB Stakeholder comments related to the 2011 Outcrop Zone Report and associated APD application for the 10U#3 production well. The TWG also discussed scheduling for the 10U#3 and proposed 9U#3 CBM wells. Below is a summary of topics and action items discussed during the second meeting of the TWG.

NSJB Stakeholder Comments

The TWG discussed comments from the NSJB Stakeholders regarding the 10U#3 APD and associated 2011 Outcrop Zone Report. The three main issues are listed below with TWG comments for each issue:

1. Natural Spring Sampling – The NSJB Stakeholders had issues with the quantity of natural spring samples collected compared to the known 28 natural springs identified in the 2011 Outcrop Zone Report. In addition, Mrs. Munger identified several natural springs on her property that have not been sampled to date.

TWG Comments

- In general, natural springs are sampled to compare water chemistry of the springs with the Kf aquifer water. This is used to identify whether natural spring water has communication with the Kf aquifer. Based on natural springs analytical data for the past nine years, the natural springs along the Kf outcrop in Archuleta County have different water chemistry than the Kf aquifer. The natural springs along the Kf outcrop in Archuleta County appear to be fed by snow pack runoff and are not fed by Kf aquifer discharge to the ground surface;
- LTE emphasizes sampling those natural springs that are on or adjacent to the Kf outcrop. In general, those natural springs that are not sampled annually are either dry at the time of sampling or property access was denied. LTE and Petrox have never denied sampling anyone's natural spring; and in consultation with the TWG, will sample springs/water sources in the outcrop zone upon landholder request if there is some potential that the spring/water source could be impacted by gas field production.
- LTE has utilized the United States Geological Survey (USGS) topographic maps and the Colorado Division of Water Resources (DWR) database to identify natural springs along the Kf outcrop in Archuleta County. LTE will conduct another inventory of natural springs along the Kf outcrop in Archuleta County prior to the 2013 Kf outcrop monitoring event utilizing existing resources as well as natural spring information from the *Isotopic and Geochemical Analysis of Groundwater-Surface Water Interactions at the Fruitland Outcrop: An Addition to the 4M Project* report by the Mountain State Institute, dated December 10, 2012; and
- To address landowners that have natural springs on their property that are not included in the previously identified resources, LTE will prepare a questionnaire for landowners that will accompany the 2013 property access letter. The questionnaire will ask if the landowner has natural springs on their property and if so, would they like to have it inspected by LTE field crew during the annual natural spring sampling event. Natural springs identified through the questionnaire or through landowner inquiries will be dealt with on a case-by-case based on natural spring proximity to the Kf outcrop. This will help address those landowners that have natural springs that have not been sampled in the past.

2. Coal fires along the Kf outcrop in Archuleta County – the NSJB Stakeholders are concerned about coal fires, specifically the potential for coal fires near homes and Highway 160.

TWG Comments

- There are currently no active coal fires in Archuleta County. There are currently no active coal fires in La Plata County above the SUIT boundary;

- There are three main causes for surface and near-surface coal fires: 1) lightning strikes to exposed coal that ignites and burns; 2) wildfires that ignite exposed coal; and 3) dewatering of coal where oxygen is present and spontaneous combustion conditions ignite coal and burn;

- Petrox is not responsible for naturally occurring events that would ignite the Kf outcrop such as lightning strikes or wildfires;

- Data currently suggests that the production of CBM wells within the outcrop zone would not dewater the Kf enough to create a spontaneous combustion atmosphere. In addition, the depth to the Kf in the Fosset Gulch area and chemical makeup of gases do not indicate that the Kf has enough oxygen to fuel the coals if it were to be dewatered;

- Monitoring of abandoned coal mines will be conducted by LTE for four consecutive quarters once Fosset Gulch Unit production begins. After the fourth quarterly monitoring event is conducted, the TWG will evaluate the data and determine monitoring frequency moving forward;

- The TWG will continually evaluate the potential for coal fires based on Petrox CBM productions and modify monitoring as needed; and

- Coal fires are possible to extinguish/mitigate and the SUIT have successfully extinguished one coal fire on their reservation within the last year. Petrox and LTE would look into the SUIT success in extinguishing their coal fire and evaluate the technical feasibility in the event a coal fire ignites along the Kf outcrop in Archuleta and Petrox is deemed the responsible party.

3. NSJB Stakeholder role in APD process for CBM production wells within the outcrop zone – There is a confusion of what role the NSJB Stakeholders play in the APD approval process for CBM production wells within the mile and half outcrop zone in Archuleta County.

TWG Comments

- NSJB Stakeholders meetings are for information sharing between regulators, industry, and landowners/stakeholders. It is a time for the NSJB Stakeholders to ask questions, share concerns, and make suggestions to regulatory decision makers;

- LTE's 2011 Outcrop Zone Report was prepared based on the Record of Decision (ROD) for the NSJB FEIS in order to have an APD approved by the BLM/USFS. ; and

- The roles and responsibilities of the NSJB Stakeholders Group and the TWG need to be clarified. The USFS, BLM, and LTE will explain the process in more detail at the next Stakeholders Group Meeting.

10U#3 and 9U#3 Schedules

- Petrox is awaiting their injection permit from the EPA for Petrox's produced water injection well to be approved prior to putting the 10U#3 online. Petrox is anticipating approval in February/March 2013;
- The USFS is currently reviewing Petrox's SUPO for the 9U#3, which Petrox was informed during the TWG meeting that a decision on the SUPO and APD should be given by the first week of March 2013. Petrox has tentatively scheduled drilling the 9U#3 (Federal lease) in May 2013. SUPO and APD approval in March, 2013, is necessary for Petrox to give adequate notice to the drilling company to have a drill rig available for the May 2013 drilling schedule, which is essential to keep the downhole pressure data collection schedule on track;
- Petrox will drill the 9U#3 in May 2013 and begin collecting downhole pressure data for three months (August 2013, September 2013, and October 2013), as agreed upon during the first TWG meeting in September 2012, assuming that the Fosset Gulch unit has been producing for approximately six months prior to data collection. Once the three months of downhole pressure data is collected, Petrox will put the 9U#3 online and begin producing CBM; and
- Downhole pressure data collected from the 9U#3 in 2013 will be reviewed and discussed by the TWG during the TWG meeting at the end of 2013, or sooner if results warrant.

Other Items of Discussion

- The next NSJB Stakeholder meeting is scheduled for January 17, 2012. LTE and Petrox will be at the meeting to address Stakeholder concerns and questions. In addition, LTE and the USFS will present a power point to the Stakeholders to explain the process and clear up confusions.
- The 2012 Outcrop Zone Report, prepared by LTE, will be revised to include more information regarding the natural springs and coal fires.
- LTE will bring three hard copies and several compact disc (CD) copies of the 2012 Outcrop Zone Report for the NSJB Stakeholders to take as needed. This will hopefully help those that have troubles printing the report or accessing it through the ftp site that has been provided by LTE.

MEMORANDUM

DATE: March 7, 2013

TO: Technical Working Group (TWG)

FROM: LT Environmental, Inc. (LTE)

SUBJECT: Technical Working Group Meeting #3 Summary

TECHNICAL WORKING GROUP MEETING #3

Attendees

Mike Clark – Petrox Resources, Inc. (Petrox)
Walt Brown – United States Forest Service (USFS)
John Pecor – United States Bureau of Land Management (BLM)
Pam Leschak – BLM
Kyle Siesser – Southern Ute Indian Tribe (SUIT)
Ivan Geroy – USFS
Daniel Moir – LTE

Karen Spray and Mark Weems with the Colorado Oil and Gas Conservation Commission (COGCC) and Brad Dodd with the BLM could not attend the meeting. Archuleta County was invited to have a representative attend the meeting (provided the representative meets technical qualifications for the TWG); however, no representative for Archuleta County attended the meeting.

This meeting represents the third meeting of the TWG to discuss, evaluate, and assess Petrox Resources, Inc. (Petrox) and Elm Ridge Resources, Inc. (Elm Ridge) coalbed methane (CBM) development within the Fruitland Formation (Kf) outcrop zone in Archuleta County, Colorado. The mile and a half outcrop zone was developed in the Record of Decision (ROD) for the Northern San Juan Basin (NSJB) Final Environmental Impact Statement (FEIS).

This meeting was convened to discuss topics related to the NSJB Stakeholder comments related Application for Permit to Drill (APD) for the 9U#3 CBM production well. Below is a summary of topics and action items discussed during the meeting.

Revised Fosset Gulch Unit Schedules

Below is a revised tentative schedule for the Project Area, specifically for the 10U#3 and the 9U#3 CBM production wells:

- Petrox is awaiting approval of their Underground Injection Control (UIC) permit from the EPA for a produced water injection well prior to putting the 10U#3 online. Petrox is anticipating UIC approval in April 2013;
- The USFS is currently reviewing Petrox's Surface Use Plan of Operations (SUPO) for the 9U#3. Petrox was informed by the USFS during the second TWG meeting that the approval of the SUPO should be given by the first week of March 2013. According to the USFS, the approval of the APD for the 9U#3 is also anticipated for the first week of March 2013. Petrox has tentatively scheduled drilling the 9U#3 (Federal lease) in May 2013. SUPO and APD approval in March 2013 is necessary for Petrox to give adequate notice to the drilling company to have a drill rig available for the May 2013 drilling schedule and to keep the downhole pressure data collection schedule on track;
- Petrox will drill the 9U#3 in May 2013, pending APD and SUPO approval, and begin collecting downhole pressure data for three months (August - October 2013) as agreed upon during the first TWG meeting in September 2012. The Fosset Gulch unit it anticipated to begin production in April 2013, pending EPA UIC approval. Assuming production begins in April 2013, there will be approximately three to five months of production prior to downhole pressure data collection from the 9U#3, approximately one month less than discussed during the second TWG meeting in December 2012. Once the three months of downhole pressure data are collected, Petrox will put the 9U#3 online and begin producing CBM. The deadline to bring the 9U#3 online is December 1, 2013, due to forest access restrictions imposed by the USFS; and
- Downhole pressure data collected from the 9U#3 in 2013 will be reviewed and utilized for history matching, confirming permeability, and modeling to revise, if necessary, drainage patterns for the Project. Data and models will be discussed by the TWG during the meeting planned at the end of 2013.

Additional Monitoring Plans

The outcrop monitoring plan is discussed in detail in the 2012 Outcrop Zone Report as well as potential mitigation options if methane seepage and/or coal fires are identified along the Kf outcrop. Below is a summary of additional monitoring actions/trigger mechanisms that will take place for the Fosset Gulch Unit:

- "Step-wise" monitoring approach will be met by bringing on four CBM production wells within the outcrop zone instead of the proposed 16 CBM production wells discussed in Decision Point 5 of the ROD. This will allow review of data for fewer wells and provide easier correlation with four wells instead of sixteen;

- Produced water will be monitored during production. If there is an increase of water production reaching the 100 barrels of water per day (bbl/day) per well or the water is determined to be fresh (less than 500 mg/L total dissolved solids (TDS)), then the TWG will convene and discuss the data and recommend action items to address potential impacts from withdrawing larger volumes and/or fresh produced water with CBM production; and
- Permeability and drainage patterns will be examined yearly. If permeability is greater than measured in the past or if the drainage pattern varies from past modeling, the TWG will convene to discuss and evaluate the new data.

Other Items Discussed

- Petrox does not plan to drill another CBM production well within the outcrop zone in the near future;
- If another APD is submitted to the BLM for a CBM production well within the outcrop zone, the following steps will occur:
    1. Outcrop Zone Report will be updated;
    2. TWG will convene and discuss Outcrop Zone report, plans for new CBM production well, and schedule;
    3. TWG will prepare recommendations to the BLM;
    4. TWG recommendations would be distributed to NSJB Stakeholders; and
    5. BLM would decide on APD application.
- LTE is preparing a questionnaire for landowners along the Kf outcrop to identify any natural springs on their property. If natural springs are present, LTE would review locations on a case-by-case basis to determine if the natural spring is on or near the Kf outcrop and if sampling the natural spring is necessary.

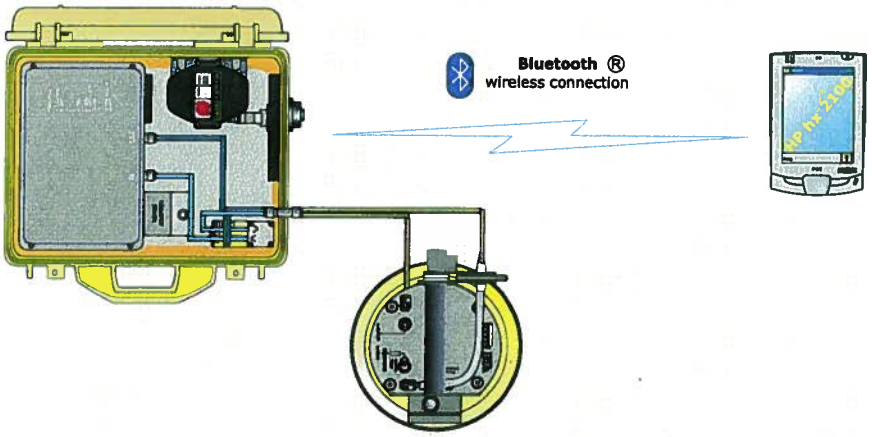
APPENDIX B

EQUIPMENT SPECIFICATIONS

WEST Systems portable soil flux meter

for Carbon dioxide, Methane and Hydrogen sulfide fluxes

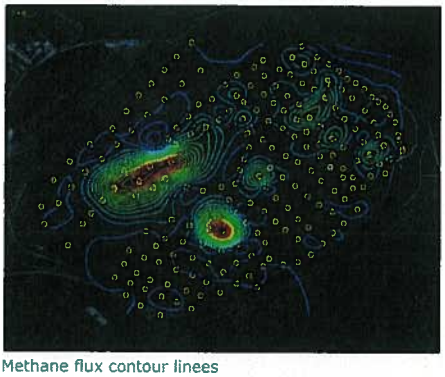
The WEST Systems Fluxmeter is a portable instrument for the measurement of soil gas diffuse degassing phenomena that uses the accumulation chamber method.



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 linees



a group of researchers during a flux mapping fieldwork, using the WS-LI820 flux meter

Courtesy of United States Geological Survey

WEST Systems

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

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

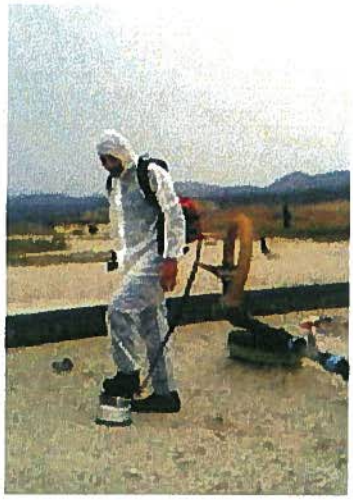
Palm top computer: PocketPC Color Display based on Windows Mobile operating system.
- PalmTop with cables, 0.3 Kg/0.7 lbs.
- Size 125mm (4.8") x 82mm (3.2") * 25 mm (1").

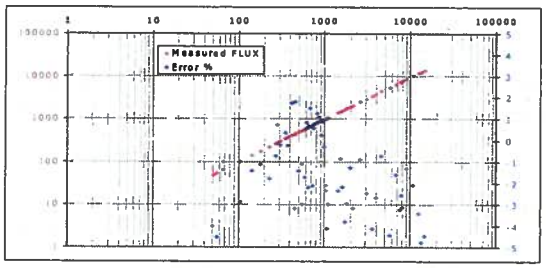
Software The instrument is supplied with a custom software, FluxManager, which allows recording and visualization of the increase in concentration of the target gas in the accumulation chamber, and then the flux calculations. The obtained measurements can be saved on the palmtop computer and then transferred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

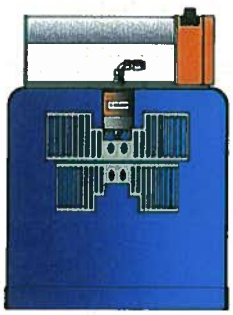
Finally we improved the connection between the instrument and the palmtop that now is based on BlueTooth wireless embedded device.





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 landfil.



Accumulation Chamber Type B

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

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CO_2 - LI820

LI820 based Carbon dioxide fluxmeter

The CO_2 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 ±5ppm. 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}

CO_2 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 CO_2

WS-DRAGER: CO_2 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/m^2 per day.

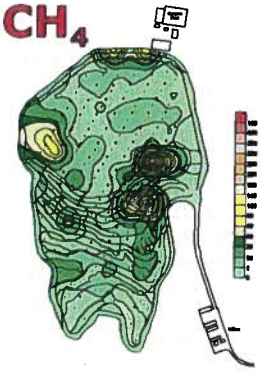
The precision depends on the measured flux:

range:0.5 – 5 moles/m^2 per day 25% (Acc. chamber A)

5-350 moles/m^2/day 10% (Acc. chamber B)

350-600 moles/ m^2/day 25% (Acc. chamber B)

600-1500 moles/ m^2/day 25% (Acc.Ch.B / F.S.=10%)



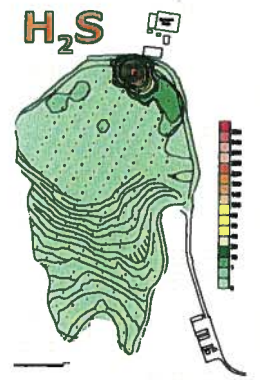
WS-HC CH^4

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/m^2/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)



H_2S - 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%.

H_2S Flux measurement range: from 0.0025 to 0.5 moles/m^2 per day.
The precision depends on the measured flux:
0.0025 – 0.05 moles/m^2 per day ±25% (Acc. Chamber A)
0.05 – 0.5 moles/m^2 per day ±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.

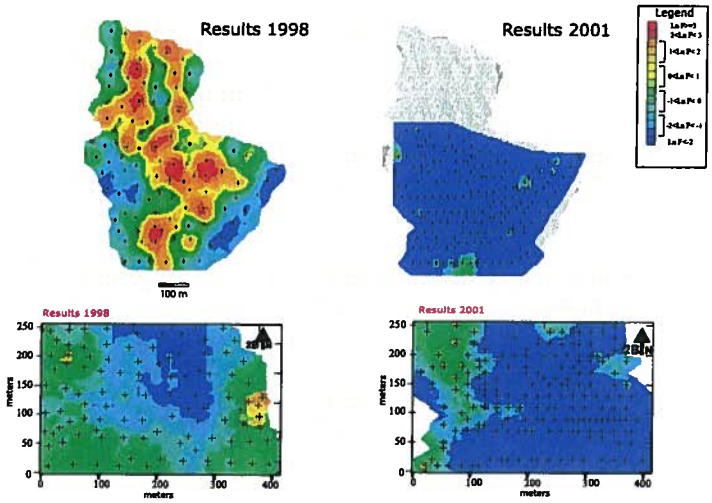
We thanks to N.Lima et al. for the maps.

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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 intervensions 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.

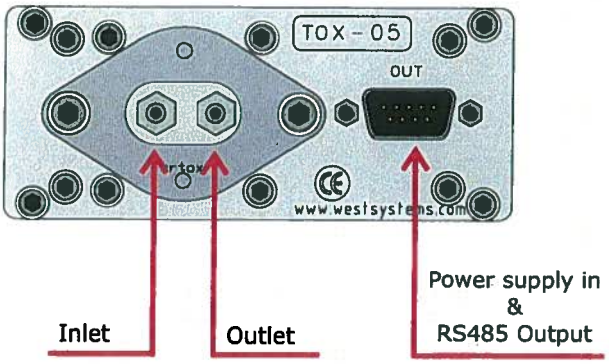
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Hydrogen Sulfide Detector



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:

$$H_2S + 2O_2 = H_2SO_4$$

the gas sample specific consuption is very low:

2.5×10^{-10} moles/Sec per ppm

Due to this consuption the H2S flux is methodically understimated 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%

Repeatibility 2%

Resolution 22 ppm (Methane equivalent)

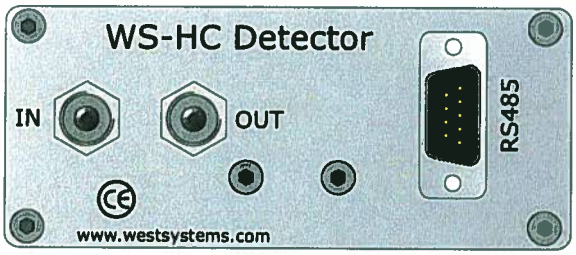
Full scale range is 50000 ppm of methane.

Detection limit 60 ppm.

Methane flux measurement range from 0.1 to 150 moles/m^2 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/m^2/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

CO_2 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

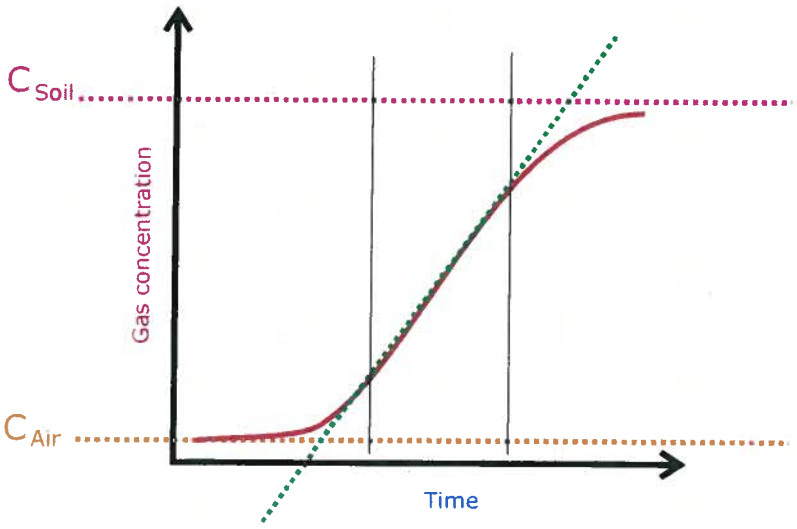
Relative Humidity Range: 0 to 95% RH, Non-Condensing

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 $L\,K^{-1}\,mol^{-1}$
- $\mathbf{T_k}$ 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

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

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

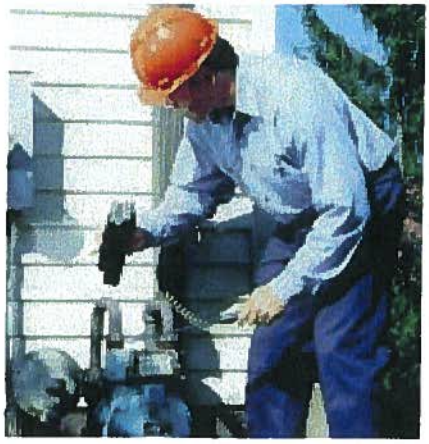
An example:

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

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_2S

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_2S
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. Gaspor tGas Testers sold in Canada are approved by CSA for use in Class I, Division I, Groups A, B, C, and D locations.

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

Gasport Gas Tester Kits

	LEL Display	O_2	CO	H_2S	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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MSA

GeoXT

The total GPS platform for all your GIS field requirements

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

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

High-accuracy Integrated GPS

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

Need submeter accuracy in real-time? Use corrections from a satellite-based augmentation system (SBAS) like WAAS[1] or EGNOS[2]. 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 Mobile lets you choose a software solution to match your workflow.

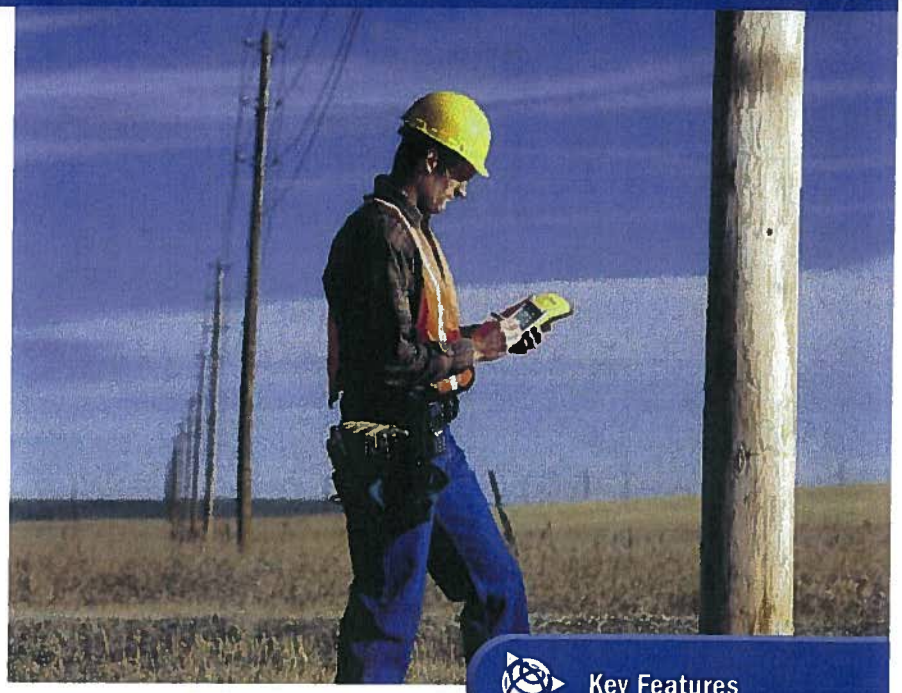
Windows Mobile includes familiar Microsoft productivity tools, including Pocket Word, Pocket Excel, and Pocket Outlook®. Pocket Outlook lets you synchronize e-mails, contacts, appointments, and data with your office computer, so whether you're in the office or in the field, you're always up to date.

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.



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

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 AutoRoute® 2004 in Europe.*

Trimble.

GeoXT

The total GPS platform for all your GIS field requirements

Standard features

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

GPS
- Submeter accuracy
- Integrated WAAS[1]/EGNOS[2]
- 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 adaptor[3]
- Portable power kit[3]
- Hurricane antenna
- External patch antenna
- Pole-mountable ground plane
- Baseball cap with antenna sleeve
- Beacon-on-a-Belt (BoB™) differential correction receiver[3]
- Hard carry case
- Null modem cable[3]
- 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	WAAS[1] or EGNOS[2]
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

Postprocessed[5]	Submeter
Carrier postprocessed[6]	
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).*

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ULTRAMETER II™

OVER 50 YEARS



MYRON L COMPANY

Water Quality Instrumentation

Accuracy • Reliability • Simplicity

ULTRAMETER II™

Advanced Design • Superior Performance

MADE IN USA

OVER 50 YEARS



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

CE

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 ±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 ☒ or ☒ 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 9.99%/°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 Conductivity TDS, Resistivity Temperature	6PII 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 LxWxH	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 ml/0.04 oz. Cond/TDS/Res: 5 ml/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: SS2OZ, 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.

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.



MYRON L COMPANY
Water Quality Instrumentation
Accuracy • Reliability • Simplicity

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APPENDIX C

FLUX METER DATA

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
BeaverCreek_01_17072014_102358.txt	BeaverCreek	1234763.949	2424959.787	7/17/2014	0	0	0.125616	A	776.2	32.0	17-07-2014 10:23:58	-0.882	-0.045	0.528	0.237909
BeaverCreek_02_17072014_102843.txt	BeaverCreek	1234778.482	2425160.563	7/17/2014	0	0	0.657241	A	776.2	32.6	17-07-2014 10:28:43	0	0	2.768	0.237442
BeaverCreek_03_17072014_103054.txt	BeaverCreek	1234767.579	2425327.341	7/17/2014	0	0	0.391295	A	776.0	32.9	17-07-2014 10:30:54	0	-0.041	1.65	0.237149
BeaverCreek_04_17072014_103718.txt	BeaverCreek	1234753.489	2425561.23	7/17/2014	0	0	0.607647	A	776.1	33.5	17-07-2014 10:37:18	0	-0.03	2.567	0.236715
BeaverCreek_05_17072014_104046.txt	BeaverCreek	1234775.573	2425737.448	7/17/2014	0	0	0.161862	A	774.6	33.9	17-07-2014 10:40:46	-0.124	0	0.686	0.23595
BeaverCreek_06_17072014_104505.txt	BeaverCreek	1234771.381	2425914.591	7/17/2014	0	0	1.107452	A	774.3	34.2	17-07-2014 10:45:05	-0.915	-0.013	4.7	0.235628
BeaverCreek_07_17072014_104936.txt	BeaverCreek	1234574.345	2426141.943	7/17/2014	0	0	0.121238	A	773.1	34.6	17-07-2014 10:49:36	-1.359	-0.021	0.516	0.234957
BeaverCreek_08_17072014_105322.txt	BeaverCreek	1234540.267	2425981.565	7/17/2014	0	0	0.328003	A	772.2	34.9	17-07-2014 10:53:22	0	-0.091	1.399	0.234455
BeaverCreek_09_17072014_110332.txt	BeaverCreek	1234603.246	2426347.458	7/17/2014	0	0	0.339943	A	772.6	35.5	17-07-2014 11:03:32	0	-0.033	1.452	0.234121
BeaverCreek_10_17072014_110848.txt	BeaverCreek	1234596.484	2426515.414	7/17/2014	0	0	0.162031	A	769.0	35.8	17-07-2014 11:08:48	0	-0.02	0.696	0.232803
BeaverCreek_11_17072014_111220.txt	BeaverCreek	1234705.115	2426581.391	7/17/2014	0	0	0.462493	A	766.9	36.1	17-07-2014 11:12:20	0	-0.001	1.994	0.231942
BeaverCreek_12_17072014_111619.txt	BeaverCreek	1234780.411	2426381.644	7/17/2014	0	0	0.457452	A	767.5	36.3	17-07-2014 11:16:19	0	-0.003	1.972	0.231974
BeaverCreek_13_17072014_112016.txt	BeaverCreek	1234767.829	2426157.926	7/17/2014	0	0	0.219938	A	768.9	36.5	17-07-2014 11:20:16	-0.477	-0.034	0.947	0.232247
BeaverCreek_14_17072014_112405.txt	BeaverCreek	1234964.973	2426160.458	7/17/2014	0	0	0.417042	A	770.3	36.6	17-07-2014 11:24:05	0	0	1.793	0.232595
BeaverCreek_15_17072014_112942.txt	BeaverCreek	1234980.822	2426353.01	7/17/2014	0	0	0.227104	A	771.9	36.8	17-07-2014 11:29:42	0	-0.011	0.975	0.232927
BeaverCreek_16_17072014_113357.txt	BeaverCreek	1234958.104	2426528.902	7/17/2014	0	0	0.157114	A	771.6	36.9	17-07-2014 11:33:57	0	0	0.675	0.232762
BeaverCreek_17_17072014_113854.txt	BeaverCreek	1235143.755	2426338.251	7/17/2014	0	0	0.161382	A	770.0	37.0	17-07-2014 11:38:54	0	-0.006	0.695	0.232204
BeaverCreek_18_17072014_114313.txt	BeaverCreek	1235165.087	2426140.131	7/17/2014	0	0	0.521566	A	770.3	37.1	17-07-2014 11:43:13	0	0	2.246	0.23222
BeaverCreek_19_17072014_114727.txt	BeaverCreek	1235168.896	2425971.895	7/17/2014	0	0	0.179473	A	771.9	37.4	17-07-2014 11:47:27	0	-0.013	0.772	0.232477
BeaverCreek_20_17072014_115045.txt	BeaverCreek	1235025.073	2425988.322	7/17/2014	0	0	0.352235	A	774.0	37.6	17-07-2014 11:50:45	0	0	1.512	0.23296
BeaverCreek_21_17072014_115722.txt	BeaverCreek	1234963.014	2425764.742	7/17/2014	0	0	0	A	773.6	38.0	17-07-2014 11:57:22	0	0	-0.029	0.23254
BeaverCreek_22_17072014_120010.txt	BeaverCreek	1234943.836	2425553.22	7/17/2014	0	0	2.449789	A	774.9	38.2	17-07-2014 12:00:10	0	-0.013	10.524	0.232781
BeaverCreek_23_17072014_120321.txt	BeaverCreek	1235192.577	2425668.213	7/17/2014	0	0	0.057519	A	775.7	38.4	17-07-2014 12:03:21	0	-0.053	0.247	0.232872
BeaverCreek_24_17072014_120524.txt	BeaverCreek	1235171.03	2425756.748	7/17/2014	0	0	0.53483	A	775.5	38.5	17-07-2014 12:05:24	0	-0.02	2.298	0.232737
BeaverCreek_25_17072014_120757.txt	BeaverCreek	1235369.006	2425812.594	7/17/2014	0	0	0.400852	A	775.9	38.6	17-07-2014 12:07:57	0	0	1.722	0.232783
BeaverCreek_26_17072014_121151.txt	BeaverCreek	1235346.989	2425993.835	7/17/2014	0	0	0.661966	A	775.5	38.8	17-07-2014 12:11:51	0	-0.049	2.847	0.232513
BeaverCreek_27_17072014_121730.txt	BeaverCreek	1235403.419	2425594.666	7/17/2014	0	0	0.170334	A	775.3	38.9	17-07-2014 12:17:30	0	-0.013	0.733	0.232379
BeaverCreek_28_17072014_122048.txt	BeaverCreek	1235365.441	2425349.353	7/17/2014	0	0	0.518696	A	774.2	39.0	17-07-2014 12:20:48	0	-0.025	2.236	0.231975
BeaverCreek_29_17072014_122345.txt	BeaverCreek	1235351.706	2425155.541	7/17/2014	0	0	0.130345	A	774.3	39.1	17-07-2014 12:23:45	0	-0.029	0.562	0.231931
BeaverCreek_30_17072014_122803.txt	BeaverCreek	1235554.519	2425191.087	7/17/2014	0	0.008574	0.567986	A	773.9	39.2	17-07-2014 12:28:03	0	0.037	2.451	0.231736
BeaverCreek_31_17072014_123210.txt	BeaverCreek	1235499.106	2424989.089	7/17/2014	0	0	1.084668	A	774.0	39.4	17-07-2014 12:32:10	0	-0.002	4.683	0.231618
BeaverCreek_32_17072014_123431.txt	BeaverCreek	1235388.321	2425010.096	7/17/2014	0	0	0.268991	A	773.4	39.6	17-07-2014 12:34:31	0	-0.015	1.163	0.231291
BeaverCreek_33_17072014_123731.txt	BeaverCreek	1235197.311	2424955.318	7/17/2014	0	0	0.487101	A	773.9	39.8	17-07-2014 12:37:31	0	0	2.106	0.231292
BeaverCreek_34_17072014_124052.txt	BeaverCreek	1235197.549	2425182.428	7/17/2014	0	0	0.321055	A	774.2	39.9	17-07-2014 12:40:52	0	-0.004	1.388	0.231308
BeaverCreek_35_17072014_124404.txt	BeaverCreek	1235162.969	2425334.422	7/17/2014	0	0	0.075619	A	774.5	40.1	17-07-2014 12:44:04	0	-0.044	0.327	0.23125
BeaverCreek_36_17072014_124737.txt	BeaverCreek	1235002.901	2425381.549	7/17/2014	0	0	0.24326	A	774.7	40.2	17-07-2014 12:47:37	0	-0.006	1.052	0.231236
BeaverCreek_37_17072014_125056.txt	BeaverCreek	1234954.074	2425176.5	7/17/2014	0	0	0.162212	A	775.5	40.3	17-07-2014 12:50:56	0	-0.007	0.701	0.231401
BeaverCreek_38_17072014_125418.txt	BeaverCreek	1234963.397	2425003.629	7/17/2014	0	0	1.156866	A	775.5	40.4	17-07-2014 12:54:18	0	0	5.001	0.231327
BeaverCreek_39_17072014_125805.txt	BeaverCreek	1234975.76	2424758.991	7/17/2014	0	0	0.179568	A	775.0	40.5	17-07-2014 12:58:05	-0.069	-0.016	0.777	0.231104
BeaverCreek_40_17072014_130105.txt	BeaverCreek	1235195.321	2424787.228	7/17/2014	0.012237	0	0.379107	A	774.5	40.6	17-07-2014 13:01:05	0.053	-0.003	1.642	0.230881
BeaverCreek_41_17072014_130426.txt	BeaverCreek	1235371.293	2424813.062	7/17/2014	0	0	0.315332	A	774.3	40.8	17-07-2014 13:04:26	-3.149	-0.003	1.367	0.230675
BeaverCreek_42_17072014_130730.txt	BeaverCreek	1235562.865	2424787.814	7/17/2014	0	0	0.308778	A	773.4	41.0	17-07-2014 13:07:30	0	-0.012	1.341	0.23026
BeaverCreek_43_17072014_131033.txt	BeaverCreek	1235744.415	2424785.282	7/17/2014	0	0	0.553611	A	772.7	41.2	17-07-2014 13:10:33	0	-0.012	2.408	0.229905
BeaverCreek_44_17072014_131349.txt	BeaverCreek	1235760.639	2424580.161	7/17/2014	0	0	0.152691	A	772.2	41.4	17-07-2014 13:13:49	0	-0.004	0.665	0.22961
BeaverCreek_45_17072014_131704.txt	BeaverCreek	1235770.961	2424392.673	7/17/2014	0	0	0.328357	A	771.4	41.5	17-07-2014 13:17:04	0	-0.023	1.432	0.229299
BeaverCreek_46_17072014_132002.txt	BeaverCreek	1235574.728	2424349.287	7/17/2014	0	0	0.454804	A	772.6	41.6	17-07-2014 13:20:02	-0.452	-0.04	1.981	0.229583
BeaverCreek_47_17072014_132314.txt	BeaverCreek	1235583.427	2424593.201	7/17/2014	0	0	0.048895	A	773.0	41.8	17-07-2014 13:23:14	0	-0.031	0.213	0.229556
BeaverCreek_48_17072014_132558.txt	BeaverCreek	1235374.32	2424622.753	7/17/2014	0	0	0.086493	A	772.8	41.9	17-07-2014 13:25:58	-0.229	-0.066	0.377	0.229424
BeaverCreek_49_17072014_132951.txt	BeaverCreek	1235350.315	2424374.693	7/17/2014	0	0	0.440064	A	773.5	42.0	17-07-2014 13:29:51	0	-0.013	1.917	0.229559
BeaverCreek_50_17072014_133203.txt	BeaverCreek	1235204.734	2424391.683	7/17/2014	0	0	0.290496	A	772.8	42.1	17-07-2014 13:32:03	-1.059	-0.062	1.267	0.229278
BeaverCreek_51_17072014_133512.txt	BeaverCreek	1235169.453	2424567.06	7/17/2014	0	0	0.289178	A	773.2	42.2	17-07-2014 13:35:12	0	0	1.261	0.229324
BigHornSchomberg_01_14072014_130134.txt	BigHornSchomberg	1194687.444	2459482.721	7/14/2014	0	0	0.140029	A	802.4	37.7	14-07-2014 13:01:34	0	-0.019	0.58	0.24143
BigHornSchomberg_02_14072014_130513.txt	BigHornSchomberg	1194685.361	2459511.117	7/14/2014	0	0	0.122892	A	802.4	38.3	14-07-2014 13:05:13	0	-0.043	0.51	0.240965
BigHornSchomberg_03_14072014_130850.txt	BigHornSchomberg	1194688.279	2459545.058	7/14/2014	0	0	0.094709	A	802.5	39.1	14-07-2014 13:08:50	0	-0.031	0.394	0.240377
BigHornSchomberg_04_14072014_131116.txt	BigHornSchomberg	1194693.653	2459565.388	7/14/2014	0	0	0.619345	A	802.4	39.6	14-07-2014 13:11:16	0	-0.025	2.581	0.239963
BigHornSchomberg_05_14072014_131406.txt	BigHornSchomberg	1194661.145	2459576.591	7/14/2014	0	0	0.048635	A	802.4	40.1	14-07-2014 13:14:06	0	-0.031	0.203	0.23958
BigHornSchomberg_06_14072014_131725.txt	BigHornSchomberg	1194659.063	2459562.147	7/14/2014	0	0	0.107653	A	802.5	40.6	14-07-2014 13:17:25	0	-0.023	0.45	0.239228
BigHornSchomberg_07_14072014_132039.txt	BigHornSchomberg	1194655.915	2459543.699	7/14/2014	0	0	0.051094	A	802.2	41.1	14-07-2014 13:20:39	0	-0.045	0.214	0.238758
BigHornSchomberg_08_14072014_132335.txt	BigHornSchomberg	1194660.767	2459516.222	7/14/2014	0	0	0.063183	A	802.1	41.5	14-07-2014 13:23:35	-0.012	-0.044	0.265	0.238425
BigHornSchomberg_09_14072014_132551.txt	BigHornSchomberg	1194655.438	2459517.093	7/14/2014	0	0	0.047863	A	802.1	41.9	14-07-2014 13:25:51	0	-0.01	0.201	0.238122
BigHornSchomberg_10_14072014_132859.txt	BigHornSchomberg	1194654.333	2459484.298	7/14/2014	0	0	0.054699	A	802.1	42.3	14-07-2014 13:28:59	0	-0.038	0.23	0.23782

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
BigHornSchomberg_11_14072014_133141.txt	BigHornSchomberg	1194625.915	2459488.454	7/14/2014	0	0	0.066972	A	802.0	42.7	14-07-2014 13:31:41	0	-0.068	0.282	0.23749
BigHornSchomberg_12_14072014_133423.txt	BigHornSchomberg	1194622.089	2459510.107	7/14/2014	0	0	0.021824	A	802.1	43.1	14-07-2014 13:34:23	0	-0.018	0.092	0.237219
BigHornSchomberg_13_14072014_133718.txt	BigHornSchomberg	1194627.649	2459528.37	7/14/2014	0	0	0.056617	A	802.0	43.5	14-07-2014 13:37:18	0	-0.052	0.239	0.23689
BigHornSchomberg_14_14072014_133937.txt	BigHornSchomberg	1194627.371	2459557.672	7/14/2014	0	0	0.076916	A	802.0	43.8	14-07-2014 13:39:37	0	-0.048	0.325	0.236665
BigHornSchomberg_15_14072014_134216.txt	BigHornSchomberg	1194629.581	2459586.547	7/14/2014	0	0	0.046103	A	802.2	44.2	14-07-2014 13:42:16	0	-0.063	0.195	0.236426
BigHornSchomberg_16_14072014_134510.txt	BigHornSchomberg	1194606.395	2459585.263	7/14/2014	0	0	0.038956	A	802.1	44.6	14-07-2014 13:45:10	0	-0.074	0.165	0.236099
BigHornSchomberg_17_14072014_134805.txt	BigHornSchomberg	1194600.02	2459540.798	7/14/2014	0	0	0.019329	A	801.8	45.0	14-07-2014 13:48:05	0	-0.076	0.082	0.235714
BigHornSchomberg_18_14072014_135052.txt	BigHornSchomberg	1194579.146	2459537.455	7/14/2014	0	0	0.086886	A	801.7	45.3	14-07-2014 13:50:52	0	-0.061	0.369	0.235463
BigHornSchomberg_19_14072014_135414.txt	BigHornSchomberg	1194599.354	2459510.92	7/14/2014	0	0	0.105355	A	801.7	45.7	14-07-2014 13:54:14	0	-0.086	0.448	0.235167
FossetGulch071414_01_14072014_101753.txt	FossetGulch071414	1208369.474	2446952.613	7/14/2014	0	0	0.089251	A	793.5	28.7	14-07-2014 10:17:53	0	-0.012	0.363	0.245871
FossetGulch071414_02_14072014_102220.txt	FossetGulch071414	1208300.83	2446757.589	7/14/2014	0	0	0.070064	A	793.5	29.8	14-07-2014 10:22:20	0	0	0.286	0.244978
FossetGulch071414_03_14072014_102605.txt	FossetGulch071414	1208300.497	2446590.805	7/14/2014	0	0	0.106601	A	793.0	30.9	14-07-2014 10:26:05	0	-0.005	0.437	0.243938
FossetGulch071414_04_14072014_103402.txt	FossetGulch071414	1208531.929	2446556.729	7/14/2014	0	0.004832	0.018121	A	790.6	32.9	14-07-2014 10:34:02	0	0.02	0.075	0.24161
FossetGulch071414_05_14072014_104015.txt	FossetGulch071414	1208531.351	2446382.247	7/14/2014	0	0	0.054818	A	790.6	34.4	14-07-2014 10:40:15	0	-0.022	0.228	0.240432
FossetGulch071414_06_14072014_104749.txt	FossetGulch071414	1208509.413	2446155.633	7/14/2014	0	0.008351	0.8241	A	789.4	36.3	14-07-2014 10:47:49	0	0.035	3.454	0.238593
FossetGulch071414_07_14072014_105247.txt	FossetGulch071414	1208553.323	2445985.538	7/14/2014	0	0	0.064691	A	787.3	37.6	14-07-2014 10:52:47	0	-0.018	0.273	0.236963
FossetGulch071414_08_14072014_105708.txt	FossetGulch071414	1208359.29	2445981.721	7/14/2014	0	0.006612	0.108397	A	786.9	38.5	14-07-2014 10:57:08	0	0.028	0.459	0.236158
FossetGulch071414_09_14072014_110202.txt	FossetGulch071414	1208328.886	2446187.866	7/14/2014	0	0	0.080091	A	789.0	39.2	14-07-2014 11:02:02	0	-0.007	0.339	0.236258
FossetGulch071414_10_14072014_110619.txt	FossetGulch071414	1208335.944	2446371.24	7/14/2014	0	0	0.057345	A	789.1	39.6	14-07-2014 11:06:19	0	-0.006	0.243	0.235986
FossetGulch071414_11_14072014_111018.txt	FossetGulch071414	1208122.132	2446380.381	7/14/2014	0	0	0.167601	A	790.1	39.9	14-07-2014 11:10:18	0	-0.006	0.71	0.236058
FossetGulch071414_12_14072014_111407.txt	FossetGulch071414	1208128.177	2446555.631	7/14/2014	0	0	0.363331	A	791.2	40.1	14-07-2014 11:14:07	0	-0.01	1.538	0.236236
FossetGulch071414_13_14072014_112047.txt	FossetGulch071414	1208153.164	2446788.805	7/14/2014	0	0.001417	0.341679	A	791.6	40.4	14-07-2014 11:20:47	0	0.006	1.447	0.236129
FossetGulch071414_14_14072014_112429.txt	FossetGulch071414	1208153.561	2446982.482	7/14/2014	0	0	0.309541	A	793.0	40.5	14-07-2014 11:24:29	0	-0.002	1.309	0.236472
FossetGulch071414_15_14072014_112832.txt	FossetGulch071414	1208129.528	2447194.882	7/14/2014	0	0	0.125835	A	793.2	40.5	14-07-2014 11:28:32	0	0	0.532	0.236531
FossetGulch071414_16_14072014_113233.txt	FossetGulch071414	1208127.562	2447346.125	7/14/2014	0	0	0.603408	A	792.6	40.5	14-07-2014 11:32:33	0	-0.013	2.553	0.236352
FossetGulch071414_17_14072014_113715.txt	FossetGulch071414	1208006.609	2447378.792	7/14/2014	0	0	0.348835	A	792.3	40.4	14-07-2014 11:37:15	0	-0.001	1.476	0.236338
FossetGulch071414_18_14072014_114152.txt	FossetGulch071414	1207898.302	2447156.925	7/14/2014	0	0	0.36243	A	791.8	40.3	14-07-2014 11:41:52	0	-0.016	1.534	0.236264
FossetGulch071414_19_14072014_114705.txt	FossetGulch071414	1207973.253	2446985.42	7/14/2014	0	0	0.338353	A	791.6	40.2	14-07-2014 11:47:05	0	-0.001	1.432	0.23628
FossetGulch071414_20_14072014_115151.txt	FossetGulch071414	1207922.397	2446767.618	7/14/2014	0	0	0.17837	A	792.3	40.1	14-07-2014 11:51:51	0	-0.003	0.754	0.236565
FossetGulch071414_21_14072014_115736.txt	FossetGulch071414	1207936.782	2446556.257	7/14/2014	0	0	0.209847	A	792.1	40.0	14-07-2014 11:57:36	-0.385	-0.01	0.887	0.23658
FossetGulch071414_22_14072014_120154.txt	FossetGulch071414	1207923.224	2446380.095	7/14/2014	0	0	0.246675	A	792.1	40.1	14-07-2014 12:01:54	0	0	1.043	0.236505
FossetGulch071414_23_14072014_120742.txt	FossetGulch071414	1207688.257	2446393.96	7/14/2014	0	0	1.000656	A	791.3	40.3	14-07-2014 12:07:42	0	-0.012	4.238	0.236115
FossetGulch071414_24_14072014_121254.txt	FossetGulch071414	1207736.222	2446604.134	7/14/2014	0	0	0.263811	A	790.6	40.5	14-07-2014 12:12:54	0	-0.01	1.119	0.235756
FossetGulch071414_25_14072014_121723.txt	FossetGulch071414	1207739.526	2446778.375	7/14/2014	0	0	0.374782	A	791.7	40.6	14-07-2014 12:17:23	0	0	1.588	0.236009
FossetGulch071414_26_14072014_122156.txt	FossetGulch071414	1207773.405	2446975.936	7/14/2014	0	0	0.258485	A	791.4	40.7	14-07-2014 12:21:56	0	-0.003	1.096	0.235844
FossetGulch071414_27_14072014_122636.txt	FossetGulch071414	1207791.186	2447205.545	7/14/2014	0	0	0.111047	A	791.4	40.8	14-07-2014 12:26:36	0	-0.876	0.471	0.235769
FossetGulch071414_28_14072014_123053.txt	FossetGulch071414	1207798.226	2447376.976	7/14/2014	0	0	0.252687	A	790.0	40.9	14-07-2014 12:30:53	0	-0.005	1.074	0.235277
PetersonGulch_01_30072014_091331.txt	PetersonGulch	1205804.384	2454161.899	7/30/2014	0	0	0.718863	A	788.7	30.8	30-07-2014 09:13:31	0	-0.021	2.962	0.242695
PetersonGulch_02_30072014_092054.txt	PetersonGulch	1205532.401	2454166.479	7/30/2014				A	n.a.	30.7	30-07-2014 09:20:54	0	-0.075	1.482	
PetersonGulch_03_30072014_092451.txt	PetersonGulch	1205503.719	2454397.624	7/30/2014	0	0	0.078793	A	790.3	30.8	30-07-2014 09:24:51	0	-0.013	0.324	0.243187
PetersonGulch_04_30072014_092728.txt	PetersonGulch	1205338.8	2454378.547	7/30/2014	0	0		A	795.0	30.9	30-07-2014 09:27:28	0	-0.005		0.244553
PetersonGulch_05_30072014_093528.txt	PetersonGulch	1205322.352	2454643.491	7/30/2014	0	0	0.894944	A	789.5	30.9	30-07-2014 09:35:28	0	-0.047	3.685	0.242861
PetersonGulch_06_30072014_093952.txt	PetersonGulch	1205555.653	2454597.497	7/30/2014	0	0	0.248652	A	789.9	31.1	30-07-2014 09:39:52	0	0	1.024	0.242825
PetersonGulch_07_30072014_094246.txt	PetersonGulch	1205771.215	2454399.241	7/30/2014	0	0	0.182332	A	789.5	31.4	30-07-2014 09:42:46	0	-0.015	0.752	0.242463
PetersonGulch_08_30072014_094604.txt	PetersonGulch	1205728.071	2454619.476	7/30/2014	0	0	0.311624	A	789.2	31.7	30-07-2014 09:46:04	0	-0.01	1.287	0.242132
PetersonGulch_09_30072014_094906.txt	PetersonGulch	1205729.255	2454814.367	7/30/2014	0	0.007504	0.308875	A	789.5	31.9	30-07-2014 09:49:06	0	0.031	1.276	0.242065
PetersonGulch_10_30072014_095126.txt	PetersonGulch	1205562.248	2454769.671	7/30/2014	0	0	0.270764	A	789.0	32.1	30-07-2014 09:51:26	0	-0.004	1.12	0.241753
PetersonGulch_100_31072014_105202.txt	PetersonGulch	1202758.932	2459198.194	7/31/2014	0	0.007744	0.253615	A	794.2	33.8	31-07-2014 10:52:02	0	0.032	1.048	0.241999
PetersonGulch_101_31072014_105459.txt	PetersonGulch	1202938.126	2459186.306	7/31/2014	0	0	0.11249	A	794.7	34.1	31-07-2014 10:54:59	0	-0.005	0.465	0.241915
PetersonGulch_102_31072014_105718.txt	PetersonGulch	1203140.315	2459165.769	7/31/2014	0	0	0.43333	A	794.7	34.4	31-07-2014 10:57:18	0	-0.002	1.793	0.241679
PetersonGulch_103_31072014_110010.txt	PetersonGulch	1202935.143	2459407.796	7/31/2014	0	0	0.053325	A	794.2	34.7	31-07-2014 11:00:10	0	-0.001	0.221	0.241291
PetersonGulch_104_31072014_110243.txt	PetersonGulch	1202742.782	2459357.19	7/31/2014	0	0	0.11472	A	794.3	35.1	31-07-2014 11:02:43	0	-0.007	0.476	0.241009
PetersonGulch_105_31072014_110534.txt	PetersonGulch	1202542.036	2459382.518	7/31/2014	0	0	0.043361	A	794.7	35.4	31-07-2014 11:05:34	0	-0.002	0.18	0.240896
PetersonGulch_106_31072014_110828.txt	PetersonGulch	1202345.476	2459377.831	7/31/2014	0	0	0.068339	A	794.6	35.7	31-07-2014 11:08:28	0	0	0.284	0.240631
PetersonGulch_107_31072014_111208.txt	PetersonGulch	1202123.935	2459361.608	7/31/2014	0	0	0.244461	A	794.0	36.1	31-07-2014 11:12:08	-0.546	-0.007	1.018	0.240139
PetersonGulch_108_31072014_111531.txt	PetersonGulch	1202158.551	2459579.8	7/31/2014	0	0	0.364381	A	793.4	36.4	31-07-2014 11:15:31	0	-0.004	1.52	0.239725
PetersonGulch_109_31072014_111807.txt	PetersonGulch	1202330.877	2459557.232	7/31/2014	0	0	0.102892	A	794.3	36.6	31-07-2014 11:18:07	-0.366	0	0.429	0.239842
PetersonGulch_11_30072014_095357.txt	PetersonGulch	1205338.231	2454768.287	7/30/2014	0	0	0.377948	A	789.7	32.3	30-07-2014 09:53:57	0	0	1.563	0.241809
PetersonGulch_110_31072014_112045.txt	PetersonGulch	1202532.998	2459575.274	7/31/2014	0	0	0.076508	A	794.8	36.8	31-07-2014 11:20:45	0	-0.007	0.319	0.239838
PetersonGulch_111_31072014_112315.txt	PetersonGulch	1202759.245	2459589.459	7/31/2014	0	0	0.094202	A	794.6	36.9	31-07-2014 11:23:15	0	0	0.393	0.2397
PetersonGulch_112_31072014_112540.txt	PetersonGulch	1202950.852	2459573.285	7/31/2014	0	0	0.15769	A	794.0	37.2	31-07-2014 11:25:40	-0.017	-0.021	0.659	0.239287

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
PetersonGulch_113_31072014_112834.txt	PetersonGulch	1202911.591	2459755.964	7/31/2014	0	0	0.304319	A	794.0	37.5	31-07-2014 11:28:34	0	-0.01	1.273	0.239056
PetersonGulch_114_31072014_113049.txt	PetersonGulch	1202755.42	2459778.561	7/31/2014	0	0	0.086472	A	793.9	37.7	31-07-2014 11:30:49	0	-0.023	0.362	0.238872
PetersonGulch_115_31072014_113332.txt	PetersonGulch	1202539.234	2459736.7	7/31/2014	0	0	0.129416	A	794.6	38.1	31-07-2014 11:33:32	0	-0.015	0.542	0.238776
PetersonGulch_116_31072014_113605.txt	PetersonGulch	1202352.007	2459799.058	7/31/2014	0	0	0.072536	A	794.8	38.4	31-07-2014 11:36:05	0	-0.024	0.304	0.238606
PetersonGulch_117_31072014_113858.txt	PetersonGulch	1202159.1	2459784.514	7/31/2014	0	0	0.176138	A	794.7	38.7	31-07-2014 11:38:58	0	-0.02	0.739	0.238346
PetersonGulch_118_31072014_114217.txt	PetersonGulch	1201913.939	2459747.442	7/31/2014	0	0	0.233	A	794.3	39.0	31-07-2014 11:42:17	0	-0.021	0.979	0.237997
PetersonGulch_119_31072014_114450.txt	PetersonGulch	1201744.971	2459808.756	7/31/2014	0	0	0.251307	A	794.0	39.2	31-07-2014 11:44:50	0	-0.022	1.057	0.237755
PetersonGulch_12_30072014_095654.txt	PetersonGulch	1205146.193	2454572.203	7/30/2014	0	0	0.318117	A	790.3	32.4	30-07-2014 09:56:54	0	0	1.315	0.241914
PetersonGulch_120_31072014_114739.txt	PetersonGulch	1201723.091	2459941.36	7/31/2014	0	0	0	A	793.6	39.4	31-07-2014 11:47:39	0	-0.021	0	0.237483
PetersonGulch_121_31072014_115027.txt	PetersonGulch	1201924.472	2459955.554	7/31/2014	0	0	0	A	793.8	39.6	31-07-2014 11:50:27	0	-0.02	0	0.237391
PetersonGulch_122_31072014_115721.txt	PetersonGulch	1202162.194	2460007.913	7/31/2014	0	0	0.223577	A	800.1	38.8	31-07-2014 11:57:21	0	-0.038	0.932	0.239889
PetersonGulch_123_31072014_120008.txt	PetersonGulch	1202365.595	2459997.555	7/31/2014	0	0	0.63735	A	794.8	38.5	31-07-2014 12:00:08	0	-0.016	2.672	0.238529
PetersonGulch_124_31072014_120231.txt	PetersonGulch	1202525.112	2459982.138	7/31/2014	0	0	0.021221	A	794.5	38.5	31-07-2014 12:02:31	0	-0.013	0.089	0.238439
PetersonGulch_125_31072014_120509.txt	PetersonGulch	1202706.582	2459984.336	7/31/2014	0	0	0.183506	A	794.1	38.5	31-07-2014 12:05:09	0	-0.013	0.77	0.238319
PetersonGulch_126_31072014_120815.txt	PetersonGulch	1202524.932	2460160.87	7/31/2014	0	0	0.06026	A	793.9	38.6	31-07-2014 12:08:15	0	-0.017	0.253	0.238183
PetersonGulch_127_31072014_121049.txt	PetersonGulch	1202338.051	2460173.956	7/31/2014	0	0	0.474064	A	794.0	38.9	31-07-2014 12:10:49	0	-0.017	1.992	0.237984
PetersonGulch_128_31072014_121320.txt	PetersonGulch	1202167.486	2460197.202	7/31/2014	0	0	0.05545	A	794.5	39.1	31-07-2014 12:13:20	-0.002	-0.019	0.233	0.237981
PetersonGulch_129_31072014_121625.txt	PetersonGulch	1201943.371	2460159.46	7/31/2014	0	0	0.587012	A	794.5	39.4	31-07-2014 12:16:25	0	-0.016	2.469	0.237753
PetersonGulch_13_30072014_095945.txt	PetersonGulch	1205129.97	2454759.718	7/30/2014	0	0	0.218809	A	789.5	32.6	30-07-2014 09:59:45	0	-0.012	0.906	0.241511
PetersonGulch_130_31072014_121907.txt	PetersonGulch	1201739.502	2460183.831	7/31/2014	0	0	0.468071	A	794.9	39.6	31-07-2014 12:19:07	0	-0.011	1.969	0.23772
PetersonGulch_131_31072014_122153.txt	PetersonGulch	1201550.35	2460154.623	7/31/2014	0	0	0.433097	A	794.3	39.9	31-07-2014 12:21:53	0	-0.022	1.825	0.237313
PetersonGulch_132_31072014_122609.txt	PetersonGulch	1201332.139	2460369.498	7/31/2014	0	0	0.322437	A	794.3	40.2	31-07-2014 12:26:09	0	-0.033	1.36	0.237086
PetersonGulch_133_31072014_122934.txt	PetersonGulch	1201163.058	2460343.052	7/31/2014	0	0	0.099493	A	794.4	40.5	31-07-2014 12:29:34	0	-0.015	0.42	0.236889
PetersonGulch_134_31072014_123409.txt	PetersonGulch	1200927.912	2460367.958	7/31/2014	0	0	0.411663	A	794.1	40.6	31-07-2014 12:34:09	-0.025	-0.012	1.739	0.236724
PetersonGulch_135_31072014_123857.txt	PetersonGulch	1200676.022	2460570.165	7/31/2014	0	0	0.8701	A	793.4	40.7	31-07-2014 12:38:57	-0.131	-0.007	3.68	0.23644
PetersonGulch_136_31072014_124144.txt	PetersonGulch	1200883.902	2460596.359	7/31/2014	0	0	0	A	793.9	40.8	31-07-2014 12:41:44	-0.185	-0.026	0	0.236514
PetersonGulch_137_31072014_124525.txt	PetersonGulch	1201153.507	2460619.565	7/31/2014	0	0	0	A	539.4	40.9	31-07-2014 12:45:25	-0.08	-0.023	0	0.160644
PetersonGulch_138_31072014_144600.txt	PetersonGulch	1201327.985	2460588.851	7/31/2014	0	0	0.052321	A	806.2	29.5	31-07-2014 14:46:00	0	-0.069	0.21	0.249146
PetersonGulch_139_01082014_083116.txt	PetersonGulch	1201537.474	2460398.041	8/1/2014	0	0	0.095205	A	796.7	27.4	01-08-2014 08:31:16	0	-0.008	0.384	0.24793
PetersonGulch_14_30072014_100244.txt	PetersonGulch	1204871.885	2454761.273	7/30/2014	0	0.004104	0.270142	A	789.7	32.8	30-07-2014 10:02:44	0	0.017	1.119	0.241414
PetersonGulch_140_01082014_083407.txt	PetersonGulch	1201711.749	2460405.838	8/1/2014	0	0	0.278891	A	796.7	27.7	01-08-2014 08:34:07	0	-0.047	1.126	0.247683
PetersonGulch_141_01082014_083622.txt	PetersonGulch	1201912.735	2460397.967	8/1/2014	0	0	0.255686	A	796.7	27.9	01-08-2014 08:36:22	0	0	1.033	0.247518
PetersonGulch_142_01082014_083837.txt	PetersonGulch	1202140.644	2460366.885	8/1/2014	0	0	0.176755	A	796.5	28.2	01-08-2014 08:38:37	0	-0.011	0.715	0.24721
PetersonGulch_143_01082014_084050.txt	PetersonGulch	1202160.065	2460511.878	8/1/2014	0	0	0.099698	A	795.9	28.5	01-08-2014 08:40:50	0	-0.004	0.404	0.246778
PetersonGulch_144_01082014_084259.txt	PetersonGulch	1201968.605	2460546.089	8/1/2014	0	0	0.063863	A	796.3	28.9	01-08-2014 08:42:59	0	-0.002	0.259	0.246575
PetersonGulch_145_01082014_084515.txt	PetersonGulch	1201729.59	2460565.869	8/1/2014	0	0	0.456186	A	796.7	29.2	01-08-2014 08:45:15	0	-0.014	1.851	0.246454
PetersonGulch_146_01082014_084718.txt	PetersonGulch	1201539.883	2460596.594	8/1/2014	0	0.001232	0.146568	A	797.1	29.5	01-08-2014 08:47:18	0	0.005	0.595	0.246333
PetersonGulch_147_01082014_084935.txt	PetersonGulch	1201509.606	2460773.188	8/1/2014	0	0	0.134857	A	797.1	29.8	01-08-2014 08:49:35	0	-0.011	0.548	0.246089
PetersonGulch_148_01082014_085220.txt	PetersonGulch	1201530.577	2460956.6	8/1/2014	0	0	0.239867	A	797.1	30.2	01-08-2014 08:52:20	0	-0.01	0.976	0.245765
PetersonGulch_149_01082014_085437.txt	PetersonGulch	1201356.153	2460928.32	8/1/2014	0	0	0.157114	A	797.0	30.5	01-08-2014 08:54:37	0	-0.041	0.64	0.245491
PetersonGulch_15_30072014_100601.txt	PetersonGulch	1204885.328	2454966.984	7/30/2014	0	0	0.083261	A	789.7	32.9	30-07-2014 10:06:01	0	0	0.345	0.241335
PetersonGulch_150_01082014_085700.txt	PetersonGulch	1201348.234	2460771.142	8/1/2014	0	0	0.198261	A	797.4	30.8	01-08-2014 08:57:00	0	-0.012	0.808	0.245372
PetersonGulch_151_01082014_085947.txt	PetersonGulch	1201150.359	2460786.761	8/1/2014	0	0	0.146881	A	797.4	31.0	01-08-2014 08:59:47	0	-0.006	0.599	0.245211
PetersonGulch_152_01082014_090210.txt	PetersonGulch	1200941.474	2460808.959	8/1/2014	0	0	0.109501	A	797.4	31.3	01-08-2014 09:02:10	0	-0.002	0.447	0.244969
PetersonGulch_153_01082014_090534.txt	PetersonGulch	1200727.937	2460785.515	8/1/2014	0	0	0.623115	A	797.5	31.5	01-08-2014 09:05:34	0	-0.001	2.545	0.244839
PetersonGulch_154_01082014_090812.txt	PetersonGulch	1200568.225	2460797.382	8/1/2014	0	0	0.045738	A	797.2	31.7	01-08-2014 09:08:12	0	-0.004	0.187	0.244586
PetersonGulch_155_01082014_091040.txt	PetersonGulch	1200521.999	2460970.895	8/1/2014	0	0	0.093879	A	797.1	31.8	01-08-2014 09:10:40	0	-0.012	0.384	0.244475
PetersonGulch_156_01082014_091333.txt	PetersonGulch	1200337.614	2460959.728	8/1/2014	0	0	0	A	797.1	31.9	01-08-2014 09:13:33	0	-0.008	-1.385	0.244395
PetersonGulch_157_01082014_091644.txt	PetersonGulch	1200125.075	2460983.061	8/1/2014	0	0	0.062831	A	797.9	32.1	01-08-2014 09:16:44	0	-0.002	0.257	0.24448
PetersonGulch_158_01082014_092003.txt	PetersonGulch	1200141.216	2461184.35	8/1/2014	0	0	0.184826	A	797.1	32.2	01-08-2014 09:20:03	0	-0.001	0.757	0.244155
PetersonGulch_159_01082014_092253.txt	PetersonGulch	1199934.586	2461141.184	8/1/2014	0	0	0.200227	A	797.7	32.4	01-08-2014 09:22:53	0	-0.001	0.82	0.244179
PetersonGulch_16_30072014_100815.txt	PetersonGulch	1204750.159	2454943.97	7/30/2014	0	0	0.153015	A	790.0	33.0	30-07-2014 10:08:15	-0.128	-0.019	0.634	0.241348
PetersonGulch_160_01082014_092534.txt	PetersonGulch	1199911.758	2461336.807	8/1/2014	0	0	0.073947	A	797.8	32.6	01-08-2014 09:25:34	0	-0.023	0.303	0.24405
PetersonGulch_161_01082014_092753.txt	PetersonGulch	1199755.659	2461340.743	8/1/2014	0	0	0.16523	A	798.1	32.7	01-08-2014 09:27:53	0	-0.014	0.677	0.244062
PetersonGulch_162_01082014_093033.txt	PetersonGulch	1199563.202	2461334.91	8/1/2014		0	0.047573	A	798.3	32.9	01-08-2014 09:30:33		-0.022	0.195	0.243963
PetersonGulch_163_01082014_093336.txt	PetersonGulch	1199364.861	2461351.2	8/1/2014		0	0.458839	A	798.3	33.1	01-08-2014 09:33:36		-0.015	1.882	0.243804
PetersonGulch_164_01082014_093607.txt	PetersonGulch	1199323.594	2461526.989	8/1/2014	0	0	0.183405	A	799.1	33.3	01-08-2014 09:36:07	0	-0.012	0.752	0.243889
PetersonGulch_165_01082014_093826.txt	PetersonGulch	1199166.412	2461571.187	8/1/2014	0	0	0.34911	A	799.6	33.4	01-08-2014 09:38:26	0	-0.022	1.431	0.243962
PetersonGulch_166_01082014_094048.txt	PetersonGulch	1198955.968	2461548.24	8/1/2014	0	0	0	A	799.7	33.6	01-08-2014 09:40:48	0	-0.058	-0.311	0.243834
PetersonGulch_167_01082014_094326.txt	PetersonGulch	1198765.944	2461587.874	8/1/2014	0	0	0.099001	A	800.0	33.7	01-08-2014 09:43:26	0	0	0.406	0.243846
PetersonGulch_168_01082014_094552.txt	PetersonGulch	1198562.48	2461592.62	8/1/2014	0	0	0.142331	A	800.1	33.9	01-08-2014 09:45:52	-0.012	-0.002	0.584	0.243717

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
PetersonGulch_169_01082014_094925.txt	PetersonGulch	1198536.056	2461758.8	8/1/2014	0	0	0.352429	A	800.1	34.1	01-08-2014 09:49:25	-0.019	-0.019	1.447	0.243559
PetersonGulch_17_30072014_101117.txt	PetersonGulch	1204724.353	2455174.568	7/30/2014	0	0	0.12065	A	790.1	33.1	30-07-2014 10:11:17	0	-0.002	0.5	0.2413
PetersonGulch_170_01082014_095701.txt	PetersonGulch	1198334.005	2461779.627	8/1/2014	0	0	0.078161	A	800.4	34.3	01-08-2014 09:57:01	0	-0.001	0.321	0.243491
PetersonGulch_171_01082014_095941.txt	PetersonGulch	1198122.242	2461753.371	8/1/2014	0	0	0.265543	A	800.6	34.5	01-08-2014 09:59:41	0	-0.012	1.091	0.243394
PetersonGulch_172_01082014_100232.txt	PetersonGulch	1198149.461	2461981.481	8/1/2014	0	0	0.079376	A	800.9	34.5	01-08-2014 10:02:32	0	-0.019	0.326	0.243485
PetersonGulch_173_01082014_100459.txt	PetersonGulch	1197960.352	2461994.821	8/1/2014	0	0	0.244958	A	801.2	34.6	01-08-2014 10:04:59	0	0	1.006	0.243497
PetersonGulch_174_01082014_100814.txt	PetersonGulch	1197765.107	2461927.683	8/1/2014	0	0	0.133226	A	801.4	34.6	01-08-2014 10:08:14	0	-0.012	0.547	0.243558
PetersonGulch_175_01082014_101117.txt	PetersonGulch	1197760.829	2462149.514	8/1/2014	0	0	0.081241	A	800.6	34.7	01-08-2014 10:11:17	0	-0.003	0.334	0.243236
PetersonGulch_176_01082014_101421.txt	PetersonGulch	1197555.64	2462175.274	8/1/2014	0	0	0.091523	A	801.7	34.9	01-08-2014 10:14:21	0	-0.064	0.376	0.243412
PetersonGulch_177_01082014_101704.txt	PetersonGulch	1197338.495	2462182.327	8/1/2014	0	0	0.247802	A	801.2	35.0	01-08-2014 10:17:04	0	-0.03	1.019	0.243181
PetersonGulch_178_01082014_101933.txt	PetersonGulch	1197153.604	2462204.14	8/1/2014	0	0	0.099157	A	803.2	35.2	01-08-2014 10:19:33	0	-0.009	0.407	0.24363
PetersonGulch_179_01082014_102240.txt	PetersonGulch	1196915.346	2462228.489	8/1/2014	0	0	0.119714	A	802.7	35.4	01-08-2014 10:22:40	0	-0.022	0.492	0.243321
PetersonGulch_18_30072014_101354.txt	PetersonGulch	1204942.973	2455229.249	7/30/2014	0	0	0.457654	A	790.2	33.2	30-07-2014 10:13:54	0	-0.059	1.897	0.241252
PetersonGulch_180_01082014_102515.txt	PetersonGulch	1196747.527	2462209.554	8/1/2014	0	0	0.115723	A	802.8	35.7	01-08-2014 10:25:15	0	-0.019	0.476	0.243115
PetersonGulch_181_01082014_102834.txt	PetersonGulch	1196517.062	2462192.146	8/1/2014	0	0	0.075755	A	802.3	35.9	01-08-2014 10:28:34	0	-0.057	0.312	0.242806
PetersonGulch_182_01082014_103112.txt	PetersonGulch	1196545.726	2462334.815	8/1/2014	0	0	0.248996	A	801.9	36.2	01-08-2014 10:31:12	0	-0.026	1.027	0.242449
PetersonGulch_183_01082014_103420.txt	PetersonGulch	1196342.672	2462383.125	8/1/2014	0	0	0.025479	A	803.1	36.4	01-08-2014 10:34:20	0	-0.011	0.105	0.242655
PetersonGulch_184_01082014_103649.txt	PetersonGulch	1196145.434	2462428.025	8/1/2014	0	0	0.161139	A	803.7	36.6	01-08-2014 10:36:49	-1.7	-0.006	0.664	0.24268
PetersonGulch_185_01082014_103924.txt	PetersonGulch	1195974.777	2462374.056	8/1/2014	0	0	0.160097	A	803.6	36.7	01-08-2014 10:39:24	0	-0.007	0.66	0.242571
PetersonGulch_186_01082014_104215.txt	PetersonGulch	1195736.49	2462426.494	8/1/2014	0	0	0.170902	A	803.6	36.9	01-08-2014 10:42:15	0	-0.006	0.705	0.242415
PetersonGulch_187_01082014_104444.txt	PetersonGulch	1195720.874	2462560.899	8/1/2014	0	0	0.082167	A	804.0	37.1	01-08-2014 10:44:44	0	-0.014	0.339	0.242379
PetersonGulch_188_01082014_104701.txt	PetersonGulch	1195733.44	2462765.697	8/1/2014	0	0	0.242586	A	804.4	37.3	01-08-2014 10:47:01	0	-0.013	1.001	0.242344
PetersonGulch_189_01082014_105020.txt	PetersonGulch	1195726.066	2463023.765	8/1/2014	0	0	0.07918	A	804.5	37.6	01-08-2014 10:50:20	0	-0.001	0.327	0.24214
PetersonGulch_19_30072014_101620.txt	PetersonGulch	1204883.278	2455381.527	7/30/2014	0	0	0.183073	A	790.3	33.3	30-07-2014 10:16:20	-0.13	-0.01	0.759	0.241203
PetersonGulch_190_01082014_105257.txt	PetersonGulch	1195732.194	2463204.204	8/1/2014	0	0	0.547751	A	803.9	37.9	01-08-2014 10:52:57	0	-0.032	2.266	0.241726
PetersonGulch_191_01082014_105521.txt	PetersonGulch	1195562.84	2463201.125	8/1/2014	0	0	0.057905	A	802.9	38.1	01-08-2014 10:55:21	0	-0.003	0.24	0.24127
PetersonGulch_192_01082014_105817.txt	PetersonGulch	1195328.534	2463163.752	8/1/2014	0	0	0.10187	A	804.1	38.4	01-08-2014 10:58:17	0	-0.012	0.422	0.241398
PetersonGulch_193_01082014_110025.txt	PetersonGulch	1195162.925	2463168.515	8/1/2014	0	0	0.232094	A	805.0	38.6	01-08-2014 11:00:25	0	-0.031	0.961	0.241513
PetersonGulch_194_01082014_110507.txt	PetersonGulch	1195935.43	2462990.466	8/1/2014	0	0	0.04803	A	805.0	38.8	01-08-2014 11:05:07	0	-0.024	0.199	0.241358
PetersonGulch_195_01082014_110741.txt	PetersonGulch	1195940.667	2462807.515	8/1/2014	0	0	0.068405	A	803.6	38.9	01-08-2014 11:07:41	0	-0.014	0.284	0.240861
PetersonGulch_196_01082014_111136.txt	PetersonGulch	1196006.323	2462634.99	8/1/2014	0	0	0.654909	A	803.2	39.2	01-08-2014 11:11:36	0	-0.005	2.723	0.24051
PetersonGulch_197_01082014_111456.txt	PetersonGulch	1196132.149	2462587.064	8/1/2014	0	0	0.030078	A	804.1	39.4	01-08-2014 11:14:56	0	-0.016	0.125	0.240626
PetersonGulch_198_01082014_111750.txt	PetersonGulch	1196152.695	2462761.006	8/1/2014	0	0	0.104039	A	803.7	39.7	01-08-2014 11:17:50	0	-0.031	0.433	0.240275
PetersonGulch_199_01082014_112024.txt	PetersonGulch	1196311.979	2462798.83	8/1/2014	0	0	0.054467	A	803.1	39.9	01-08-2014 11:20:24	0	-0.029	0.227	0.239942
PetersonGulch_20_30072014_101830.txt	PetersonGulch	1204772.933	2455363.828	7/30/2014	0	0	0.183737	A	790.3	33.4	30-07-2014 10:18:30	0	-0.007	0.762	0.241125
PetersonGulch_200_01082014_112304.txt	PetersonGulch	1196367.779	2462615.968	8/1/2014	0	0	0.164966	A	802.8	40.0	01-08-2014 11:23:04	-0.149	-0.026	0.688	0.239776
PetersonGulch_201_01082014_112545.txt	PetersonGulch	1196553.711	2462761.476	8/1/2014	0	0	0.294441	A	803.3	40.2	01-08-2014 11:25:45	0	-0.017	1.228	0.239772
PetersonGulch_202_01082014_112806.txt	PetersonGulch	1196535.769	2462602.054	8/1/2014	0	0	0.080009	A	802.8	40.3	01-08-2014 11:28:06	0	-0.029	0.334	0.239547
PetersonGulch_203_01082014_113033.txt	PetersonGulch	1196726.292	2462626.709	8/1/2014	0	0	0.094398	A	803.2	40.4	01-08-2014 11:30:33	0	-0.021	0.394	0.23959
PetersonGulch_204_01082014_113403.txt	PetersonGulch	1196705.42	2462395.295	8/1/2014	0	0	0.115488	A	803.5	40.5	01-08-2014 11:34:03	0	-0.022	0.482	0.239603
PetersonGulch_205_01082014_113727.txt	PetersonGulch	1196965.507	2462378.008	8/1/2014	0	0	0.288557	A	803.3	40.6	01-08-2014 11:37:27	0	-0.007	1.205	0.239467
PetersonGulch_206_01082014_113954.txt	PetersonGulch	1196968.612	2462546.037	8/1/2014	0	0	0.091169	A	802.7	40.6	01-08-2014 11:39:54	0	-0.045	0.381	0.239288
PetersonGulch_207_01082014_114216.txt	PetersonGulch	1197144.69	2462568.144	8/1/2014	0	0	0.236597	A	802.5	40.6	01-08-2014 11:42:16	0	-0.026	0.989	0.239228
PetersonGulch_208_01082014_114423.txt	PetersonGulch	1197158.674	2462421.899	8/1/2014	0	0	0.106677	A	802.1	40.5	01-08-2014 11:44:23	0	-0.034	0.446	0.239185
PetersonGulch_209_01082014_114650.txt	PetersonGulch	1197336.378	2462378.833	8/1/2014	0	0	0.156466	A	802.3	40.5	01-08-2014 11:46:50	0	-0.012	0.654	0.239245
PetersonGulch_21_30072014_102107.txt	PetersonGulch	1204590.352	2455384.648	7/30/2014	0	0	0.128028	A	790.5	33.5	30-07-2014 10:21:07	0	-0.02	0.531	0.241107
PetersonGulch_210_01082014_114943.txt	PetersonGulch	1197330.97	2462575.994	8/1/2014	0	0	0	A	802.3	40.4	01-08-2014 11:49:43	0	-0.047	-0.775	0.239321
PetersonGulch_211_01082014_115222.txt	PetersonGulch	1197527.945	2462560.411	8/1/2014	0	0	1.346672	A	800.6	40.4	01-08-2014 11:52:22	0	-0.031	5.639	0.238814
PetersonGulch_212_01082014_115528.txt	PetersonGulch	1197571	2462398.572	8/1/2014	0	0	0.067972	A	802.1	40.3	01-08-2014 11:55:28	0	-0.02	0.284	0.239338
PetersonGulch_213_01082014_115912.txt	PetersonGulch	1197747.722	2462550.669	8/1/2014	0	0	0.069673	A	802.4	40.3	01-08-2014 11:59:12	0	-0.002	0.291	0.239427
PetersonGulch_214_01082014_120226.txt	PetersonGulch	1197776.926	2462408.065	8/1/2014	0	0	0.189396	A	807.8	40.4	01-08-2014 12:02:26	0	-0.061	0.786	0.240962
PetersonGulch_215_01082014_120625.txt	PetersonGulch	1197894.385	2462346.116	8/1/2014	0	0	0.247324	A	801.6	40.6	01-08-2014 12:06:25	0	-0.013	1.035	0.23896
PetersonGulch_216_01082014_120848.txt	PetersonGulch	1197901.871	2462201.254	8/1/2014	0	0	0.113385	A	801.0	40.7	01-08-2014 12:08:48	0	-0.033	0.475	0.238705
PetersonGulch_217_01082014_121204.txt	PetersonGulch	1198119.79	2462182.967	8/1/2014	0	0	0.111207	A	801.3	40.9	01-08-2014 12:12:04	-0.951	-0.024	0.466	0.238642
PetersonGulch_218_01082014_121501.txt	PetersonGulch	1198322.59	2462166.655	8/1/2014	0	0	0.08171	A	800.4	41.1	01-08-2014 12:15:01	0	-0.054	0.343	0.238223
PetersonGulch_219_01082014_121712.txt	PetersonGulch	1198306.7	2461995.706	8/1/2014	0	0	0.154081	A	800.4	41.2	01-08-2014 12:17:12	0	-0.036	0.647	0.238147
PetersonGulch_22_30072014_102359.txt	PetersonGulch	1204476.703	2455546.588	7/30/2014	0	0	0.874341	A	790.4	33.6	30-07-2014 10:23:59	0	-0.012	3.628	0.240998
PetersonGulch_220_01082014_122017.txt	PetersonGulch	1198500.947	2461978.835	8/1/2014	0	0	0.484923	A	800.1	41.2	01-08-2014 12:20:17	0	-0.005	2.037	0.238058
PetersonGulch_221_01082014_122249.txt	PetersonGulch	1198740.847	2461970.296	8/1/2014	0	0	0	A	799.6	41.2	01-08-2014 12:22:49	0	-0.033	-0.961	0.237909
PetersonGulch_222_01082014_122510.txt	PetersonGulch	1198732.096	2461795.96	8/1/2014	0	0	0.303496	A	799.4	41.2	01-08-2014 12:25:10	0	-0.011	1.276	0.237849
PetersonGulch_223_01082014_122816.txt	PetersonGulch	1198923.323	2461938.031	8/1/2014	0	0	0.011187	A	799.7	41.1	01-08-2014 12:28:16	-0.464	-0.015	0.047	0.238014

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
PetersonGulch_224_01082014_123250.txt	PetersonGulch	1198976.453	2461820.333	8/1/2014	0	0	0.552095	A	798.9	40.3	01-08-2014 12:32:50	0	-0.062	2.316	0.238383
PetersonGulch_225_01082014_123545.txt	PetersonGulch	1199160.438	2461744.158	8/1/2014	0	0	0.14602	A	799.1	40.1	01-08-2014 12:35:45	0	-0.014	0.612	0.238595
PetersonGulch_226_01082014_123841.txt	PetersonGulch	1199180.779	2461967.508	8/1/2014	0	0	0.010013	A	798.5	40.1	01-08-2014 12:38:41	0	-0.033	0.042	0.238416
PetersonGulch_227_01082014_124055.txt	PetersonGulch	1199342.278	2461964.915	8/1/2014	0	0	0.093127	A	797.7	40.1	01-08-2014 12:40:55	0	0	0.391	0.238177
PetersonGulch_228_01082014_124309.txt	PetersonGulch	1199345.769	2461788.534	8/1/2014	0	0	0.216331	A	798.2	40.2	01-08-2014 12:43:09	0	-0.017	0.908	0.23825
PetersonGulch_229_01082014_124604.txt	PetersonGulch	1199517.821	2461756.006	8/1/2014	0	0	0.25464	A	798.3	40.3	01-08-2014 12:46:04	0	-0.018	1.069	0.238204
PetersonGulch_23_30072014_102658.txt	PetersonGulch	1204729.554	2455585.332	7/30/2014	0	0	0.094223	A	790.6	33.7	30-07-2014 10:26:58	-1.113	-0.073	0.391	0.24098
PetersonGulch_230_01082014_124902.txt	PetersonGulch	1199536.772	2461571.105	8/1/2014	0	0	0.181193	A	798.2	40.4	01-08-2014 12:49:02	0	-0.015	0.761	0.238098
PetersonGulch_231_01082014_125111.txt	PetersonGulch	1199769.626	2461528.519	8/1/2014	0	0	0.168965	A	797.8	40.4	01-08-2014 12:51:11	0	-0.029	0.71	0.237979
PetersonGulch_232_01082014_125428.txt	PetersonGulch	1199976.786	2461564.576	8/1/2014	0	0	0.165571	A	797.5	40.4	01-08-2014 12:54:28	0	-0.042	0.696	0.237889
PetersonGulch_233_01082014_125737.txt	PetersonGulch	1199943.632	2461775.098	8/1/2014	0	0	0.071569	A	797.1	40.4	01-08-2014 12:57:37	0	-0.013	0.301	0.23777
PetersonGulch_234_01082014_125936.txt	PetersonGulch	1199779.641	2461791.873	8/1/2014	0	0	0.209846	A	796.7	40.4	01-08-2014 12:59:36	0	-0.008	0.883	0.237651
PetersonGulch_235_01082014_130228.txt	PetersonGulch	1200112.663	2461543.465	8/1/2014	0	0	0.352984	A	797.4	40.4	01-08-2014 13:02:28	0	-0.013	1.484	0.23786
PetersonGulch_236_01082014_130532.txt	PetersonGulch	1200201.965	2461349.857	8/1/2014	0	0	0.046565	A	796.7	40.5	01-08-2014 13:05:32	0	-0.03	0.196	0.237575
PetersonGulch_237_01082014_130718.txt	PetersonGulch	1200346.416	2461367.858	8/1/2014	0	0	0.170579	A	796.7	40.5	01-08-2014 13:07:18	0	-0.026	0.718	0.237575
PetersonGulch_238_01082014_131003.txt	PetersonGulch	1200323.738	2461206.417	8/1/2014	0	0	0.114683	A	796.5	40.6	01-08-2014 13:10:03	0	-0.013	0.483	0.23744
PetersonGulch_239_01082014_131156.txt	PetersonGulch	1200511.455	2461138.365	8/1/2014	0	0	0.129077	A	796.2	40.7	01-08-2014 13:11:56	0	-0.004	0.544	0.237275
PetersonGulch_24_30072014_102916.txt	PetersonGulch	1204915.96	2455593.485	7/30/2014	0	0	0.120088	A	789.8	33.8	30-07-2014 10:29:16	0	-0.13	0.499	0.240658
PetersonGulch_240_01082014_131357.txt	PetersonGulch	1200578.784	2461319.976	8/1/2014	0	0	0.310731	A	796.2	40.8	01-08-2014 13:13:57	0	-0.006	1.31	0.237199
PetersonGulch_241_01082014_131609.txt	PetersonGulch	1200740.086	2461213.836	8/1/2014	0	0	0	A	796.0	40.8	01-08-2014 13:16:09	0	-0.035	-1.165	0.237139
PetersonGulch_242_01082014_131819.txt	PetersonGulch	1200884.1	2461161.829	8/1/2014	0	0	0.199909	A	796.0	40.8	01-08-2014 13:18:19	0	-0.015	0.843	0.237139
PetersonGulch_243_01082014_132131.txt	PetersonGulch	1200727.379	2460902.928	8/1/2014	0	0	0.109545	A	795.9	40.8	01-08-2014 13:21:31	0	-0.021	0.462	0.23711
PetersonGulch_244_01082014_132346.txt	PetersonGulch	1200999.72	2461064.185	8/1/2014	0	0	0.244209	A	795.6	40.7	01-08-2014 13:23:46	0	0	1.03	0.237096
PetersonGulch_245_01082014_132523.txt	PetersonGulch	1201168.081	2460970.219	8/1/2014	0	0	0.258582	A	801.2	40.7	01-08-2014 13:25:23	0	-0.005	1.083	0.238765
PetersonGulch_25_30072014_103140.txt	PetersonGulch	1204923.029	2455778.124	7/30/2014	0	0	0.334099	A	789.9	34.0	30-07-2014 10:31:40	0	-0.021	1.389	0.240532
PetersonGulch_26_30072014_103355.txt	PetersonGulch	1204770.925	2455785.087	7/30/2014	0	0	0.386939	A	790.0	34.1	30-07-2014 10:33:55	-0.377	-0.124	1.609	0.240484
PetersonGulch_27_30072014_103647.txt	PetersonGulch	1204522.559	2455793.358	7/30/2014	0	0	0.242041	A	790.1	34.3	30-07-2014 10:36:47	0	-0.029	1.007	0.240358
PetersonGulch_28_30072014_104006.txt	PetersonGulch	1204367.155	2455773.981	7/30/2014	0	0	0.4239	A	790.7	34.6	30-07-2014 10:40:06	0	-0.015	1.764	0.240306
PetersonGulch_29_30072014_104324.txt	PetersonGulch	1204336.023	2456000.245	7/30/2014	0	0	0.253212	A	790.5	34.9	30-07-2014 10:43:24	0	-0.011	1.055	0.240011
PetersonGulch_30_30072014_104626.txt	PetersonGulch	1204525.775	2455990.056	7/30/2014	0	0	0.092086	A	790.6	35.2	30-07-2014 10:46:26	0	0	0.384	0.239808
PetersonGulch_31_30072014_104854.txt	PetersonGulch	1204714.161	2456001.845	7/30/2014	0	0.001438	0.270157	A	790.8	35.4	30-07-2014 10:48:54	0	0.006	1.127	0.239713
PetersonGulch_32_30072014_105134.txt	PetersonGulch	1204726.79	2456189.763	7/30/2014	0	0	0.219704	A	790.3	35.7	30-07-2014 10:51:34	0	-0.06	0.918	0.239329
PetersonGulch_33_30072014_105359.txt	PetersonGulch	1204543.533	2456171.613	7/30/2014	0	0	0.151235	A	790.7	35.9	30-07-2014 10:53:59	0	-0.001	0.632	0.239295
PetersonGulch_34_30072014_105617.txt	PetersonGulch	1204362.729	2456164.61	7/30/2014	0	0	0.211571	A	790.7	36.2	30-07-2014 10:56:17	0	0	0.885	0.239063
PetersonGulch_35_30072014_105835.txt	PetersonGulch	1204180.805	2456173.82	7/30/2014	0	0	1.028762	A	790.9	36.4	30-07-2014 10:58:35	0	-0.214	4.305	0.238969
PetersonGulch_36_30072014_110050.txt	PetersonGulch	1204150.539	2456343.139	7/30/2014	0	0	0.212121	A	791.1	36.6	30-07-2014 11:00:50	0	-0.064	0.888	0.238875
PetersonGulch_37_30072014_110307.txt	PetersonGulch	1204333.364	2456396.48	7/30/2014	0	0	0.158033	A	791.1	36.8	30-07-2014 11:03:07	0	-0.018	0.662	0.238721
PetersonGulch_38_30072014_110525.txt	PetersonGulch	1204357.019	2456568.859	7/30/2014	0	0	0.194194	A	791.1	37.0	30-07-2014 11:05:25	0	-0.036	0.814	0.238567
PetersonGulch_39_30072014_110737.txt	PetersonGulch	1204171.38	2456610.141	7/30/2014	0	0	0.128521	A	791.2	37.2	30-07-2014 11:07:37	0	-0.199	0.539	0.238444
PetersonGulch_40_30072014_111014.txt	PetersonGulch	1203962.715	2456573.856	7/30/2014	0	0	0.282962	A	791.1	37.5	30-07-2014 11:10:14	0	-0.003	1.188	0.238183
PetersonGulch_41_30072014_111237.txt	PetersonGulch	1203947.7	2456408.512	7/30/2014	0	0	0.188935	A	791.1	37.8	30-07-2014 11:12:37	-0.286	-0.027	0.794	0.237953
PetersonGulch_42_30072014_111604.txt	PetersonGulch	1203744.082	2456735.252	7/30/2014	0	0	0.076993	A	790.8	38.1	30-07-2014 11:16:04	0	-0.012	0.324	0.237634
PetersonGulch_43_30072014_111825.txt	PetersonGulch	1203927.124	2456770.202	7/30/2014	0	0	0.450528	A	791.1	38.4	30-07-2014 11:18:25	0	-0.029	1.897	0.237495
PetersonGulch_44_30072014_112038.txt	PetersonGulch	1203946.88	2456938.383	7/30/2014	0	0	0.100697	A	791.6	38.6	30-07-2014 11:20:38	0	-0.101	0.424	0.237493
PetersonGulch_45_30072014_112252.txt	PetersonGulch	1203764.983	2457002.766	7/30/2014	0	0	0.124557	A	791.3	38.8	30-07-2014 11:22:52	0	-0.078	0.525	0.237251
PetersonGulch_46_30072014_112518.txt	PetersonGulch	1203772.254	2457188.989	7/30/2014	0	0	0.136603	A	791.5	39.0	30-07-2014 11:25:18	0	-0.233	0.576	0.237158
PetersonGulch_47_30072014_112742.txt	PetersonGulch	1203948.899	2457174.532	7/30/2014	0	0	0.087405	A	791.3	39.3	30-07-2014 11:27:42	0	-0.031	0.369	0.236871
PetersonGulch_48_30072014_112954.txt	PetersonGulch	1203922.068	2457340.582	7/30/2014	0	0	0.087586	A	791.3	39.5	30-07-2014 11:29:54	0	-0.012	0.37	0.236719
PetersonGulch_49_30072014_113217.txt	PetersonGulch	1203759.296	2457393.235	7/30/2014	0	0	0.307853	A	791.5	39.7	30-07-2014 11:32:17	0	-0.004	1.301	0.236628
PetersonGulch_50_30072014_113517.txt	PetersonGulch	1203559.609	2457194.134	7/30/2014	0	0	0.156094	A	791.6	39.9	30-07-2014 11:35:17	-0.832	-0.064	0.66	0.236507
PetersonGulch_51_30072014_113729.txt	PetersonGulch	1203538.925	2457357.001	7/30/2014	0	0	0.166568	A	791.3	40.1	30-07-2014 11:37:29	0	-0.097	0.705	0.236266
PetersonGulch_52_30072014_113953.txt	PetersonGulch	1203543.421	2457576.425	7/30/2014	0		0.391342	A	791.5	40.3	30-07-2014 11:39:53	0		1.657	0.236175
PetersonGulch_53_30072014_114248.txt	PetersonGulch	1203603.15	2457769.147	7/30/2014	0	0	0.252578	A	791.6	40.5	30-07-2014 11:42:48	0	-0.005	1.07	0.236054
PetersonGulch_54_30072014_114533.txt	PetersonGulch	1203392.384	2457782.577	7/30/2014	0	0	0.129292	A	791.7	40.7	30-07-2014 11:45:33	0	-0.026	0.548	0.235934
PetersonGulch_55_30072014_114753.txt	PetersonGulch	1203346.767	2457991.5	7/30/2014	0	0.014152	0.241298	A	792.0	40.9	30-07-2014 11:47:53	-0.683	0.06	1.023	0.235873
PetersonGulch_56_30072014_115023.txt	PetersonGulch	1203584.937	2457970.418	7/30/2014	0	0	0.332411	A	792.1	41.1	30-07-2014 11:50:23	0	-0.015	1.41	0.235752
PetersonGulch_57_30072014_115247.txt	PetersonGulch	1203539.116	2458159.229	7/30/2014	0	0	0.288632	A	791.9	41.2	30-07-2014 11:52:47	0	-0.029	1.225	0.235618
PetersonGulch_58_30072014_115504.txt	PetersonGulch	1203363.207	2458198.368	7/30/2014	0.048748	0	0.069001	A	792.0	41.4	30-07-2014 11:55:04	0.207	-0.002	0.293	0.235498
PetersonGulch_59_30072014_115741.txt	PetersonGulch	1203158.04	2458183.711	7/30/2014	0	0	0.053199	A	791.9	41.5	30-07-2014 11:57:41	0	-0.073	0.226	0.235393
PetersonGulch_60_30072014_120016.txt	PetersonGulch	1203130.261	2458345.818	7/30/2014	0	0	0.236095	A	791.6	41.7	30-07-2014 12:00:16	0	-0.012	1.004	0.235154
PetersonGulch_61_30072014_120256.txt	PetersonGulch	1203374.989	2458398.48	7/30/2014	0	0	0.214293	A	792.1	41.8	30-07-2014 12:02:56	0	-0.062	0.911	0.235228

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
PetersonGulch_62_30072014_120525.txt	PetersonGulch	1203561.899	2458353.665	7/30/2014	0	0	0.050336	A	792.3	41.9	30-07-2014 12:05:25	0	-0.012	0.214	0.235213
PetersonGulch_63_30072014_120803.txt	PetersonGulch	1203524.719	2458561.871	7/30/2014	0	0	0.240144	A	792.0	42.1	30-07-2014 12:08:03	0	-0.051	1.022	0.234975
PetersonGulch_64_30072014_121030.txt	PetersonGulch	1203325.497	2458563.694	7/30/2014	0	0	0.296482	A	792.1	42.2	30-07-2014 12:10:30	0	-0.065	1.262	0.23493
PetersonGulch_65_30072014_121330.txt	PetersonGulch	1203150.587	2458595.45	7/30/2014	0	0	0.019017	A	792.1	42.4	30-07-2014 12:13:30	0	-0.027	0.081	0.234781
PetersonGulch_66_30072014_121611.txt	PetersonGulch	1202936.832	2458589.815	7/30/2014	0	0	0.165468	A	792.1	42.5	30-07-2014 12:16:11	0	-0.041	0.705	0.234707
PetersonGulch_67_30072014_121844.txt	PetersonGulch	1202950.751	2458760.524	7/30/2014	0	0	0.087468	A	791.9	42.7	30-07-2014 12:18:44	0	-0.07	0.373	0.234499
PetersonGulch_68_30072014_122105.txt	PetersonGulch	1203150.182	2458781.419	7/30/2014	0	0	0.283779	A	792.0	42.7	30-07-2014 12:21:05	0	0	1.21	0.234528
PetersonGulch_69_30072014_122339.txt	PetersonGulch	1203359.812	2458758.052	7/30/2014	0	0	0.072203	A	791.9	42.8	30-07-2014 12:23:39	0	-0.09	0.308	0.234425
PetersonGulch_70_30072014_122557.txt	PetersonGulch	1203558.219	2458726.981	7/30/2014	0	0	0.074495	A	791.6	42.9	30-07-2014 12:25:57	0	-0.075	0.318	0.234262
PetersonGulch_71_30072014_122831.txt	PetersonGulch	1203758.347	2458597.077	7/30/2014	0	0	0.011721	A	792.4	43.0	30-07-2014 12:28:31	0	-0.068	0.05	0.234424
PetersonGulch_72_30072014_123045.txt	PetersonGulch	1203745.279	2458385.532	7/30/2014	0	0	0.113531	A	791.5	43.1	30-07-2014 12:30:45	0	-0.087	0.485	0.234084
PetersonGulch_73_30072014_123303.txt	PetersonGulch	1203737.294	2458210.198	7/30/2014	0	0	0.060869	A	791.6	43.1	30-07-2014 12:33:03	0	-0.023	0.26	0.234113
PetersonGulch_74_30072014_124231.txt	PetersonGulch	1203753.368	2457976.725	7/30/2014	0	0.094569	1.381226	A	791.2	42.2	30-07-2014 12:42:31	0	0.403	5.886	0.234663
PetersonGulch_75_30072014_124851.txt	PetersonGulch	1203752.254	2457800.927	7/30/2014				A	n.a.	41.9	30-07-2014 12:48:51	0	-0.067	0.53	
PetersonGulch_76_30072014_125223.txt	PetersonGulch	1203735.892	2457609.941	7/30/2014	0	0	0.22833	A	792.4	41.7	30-07-2014 12:52:23	0	0	0.97	0.235392
PetersonGulch_77_30072014_125523.txt	PetersonGulch	1203950.344	2457541.854	7/30/2014	0	0.006814	0.0914	A	791.2	41.8	30-07-2014 12:55:23	0	0.029	0.389	0.234961
PetersonGulch_78_30072014_125936.txt	PetersonGulch	1204147.053	2457400.445	7/30/2014		0	0.537338	A	790.2	42.1	30-07-2014 12:59:36		-0.089	2.292	0.234441
PetersonGulch_79_30072014_130241.txt	PetersonGulch	1204145.689	2457220.972	7/30/2014	0	0	4.925446	A	790.1	42.4	30-07-2014 13:02:41	0	-0.005	21.032	0.234188
PetersonGulch_80_30072014_130747.txt	PetersonGulch	1204140.353	2456996.788	7/30/2014	0	0	0.974961	A	790.0	42.5	30-07-2014 13:07:47	0	-0.167	4.165	0.234084
PetersonGulch_81_30072014_131345.txt	PetersonGulch	1204128.231	2456798.632	7/30/2014	0	0	0.085384	A	792.4	42.8	30-07-2014 13:13:45	0	-0.233	0.364	0.234573
PetersonGulch_82_31072014_091510.txt	PetersonGulch	1205504.506	2454946.999	7/31/2014	0	0	0	A	790.5	22.0	31-07-2014 09:15:10	0	-0.005	0	0.250501
PetersonGulch_83_31072014_093215.txt	PetersonGulch	1205295.203	2454953.573	7/31/2014				A	n.a.	26.3	31-07-2014 09:32:15	0	-0.006	0.648	
PetersonGulch_84_31072014_093614.txt	PetersonGulch	1205134.371	2454946.252	7/31/2014	0	0	0	A	791.1	27.0	31-07-2014 09:36:14	0	-0.005	0	0.246515
PetersonGulch_85_31072014_093904.txt	PetersonGulch	1205162.305	2455193.466	7/31/2014	0	0	0	A	728.0	27.6	31-07-2014 09:39:04	0	-0.009	0	0.2264
PetersonGulch_86_31072014_094840.txt	PetersonGulch	1205157.746	2455393.402	7/31/2014				A	n.a.	28.8	31-07-2014 09:48:40	0	-0.004	0.144	
PetersonGulch_87_31072014_095610.txt	PetersonGulch	1205064.007	2455616.529	7/31/2014	0	0	0.252928	A	790.5	29.4	31-07-2014 09:56:10	0	-0.007	1.035	0.244374
PetersonGulch_88_31072014_100025.txt	PetersonGulch	1205129.669	2455773.263	7/31/2014	0	0	0	A	790.5	29.6	31-07-2014 10:00:25	0	-0.006	0	0.244213
PetersonGulch_89_31072014_100434.txt	PetersonGulch	1204961.482	2456003.008	7/31/2014	0	0	0.408299	A	790.5	29.8	31-07-2014 10:04:34	0	-0.016	1.673	0.244052
PetersonGulch_90_31072014_100818.txt	PetersonGulch	1204910.63	2456177.729	7/31/2014	0	0	0.000244	A	791.1	30.1	31-07-2014 10:08:18	0	-0.004	0.001	0.243995
PetersonGulch_91_31072014_101318.txt	PetersonGulch	1204543.117	2456363.796	7/31/2014	0	0	0.094837	A	791.5	30.5	31-07-2014 10:13:18	0	0	0.389	0.243797
PetersonGulch_92_31072014_101659.txt	PetersonGulch	1204525.215	2456605.296	7/31/2014	0	0	0.292696	A	792.0	30.8	31-07-2014 10:16:59	0	0	1.201	0.24371
PetersonGulch_93_31072014_102019.txt	PetersonGulch	1204355.466	2456790.195	7/31/2014	0	0	0.022147	A	791.7	31.1	31-07-2014 10:20:19	0	-0.004	0.091	0.243378
PetersonGulch_94_31072014_103302.txt	PetersonGulch	1203355.175	2458961.578	7/31/2014	0	0	0.42088	A	792.1	31.9	31-07-2014 10:33:02	0	-0.002	1.733	0.242862
PetersonGulch_95_31072014_103617.txt	PetersonGulch	1203159.915	2458976.013	7/31/2014	0	0	0.178734	A	793.9	32.2	31-07-2014 10:36:17	-0.016	-0.007	0.735	0.243175
PetersonGulch_96_31072014_103930.txt	PetersonGulch	1202956.008	2458982.488	7/31/2014	0	0	0.251904	A	794.6	32.5	31-07-2014 10:39:30	0	-0.005	1.036	0.243151
PetersonGulch_97_31072014_104211.txt	PetersonGulch	1202753.433	2458995.781	7/31/2014	0	0	0.375037	A	794.3	32.7	31-07-2014 10:42:11	0	-0.005	1.544	0.2429
PetersonGulch_98_31072014_104517.txt	PetersonGulch	1202548.57	2458940.386	7/31/2014	0	0	0.041943	A	793.6	33.0	31-07-2014 10:45:17	-0.314	-0.003	0.173	0.242448
PetersonGulch_99_31072014_104853.txt	PetersonGulch	1202532.171	2459144.753	7/31/2014	0	0	0.167029	A	793.4	33.4	31-07-2014 10:48:53	0	-0.003	0.69	0.242071
PiedraRiver_01_18072014_090147.txt	PiedraRiver	1191409.506	2464213.652	7/18/2014	0	0	210.3322	A	807.5	26.7	18-07-2014 09:01:47	0	-0.019	835.057	0.251878
PiedraRiver_02_18072014_090605.txt	PiedraRiver	1191582.17	2464189.605	7/18/2014	0	0	0.245342	A	807.5	27.3	18-07-2014 09:06:05	0	-0.004	0.976	0.251375
PiedraRiver_03_18072014_092941.txt	PiedraRiver	1191630.917	2464402.66	7/18/2014	0	0	1.44579	A	808.1	29.9	18-07-2014 09:29:41	0	-0.006	5.797	0.249403
PiedraRiver_04_18072014_094446.txt	PiedraRiver	1191853.944	2464385.326	7/18/2014	0	0	0.453429	A	806.1	32.3	18-07-2014 09:44:46	0	-0.013	1.837	0.246831
PiedraRiver_05_18072014_095655.txt	PiedraRiver	1191815.15	2464205.278	7/18/2014				A	n.a.	33.2	18-07-2014 09:56:55	0	-0.003	0.082	
PiedraRiver_06_18072014_100459.txt	PiedraRiver	1191823.567	2464006.969	7/18/2014	0	0	1.325432	A	699.5	35.7	18-07-2014 10:04:59	0	-0.019	6.257	0.211832
PiedraRiver_07_18072014_102234.txt	PiedraRiver	1191978.642	2464029.665	7/18/2014	0	0	0.026576	A	807.1	39.3	18-07-2014 10:22:34	0	-0.002	0.11	0.241601
PiedraRiver_08_18072014_102632.txt	PiedraRiver	1192146.161	2464055.964	7/18/2014	0	0	0.178193	A	807.9	39.8	18-07-2014 10:26:32	0	-0.001	0.738	0.241454
PiedraRiver_09_18072014_103036.txt	PiedraRiver	1192125.872	2463882.952	7/18/2014	0	0	0.286458	A	806.9	40.1	18-07-2014 10:30:36	0	-0.013	1.189	0.240924
PiedraRiver_10_18072014_103423.txt	PiedraRiver	1192139.683	2463676.333	7/18/2014	0	0	0.065265	A	807.1	40.3	18-07-2014 10:34:23	0	-0.002	0.271	0.24083
PiedraRiver_11_18072014_103724.txt	PiedraRiver	1191966.509	2463654.69	7/18/2014	0	0	0.057633	A	805.3	40.5	18-07-2014 10:37:24	0	-0.001	0.24	0.240139
PiedraRiver_12_18072014_104425.txt	PiedraRiver	1191976.475	2463814.191	7/18/2014	0	0	0.020454	A	806.7	40.4	18-07-2014 10:44:25	0	-0.035	0.085	0.240634
PiedraRiver_13_18072014_104841.txt	PiedraRiver	1191810.593	2463837.706	7/18/2014	0	0	0.208614	A	806.8	40.1	18-07-2014 10:48:41	0	-0.014	0.866	0.240894
PiedraRiver_14_18072014_105243.txt	PiedraRiver	1191610.039	2463842.519	7/18/2014	0	0	1.086644	A	806.8	39.9	18-07-2014 10:52:43	0	-0.014	4.508	0.241048
PiedraRiver_15_18072014_105713.txt	PiedraRiver	1191589.091	2464048.442	7/18/2014	0	0	1.706459	A	805.7	39.9	18-07-2014 10:57:13	0	-0.02	7.089	0.240719
PiedraRiver_16_18072014_110127.txt	PiedraRiver	1191418.613	2464068.217	7/18/2014	0	0	0.05135	A	806.9	39.9	18-07-2014 11:01:27	0	-0.002	0.213	0.241078
PiedraRiver_17_18072014_110527.txt	PiedraRiver	1191266.204	2464019.651	7/18/2014	0	0	0.076543	A	805.9	40.0	18-07-2014 11:05:27	0	-0.027	0.318	0.240702
PiedraRiver_18_18072014_111102.txt	PiedraRiver	1191235.362	2464190.339	7/18/2014	0	0	0.139449	A	805.5	40.2	18-07-2014 11:11:02	0	-0.007	0.58	0.240429
PiedraRiver_19_18072014_111557.txt	PiedraRiver	1191253.484	2464451.052	7/18/2014	0	0	0.703089	A	806.1	40.4	18-07-2014 11:15:57	0	0	2.924	0.240455
PiedraRiver_20_18072014_111848.txt	PiedraRiver	1191041.079	2464633.078	7/18/2014	0	0	9.261115	A	807.6	40.6	18-07-2014 11:18:48	0	-0.037	38.468	0.240749
PiedraRiver_21_18072014_112204.txt	PiedraRiver	1190875.421	2464618.368	7/18/2014	0	0	1.088693	A	807.6	40.8	18-07-2014 11:22:04	0	-0.061	4.525	0.240595
PiedraRiver_22_18072014_113008.txt	PiedraRiver	1191056.887	2464337.44	7/18/2014	0	0	0.572593	A	806.4	41.4	18-07-2014 11:30:08	0	0	2.388	0.239779
PiedraRiver_23_18072014_113728.txt	PiedraRiver	1191436.394	2464414.251	7/18/2014	0	0	0.056057	A	807.2	42.0	18-07-2014 11:37:28	0	-0.001	0.234	0.23956

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
PiedraRiver_24_18072014_114813.txt	PiedraRiver	1191450.939	2464589.415	7/18/2014	0	0	0.198898	A	807.2	41.9	18-07-2014 11:48:13	0	-0.033	0.83	0.239636
PiedraRiver_25_18072014_115428.txt	PiedraRiver	1191200.23	2464640.651	7/18/2014	0	0	0.674185	A	807.5	42.2	18-07-2014 11:54:28	0	-0.064	2.815	0.239497
PiedraRiver_26_18072014_121010.txt	PiedraRiver	1191239.578	2464799.303	7/18/2014	0	0	0.057041	A	807.3	41.9	18-07-2014 12:10:10	0	-0.098	0.238	0.239666
PiedraRiver_27_18072014_121544.txt	PiedraRiver	1191425.405	2464798.678	7/18/2014	0	0	0.680915	A	807.3	42.0	18-07-2014 12:15:44	0	-0.037	2.842	0.23959
PiedraRiver_28_18072014_121845.txt	PiedraRiver	1191436.48	2464997.1	7/18/2014	0	0	0.615744	A	809.7	42.2	18-07-2014 12:18:45	0	-0.108	2.564	0.24015
PiedraRiver_29_18072014_122139.txt	PiedraRiver	1191212.732	2465017.614	7/18/2014	0	0	0.0124	A	804.5	42.4	18-07-2014 12:21:39	0	-0.008	0.052	0.238456
PiedraRiver_30_18072014_122547.txt	PiedraRiver	1191197.354	2465176.154	7/18/2014	0	0	0.15728	A	805.0	42.8	18-07-2014 12:25:47	0	-0.026	0.66	0.238303
PiedraRiver_31_18072014_122907.txt	PiedraRiver	1191430.733	2465215.217	7/18/2014	0	0	0.057235	A	806.1	43.0	18-07-2014 12:29:07	0	-0.041	0.24	0.238477
PiedraRiver_32_18072014_123204.txt	PiedraRiver	1191618.856	2465225.735	7/18/2014	0	0	0.078336	A	805.6	43.3	18-07-2014 12:32:04	0	-0.014	0.329	0.238103
PiedraRiver_33_18072014_123551.txt	PiedraRiver	1191802.018	2465187.424	7/18/2014	0	0	0.413496	A	804.8	43.6	18-07-2014 12:35:51	0	-0.003	1.74	0.237642
PiedraRiver_34_18072014_124536.txt	PiedraRiver	1191014.278	2465177.589	7/18/2014	0	0	0.129902	A	803.6	44.5	18-07-2014 12:45:36	0	-0.003	0.549	0.236615
PiedraRiver_35_18072014_125723.txt	PiedraRiver	1191221.107	2465364.11	7/18/2014	0	0	0.04127	A	807.3	45.2	18-07-2014 12:57:23	0	0	0.174	0.237182
PiedraRiver_36_18072014_130014.txt	PiedraRiver	1191086.476	2465451.484	7/18/2014	0	0	0.53253	A	808.0	45.3	18-07-2014 13:00:14	0	-0.006	2.244	0.237313
PiedraRiver_37_18072014_130416.txt	PiedraRiver	1190791.319	2465469.533	7/18/2014	0		0.312345	A	808.0	45.5	18-07-2014 13:04:16	0		1.317	0.237164
PiedraRiver_38_18072014_131909.txt	PiedraRiver	1190997.794	2465040.763	7/18/2014	0	0.000474	0.108261	A	808.1	45.9	18-07-2014 13:19:09	0	0.002	0.457	0.236896
PiedraRiver_39_18072014_132143.txt	PiedraRiver	1191010.104	2464840.062	7/18/2014	0	0	0.110431	A	806.9	46.0	18-07-2014 13:21:43	0	0	0.467	0.23647
PiedraRiver_40_18072014_132417.txt	PiedraRiver	1190857.857	2464835.594	7/18/2014	0	0	0.225215	A	806.9	46.2	18-07-2014 13:24:17	0	-0.012	0.953	0.236322
PiedraRiver_41_18072014_132631.txt	PiedraRiver	1190842.35	2465005.003	7/18/2014	0	0	1.195849	A	807.1	46.2	18-07-2014 13:26:31	0	-0.042	5.059	0.23638
PiedraRiver_42_18072014_132912.txt	PiedraRiver	1190867.283	2465227.968	7/18/2014	0	0	0.047982	A	807.3	46.3	18-07-2014 13:29:12	0	-0.086	0.203	0.236365
PiedraRiver_43_18072014_133136.txt	PiedraRiver	1190631.035	2465222.424	7/18/2014	0	0	0.109112	A	806.9	46.4	18-07-2014 13:31:36	0	-0.038	0.462	0.236174
PiedraRiver_44_18072014_133456.txt	PiedraRiver	1190439.071	2465244.13	7/18/2014	0	0	0.222586	A	807.3	46.4	18-07-2014 13:34:56	0	-0.027	0.942	0.236291
PiedraRiver_45_18072014_134041.txt	PiedraRiver	1190652.206	2465406.483	7/18/2014	0	0	0.739253	A	807.7	46.5	18-07-2014 13:40:41	0	-0.018	3.128	0.236334
PiedraRiver_46_18072014_134316.txt	PiedraRiver	1190399.524	2465421.29	7/18/2014	0	0	0.10089	A	807.5	46.5	18-07-2014 13:43:16	0	-0.08	0.427	0.236276
PiedraRiver_47_18072014_134551.txt	PiedraRiver	1190228.751	2465463.978	7/18/2014	0	0	0.084135	A	807.7	46.5	18-07-2014 13:45:51	-0.397	-0.014	0.356	0.236334
PiedraRiver_48_18072014_134851.txt	PiedraRiver	1190021.69	2465478.857	7/18/2014	0	0	0.202104	A	807.6	46.4	18-07-2014 13:48:51	0	-0.027	0.855	0.236379
PiedraRiver_49_18072014_135132.txt	PiedraRiver	1189817.099	2465460.884	7/18/2014	0	0	0.278305	A	807.6	46.3	18-07-2014 13:51:32	0	-0.023	1.177	0.236453
PiedraRiver_50_18072014_135554.txt	PiedraRiver	1189839.298	2465208.705	7/18/2014	0	0	0.607383	A	807.7	46.0	18-07-2014 13:55:54	0	-0.031	2.566	0.236704
PiedraRiver_51_18072014_135835.txt	PiedraRiver	1190028.39	2465226.841	7/18/2014	0	0	0.152684	A	807.5	45.9	18-07-2014 13:58:35	0	-0.024	0.645	0.23672
PiedraRiver_52_18072014_140155.txt	PiedraRiver	1190007.168	2465017.489	7/18/2014	0	0	0.123882	A	807.5	45.7	18-07-2014 14:01:55	0	-0.047	0.523	0.236868
PiedraRiver_53_18072014_140352.txt	PiedraRiver	1189855.743	2464999.996	7/18/2014	0	0	0.637418	A	807.6	45.5	18-07-2014 14:03:52	-0.143	-0.084	2.689	0.237046
PiedraRiver_54_18072014_140713.txt	PiedraRiver	1190198.594	2465214.291	7/18/2014	0	0	0.414329	A	807.5	45.3	18-07-2014 14:07:13	0	-0.024	1.747	0.237166
PiedraRiver_55_18072014_140937.txt	PiedraRiver	1190201.654	2465000.359	7/18/2014	0	0	0.144206	A	807.3	45.2	18-07-2014 14:09:37	0	-0.028	0.608	0.237182
PiedraRiver_56_18072014_141230.txt	PiedraRiver	1190216.074	2464796.015	7/18/2014	0	0	0.164511	A	807.5	45.0	18-07-2014 14:12:30	-0.232	-0.071	0.693	0.23739
PiedraRiver_57_18072014_141541.txt	PiedraRiver	1190388.49	2464822.813	7/18/2014	0	0	0.145503	A	806.9	44.8	18-07-2014 14:15:41	-1.059	-0.115	0.613	0.237362
PiedraRiver_58_18072014_141808.txt	PiedraRiver	1190622.446	2464841.626	7/18/2014	0	0	0.10798	A	806.5	44.7	18-07-2014 14:18:08	0	-0.018	0.455	0.237319
PiedraRiver_59_18072014_142041.txt	PiedraRiver	1190634.569	2465046.004	7/18/2014	0	0	0.06906	A	806.5	44.7	18-07-2014 14:20:41	0	-0.067	0.291	0.237319
PiedraRiver_60_18072014_142325.txt	PiedraRiver	1190429.789	2464999.041	7/18/2014	0	0	0.169952	A	806.9	44.8	18-07-2014 14:23:25	0	-0.036	0.716	0.237362
PiedraRiver_61_18072014_142833.txt	PiedraRiver	1190598.474	2464641.178	7/18/2014	0	0	0.05977	A	806.8	45.0	18-07-2014 14:28:33	0	-0.064	0.252	0.237184
SquaCreek_01_15072014_093506.txt	SquaCreek	1212953.858	2440002.418	7/15/2014	0	0	0.13259	A	790.1	26.7	15-07-2014 09:35:06	0	-0.072	0.538	0.24645
SquaCreek_02_15072014_093817.txt	SquaCreek	1213140.266	2439778.456	7/15/2014	0	0	0.153037	A	790.1	27.2	15-07-2014 09:38:17	-0.483	0	0.622	0.24604
SquaCreek_03_15072014_094048.txt	SquaCreek	1213323.763	2439554.612	7/15/2014	0	0.011538	0.398929	A	789.4	27.6	15-07-2014 09:40:48	0	0.047	1.625	0.245495
SquaCreek_04_15072014_094448.txt	SquaCreek	1213557.021	2439366.985	7/15/2014	0	0	0.139945	A	789.4	28.1	15-07-2014 09:44:48	0	-0.013	0.571	0.245088
SquaCreek_05_15072014_094826.txt	SquaCreek	1213735.789	2439145.213	7/15/2014	0	0	0.054463	A	788.2	28.7	15-07-2014 09:48:26	0	0	0.223	0.244229
SquaCreek_06_15072014_095616.txt	SquaCreek	1213696.51	2438985.122	7/15/2014	0	0.014849	0.349798	A	788.2	29.7	15-07-2014 09:56:16	0	0.061	1.437	0.243422
SquaCreek_07_15072014_100046.txt	SquaCreek	1213936.655	2439182.51	7/15/2014	0	0	0.412785	A	788.2	30.1	15-07-2014 10:00:46	0	0	1.698	0.243101
SquaCreek_08_15072014_100346.txt	SquaCreek	1213929.982	2439364.036	7/15/2014	0	0.00655	0.718775	A	787.3	30.4	15-07-2014 10:03:46	0	0.027	2.963	0.242583
SquaCreek_09_15072014_100841.txt	SquaCreek	1213712.208	2439388.138	7/15/2014	0	0	12.09449	A	787.1	30.7	15-07-2014 10:08:41	0	-0.003	49.919	0.242282
SquaCreek_10_15072014_101227.txt	SquaCreek	1213530.838	2439598.92	7/15/2014	0	0	0.19026	A	786.9	30.9	15-07-2014 10:12:27	0	-0.003	0.786	0.242061
SquaCreek_100_16072014_130041.txt	SquaCreek	1209340.495	2443978.937	7/16/2014	0	0	0.272493	A	789.4	39.8	16-07-2014 13:00:41	0	-0.017	1.155	0.235925
SquaCreek_101_16072014_130537.txt	SquaCreek	1209330.082	2443792.702	7/16/2014	0	0	0.126562	A	789.1	40.0	16-07-2014 13:05:37	0	-0.018	0.537	0.235684
SquaCreek_102_16072014_131444.txt	SquaCreek	1209546.647	2443773.856	7/16/2014	0	0	0.150881	A	789.1	40.4	16-07-2014 13:14:44	0	-0.009	0.641	0.235384
SquaCreek_103_16072014_131952.txt	SquaCreek	1209556.017	2443996.949	7/16/2014	0	0	0.315549	A	789.1	40.5	16-07-2014 13:19:52	0	-0.027	1.341	0.235309
SquaCreek_104_16072014_132242.txt	SquaCreek	1209700.114	2443835.62	7/16/2014	0	0	0.437535	A	789.1	40.6	16-07-2014 13:22:42	0	-0.012	1.86	0.235234
SquaCreek_105_16072014_133812.txt	SquaCreek	1210381.794	2442972.763	7/16/2014	0	0	0.009385	A	789.1	41.4	16-07-2014 13:38:12	0	-0.011	0.04	0.234635
SquaCreek_106_16072014_134216.txt	SquaCreek	1210212.525	2443189.386	7/16/2014	0	0.003748	0.221847	A	788.6	41.7	16-07-2014 13:42:16	-0.461	0.016	0.947	0.234263
SquaCreek_107_16072014_134616.txt	SquaCreek	1210150.647	2443408.051	7/16/2014	0	0	0.054807	A	788.7	41.8	16-07-2014 13:46:16	0	-0.065	0.234	0.234219
SquaCreek_108_16072014_135040.txt	SquaCreek	1209983.531	2443604.925	7/16/2014	0	0	0.315138	A	788.9	42.0	16-07-2014 13:50:40	0	-0.005	1.346	0.234129
SquaCreek_109_16072014_135817.txt	SquaCreek	1210555.686	2442778.662	7/16/2014	0	0	0.22475	A	789.1	42.1	16-07-2014 13:58:17	0	-0.034	0.96	0.234114
SquaCreek_11_15072014_101604.txt	SquaCreek	1213737.384	2439560.548	7/15/2014	0	0	0.205702	A	786.3	31.1	15-07-2014 10:16:04	0	0	0.851	0.241718
SquaCreek_110_16072014_141204.txt	SquaCreek	1211131.147	2441976.17	7/16/2014	0	0	0.252286	A	788.3	41.6	16-07-2014 14:12:04	0	-0.051	1.077	0.234249
SquaCreek_111_16072014_141845.txt	SquaCreek	1211161.566	2441783.598	7/16/2014	0	0	0.054748	A	787.1	41.5	16-07-2014 14:18:45	0	-0.01	0.234	0.233966

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
SquaCreek_112_16072014_142635.txt	SquaCreek	1211265.605	2441802.287	7/16/2014	0	0	0.643929	A	786.2	41.0	16-07-2014 14:26:35	0	-0.016	2.751	0.234071
SquaCreek_113_16072014_142940.txt	SquaCreek	1211314.496	2441725.489	7/16/2014	0	0	0.262727	A	786.7	40.8	16-07-2014 14:29:40	0	-0.019	1.121	0.234369
SquaCreek_114_17072014_085950.txt	SquaCreek	1210945.048	2442007.997	7/17/2014	0	0	0.478856	A	786.7	25.1	17-07-2014 08:59:50	-0.774	-0.002	1.941	0.246706
SquaCreek_115_17072014_090430.txt	SquaCreek	1210798.005	2441996.013	7/17/2014	0	0.004924	0.310447	A	786.9	25.8	17-07-2014 09:04:30	0	0.02	1.261	0.246191
SquaCreek_116_17072014_090826.txt	SquaCreek	1210684.005	2441781.805	7/17/2014	0	0	0.253161	A	785.4	26.3	17-07-2014 09:08:26	-0.124	-0.002	1.032	0.245311
SquaCreek_117_17072014_091335.txt	SquaCreek	1210718.394	2441499.936	7/17/2014	0	0	0.443968	A	785.5	26.7	17-07-2014 09:13:35	0	0	1.812	0.245015
SquaCreek_118_17072014_091753.txt	SquaCreek	1210994.716	2441556.581	7/17/2014	0	0	0.280204	A	785.6	27.1	17-07-2014 09:17:53	0	-0.012	1.145	0.24472
SquaCreek_119_17072014_092055.txt	SquaCreek	1211140.485	2441596.438	7/17/2014	0	0	0.058375	A	784.6	27.3	17-07-2014 09:20:55	0	-0.025	0.239	0.244246
SquaCreek_12_15072014_101854.txt	SquaCreek	1213920.786	2439575.808	7/15/2014	0	0	0.186767	A	785.2	31.2	15-07-2014 10:18:54	0	-0.006	0.774	0.2413
SquaCreek_120_17072014_092400.txt	SquaCreek	1211117.767	2441365.381	7/17/2014	0	0	0.792424	A	783.3	27.6	17-07-2014 09:24:00	0	0	3.253	0.243598
SquaCreek_121_17072014_092833.txt	SquaCreek	1211311.264	2441566.032	7/17/2014	0	0	0.559989	A	783.6	28.0	17-07-2014 09:28:33	0	0	2.301	0.243368
SquaCreek_122_17072014_093113.txt	SquaCreek	1211338.414	2441413.18	7/17/2014	0	0	0.342925	A	786.1	28.3	17-07-2014 09:31:13	0	-0.003	1.406	0.243901
SquaCreek_123_17072014_093517.txt	SquaCreek	1211354.981	2441180.507	7/17/2014	0	0	0.202082	A	785.5	28.6	17-07-2014 09:35:17	0	-0.008	0.83	0.243473
SquaCreek_124_17072014_094015.txt	SquaCreek	1211339.359	2440972.964	7/17/2014	0	0	0.124967	A	783.9	29.0	17-07-2014 09:40:15	0	-0.006	0.515	0.242655
SquaCreek_125_17072014_095659.txt	SquaCreek	1210906.592	2441749.186	7/17/2014	0	0	0.064773	A	782.0	30.6	17-07-2014 09:56:59	0	-0.001	0.269	0.240792
SquaCreek_13_15072014_102319.txt	SquaCreek	1213925.285	2439830.351	7/15/2014	0	0.01567	0	A	785.0	31.4	15-07-2014 10:23:19	0	0.065	-0.338	0.241081
SquaCreek_14_15072014_102646.txt	SquaCreek	1213708.713	2439788.014	7/15/2014	0	0	0.464969	A	783.1	31.5	15-07-2014 10:26:46	0	-0.033	1.934	0.240418
SquaCreek_15_15072014_103013.txt	SquaCreek	1213527.446	2439791.786	7/15/2014	0	0	0.08117	A	784.8	31.6	15-07-2014 10:30:13	0	0	0.337	0.240861
SquaCreek_16_15072014_103251.txt	SquaCreek	1213513.186	2439970.918	7/15/2014	0	0	0.221448	A	785.4	31.7	15-07-2014 10:32:51	0	-0.002	0.919	0.240966
SquaCreek_17_15072014_103647.txt	SquaCreek	1213342.7	2439812.984	7/15/2014	0	0.010846	0.200053	A	785.6	31.7	15-07-2014 10:36:47	0	0.045	0.83	0.241027
SquaCreek_18_15072014_104131.txt	SquaCreek	1213341.907	2440000.019	7/15/2014	0	0.010139	0.352215	A	787.1	31.8	15-07-2014 10:41:31	0	0.042	1.459	0.241408
SquaCreek_19_15072014_104755.txt	SquaCreek	1213318.103	2440195.106	7/15/2014	0	0.017337	0.256923	A	785.6	32.0	15-07-2014 10:47:55	0	0.072	1.067	0.24079
SquaCreek_20_15072014_105143.txt	SquaCreek	1213331.261	2440386.657	7/15/2014	0	0	0.127151	A	786.2	32.2	15-07-2014 10:51:43	0	0	0.528	0.240816
SquaCreek_21_15072014_105548.txt	SquaCreek	1213121.687	2440400.477	7/15/2014	0	0.017565	0.297882	A	785.8	32.3	15-07-2014 10:55:48	0	0.073	1.238	0.240615
SquaCreek_22_15072014_105845.txt	SquaCreek	1212949.083	2440376.549	7/15/2014	0	0.015919	0.264347	A	788.2	32.5	15-07-2014 10:58:45	0	0.066	1.096	0.241192
SquaCreek_23_15072014_110136.txt	SquaCreek	1212976.234	2440194.417	7/15/2014	0	0.009173	0.221124	A	789.4	32.7	15-07-2014 11:01:36	0	0.038	0.916	0.241401
SquaCreek_24_15072014_110434.txt	SquaCreek	1213147.075	2440151.773	7/15/2014	0	0.004337	0.509788	A	788.6	33.0	15-07-2014 11:04:34	0	0.018	2.116	0.24092
SquaCreek_25_15072014_111005.txt	SquaCreek	1213131.386	2439990.394	7/15/2014	0	0	0.280609	A	788.1	33.4	15-07-2014 11:10:05	0	-0.081	1.167	0.240454
SquaCreek_26_15072014_111251.txt	SquaCreek	1213146.289	2439941.081	7/15/2014	0.016312	0.045818	0.324082	A	787.0	33.7	15-07-2014 11:12:51	0.068	0.191	1.351	0.239883
SquaCreek_27_15072014_112406.txt	SquaCreek	1212917.283	2439754.333	7/15/2014	0	0	0.234428	A	787.1	34.6	15-07-2014 11:24:06	-0.278	0	0.98	0.239212
SquaCreek_28_15072014_112815.txt	SquaCreek	1212913.751	2439583.13	7/15/2014	0	0.007908	0.196271	A	789.3	34.9	15-07-2014 11:28:15	0	0.033	0.819	0.239647
SquaCreek_29_15072014_113058.txt	SquaCreek	1213085.338	2439545.134	7/15/2014	0	0	0.280659	A	788.3	35.0	15-07-2014 11:30:58	0	-0.002	1.173	0.239266
SquaCreek_30_15072014_113454.txt	SquaCreek	1213125.983	2439340.06	7/15/2014	0	0.003108	0.229995	A	788.2	35.2	15-07-2014 11:34:54	0	0.013	0.962	0.23908
SquaCreek_31_15072014_113855.txt	SquaCreek	1213265.323	2439376.023	7/15/2014	0	0.014326	0.106493	A	787.7	35.4	15-07-2014 11:38:55	0	0.06	0.446	0.238774
SquaCreek_32_15072014_114432.txt	SquaCreek	1213321.654	2439230.408	7/15/2014	0	0.014089	2.213922	A	788.3	35.6	15-07-2014 11:44:32	0	0.059	9.271	0.238801
SquaCreek_33_15072014_114845.txt	SquaCreek	1213498.357	2439133.554	7/15/2014	0	0.006208	0.261946	A	788.5	35.7	15-07-2014 11:48:45	0	0.026	1.097	0.238784
SquaCreek_34_15072014_115439.txt	SquaCreek	1213360.362	2438984.508	7/15/2014	0	0	0.197751	A	787.7	35.7	15-07-2014 11:54:39	0	0	0.829	0.238542
SquaCreek_35_15072014_121256.txt	SquaCreek	1213174.262	2439048.935	7/15/2014	0	0	0.191812	A	787.8	35.7	15-07-2014 12:12:56	0	-0.012	0.804	0.238572
SquaCreek_36_15072014_121548.txt	SquaCreek	1213154.541	2439188.825	7/15/2014	0	0	0.387885	A	785.8	35.7	15-07-2014 12:15:48	0	-0.005	1.63	0.237966
SquaCreek_37_15072014_121918.txt	SquaCreek	1212955.192	2439344.692	7/15/2014	0	0.004765	0.136273	A	786.7	35.7	15-07-2014 12:19:18	0	0.02	0.572	0.238239
SquaCreek_38_15072014_122236.txt	SquaCreek	1212772.283	2439560.005	7/15/2014	0	0.002621	0.438233	A	786.9	35.7	15-07-2014 12:22:36	0	0.011	1.839	0.238299
SquaCreek_39_15072014_122634.txt	SquaCreek	1212764.278	2439768.128	7/15/2014	0	0.003099	0.185968	A	787.3	35.7	15-07-2014 12:26:34	0	0.013	0.78	0.238421
SquaCreek_40_15072014_122942.txt	SquaCreek	1212557.581	2439802.699	7/15/2014	0	0.015513	0.325775	A	788.1	35.7	15-07-2014 12:29:42	0	0.065	1.365	0.238663
SquaCreek_41_15072014_123324.txt	SquaCreek	1212575.751	2439975.915	7/15/2014	0	0.014543	1.037832	A	787.8	35.9	15-07-2014 12:33:24	0	0.061	4.353	0.238418
SquaCreek_42_15072014_123904.txt	SquaCreek	1212342.098	2439993.326	7/15/2014	0	0.027649	0.112742	A	788.1	36.1	15-07-2014 12:39:04	0	0.116	0.473	0.238354
SquaCreek_43_15072014_124228.txt	SquaCreek	1212372.838	2440162.813	7/15/2014	0	0.019713	0.420621	A	785.8	36.3	15-07-2014 12:42:28	0	0.083	1.771	0.237505
SquaCreek_44_15072014_124753.txt	SquaCreek	1212141.893	2440201.284	7/15/2014	0	0.009751	5.145495	A	787.1	36.4	15-07-2014 12:47:53	0	0.041	21.636	0.237821
SquaCreek_45_15072014_125120.txt	SquaCreek	1212148.464	2440380.547	7/15/2014	0	0.036775	0.124562	A	785.5	36.5	15-07-2014 12:51:20	-0.462	0.155	0.525	0.237261
SquaCreek_46_15072014_125406.txt	SquaCreek	1212107.864	2440575.243	7/15/2014	0	0.00641	0.136028	A	786.2	36.6	15-07-2014 12:54:06	0	0.027	0.573	0.237396
SquaCreek_47_15072014_130213.txt	SquaCreek	1211908.971	2440742.712	7/15/2014	0	0	0.459092	A	786.3	36.5	15-07-2014 13:02:13	0	0	1.933	0.237503
SquaCreek_48_15072014_130444.txt	SquaCreek	1211773.671	2440729.599	7/15/2014	0	0.005715	0.779606	A	788.6	36.6	15-07-2014 13:04:44	0	0.024	3.274	0.23812
SquaCreek_49_15072014_130701.txt	SquaCreek	1211739.137	2440603.565	7/15/2014	0	0.00333	1.155206	A	788.1	36.7	15-07-2014 13:07:01	0	0.014	4.856	0.237893
SquaCreek_50_15072014_131002.txt	SquaCreek	1211904.881	2440533.65	7/15/2014	0	0.013786	0.41763	A	787.7	36.8	15-07-2014 13:10:02	0	0.058	1.757	0.237695
SquaCreek_51_15072014_131518.txt	SquaCreek	1211577.729	2440797.601	7/15/2014	0	0	0.694993	A	787.1	37.0	15-07-2014 13:15:18	0	0	2.928	0.237361
SquaCreek_52_15072014_131856.txt	SquaCreek	1211558.894	2440963.143	7/15/2014	0	0.011162	0.107823	A	787.8	37.1	15-07-2014 13:18:56	0	0.047	0.454	0.237495
SquaCreek_53_15072014_132343.txt	SquaCreek	1211710.542	2441002.762	7/15/2014	0	0.00356	0	A	787.5	37.2	15-07-2014 13:23:43	0	0.015	0	0.237329
SquaCreek_54_15072014_132827.txt	SquaCreek	1211578.653	2441199.771	7/15/2014	0	0	0.163676	A	789.4	37.2	15-07-2014 13:28:27	0	-0.172	0.688	0.237901
SquaCreek_55_15072014_133132.txt	SquaCreek	1211514.912	2441329.021	7/15/2014	0	0.003806	0.450347	A	789.4	37.2	15-07-2014 13:31:32	0	0.016	1.893	0.237901
SquaCreek_56_15072014_134052.txt	SquaCreek	1211541.944	2441589.151	7/15/2014	0	0	0.074405	A	790.8	37.0	15-07-2014 13:40:52	0	-0.002	0.312	0.238477
SquaCreek_57_15072014_134316.txt	SquaCreek	1211733.747	2441462.612	7/15/2014	0	0	0.190051	A	790.0	37.1	15-07-2014 13:43:16	0	0	0.798	0.238159
SquaCreek_58_15072014_134504.txt	SquaCreek	1211729.429	2441366.475	7/15/2014	0	0	0.185228	A	790.0	37.2	15-07-2014 13:45:04	0	0	0.778	0.238082

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
SquaCreek_59_15072014_134721.txt	SquaCreek	1211773.029	2441197.458	7/15/2014	0	0	0.118259	A	789.8	37.3	15-07-2014 13:47:21	0	0	0.497	0.237945
SquaCreek_60_15072014_134931.txt	SquaCreek	1211921.546	2441137.104	7/15/2014	0	0	0.099854	A	789.4	37.4	15-07-2014 13:49:31	0	0	0.42	0.237748
SquaCreek_61_15072014_135141.txt	SquaCreek	1211999.635	2440977.152	7/15/2014	0	0.009266	0.133045	A	789.1	37.5	15-07-2014 13:51:41	0	0.039	0.56	0.237581
SquaCreek_62_15072014_135428.txt	SquaCreek	1212139.868	2440974.871	7/15/2014	0	0	0.85049	A	788.9	37.7	15-07-2014 13:54:28	0	0	3.583	0.237368
SquaCreek_63_15072014_135925.txt	SquaCreek	1212076.171	2440787.4	7/15/2014	0	0.009722	0.357111	A	788.6	37.9	15-07-2014 13:59:25	0	0.041	1.506	0.237125
SquaCreek_64_15072014_140415.txt	SquaCreek	1212307.69	2440949.236	7/15/2014	0	0	0.829747	A	788.7	38.1	15-07-2014 14:04:15	0	-0.002	3.501	0.237003
SquaCreek_65_15072014_140655.txt	SquaCreek	1212359.311	2440814.391	7/15/2014	0	0	0.408834	A	788.3	38.3	15-07-2014 14:06:55	0	-0.007	1.727	0.236731
SquaCreek_66_15072014_141140.txt	SquaCreek	1212366.027	2440575.009	7/15/2014	0	0	0.246135	A	788.6	38.5	15-07-2014 14:11:40	0	-0.02	1.04	0.236669
SquaCreek_67_15072014_141719.txt	SquaCreek	1212348.372	2440361.1	7/15/2014	0	0	1.73313	A	788.5	38.8	15-07-2014 14:17:19	0	-0.006	7.331	0.236411
SquaCreek_68_15072014_142221.txt	SquaCreek	1212509.537	2440182.2	7/15/2014	0	0	0.265354	A	787.9	39.0	15-07-2014 14:22:21	0	-0.008	1.124	0.23608
SquaCreek_69_15072014_142809.txt	SquaCreek	1212719.371	2439880.973	7/15/2014	0	0.005893	0.583172	A	786.7	39.0	15-07-2014 14:28:09	0	0.025	2.474	0.23572
SquaCreek_70_15072014_143421.txt	SquaCreek	1212762.042	2440146.715	7/15/2014	0	0	0.215876	A	787.4	39.0	15-07-2014 14:34:21	0	-0.013	0.915	0.23593
SquaCreek_71_15072014_143724.txt	SquaCreek	1212561.95	2440388.857	7/15/2014	0	0	0.051407	A	787.0	39.0	15-07-2014 14:37:24	0	-0.014	0.218	0.23581
SquaCreek_72_15072014_144015.txt	SquaCreek	1212541.319	2440597.974	7/15/2014	0	0	0.088474	A	787.4	39.0	15-07-2014 14:40:15	0	-0.032	0.375	0.23593
SquaCreek_73_15072014_144320.txt	SquaCreek	1212692.471	2440317.355	7/15/2014	0	0	0.132357	A	787.4	39.0	15-07-2014 14:43:20	0	-0.001	0.561	0.23593
SquaCreek_74_15072014_145454.txt	SquaCreek	1213520.452	2438979.668	7/15/2014	0	0	1.193048	A	786.9	39.0	15-07-2014 14:54:54	0	-0.034	5.06	0.23578
SquaCreek_75_16072014_105110.txt	SquaCreek	1209560.871	2444200.192	7/16/2014	0	0	0.292016	A	792.8	30.8	16-07-2014 10:51:10	0	-0.093	1.197	0.243957
SquaCreek_76_16072014_105649.txt	SquaCreek	1209364.493	2444372.568	7/16/2014	0	0	0.17021	A	792.8	31.8	16-07-2014 10:56:49	0	-0.01	0.7	0.243157
SquaCreek_77_16072014_110203.txt	SquaCreek	1209360.288	2444578.449	7/16/2014	0	0	0.171742	A	790.4	32.9	16-07-2014 11:02:03	0	-0.002	0.711	0.241549
SquaCreek_78_16072014_110759.txt	SquaCreek	1209204.057	2444617.779	7/16/2014	0	0	0.380694	A	790.5	33.9	16-07-2014 11:07:59	0	-0.003	1.581	0.240793
SquaCreek_79_16072014_111618.txt	SquaCreek	1208945.074	2444568.028	7/16/2014	0	0	0.142232	A	788.9	35.0	16-07-2014 11:16:18	-0.29	-0.012	0.594	0.239448
SquaCreek_80_16072014_112141.txt	SquaCreek	1208899.454	2444350.936	7/16/2014	0	0	0.187115	A	785.6	35.5	16-07-2014 11:21:41	0	-0.011	0.786	0.23806
SquaCreek_81_16072014_112523.txt	SquaCreek	1208902.813	2444198.7	7/16/2014	0	0	0.19316	A	787.0	35.9	16-07-2014 11:25:23	0	-0.005	0.811	0.238176
SquaCreek_82_16072014_113211.txt	SquaCreek	1208711.744	2443784.601	7/16/2014	0	0	0.351559	A	788.3	36.4	16-07-2014 11:32:11	0	-0.022	1.476	0.238184
SquaCreek_83_16072014_113648.txt	SquaCreek	1208684.435	2443569.407	7/16/2014	0	0	0.521804	A	787.9	36.7	16-07-2014 11:36:48	0	-0.007	2.194	0.237832
SquaCreek_84_16072014_114048.txt	SquaCreek	1208701.105	2443353.235	7/16/2014	0	0	0.269018	A	787.8	36.9	16-07-2014 11:40:48	0	-0.013	1.132	0.237649
SquaCreek_85_16072014_114555.txt	SquaCreek	1208939.978	2443352.827	7/16/2014	0	0	0.198949	A	788.2	37.0	16-07-2014 11:45:55	0	-0.04	0.837	0.237693
SquaCreek_86_16072014_115406.txt	SquaCreek	1209207.702	2443316.08	7/16/2014	0	0	0.137112	A	788.5	37.2	16-07-2014 11:54:06	0	-0.011	0.577	0.23763
SquaCreek_87_16072014_115850.txt	SquaCreek	1209366.071	2443324.276	7/16/2014	0	0	0.057731	A	785.6	37.4	16-07-2014 11:58:50	0	-0.01	0.244	0.236603
SquaCreek_88_16072014_120220.txt	SquaCreek	1209533.685	2443354.103	7/16/2014	0	0	0.169074	A	785.4	37.5	16-07-2014 12:02:20	0	-0.01	0.715	0.236467
SquaCreek_89_16072014_120731.txt	SquaCreek	1209548.053	2443523.527	7/16/2014	0	0	0.219065	A	786.0	37.6	16-07-2014 12:07:31	0	-0.026	0.926	0.236572
SquaCreek_90_16072014_121213.txt	SquaCreek	1209340.319	2443573.838	7/16/2014	0	0	0.174911	A	787.7	37.7	16-07-2014 12:12:13	0	-0.017	0.738	0.237007
SquaCreek_91_16072014_121540.txt	SquaCreek	1209143.315	2443581.709	7/16/2014	0	0	0.164009	A	787.7	37.7	16-07-2014 12:15:40	0	-0.001	0.692	0.237007
SquaCreek_92_16072014_122003.txt	SquaCreek	1208944.484	2443589.115	7/16/2014	0	0	0.237348	A	788.3	37.8	16-07-2014 12:20:03	0	-0.001	1.001	0.237111
SquaCreek_93_16072014_122639.txt	SquaCreek	1208888.434	2443784.525	7/16/2014	0	0	0.616723	A	788.5	38.0	16-07-2014 12:26:39	0	-0.015	2.602	0.237019
SquaCreek_94_16072014_123057.txt	SquaCreek	1208909.131	2443974.314	7/16/2014	0	0	0.221807	A	788.6	38.1	16-07-2014 12:30:57	0	-0.008	0.936	0.236973
SquaCreek_95_16072014_123548.txt	SquaCreek	1209149.976	2443758.56	7/16/2014	0	0	0.278933	A	788.9	38.2	16-07-2014 12:35:48	0	-0.053	1.177	0.236987
SquaCreek_96_16072014_123829.txt	SquaCreek	1209150.364	2443967.36	7/16/2014	0	0	0.473076	A	788.7	38.4	16-07-2014 12:38:29	0	-0.02	1.998	0.236775
SquaCreek_97_16072014_124417.txt	SquaCreek	1209156.217	2444155.579	7/16/2014	0	0	0.476976	A	789.0	38.6	16-07-2014 12:44:17	0	-0.016	2.015	0.236713
SquaCreek_98_16072014_124857.txt	SquaCreek	1209176.502	2444360.297	7/16/2014	0	0	0.100512	A	789.3	39.0	16-07-2014 12:48:57	0	-0.026	0.425	0.236499
SquaCreek_99_16072014_125550.txt	SquaCreek	1209358.239	2444178.33	7/16/2014	0	0	0.208336	A	788.7	39.5	16-07-2014 12:55:50	0	-0.034	0.883	0.235942
StolstiemerCreek_01_21072014_112049.txt	StolstiemerCreek	1185334.728	2470379.949	7/21/2014	0	0	0.042026	A	808.4	34.5	21-07-2014 11:20:49	0	-0.003	0.171	0.245765
StolstiemerCreek_02_21072014_112520.txt	StolstiemerCreek	1185525.906	2470345.935	7/21/2014	0	0	0	A	808.4	35.6	21-07-2014 11:25:20	0	-0.018	-0.074	0.24489
StolstiemerCreek_03_21072014_113022.txt	StolstiemerCreek	1185523.153	2470588.156	7/21/2014	0	0	0.041192	A	808.0	36.9	21-07-2014 11:30:22	0	0	0.169	0.243742
StolstiemerCreek_04_21072014_113526.txt	StolstiemerCreek	1185761.445	2470335.959	7/21/2014	0	0	0.121272	A	808.5	38.0	21-07-2014 11:35:26	0	-0.034	0.499	0.243031
StolstiemerCreek_05_21072014_114029.txt	StolstiemerCreek	1185738.391	2470166.994	7/21/2014	0	0	0.188151	A	807.9	38.9	21-07-2014 11:40:29	-0.025	-0.042	0.777	0.24215
StolstiemerCreek_06_21072014_114527.txt	StolstiemerCreek	1185929.689	2470171.322	7/21/2014	0	0	0.00843	A	806.4	40.0	21-07-2014 11:45:27	0	-0.065	0.035	0.240851
StolstiemerCreek_07_21072014_114928.txt	StolstiemerCreek	1186125.403	2470165.103	7/21/2014	0	0	0.022342	A	806.4	40.8	21-07-2014 11:49:28	0	-0.019	0.093	0.240238
StolstiemerCreek_08_21072014_115336.txt	StolstiemerCreek	1186332.046	2470157.343	7/21/2014	0	0	0.040841	A	808.2	41.5	21-07-2014 11:53:36	0	-0.051	0.17	0.240238
StolstiemerCreek_09_21072014_115746.txt	StolstiemerCreek	1186535.046	2470180.706	7/21/2014	0	0	0.035474	A	807.9	42.1	21-07-2014 11:57:46	-0.015	-0.04	0.148	0.239692
StolstiemerCreek_10_21072014_120133.txt	StolstiemerCreek	1186725.845	2470191.819	7/21/2014	0	0	0.056208	A	807.2	42.5	21-07-2014 12:01:33	0	-0.048	0.235	0.239181
StolstiemerCreek_100_28072014_123753.txt	StolstiemerCreek	1185511.509	2468599.264	7/28/2014	0	0	1.324747	A	814.5	42.9	28-07-2014 12:37:53	0	-0.014	5.496	0.241038
StolstiemerCreek_101_28072014_125705.txt	StolstiemerCreek	1186141.097	2468782.682	7/28/2014	0	0	0.242194	A	814.0	43.4	28-07-2014 12:57:05	0	-0.219	1.007	0.24051
StolstiemerCreek_102_28072014_130521.txt	StolstiemerCreek	1186336.948	2468806.608	7/28/2014	0	0	0.218309	A	814.5	44.4	28-07-2014 13:05:21	0	-0.117	0.91	0.2399
StolstiemerCreek_103_28072014_130929.txt	StolstiemerCreek	1186325.601	2468979.301	7/28/2014	0	0	0.06393	A	813.7	44.7	28-07-2014 13:09:29	0	-0.044	0.267	0.239438
StolstiemerCreek_104_28072014_131303.txt	StolstiemerCreek	1186303.489	2469168.544	7/28/2014	0	0	0.004576	A	741.5	45.1	28-07-2014 13:13:03	0	-0.098	0.021	0.217918
StolstiemerCreek_105_28072014_131700.txt	StolstiemerCreek	1186315.856	2469366.019	7/28/2014	0	0	1.484273	A	812.6	45.5	28-07-2014 13:17:00	0	-0.273	6.223	0.238514
StolstiemerCreek_106_28072014_131922.txt	StolstiemerCreek	1186149.209	2469402.989	7/28/2014	0	0	0.170514	A	809.6	45.7	28-07-2014 13:19:22	0	-0.109	0.718	0.237484
StolstiemerCreek_107_28072014_132630.txt	StolstiemerCreek	1185946.62	2469386.859	7/28/2014	0	0	0.021176	A	811.4	45.8	28-07-2014 13:26:30	0	-0.176	0.089	0.237938
StolstiemerCreek_108_28072014_132957.txt	StolstiemerCreek	1185754.914	2469392.194	7/28/2014	0	0	0	A	811.4	45.8	28-07-2014 13:29:57	0	-0.199	0	0.237938
StolstiemerCreek_109_28072014_133231.txt	StolstiemerCreek	1185549.836	2469367.075	7/28/2014	0	0	0.235816	A	700.1	45.9	28-07-2014 13:32:31	0	-0.22	1.149	0.205235

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
StolstiemerCreek_11_21072014_120515.txt	StolstiemerCreek	1186720.628	2469994.568	7/21/2014	0	0	0.087647	A	807.0	42.9	21-07-2014 12:05:15	0	-0.001	0.367	0.238819
StolstiemerCreek_110_28072014_133506.txt	StolstiemerCreek	1185344.347	2469383.527	7/28/2014	0	0	0.186079	A	813.0	46.0	28-07-2014 13:35:06	0	0	0.781	0.238258
StolstiemerCreek_111_28072014_133726.txt	StolstiemerCreek	1185143.631	2469369.788	7/28/2014	0	0	0.062185	A	813.0	46.0	28-07-2014 13:37:26	0	-0.089	0.261	0.238258
StolstiemerCreek_112_28072014_134006.txt	StolstiemerCreek	1184995.85	2469404.336	7/28/2014	0	0	0.314069	A	812.5	46.0	28-07-2014 13:40:06	0	-0.168	1.319	0.238111
StolstiemerCreek_113_28072014_134543.txt	StolstiemerCreek	1184921.533	2469190.399	7/28/2014	0	0	0.04884	A	812.7	45.9	28-07-2014 13:45:43	0	0	0.205	0.238244
StolstiemerCreek_114_28072014_134917.txt	StolstiemerCreek	1185133.499	2469163.163	7/28/2014	0	0	0	A	812.6	45.9	28-07-2014 13:49:17	0	-0.047	0	0.238215
StolstiemerCreek_115_28072014_135216.txt	StolstiemerCreek	1185326.322	2469177.5	7/28/2014	0	0	0	A	739.0	46.1	28-07-2014 13:52:16	0	-0.306	0	0.216503
StolstiemerCreek_116_28072014_135609.txt	StolstiemerCreek	1185544.08	2469178.487	7/28/2014	0	0	0.519837	A	813.8	45.9	28-07-2014 13:56:09	0	-0.366	2.179	0.238567
StolstiemerCreek_117_28072014_135958.txt	StolstiemerCreek	1185742.669	2469172.925	7/28/2014	0	0	0	A	812.9	46.1	28-07-2014 13:59:58	0	-0.019	-0.041	0.238154
StolstiemerCreek_118_28072014_140230.txt	StolstiemerCreek	1185935.187	2469169.936	7/28/2014	0	0	0.054731	A	813.0	46.4	28-07-2014 14:02:30	0	-0.081	0.23	0.237959
StolstiemerCreek_119_28072014_140509.txt	StolstiemerCreek	1186108.447	2469162.727	7/28/2014	0	0	0.268732	A	812.3	46.6	28-07-2014 14:05:09	0	-0.115	1.131	0.237606
StolstiemerCreek_12_21072014_120855.txt	StolstiemerCreek	1186528.292	2469983.194	7/21/2014	0	0	0.075381	A	807.1	43.3	21-07-2014 12:08:55	0	-0.058	0.316	0.238547
StolstiemerCreek_120_28072014_140811.txt	StolstiemerCreek	1185942.259	2469012.232	7/28/2014	0	0	0.07838	A	812.5	46.8	28-07-2014 14:08:11	0	-0.038	0.33	0.237516
StolstiemerCreek_121_28072014_141038.txt	StolstiemerCreek	1185927.919	2468781.88	7/28/2014	0	0	0.066717	A	812.7	47.0	28-07-2014 14:10:38	0	-0.134	0.281	0.237426
StolstiemerCreek_122_28072014_141245.txt	StolstiemerCreek	1185758.913	2468767.128	7/28/2014	0	0	0.075217	A	812.7	47.2	28-07-2014 14:12:45	0	-0.117	0.317	0.237278
StolstiemerCreek_123_28072014_141504.txt	StolstiemerCreek	1185686.122	2468936.029	7/28/2014	0	0	0.146628	A	812.9	47.3	28-07-2014 14:15:04	0	-0.242	0.618	0.237262
StolstiemerCreek_124_28072014_141706.txt	StolstiemerCreek	1185528.903	2468954.718	7/28/2014	0	0	0.491928	A	812.9	47.4	28-07-2014 14:17:06	0	-0.078	2.074	0.237188
StolstiemerCreek_125_28072014_141906.txt	StolstiemerCreek	1185522.267	2468800.872	7/28/2014	0	0	1.109657	A	812.7	47.5	28-07-2014 14:19:06	0	-0.086	4.681	0.237056
StolstiemerCreek_126_28072014_142117.txt	StolstiemerCreek	1185362.85	2468753.186	7/28/2014	0	0	0.573437	A	812.7	47.5	28-07-2014 14:21:17	0	-0.07	2.419	0.237056
StolstiemerCreek_127_28072014_142334.txt	StolstiemerCreek	1185280.507	2468950.046	7/28/2014	0	0	0.082495	A	812.7	47.5	28-07-2014 14:23:34	0	-0.069	0.348	0.237056
StolstiemerCreek_128_28072014_142528.txt	StolstiemerCreek	1185158.404	2468954.818	7/28/2014	0.008768	0	0.15072	A	812.7	47.6	28-07-2014 14:25:28	0.037	-0.002	0.636	0.236982
StolstiemerCreek_129_28072014_142728.txt	StolstiemerCreek	1185129.111	2468812.667	7/28/2014	0	0	0.046922	A	812.7	47.6	28-07-2014 14:27:28	-1.278	-0.095	0.198	0.236982
StolstiemerCreek_13_21072014_121418.txt	StolstiemerCreek	1186329.984	2469961.671	7/21/2014	0	0	0.271889	A	806.8	43.8	21-07-2014 12:14:18	0	-0.01	1.142	0.238082
StolstiemerCreek_130_28072014_143252.txt	StolstiemerCreek	1186121.628	2468987.51	7/28/2014	0	0	0.11401	A	812.6	47.5	28-07-2014 14:32:52	-0.012	-0.074	0.481	0.237026
StolstiemerCreek_131_28072014_150450.txt	StolstiemerCreek	1184935.701	2468209.781	7/28/2014	0	0	0.104529	A	811.6	44.2	28-07-2014 15:04:50	0	-0.277	0.437	0.239196
StolstiemerCreek_14_21072014_121825.txt	StolstiemerCreek	1186136.747	2469956.162	7/21/2014	0	0	0.206479	A	806.2	44.2	21-07-2014 12:18:25	0	-0.002	0.869	0.237605
StolstiemerCreek_15_21072014_122207.txt	StolstiemerCreek	1185935.588	2469959.964	7/21/2014	0	0	0.337792	A	806.2	44.5	21-07-2014 12:22:07	0	-0.066	1.423	0.237381
StolstiemerCreek_16_21072014_122625.txt	StolstiemerCreek	1185731.928	2469991.561	7/21/2014	0	0	0.031289	A	805.8	44.8	21-07-2014 12:26:25	0	-0.09	0.132	0.237039
StolstiemerCreek_17_21072014_123110.txt	StolstiemerCreek	1185518.973	2469961.78	7/21/2014	0	0	0.218886	A	805.8	45.0	21-07-2014 12:31:10	0	-0.12	0.924	0.23689
StolstiemerCreek_18_21072014_123535.txt	StolstiemerCreek	1185538.886	2470183.238	7/21/2014	0	0	0.05873	A	806.3	45.3	21-07-2014 12:35:35	0	-0.016	0.248	0.236814
StolstiemerCreek_19_21072014_123932.txt	StolstiemerCreek	1185359.905	2470160.851	7/21/2014	0	0	0.062514	A	807.0	45.6	21-07-2014 12:39:32	0	-0.037	0.264	0.236796
StolstiemerCreek_20_21072014_124347.txt	StolstiemerCreek	1185345.904	2469992.79	7/21/2014	0	0	0.070126	A	807.9	45.8	21-07-2014 12:43:47	-0.425	-0.006	0.296	0.236911
StolstiemerCreek_21_21072014_124847.txt	StolstiemerCreek	1185139.616	2469983.603	7/21/2014	0	0	0.040695	A	807.6	46.1	21-07-2014 12:48:47	0	0	0.172	0.236601
StolstiemerCreek_22_21072014_125235.txt	StolstiemerCreek	1185156.372	2470165.895	7/21/2014	0	0	0.017511	A	808.2	46.3	21-07-2014 12:52:35	0	-0.034	0.074	0.236629
StolstiemerCreek_23_21072014_125635.txt	StolstiemerCreek	1184950.459	2469965.734	7/21/2014	0	0	0.0279	A	807.8	46.4	21-07-2014 12:56:35	0	-0.072	0.118	0.236437
StolstiemerCreek_24_21072014_130115.txt	StolstiemerCreek	1184944.455	2469763.336	7/21/2014	0	0	0.08895	A	808.5	46.5	21-07-2014 13:01:15	0	-0.093	0.376	0.236568
StolstiemerCreek_25_21072014_130523.txt	StolstiemerCreek	1185130.463	2469781.247	7/21/2014	0	0	0.458939	A	809.0	46.7	21-07-2014 13:05:23	0	-0.036	1.94	0.236567
StolstiemerCreek_26_21072014_130849.txt	StolstiemerCreek	1185323.786	2469753.225	7/21/2014	0	0	0.003309	A	808.9	46.9	21-07-2014 13:08:49	0	-0.016	0.014	0.236389
StolstiemerCreek_27_21072014_131226.txt	StolstiemerCreek	1185509.848	2469777.237	7/21/2014	0	0	0.006373	A	808.2	47.1	21-07-2014 13:12:26	0	-0.025	0.027	0.236037
StolstiemerCreek_28_21072014_131640.txt	StolstiemerCreek	1185746.013	2469760.546	7/21/2014	0	0	1.414857	A	807.1	47.4	21-07-2014 13:16:40	-0.023	-0.015	6.008	0.235496
StolstiemerCreek_29_21072014_131958.txt	StolstiemerCreek	1185924.192	2469745.575	7/21/2014	0	0	0.596192	A	805.9	47.6	21-07-2014 13:19:58	-0.702	-0.106	2.537	0.234999
StolstiemerCreek_30_21072014_132340.txt	StolstiemerCreek	1186123.824	2469786.936	7/21/2014	0	0	0.118989	A	805.1	47.7	21-07-2014 13:23:40	0	-0.087	0.507	0.234692
StolstiemerCreek_31_21072014_132641.txt	StolstiemerCreek	1186327.269	2469762.318	7/21/2014	0	0	0.035182	A	805.1	47.9	21-07-2014 13:26:41	0	-0.124	0.15	0.234546
StolstiemerCreek_32_21072014_132948.txt	StolstiemerCreek	1186520.014	2469786.663	7/21/2014	0	0	0.146311	A	805.1	48.0	21-07-2014 13:29:48	0	-0.04	0.624	0.234473
StolstiemerCreek_33_21072014_133438.txt	StolstiemerCreek	1186724.109	2469787.45	7/21/2014	0	0.009381	0.19513	A	805.8	48.2	21-07-2014 13:34:38	0	0.04	0.832	0.234531
StolstiemerCreek_34_21072014_133945.txt	StolstiemerCreek	1186717.141	2469576.71	7/21/2014	0	0	0.096669	A	806.4	48.3	21-07-2014 13:39:45	-0.877	-0.008	0.412	0.234633
StolstiemerCreek_35_21072014_134644.txt	StolstiemerCreek	1186741.848	2469378.079	7/21/2014	0	0	0.083946	A	806.4	48.5	21-07-2014 13:46:44	0	-0.004	0.358	0.234487
StolstiemerCreek_36_21072014_135437.txt	StolstiemerCreek	1186936.969	2469365.44	7/21/2014	0	0	0.455268	A	809.8	48.6	21-07-2014 13:54:37	0	-0.144	1.934	0.235402
StolstiemerCreek_37_21072014_140140.txt	StolstiemerCreek	1187138.083	2469367.522	7/21/2014	0	0	0.066404	A	810.3	48.7	21-07-2014 14:01:40	-0.115	-0.157	0.282	0.235474
StolstiemerCreek_38_21072014_140615.txt	StolstiemerCreek	1187297.705	2469371.041	7/21/2014	0	0	0.25682	A	809.8	48.9	21-07-2014 14:06:15	0	-0.094	1.092	0.235183
StolstiemerCreek_39_21072014_141209.txt	StolstiemerCreek	1187550.035	2469344.943	7/21/2014	0	0	0.075879	A	809.4	49.1	21-07-2014 14:12:09	0	-0.113	0.323	0.234921
StolstiemerCreek_40_21072014_142355.txt	StolstiemerCreek	1187334.022	2469195.79	7/21/2014	0	0	0.010087	A	809.0	49.4	21-07-2014 14:23:55	0	-0.176	0.043	0.234586
StolstiemerCreek_41_21072014_143033.txt	StolstiemerCreek	1187535.205	2469135.155	7/21/2014	0	0	0.153268	A	808.2	49.4	21-07-2014 14:30:33	0	-0.195	0.654	0.234354
StolstiemerCreek_42_21072014_143540.txt	StolstiemerCreek	1187541.095	2468978.376	7/21/2014	0	0	0.016609	A	807.0	49.5	21-07-2014 14:35:40	0	-0.162	0.071	0.233934
StolstiemerCreek_43_21072014_143834.txt	StolstiemerCreek	1187317.93	2468985.933	7/21/2014	0	0	0.095611	A	808.4	49.5	21-07-2014 14:38:34	0	-0.165	0.408	0.23434
StolstiemerCreek_44_21072014_144323.txt	StolstiemerCreek	1187319.197	2468770.46	7/21/2014	0	0	0.006794	A	808.2	49.5	21-07-2014 14:43:23	0	-0.14	0.029	0.234282
StolstiemerCreek_45_21072014_144651.txt	StolstiemerCreek	1187120.093	2468794.364	7/21/2014	0	0	0.362674	A	806.4	49.4	21-07-2014 14:46:51	0	-0.105	1.551	0.233832
StolstiemerCreek_46_21072014_145014.txt	StolstiemerCreek	1187133.416	2468564.737	7/21/2014	0	0	0.070141	A	806.3	49.4	21-07-2014 14:50:14	0	-0.089	0.3	0.233803
StolstiemerCreek_47_21072014_145725.txt	StolstiemerCreek	1186942.263	2468384.267	7/21/2014	0	0	0.122813	A	805.2	49.4	21-07-2014 14:57:25	0	-0.186	0.526	0.233484
StolstiemerCreek_48_21072014_150016.txt	StolstiemerCreek	1186919.968	2468577.021	7/21/2014	0	0	0.04623	A	805.2	49.4	21-07-2014 15:00:16	0	-0.091	0.198	0.233484
StolstiemerCreek_49_21072014_150417.txt	StolstiemerCreek	1186919.405	2468767.209	7/21/2014	0	0	0.084771	A	805.1	49.3	21-07-2014 15:04:17	-1.71	-0.1	0.363	0.233528

APPENDIX C - FLUX METER DATA

Filename	Site	Northing	Easting	Date	CH_4flux	H_2Sflux	CO_2flux	ACCUMULATION CHAMBER	PRESSURE (HPa)	TEMP DegC	TIME:	CH_4slope	H_2Sslope	CO_2slope	AcK
StolstiemerCreek_50_21072014_150803.txt	StolstiemerCreek	1186935.553	2468974.676	7/21/2014	0	0	0.066445	A	806.6	49.3	21-07-2014 15:08:03	0	-0.039	0.284	0.233963
StolstiemerCreek_51_21072014_151138.txt	StolstiemerCreek	1187118.135	2468975.99	7/21/2014	0	0	0.168256	A	807.9	49.3	21-07-2014 15:11:38	0	-0.22	0.718	0.23434
StolstiemerCreek_52_21072014_151520.txt	StolstiemerCreek	1187115.732	2469164.154	7/21/2014	0	0	0.028352	A	807.8	49.3	21-07-2014 15:15:20	0	-0.222	0.121	0.234311
StolstiemerCreek_53_21072014_152023.txt	StolstiemerCreek	1186930.255	2469178.356	7/21/2014	0	0	0.147412	A	809.0	49.2	21-07-2014 15:20:23	-0.74	-0.196	0.628	0.234732
StolstiemerCreek_54_21072014_152503.txt	StolstiemerCreek	1186761.879	2469151.203	7/21/2014	0	0	0.136698	A	809.5	49.2	21-07-2014 15:25:03	-0.835	-0.153	0.582	0.234877
StolstiemerCreek_55_21072014_153107.txt	StolstiemerCreek	1186540.797	2469186.352	7/21/2014	0	0	0.05378	A	809.4	49.2	21-07-2014 15:31:07	0	-0.139	0.229	0.234848
StolstiemerCreek_56_21072014_153454.txt	StolstiemerCreek	1186529.258	2469353.313	7/21/2014	0	0	0.141074	A	809.0	49.2	21-07-2014 15:34:54	-0.475	-0.012	0.601	0.234732
StolstiemerCreek_57_21072014_153923.txt	StolstiemerCreek	1186515.555	2469598.947	7/21/2014	0	0	0.062304	A	807.5	49.3	21-07-2014 15:39:23	0	-0.093	0.266	0.234224
StolstiemerCreek_58_21072014_154225.txt	StolstiemerCreek	1186335.165	2469585.964	7/21/2014	0	0	0.059972	A	805.0	49.5	21-07-2014 15:42:25	0	-0.019	0.257	0.233354
StolstiemerCreek_59_21072014_154658.txt	StolstiemerCreek	1186109.088	2469592.178	7/21/2014	0	0	0.13958	A	804.1	49.6	21-07-2014 15:46:58	0	-0.001	0.599	0.233021
StolstiemerCreek_60_21072014_155029.txt	StolstiemerCreek	1185923.09	2469584.547	7/21/2014	0	0	0.02937	A	804.1	49.5	21-07-2014 15:50:29	0	-0.246	0.126	0.233093
StolstiemerCreek_61_21072014_155342.txt	StolstiemerCreek	1185706.958	2469578.317	7/21/2014	0	0	0.043458	A	805.5	49.3	21-07-2014 15:53:42	0	-0.057	0.186	0.233644
StolstiemerCreek_62_21072014_155708.txt	StolstiemerCreek	1185508.038	2469570.846	7/21/2014	0	0	0.225862	A	807.0	49.0	21-07-2014 15:57:08	0	-0.16	0.964	0.234297
StolstiemerCreek_63_21072014_155953.txt	StolstiemerCreek	1185304.059	2469570.685	7/21/2014	0	0	0.004456	A	807.2	48.8	21-07-2014 15:59:53	0	-0.04	0.019	0.234501
StolstiemerCreek_64_21072014_160323.txt	StolstiemerCreek	1185119.285	2469574.815	7/21/2014	0	0	0.227142	A	807.8	48.5	21-07-2014 16:03:23	0	-0.114	0.967	0.234894
StolstiemerCreek_65_21072014_160700.txt	StolstiemerCreek	1184940.078	2469590.718	7/21/2014	0	0	0.216203	A	808.3	48.2	21-07-2014 16:07:00	0	-0.177	0.919	0.235259
StolstiemerCreek_66_28072014_100342.txt	StolstiemerCreek	1184917.229	2468952.352	7/28/2014	0	0	0	A	739.9	28.0	28-07-2014 10:03:42	-0.812	-0.012	0	0.229795
StolstiemerCreek_67_28072014_101313.txt	StolstiemerCreek	1184941.62	2468785.936	7/28/2014	0	0	4.58452	A	815.6	30.6	28-07-2014 10:13:13	0	-0.014	18.255	0.251138
StolstiemerCreek_68_28072014_101614.txt	StolstiemerCreek	1184948.474	2468586.367	7/28/2014	0	0.009116	0	A	742.1	31.4	28-07-2014 10:16:14	0	0.04	0	0.227906
StolstiemerCreek_69_28072014_102253.txt	StolstiemerCreek	1184921.302	2468391.221	7/28/2014	0	0	0	A	815.4	33.1	28-07-2014 10:22:53	0	0	-0.506	0.249027
StolstiemerCreek_70_28072014_103024.txt	StolstiemerCreek	1185173.166	2468203.261	7/28/2014	0	0	0	A	815.6	34.4	28-07-2014 10:30:24	0	-0.154	-0.013	0.248035
StolstiemerCreek_71_28072014_104240.txt	StolstiemerCreek	1185362.478	2467740.212	7/28/2014	0	0	2.692765	A	815.6	36.4	28-07-2014 10:42:40	0	-0.024	10.927	0.246432
StolstiemerCreek_72_28072014_104602.txt	StolstiemerCreek	1185226.095	2467845.043	7/28/2014	0	0	0.919986	A	815.7	37.0	28-07-2014 10:46:02	0	-0.015	3.74	0.245986
StolstiemerCreek_73_28072014_105139.txt	StolstiemerCreek	1185381.04	2467957.188	7/28/2014	0	0	0.161369	A	818.8	37.7	28-07-2014 10:51:39	0	-0.023	0.655	0.246364
StolstiemerCreek_74_28072014_105447.txt	StolstiemerCreek	1185340.182	2468161.239	7/28/2014	0	0	0.424541	A	815.7	38.1	28-07-2014 10:54:47	0	-0.004	1.732	0.245116
StolstiemerCreek_75_28072014_105901.txt	StolstiemerCreek	1185167.362	2468352.073	7/28/2014	0	0	1.161829	A	815.7	38.5	28-07-2014 10:59:01	-2.272	-0.024	4.746	0.244802
StolstiemerCreek_76_28072014_110218.txt	StolstiemerCreek	1185132.05	2468599.177	7/28/2014	0	0	0.074861	A	815.7	38.7	28-07-2014 11:02:18	-0.872	-0.011	0.306	0.244645
StolstiemerCreek_77_28072014_110536.txt	StolstiemerCreek	1185346.525	2468550.295	7/28/2014	0	0	0.155181	A	815.6	39.0	28-07-2014 11:05:36	0	-0.022	0.635	0.24438
StolstiemerCreek_78_28072014_110820.txt	StolstiemerCreek	1185351.282	2468404.451	7/28/2014	0	0	0.021476	A	815.0	39.2	28-07-2014 11:08:20	0	-0.02	0.088	0.244043
StolstiemerCreek_79_28072014_111112.txt	StolstiemerCreek	1185519.187	2468396.111	7/28/2014	0	0	0.066061	A	814.6	39.4	28-07-2014 11:11:12	0	-0.001	0.271	0.243768
StolstiemerCreek_80_28072014_111953.txt	StolstiemerCreek	1185554.081	2468171.993	7/28/2014				A	n.a.	39.2	28-07-2014 11:19:53	0	-0.002	1.906	
StolstiemerCreek_81_28072014_112350.txt	StolstiemerCreek	1185559.012	2467985.549	7/28/2014	0	0	0	A	814.4	39.1	28-07-2014 11:23:50	0	-0.047	0	0.243942
StolstiemerCreek_82_28072014_112736.txt	StolstiemerCreek	1185523.428	2467804.812	7/28/2014	0	0	0.063939	A	815.0	39.2	28-07-2014 11:27:36	0	-0.173	0.262	0.244043
StolstiemerCreek_83_28072014_113309.txt	StolstiemerCreek	1185745.367	2468183.848	7/28/2014	0	0	0.844318	A	813.6	38.6	28-07-2014 11:33:09	0	-0.13	3.459	0.244093
StolstiemerCreek_84_28072014_113634.txt	StolstiemerCreek	1185744.7	2468336.761	7/28/2014	0	0	0.03075	A	813.7	38.7	28-07-2014 11:36:34	0	-0.025	0.126	0.244045
StolstiemerCreek_85_28072014_114333.txt	StolstiemerCreek	1185940.408	2468360.256	7/28/2014	0	0	0.325314	A	812.4	38.9	28-07-2014 11:43:33	0	-0.272	1.336	0.243499
StolstiemerCreek_86_28072014_114628.txt	StolstiemerCreek	1186136.598	2468384.844	7/28/2014	0	0	0.340864	A	812.2	39.3	28-07-2014 11:46:28	0	-0.036	1.402	0.243127
StolstiemerCreek_87_28072014_114911.txt	StolstiemerCreek	1186343.223	2468398.412	7/28/2014	0	0	0.973585	A	811.3	39.7	28-07-2014 11:49:11	0	-0.042	4.014	0.242547
StolstiemerCreek_88_28072014_115145.txt	StolstiemerCreek	1186536.318	2468383.643	7/28/2014	0	0	0.230482	A	811.7	40.1	28-07-2014 11:51:45	0	-0.016	0.951	0.242357
StolstiemerCreek_89_28072014_115519.txt	StolstiemerCreek	1186756.731	2468376.772	7/28/2014	0	0	0.16179	A	811.0	40.5	28-07-2014 11:55:19	0	-0.062	0.669	0.241839
StolstiemerCreek_90_28072014_115734.txt	StolstiemerCreek	1186728.99	2468534.941	7/28/2014	0	0	0.676643	A	810.3	40.8	28-07-2014 11:57:34	0	-0.03	2.803	0.2414
StolstiemerCreek_91_28072014_120300.txt	StolstiemerCreek	1186704.834	2468762.873	7/28/2014	0	0	0	A	811.3	41.1	28-07-2014 12:03:00	0	-0.038	-0.196	0.241467
StolstiemerCreek_92_28072014_120633.txt	StolstiemerCreek	1186686.418	2468984.587	7/28/2014	0	0	0.030188	A	812.2	41.4	28-07-2014 12:06:33	0	0	0.125	0.241504
StolstiemerCreek_93_28072014_120908.txt	StolstiemerCreek	1186529.757	2468976.099	7/28/2014	0	0	0.067478	A	813.9	41.6	28-07-2014 12:09:08	-0.019	-0.054	0.279	0.241856
StolstiemerCreek_94_28072014_121227.txt	StolstiemerCreek	1186540.414	2468791.734	7/28/2014	0	0	0.763726	A	814.1	41.7	28-07-2014 12:12:27	-0.033	-0.122	3.158	0.241838
StolstiemerCreek_95_28072014_121541.txt	StolstiemerCreek	1186499.977	2468586	7/28/2014	0	0	0.069722	A	812.9	42.0	28-07-2014 12:15:41	0	-0.032	0.289	0.241252
StolstiemerCreek_96_28072014_121752.txt	StolstiemerCreek	1186349.152	2468559.351	7/28/2014	0	0	0.06217	A	812.2	42.1	28-07-2014 12:17:52	-1.138	-0.033	0.258	0.240968
StolstiemerCreek_97_28072014_122018.txt	StolstiemerCreek	1186160.356	2468534.258	7/28/2014	0	0	0.013737	A	812.8	42.3	28-07-2014 12:20:18	0	-0.063	0.057	0.240993
StolstiemerCreek_98_28072014_122317.txt	StolstiemerCreek	1185943.755	2468528.145	7/28/2014	0	0	0.09106	A	813.0	42.5	28-07-2014 12:23:17	0	-0.131	0.378	0.240899
StolstiemerCreek_99_28072014_122708.txt	StolstiemerCreek	1185751.879	2468549.582	7/28/2014	0	0	0.044845	A	814.2	42.7	28-07-2014 12:27:08	0	-0.087	0.186	0.241102

APPENDIX D

CARBON DIOXIDE FLUX CONTOUR MAP

BEAVER CREEK

SQUAW CREEK
LITTLE SQUAW CREEK

POLE GULCH

PETERSON GULCH WEST

PETERSON GULCH EAST

BIG HORN-SCHOMBURG #1

PIEDRA RIVER

STOLLSTEIMER
CREEK

RAMONA LEONARD SPRING (MOKA)
RAMONA SPRING
WOOD/CORRIGAN SPRING
CORRIGAN SPRING
WATSON WELL SPRING
GRASSY SPRING
CRAIN SPRING
FEDERAL 25A-1 (API: 05-007-06090)
USA / AMOCO COM AC-1 (API: 05-007-06118)
MUNGER SPRING 3
MUNGER SPRING 4
MR MUNGER SPRING 1
MUNGER SPRING 2
BEEP SPRING
WALT SPRING #1
TOWNSEND SPRING
THICK SPRING
VANCE SPRING #1
VANCE MEADOW SPRING
GOV-01
BIG HOLE SPRING
WILLOW SPRING
SECTION 14 SPRING (REICH)
FOSSET GULCH 9U 1A (API: 05-007-06069)
FOSSET GULCH UNIT 9U 2 (API: 05-007-06213)
FGU 9U #3 (API: 05-007-06314)
FOSSET GULCH UNIT 9U 4 (API: 05-007-06230)
CANDELARIA 33-5 FEE 10U #3 (API: 05-007-06215)
SECTION 10U SPRING
FOSSET GULCH 16U #1 (API: 05-007-06238)
FOSSET GULCH UNIT 16U 2 (API: 05-007-06194)
FOSSET GULCH UNIT 15U 2 (API: 05-007-06195)
FOSSET GULCH UNIT 15U 1 (API: 05-007-06237)
FGU CANDELARIA 14U 1 (API: 05-007-06234)
SPRING 1212
FOSSET GULCH UNIT 15U #4 (API: 05-007-06236)
WAYPOINT 0003 SPRING
NW JOHN GRUB SPRING
SE JOHN GRUB SPRING
GOV-02
BIG HORN-SCHOMBURG #1 (API: 05-007-05100)
SPRING 3424
CANDELARIA A SPRING
CANDELARIA B SPRING
VAUGHN SPRING
GOV-03

PERNADO EMILIO JR & PERNADO KAREN
WOOD LEE THOMAS & WOOD PEGGY DARL
ZWISLER MARTIN AND JANE TRUST & Z
WATSON DAVID LLOYD & WATSON DALE
SAN JUAN NF
ALABBADGH SAM
GRUBB JOHN W & PAMELA K
SOUTHERN UTE TRIBE
CANDELARIA SUSIE S TRUST
ELLIOTT DENISE L
POPP JOHN R & MARIA
MURRHEAD GEORGE & MURRHEAD LINDA
TRACY BRYAN H & MARIES D
EDWARDS DARWOOD
CANDELARIA LUCY S & GONZALES BERN
MARTINEZ MEL
CANNON RUBY S
UNITED STATES OF AMERICA - FOREST
BAYTEX LLC

LEGEND

CARBON DIOXIDE FLUX MEASUREMENT (mol/m ^{2} • day)

- 0.0000 - 0.0100
- 0.0101 - 0.5000
- 0.5001 - 1.0000
- 1.0001 - 25.0000
- 25.0001 - 225.0000
- MINE ENTRANCE

COALBED METHANE WELLS (PETROX RESOURCES, INC.)

- PRODUCING
- SHUT IN
- WAITING ON INFORMATION
- PROPOSED WELL
- ABANDONED PRODUCTION WELL
- NATURAL SPRING
- PROPERTY BOUNDARY (WHITE)

- CARBON DIOXIDE FLUX CONTOUR (mol/m^2 • day) (INTERVAL VARIES)
- HIGHWAY
- SURFACE WATER
- TOWNSHIP AND RANGE LINES

GEOLOGY - COLORADO GEOLOGICAL SURVEY, 2011

- KIRTLAND FORMATION (Kk)
- FRUITLAND FORMATION (Kf)
- PICTURED CLIFFS FORMATION (Kpc)

mol/m^2 • day: MOLES PER SQUARE METER PER DAY

IMAGE COURTESY OF ESRI

N

0 1,500 3,000
Feet

FIGURE D
CARBON DIOXIDE FLUX CONTOURS
2014 OUTCROP ZONE REPORT
ARCHULETA COUNTY, COLORADO

PETROX RESOURCES AND ELM RIDGE RESOURCES

P:\San Juan Basin GIS\Archuleta\Fruitland_OMR\MXDs\Subgas_Flux\2014\2014_ARCH_FIG H CO2 FLUX CONTOURS.mxd

APPENDIX E

REGIONAL RECONNAISSANCE SOIL GAS MEASUREMENTS

APPENDIX E - REGIONAL RECONNAISSANCE SUB GAS MEASUREMENTS

Sub_CH_4	Sub_O_2	Sub_H_2S	Sub_CO	GPS_Date	GPS_Time	Datafile	Northing	Easting
0	20.2	0	0	8/11/2014	12:20:42pm	CHULETAIR_08111	1234311.939	2427685.320
0	20.7	0	0	8/11/2014	12:23:56pm	CHULETAIR_08111	1234321.297	2427707.734
0	20.9	0	0	8/11/2014	12:27:52pm	CHULETAIR_08111	1234292.329	2427734.123
0	20.8	0	0	8/11/2014	12:28:51pm	CHULETAIR_08111	1234276.556	2427717.725
0	20.9	0	0	8/11/2014	12:30:43pm	CHULETAIR_08111	1234251.953	2427740.029
0	20.9	0	0	8/11/2014	12:32:07pm	CHULETAIR_08111	1234270.643	2427757.988
0	20.7	0	0	8/11/2014	12:34:09pm	CHULETAIR_08111	1234238.727	2427781.858
0	20.9	0	0	8/11/2014	12:36:21pm	CHULETAIR_08111	1234215.104	2427757.956
0	20.9	0	0	8/11/2014	12:38:29pm	CHULETAIR_08111	1234191.491	2427780.534
0	20.9	0	0	8/11/2014	12:40:22pm	CHULETAIR_08111	1234178.769	2427811.920
0	20.9	0	0	8/11/2014	12:42:35pm	CHULETAIR_08111	1234212.889	2427806.126
0	20.9	0	0	8/11/2014	01:14:36pm	CHULETAIR_08111	1231655.894	2430101.043
0	20.8	0	0	8/11/2014	01:17:05pm	CHULETAIR_08111	1231642.221	2430110.671
0	20.9	0	0	8/11/2014	01:19:04pm	CHULETAIR_08111	1231627.584	2430113.695
0	20.5	0	0	8/11/2014	01:20:24pm	CHULETAIR_08111	1231616.647	2430111.291
0	20.8	0	0	8/11/2014	01:34:54pm	CHULETAIR_08111	1231343.477	2430791.695
0	20.9	0	0	8/11/2014	01:36:08pm	CHULETAIR_08111	1231375.962	2430781.914
0	20.7	0	0	8/11/2014	01:37:33pm	CHULETAIR_08111	1231365.098	2430764.123
0	20.9	0	0	8/11/2014	01:39:00pm	CHULETAIR_08111	1231348.209	2430765.237
0	20.9	0	0	8/12/2014	07:34:55am	CHULETAIR_08111	1231528.522	2430828.184
0	20.9	0	0	8/12/2014	07:39:03am	CHULETAIR_08111	1231523.229	2430789.361
0	20.9	0	0	8/12/2014	07:42:50am	CHULETAIR_08111	1231535.389	2430746.740
0	20.9	0	0	8/12/2014	07:45:56am	CHULETAIR_08111	1231549.244	2430712.267
0	20.9	0	0	8/12/2014	07:48:52am	CHULETAIR_08111	1231593.631	2430705.202
0	20.9	0	0	8/12/2014	07:51:11am	CHULETAIR_08111	1231567.044	2430707.205
0	20.9	0	0	8/12/2014	07:53:04am	CHULETAIR_08111	1231586.459	2430665.486
0	20.9	0	0	8/12/2014	07:56:39am	CHULETAIR_08111	1231638.804	2430665.098
0	20.9	0	0	8/12/2014	07:59:06am	CHULETAIR_08111	1231674.085	2430622.895
0	20.9	0	0	8/12/2014	08:01:53am	CHULETAIR_08111	1231703.395	2430592.184
0	20.9	0	0	8/12/2014	08:04:24am	CHULETAIR_08111	1231748.572	2430586.653
0	20.9	0	0	8/12/2014	08:07:31am	CHULETAIR_08111	1231755.047	2430634.898
0	20.9	0	0	8/12/2014	08:10:32am	CHULETAIR_08111	1231705.606	2430653.213
0	20.9	0	0	8/12/2014	08:12:31am	CHULETAIR_08111	1231737.385	2430683.703
0	20.9	0	0	8/12/2014	08:14:54am	CHULETAIR_08111	1231718.821	2430735.537
0	20.9	0	0	8/12/2014	08:18:22am	CHULETAIR_08111	1231711.882	2430695.654
0	20.9	0	0	8/12/2014	08:20:08am	CHULETAIR_08111	1231674.568	2430696.222
0	20.9	0	0	8/12/2014	08:22:52am	CHULETAIR_08111	1231635.183	2430746.465
0	20.9	0	0	8/12/2014	08:25:47am	CHULETAIR_08111	1231682.035	2430763.045
0	20.9	0	0	8/12/2014	08:32:20am	CHULETAIR_08111	1231603.799	2430794.071
0	20.9	0	0	8/12/2014	08:34:20am	CHULETAIR_08111	1231644.615	2430778.803
0	20.9	0	0	8/12/2014	08:38:02am	CHULETAIR_08111	1231575.088	2430795.313
0	20.9	0	0	8/12/2014	08:41:44am	CHULETAIR_08111	1231582.953	2430761.927
0	20.9	0	0	8/12/2014	09:06:40am	CHULETAIR_08111	1230626.617	2431306.979
0	20.9	0	0	8/12/2014	09:09:55am	CHULETAIR_08111	1230660.616	2431273.854
0	20.9	0	0	8/12/2014	09:12:06am	CHULETAIR_08111	1230698.931	2431264.003

Sub_CH_4	Sub_O_2	Sub_H_2S	Sub_CO	GPS_Date	GPS_Time	Datafile	Northing	Easting
0	20.9	0	0	8/12/2014	09:14:16am	CHULETAIR_08111	1230717.440	2431253.521
0	20.9	0	0	8/12/2014	09:16:15am	CHULETAIR_08111	1230625.430	2431261.225
0	20.9	0	0	8/12/2014	09:26:59am	CHULETAIR_08111	1230381.533	2431508.082
0	20.9	0	0	8/12/2014	09:29:05am	CHULETAIR_08111	1230417.324	2431470.143
0	20.9	0	0	8/12/2014	09:31:08am	CHULETAIR_08111	1230452.682	2431490.756
0	20.9	0	0	8/12/2014	09:39:40am	CHULETAIR_08111	1230438.635	2431534.091
0	20.9	0	0	8/12/2014	09:43:20am	CHULETAIR_08111	1230431.679	2431444.139
0	20.9	0	0	8/12/2014	09:44:58am	CHULETAIR_08111	1230389.786	2431428.802
0	20.9	0	0	8/12/2014	10:06:03am	CHULETAIR_08111	1228936.103	2432434.402
0	20.9	0	0	8/12/2014	10:10:05am	CHULETAIR_08111	1228885.225	2432422.276
0	20.9	0	0	8/12/2014	10:12:36am	CHULETAIR_08111	1228865.240	2432498.011
0	20.9	0	0	8/12/2014	10:16:51am	CHULETAIR_08111	1228808.297	2432419.713
0	20.9	0	0	8/12/2014	10:19:14am	CHULETAIR_08111	1228787.434	2432370.849
0	20.9	0	0	8/12/2014	10:23:12am	CHULETAIR_08111	1228823.366	2432474.170
0	20.9	0	0	8/12/2014	10:26:50am	CHULETAIR_08111	1228918.922	2432483.890
0	20.9	0	0	8/12/2014	10:49:15am	CHULETAIR_08111	1228176.892	2433128.232
0	20.9	0	0	8/12/2014	10:52:33am	CHULETAIR_08111	1228146.363	2433093.190
0	20.9	0	0	8/12/2014	10:55:29am	CHULETAIR_08111	1228076.422	2433101.532
0	20.9	0	0	8/12/2014	10:59:37am	CHULETAIR_08111	1228011.405	2433014.388
0	20.2	0	0	8/12/2014	11:01:40am	CHULETAIR_08111	1228073.123	2433028.955
0	20.9	0	0	8/12/2014	11:05:17am	CHULETAIR_08111	1228005.138	2433029.933
0	20.9	0	0	8/12/2014	11:09:06am	CHULETAIR_08111	1227902.757	2433050.416
0	20.9	0	0	8/12/2014	11:12:41am	CHULETAIR_08111	1227933.974	2433075.828
0	20.9	0	0	8/12/2014	11:15:26am	CHULETAIR_08111	1227981.490	2433159.666
0	20.9	0	0	8/12/2014	11:18:13am	CHULETAIR_08111	1227936.509	2433167.915
0	20.9	0	0	8/12/2014	11:20:26am	CHULETAIR_08111	1227917.437	2433113.340
0	20.5	0	0	8/12/2014	11:23:30am	CHULETAIR_08111	1227997.323	2433116.269
0	20.9	0	0	8/12/2014	11:26:19am	CHULETAIR_08111	1228024.726	2433170.168
0	20.9	0	0	8/12/2014	11:28:57am	CHULETAIR_08111	1227992.311	2433215.682
0	20.9	0	0	8/12/2014	11:32:04am	CHULETAIR_08111	1227942.336	2433215.756
0	20.9	0	0	8/12/2014	11:34:50am	CHULETAIR_08111	1227965.054	2433261.605
0	20.9	0	0	8/12/2014	11:38:20am	CHULETAIR_08111	1227999.900	2433275.487
0	20.9	0	0	8/12/2014	11:40:48am	CHULETAIR_08111	1228036.493	2433336.193
0	20.9	0	0	8/12/2014	11:43:19am	CHULETAIR_08111	1228069.737	2433372.864
0	20.9	0	0	8/12/2014	11:46:07am	CHULETAIR_08111	1228068.506	2433439.005
0	20.9	0	0	8/12/2014	11:54:00am	CHULETAIR_08111	1228058.442	2433227.107
0	20.9	0	0	8/12/2014	11:58:26am	CHULETAIR_08111	1228036.726	2433136.833
0	20.9	0	0	8/12/2014	12:01:20pm	CHULETAIR_08111	1228050.905	2433121.763
0	20.7	0	0	8/12/2014	12:02:56pm	CHULETAIR_08111	1228094.320	2433190.787
0	20.9	0	0	8/12/2014	12:11:00pm	CHULETAIR_08111	1228466.885	2433092.968
0	20.9	0	0	8/12/2014	12:12:44pm	CHULETAIR_08111	1228439.130	2433123.979
0	20.9	0	0	8/12/2014	12:14:13pm	CHULETAIR_08111	1228427.624	2433162.771
0	20.9	0	0	8/12/2014	12:16:36pm	CHULETAIR_08111	1228441.572	2433203.248
0	20.9	0	0	8/12/2014	12:18:39pm	CHULETAIR_08111	1228433.953	2433230.632
0	20.9	0	0	8/12/2014	12:20:09pm	CHULETAIR_08111	1228483.439	2433200.269

APPENDIX E - REGIONAL RECONNAISSANCE SUB GAS MEASUREMENTS

Sub_CH_4	Sub_O_2	Sub_H_2S	Sub_CO	GPS_Date	GPS_Time	Datafile	Northing	Easting
0	20.9	0	0	8/12/2014	12:21:32pm	CHULETAIR_08111	1228458.193	2433164.535
0	20.9	0	0	8/12/2014	12:23:31pm	CHULETAIR_08111	1228483.820	2433117.901
0	20.9	0	0	8/12/2014	12:25:37pm	CHULETAIR_08111	1228510.677	2433170.784
0	20.8	0	0	8/12/2014	12:26:47pm	CHULETAIR_08111	1228505.191	2433138.407
0	20.9	0	0	8/12/2014	12:27:57pm	CHULETAIR_08111	1228538.935	2433102.612
0	20.9	0	0	8/12/2014	12:29:18pm	CHULETAIR_08111	1228539.226	2433131.884
0	20.9	0	0	8/12/2014	12:31:04pm	CHULETAIR_08111	1228565.012	2433064.517
0	20.9	0	0	8/12/2014	12:32:09pm	CHULETAIR_08111	1228514.452	2433066.331
0	20.9	0	0	8/12/2014	12:33:02pm	CHULETAIR_08111	1228507.921	2433101.089
0	20.9	0	0	8/13/2014	08:52:01am	CHULETAIR_08111	1226656.835	2434703.632
0	20.9	0	0	8/13/2014	08:54:57am	CHULETAIR_08111	1226619.689	2434678.290
0	20.9	0	0	8/13/2014	08:57:39am	CHULETAIR_08111	1226661.350	2434664.184
0	20.8	0	0	8/13/2014	09:00:35am	CHULETAIR_08111	1226634.779	2434630.083
0	20.9	0	0	8/13/2014	09:02:30am	CHULETAIR_08111	1226645.597	2434632.897
0	20.9	0	0	8/13/2014	09:05:39am	CHULETAIR_08111	1226613.960	2434623.774
0	20.9	0	0	8/13/2014	09:07:17am	CHULETAIR_08111	1226620.078	2434594.481
0	20.9	0	0	8/13/2014	09:10:58am	CHULETAIR_08111	1226601.374	2434561.190
0	20.8	0	0	8/13/2014	09:12:08am	CHULETAIR_08111	1226621.622	2434551.841
0	20.7	0	0	8/13/2014	09:31:22am	CHULETAIR_08111	1226110.534	2434887.457
0	20.9	0	0	8/13/2014	09:34:34am	CHULETAIR_08111	1226093.199	2434898.721
0	20.9	0	0	8/13/2014	09:37:23am	CHULETAIR_08111	1226115.880	2434922.237
0	20.9	0	0	8/13/2014	09:40:47am	CHULETAIR_08111	1226139.967	2434913.498
0	20.9	0	0	8/13/2014	09:45:13am	CHULETAIR_08111	1226152.029	2434886.275
0	20.9	0	0	8/13/2014	09:48:34am	CHULETAIR_08111	1226192.029	2434887.460
0	20.9	0	0	8/13/2014	09:52:33am	CHULETAIR_08111	1226186.221	2434930.140
0	20.9	0	0	8/13/2014	09:55:27am	CHULETAIR_08111	1226210.276	2434955.044
0	20.9	0	0	8/13/2014	09:57:10am	CHULETAIR_08111	1226229.945	2434919.380
0	20.8	0	0	8/13/2014	10:00:03am	CHULETAIR_08111	1226254.480	2434950.488
0	20.9	0	0	8/13/2014	10:02:17am	CHULETAIR_08111	1226241.588	2434992.478
0	20.9	0	0	8/28/2014	08:25:44am	CHULETAIR_08281	1183528.810	2485785.518
0	20.9	0	0	8/28/2014	08:27:44am	CHULETAIR_08281	1183606.507	2485671.840
0	20.9	0	0	8/28/2014	08:30:36am	CHULETAIR_08281	1183595.142	2485529.646
0	20.9	0	0	8/28/2014	08:32:19am	CHULETAIR_08281	1183478.286	2485443.455
0	20.9	0	0	8/28/2014	08:35:26am	CHULETAIR_08281	1183426.571	2485349.758
0	20.9	0	0	8/28/2014	08:38:44am	CHULETAIR_08281	1183449.159	2485520.165
0	20.9	0	0	8/28/2014	08:41:54am	CHULETAIR_08281	1183492.234	2485643.663
0	20.9	0	0	8/28/2014	08:52:16am	CHULETAIR_08281	1183009.253	2486107.851
0	20.9	0	0	8/28/2014	08:54:07am	CHULETAIR_08281	1182925.342	2486095.934
0	20.9	0	0	8/28/2014	08:56:20am	CHULETAIR_08281	1182965.212	2486146.629
0	20.9	0	0	8/28/2014	08:58:49am	CHULETAIR_08281	1183040.433	2486146.935
0	20.9	0	0	8/28/2014	09:34:12am	CHULETAIR_08281	1184436.463	2484549.290
0	20.9	0	0	8/28/2014	09:39:11am	CHULETAIR_08281	1184480.980	2484426.657
0	20.9	0	0	8/28/2014	09:42:08am	CHULETAIR_08281	1184391.513	2484329.286
0	20.9	0	0	8/28/2014	09:44:59am	CHULETAIR_08281	1184453.716	2484200.317
0	20.9	0	0	8/28/2014	09:47:17am	CHULETAIR_08281	1184334.704	2484207.211

APPENDIX E - REGIONAL RECONNAISSANCE SUB GAS MEASUREMENTS

Sub_CH_4	Sub_O_2	Sub_H_2S	Sub_CO	GPS_Date	GPS_Time	Datafile	Northing	Easting
0	20.9	0	0	8/28/2014	09:49:54am	CHULETAIR_08281	1184405.577	2484454.184
0	20.9	0	0	8/28/2014	11:26:14am	CHULETAIR_08281	1207025.229	2454796.640
0	20.9	0	0	8/28/2014	11:30:15am	CHULETAIR_08281	1207048.147	2454894.121
0	20.9	0	0	8/28/2014	11:32:28am	CHULETAIR_08281	1206926.764	2454873.471
0	20.9	0	0	8/28/2014	11:37:58am	CHULETAIR_08281	1206953.693	2454922.953
0	20.9	0	0	8/28/2014	11:42:54am	CHULETAIR_08281	1207001.364	2454880.466
0	20.9	0	0	8/29/2014	08:11:10am	CHULETAIR_08281	1218348.756	2437462.246
0	20.9	0	0	8/29/2014	08:15:45am	CHULETAIR_08281	1218382.764	2437551.304
0	20.8	0	0	8/29/2014	08:22:08am	CHULETAIR_08281	1218282.578	2437617.280
0	20.9	0	0	8/29/2014	08:27:55am	CHULETAIR_08281	1218166.753	2437598.591
0	20.9	0	0	8/29/2014	08:30:17am	CHULETAIR_08281	1218221.060	2437695.312
0	20.9	0	0	8/29/2014	08:35:16am	CHULETAIR_08281	1218182.901	2437839.072
0	20.9	0	0	8/29/2014	08:40:50am	CHULETAIR_08281	1217975.783	2437870.536
0	20.9	0	0	8/29/2014	08:43:50am	CHULETAIR_08281	1217955.117	2437951.264
0	20.9	0	0	8/29/2014	08:48:13am	CHULETAIR_08281	1218030.961	2437990.527
0	20.9	0	0	8/29/2014	09:09:28am	CHULETAIR_08281	1218818.778	2437599.825
0	20.8	0	0	8/29/2014	09:11:37am	CHULETAIR_08281	1218872.655	2437689.683
0	20.9	0	0	8/29/2014	09:13:48am	CHULETAIR_08281	1218935.473	2437787.376
0	20.9	0	0	8/29/2014	10:06:49am	CHULETAIR_08281	1217585.147	2438369.537
0	20.9	0	0	8/29/2014	10:08:19am	CHULETAIR_08281	1217646.321	2438376.446
0	20.9	0	0	8/29/2014	10:29:10am	CHULETAIR_08281	1216985.988	2438615.386
0	20.9	0	0	8/29/2014	10:31:05am	CHULETAIR_08281	1216948.282	2438528.575
0	20.9	0	0	8/29/2014	10:34:00am	CHULETAIR_08281	1216896.374	2438595.690
0	20.9	0	0	8/29/2014	10:36:28am	CHULETAIR_08281	1216891.477	2438693.240
0	20.9	0	0	8/29/2014	10:39:06am	CHULETAIR_08281	1216906.217	2438786.777
0	20.9	0	0	8/29/2014	10:40:58am	CHULETAIR_08281	1216854.092	2438858.630
0	20.9	0	0	8/29/2014	10:44:04am	CHULETAIR_08281	1216840.000	2438759.491
0	20.9	0	0	8/29/2014	10:46:21am	CHULETAIR_08281	1216843.655	2438653.861
0	20.9	0	0	8/29/2014	10:49:19am	CHULETAIR_08281	1216800.442	2438704.676

APPENDIX F

ABANDONED COAL MINE SUBSURFACE SOIL GAS AND TEMPERATURE MEASUREMENTS

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
18.5	0.00	0.00	0.00	12000.00	12.0	8/5/2014	08:01:23am	CHIMNEYROCKMINE08051	1185733.942	2470119.599
19.2	0.00	0.00	0.00	9000.00	11.0	8/5/2014	08:06:41am	CHIMNEYROCKMINE08051	1185788.662	2470117.388
17.1	0.00	0.00	0.00	22000.00	10.0	8/5/2014	08:08:32am	CHIMNEYROCKMINE08051	1185840.164	2470118.500
20.2	0.00	0.00	0.00	4000.00	11.0	8/5/2014	08:11:01am	CHIMNEYROCKMINE08051	1185882.999	2470120.605
20.4	0.00	0.00	0.00	2000.00	10.0	8/5/2014	08:13:19am	CHIMNEYROCKMINE08051	1185875.228	2470177.531
20.7	0.00	0.00	0.00	0.00	9.0	8/5/2014	08:15:28am	CHIMNEYROCKMINE08051	1185929.619	2470175.027
20.7	0.00	0.00	0.00	0.00	10.0	8/5/2014	08:17:32am	CHIMNEYROCKMINE08051	1185980.000	2470170.455
20.5	0.00	0.00	0.00	3000.00	11.0	8/5/2014	08:19:35am	CHIMNEYROCKMINE08051	1186023.701	2470165.521
20.5	0.00	0.00	0.00	2000.00	11.0	8/5/2014	08:21:29am	CHIMNEYROCKMINE08051	1186024.714	2470127.461
20.5	0.00	0.00	0.00	1000.00	12.0	8/5/2014	08:23:20am	CHIMNEYROCKMINE08051	1185982.962	2470125.051
20.7	0.00	0.00	0.00	0.00	10.0	8/5/2014	08:25:22am	CHIMNEYROCKMINE08051	1185927.284	2470128.291
20.5	0.00	0.00	0.00	3000.00	11.0	8/5/2014	08:27:38am	CHIMNEYROCKMINE08051	1185922.766	2470075.582
20.2	0.00	0.00	0.00	7000.00	12.0	8/5/2014	08:29:38am	CHIMNEYROCKMINE08051	1185972.750	2470074.705
20.3	0.00	0.00	0.00	3000.00	11.0	8/5/2014	08:31:44am	CHIMNEYROCKMINE08051	1186023.487	2470068.698
20.6	0.00	0.00	0.00	1000.00	11.0	8/5/2014	08:34:08am	CHIMNEYROCKMINE08051	1186076.924	2470070.409
20.7	0.00	0.00	0.00	1000.00	12.0	8/5/2014	08:37:01am	CHIMNEYROCKMINE08051	1186077.941	2470124.297
20.7	0.00	0.00	0.00	1000.00	11.0	8/5/2014	08:38:56am	CHIMNEYROCKMINE08051	1186135.315	2470119.158
20.5	0.00	0.00	0.00	1000.00	12.0	8/5/2014	08:41:35am	CHIMNEYROCKMINE08051	1186176.982	2470112.952
20.8	0.00	0.00	0.00	0.00	11.0	8/5/2014	08:44:14am	CHIMNEYROCKMINE08051	1186225.938	2470117.403
20.5	0.00	0.00	0.00	1000.00	12.0	8/5/2014	08:47:01am	CHIMNEYROCKMINE08051	1186265.851	2470068.667
19.1	0.00	0.00	0.00	12000.00	12.0	8/5/2014	08:49:33am	CHIMNEYROCKMINE08051	1186271.408	2470017.774
20.5	0.00	0.00	0.00	1000.00	11.0	8/5/2014	08:54:48am	CHIMNEYROCKMINE08051	1186227.639	2470018.793
20.6	0.00	0.00	0.00	0.00	12.0	8/5/2014	08:57:33am	CHIMNEYROCKMINE08051	1186227.309	2470077.669
20.5	0.00	0.00	0.00	1000.00	12.0	8/5/2014	09:00:07am	CHIMNEYROCKMINE08051	1186160.089	2470063.582
20.5	0.00	0.00	0.00	1000.00	11.0	8/5/2014	09:02:11am	CHIMNEYROCKMINE08051	1186120.312	2470067.869
19.4	0.00	0.00	0.00	6000.00	11.0	8/5/2014	09:04:18am	CHIMNEYROCKMINE08051	1186115.754	2470024.413
19.1	0.00	0.00	0.00	8000.00	13.0	8/5/2014	09:06:30am	CHIMNEYROCKMINE08051	1186073.970	2470020.457
19.6	0.00	0.00	0.00	4000.00	12.0	8/5/2014	09:08:46am	CHIMNEYROCKMINE08051	1186023.210	2470023.905
20.0	0.00	0.00	0.00	4000.00	13.0	8/5/2014	09:10:20am	CHIMNEYROCKMINE08051	1185980.309	2470023.677
19.9	0.00	0.00	0.00	6000.00	12.0	8/5/2014	09:12:20am	CHIMNEYROCKMINE08051	1185931.023	2470034.179
20.6	0.00	0.00	0.00	0.00	14.0	8/5/2014	09:14:14am	CHIMNEYROCKMINE08051	1185883.652	2470020.948
19.7	0.00	0.00	0.00	6000.00	14.0	8/5/2014	09:16:21am	CHIMNEYROCKMINE08051	1185872.283	2470074.064
18.6	0.00	0.00	0.00	10000.00	13.0	8/5/2014	09:18:20am	CHIMNEYROCKMINE08051	1185826.279	2470073.644
20.8	0.00	0.00	0.00	0.00	13.0	8/5/2014	09:20:56am	CHIMNEYROCKMINE08051	1185788.929	2470071.867
20.7	0.00	0.00	0.00	0.00	13.0	8/5/2014	09:22:34am	CHIMNEYROCKMINE08051	1185737.541	2470076.904
19.7	0.00	0.00	0.00	5000.00	13.0	8/5/2014	09:24:14am	CHIMNEYROCKMINE08051	1185733.418	2470023.310
20.3	0.00	0.00	0.00	2000.00	14.0	8/5/2014	09:26:14am	CHIMNEYROCKMINE08051	1185775.113	2470031.051
20.8	0.00	0.00	0.00	0.00	14.0	8/5/2014	09:28:14am	CHIMNEYROCKMINE08051	1185819.516	2470016.925
19.3	0.00	0.00	0.00	9000.00	14.0	8/5/2014	09:30:09am	CHIMNEYROCKMINE08051	1185822.853	2469976.369
20.6	0.00	0.00	0.00	0.00	12.0	8/5/2014	09:32:14am	CHIMNEYROCKMINE08051	1185874.369	2469976.462
20.8	0.00	0.00	0.00	0.00	13.0	8/5/2014	09:34:34am	CHIMNEYROCKMINE08051	1185930.081	2469980.596
20.5	0.00	0.00	0.00	1000.00	14.0	8/5/2014	09:37:10am	CHIMNEYROCKMINE08051	1185985.758	2469975.547
17.9	0.00	0.00	0.00	16000.00	13.0	8/5/2014	09:38:46am	CHIMNEYROCKMINE08051	1186029.157	2469982.328
18.4	0.00	0.00	0.00	11000.00	15.0	8/5/2014	09:40:24am	CHIMNEYROCKMINE08051	1186082.979	2469984.117
20.7	0.00	0.00	0.00	1000.00	12.0	8/5/2014	09:42:21am	CHIMNEYROCKMINE08051	1186126.508	2469977.218
20.8	0.00	0.00	0.00	1000.00	13.0	8/5/2014	09:44:23am	CHIMNEYROCKMINE08051	1186172.737	2469977.179
16.9	0.00	0.00	0.00	23000.00	13.0	8/5/2014	09:45:57am	CHIMNEYROCKMINE08051	1186163.176	2470006.613
20.7	0.00	0.00	0.00	0.00	13.0	8/5/2014	09:48:22am	CHIMNEYROCKMINE08051	1186224.601	2469970.388
20.6	0.00	0.00	0.00	1000.00	12.0	8/5/2014	09:50:29am	CHIMNEYROCKMINE08051	1186279.890	2469967.424
20.8	0.00	0.00	0.00	0.00	13.0	8/5/2014	09:52:27am	CHIMNEYROCKMINE08051	1186267.784	2469920.856
20.9	0.00	0.00	0.00	0.00	13.0	8/5/2014	09:55:07am	CHIMNEYROCKMINE08051	1186263.980	2469888.410
20.7	0.00	0.00	0.00	0.00	13.0	8/5/2014	09:56:17am	CHIMNEYROCKMINE08051	1186265.506	2469813.563
20.7	0.00	0.00	0.00	0.00	14.0	8/5/2014	09:58:41am	CHIMNEYROCKMINE08051	1186269.522	2469762.635
20.8	0.00	0.00	0.00	0.00	15.0	8/5/2014	10:00:48am	CHIMNEYROCKMINE08051	1186269.317	2469728.438
20.6	0.00	0.00	0.00	0.00	13.0	8/5/2014	10:03:05am	CHIMNEYROCKMINE08051	1186279.338	2469675.089
20.8	0.00	0.00	0.00	1000.00	14.0	8/5/2014	10:05:08am	CHIMNEYROCKMINE08051	1186329.331	2469678.486

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
20.7	0.00	0.00	0.00	0.00	13.0	8/5/2014	10:08:31am	CHIMNEYROCKMINE08051	1186320.204	2469637.518
20.2	0.00	0.00	0.00	3000.00	12.0	8/5/2014	10:10:44am	CHIMNEYROCKMINE08051	1186275.496	2469626.473
20.8	0.00	0.00	0.00	1000.00	12.0	8/5/2014	10:13:32am	CHIMNEYROCKMINE08051	1186282.295	2469579.012
20.5	0.00	0.00	0.00	2000.00	13.0	8/5/2014	10:15:49am	CHIMNEYROCKMINE08051	1186268.691	2469534.303
20.8	0.00	0.00	0.00	0.00	11.0	8/5/2014	10:18:00am	CHIMNEYROCKMINE08051	1186279.597	2469484.592
20.8	0.00	0.00	0.00	0.00	10.0	8/5/2014	10:20:31am	CHIMNEYROCKMINE08051	1186225.767	2469480.918
20.7	0.00	0.00	0.00	0.00	10.0	8/5/2014	10:22:05am	CHIMNEYROCKMINE08051	1186175.036	2469483.447
20.8	0.00	0.00	0.00	0.00	11.0	8/5/2014	10:23:50am	CHIMNEYROCKMINE08051	1186134.828	2469487.373
20.7	0.00	0.00	0.00	0.00	10.0	8/5/2014	10:25:42am	CHIMNEYROCKMINE08051	1186119.379	2469517.524
20.4	0.00	0.00	0.00	3000.00	13.0	8/5/2014	10:29:41am	CHIMNEYROCKMINE08051	1186175.303	2469528.458
19.5	0.00	0.00	0.00	5000.00	13.0	8/5/2014	10:31:53am	CHIMNEYROCKMINE08051	1186231.277	2469533.880
20.1	0.00	0.00	0.00	5000.00	13.0	8/5/2014	10:34:17am	CHIMNEYROCKMINE08051	1186221.295	2469581.403
18.7	0.00	0.00	0.00	15000.00	13.0	8/5/2014	10:36:09am	CHIMNEYROCKMINE08051	1186170.509	2469582.910
18.5	0.00	0.00	0.00	9000.00	14.0	8/5/2014	10:38:10am	CHIMNEYROCKMINE08051	1186114.765	2469591.684
18.8	0.00	0.00	0.00	16000.00	13.0	8/5/2014	10:40:30am	CHIMNEYROCKMINE08051	1186125.700	2469623.226
20.2	0.00	0.00	0.00	6000.00	12.0	8/5/2014	10:42:27am	CHIMNEYROCKMINE08051	1186177.853	2469623.835
20.9	0.00	0.00	0.00	0.00	14.0	8/5/2014	10:44:13am	CHIMNEYROCKMINE08051	1186230.864	2469638.698
19.7	0.00	0.00	0.00	7000.00	14.0	8/5/2014	10:46:07am	CHIMNEYROCKMINE08051	1186214.928	2469672.517
20.5	0.00	0.00	0.00	2000.00	14.0	8/5/2014	10:49:01am	CHIMNEYROCKMINE08051	1186176.376	2469670.618
16.4	0.00	0.00	0.00	25000.00	14.0	8/5/2014	10:51:32am	CHIMNEYROCKMINE08051	1186121.973	2469688.711
20.5	0.00	0.00	0.00	1000.00	13.0	8/5/2014	10:53:45am	CHIMNEYROCKMINE08051	1186078.630	2469681.949
19.4	0.00	0.00	0.00	10000.00	13.0	8/5/2014	10:55:43am	CHIMNEYROCKMINE08051	1186021.684	2469683.744
19.0	0.00	0.00	0.00	8000.00	14.0	8/5/2014	10:58:00am	CHIMNEYROCKMINE08051	1185968.575	2469687.963
19.2	0.00	0.00	0.00	8000.00	14.0	8/5/2014	11:00:11am	CHIMNEYROCKMINE08051	1185923.991	2469688.592
19.9	0.00	0.00	0.00	3000.00	14.0	8/5/2014	11:03:15am	CHIMNEYROCKMINE08051	1185872.412	2469674.519
20.5	0.00	0.00	0.00	1000.00	15.0	8/5/2014	11:05:17am	CHIMNEYROCKMINE08051	1185836.005	2469682.126
20.5	0.00	0.00	0.00	1000.00	14.0	8/5/2014	11:07:34am	CHIMNEYROCKMINE08051	1185778.907	2469689.288
20.3	0.00	0.00	0.00	4000.00	14.0	8/5/2014	11:09:46am	CHIMNEYROCKMINE08051	1185775.946	2469739.476
19.9	0.00	0.00	0.00	4000.00	14.0	8/5/2014	11:11:40am	CHIMNEYROCKMINE08051	1185827.900	2469723.749
19.2	0.00	0.00	0.00	7000.00	13.0	8/5/2014	11:14:16am	CHIMNEYROCKMINE08051	1185877.682	2469729.883
18.2	0.00	0.00	0.00	12000.00	14.0	8/5/2014	11:15:55am	CHIMNEYROCKMINE08051	1185919.147	2469732.240
20.0	0.00	0.00	0.00	4000.00	13.0	8/5/2014	11:18:07am	CHIMNEYROCKMINE08051	1185974.603	2469729.782
19.2	0.00	0.00	0.00	9000.00	15.0	8/5/2014	11:19:59am	CHIMNEYROCKMINE08051	1186035.471	2469733.036
19.6	0.00	0.00	0.00	6000.00	14.0	8/5/2014	11:21:53am	CHIMNEYROCKMINE08051	1186071.683	2469732.572
20.4	0.00	0.00	0.00	2000.00	14.0	8/5/2014	11:24:24am	CHIMNEYROCKMINE08051	1186120.028	2469726.141
20.9	0.00	0.00	0.00	0.00	14.0	8/5/2014	11:26:18am	CHIMNEYROCKMINE08051	1186175.177	2469719.977
19.0	0.00	0.00	0.00	13000.00	15.0	8/5/2014	11:28:01am	CHIMNEYROCKMINE08051	1186212.313	2469731.823
20.9	0.00	0.00	0.00	0.00	15.0	8/5/2014	11:31:50am	CHIMNEYROCKMINE08051	1186212.879	2469773.202
20.4	0.00	0.00	0.00	1000.00	15.0	8/5/2014	11:34:09am	CHIMNEYROCKMINE08051	1186171.533	2469784.005
20.7	0.00	0.00	0.00	0.00	15.0	8/5/2014	11:36:20am	CHIMNEYROCKMINE08051	1186123.489	2469780.402
20.8	0.00	0.00	0.00	0.00	14.0	8/5/2014	11:38:12am	CHIMNEYROCKMINE08051	1186074.759	2469783.132
20.9	0.00	0.00	0.00	0.00	14.0	8/5/2014	11:40:34am	CHIMNEYROCKMINE08051	1186029.140	2469782.123
20.5	0.00	0.00	0.00	1000.00	15.0	8/5/2014	11:41:59am	CHIMNEYROCKMINE08051	1185971.564	2469788.789
19.7	0.00	0.00	0.00	6000.00	14.0	8/5/2014	11:43:35am	CHIMNEYROCKMINE08051	1185910.460	2469787.624
20.9	0.00	0.00	0.00	0.00	16.0	8/5/2014	11:45:23am	CHIMNEYROCKMINE08051	1185872.533	2469778.867
19.2	0.00	0.00	0.00	8000.00	15.0	8/5/2014	11:47:07am	CHIMNEYROCKMINE08051	1185820.543	2469790.815
19.7	0.00	0.00	0.00	5000.00	13.0	8/5/2014	11:49:02am	CHIMNEYROCKMINE08051	1185770.741	2469781.543
19.3	0.00	0.00	0.00	6000.00	15.0	8/5/2014	11:52:00am	CHIMNEYROCKMINE08051	1185725.195	2469787.428
20.5	0.00	0.00	0.00	2000.00	15.0	8/5/2014	11:53:39am	CHIMNEYROCKMINE08051	1185727.049	2469831.098
20.5	0.00	0.00	0.00	2000.00	15.0	8/5/2014	11:55:43am	CHIMNEYROCKMINE08051	1185764.971	2469837.784
20.8	0.00	0.00	0.00	1000.00	15.0	8/5/2014	11:57:53am	CHIMNEYROCKMINE08051	1185812.200	2469836.786
20.8	0.00	0.00	0.00	1000.00	16.0	8/5/2014	12:00:11pm	CHIMNEYROCKMINE08051	1185867.649	2469825.890
19.0	0.00	0.00	0.00	10000.00	15.0	8/5/2014	12:02:07pm	CHIMNEYROCKMINE08051	1185915.654	2469832.084
20.8	0.00	0.00	0.00	1000.00	16.0	8/5/2014	12:03:54pm	CHIMNEYROCKMINE08051	1185965.900	2469837.398
20.1	0.00	0.00	0.00	6000.00	16.0	8/5/2014	12:05:52pm	CHIMNEYROCKMINE08051	1186021.074	2469823.650
20.9	0.00	0.00	0.00	0.00	16.0	8/5/2014	12:07:45pm	CHIMNEYROCKMINE08051	1186069.043	2469840.020

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
20.9	0.00	0.00	0.00	0.00	15.0	8/5/2014	12:09:19pm	CHIMNEYROCKMINE08051	1186122.946	2469823.672
20.0	0.00	0.00	0.00	8000.00	15.0	8/5/2014	12:11:11pm	CHIMNEYROCKMINE08051	1186168.312	2469822.088
20.9	0.00	0.00	0.00	0.00	15.0	8/5/2014	12:13:33pm	CHIMNEYROCKMINE08051	1186218.723	2469830.767
20.8	0.00	0.00	0.00	0.00	15.0	8/5/2014	12:15:06pm	CHIMNEYROCKMINE08051	1186216.233	2469879.206
20.9	0.00	0.00	0.00	0.00	14.0	8/5/2014	12:17:19pm	CHIMNEYROCKMINE08051	1186207.210	2469934.681
20.5	0.00	0.00	0.00	2000.00	15.0	8/5/2014	12:18:37pm	CHIMNEYROCKMINE08051	1186166.751	2469926.582
20.7	0.00	0.00	0.00	1000.00	15.0	8/5/2014	12:21:17pm	CHIMNEYROCKMINE08051	1186172.932	2469871.720
20.2	0.00	0.00	0.00	6000.00	16.0	8/5/2014	12:23:11pm	CHIMNEYROCKMINE08051	1186114.170	2469876.932
20.9	0.00	0.00	0.00	0.00	16.0	8/5/2014	12:24:52pm	CHIMNEYROCKMINE08051	1186116.240	2469923.929
20.0	0.00	0.00	0.00	5000.00	15.0	8/5/2014	12:27:04pm	CHIMNEYROCKMINE08051	1186062.232	2469927.494
20.4	0.00	0.00	0.00	2000.00	15.0	8/5/2014	12:29:03pm	CHIMNEYROCKMINE08051	1186071.814	2469880.875
20.3	0.00	0.00	0.00	3000.00	16.0	8/5/2014	12:30:48pm	CHIMNEYROCKMINE08051	1186024.588	2469878.374
20.8	0.00	0.00	0.00	1000.00	16.0	8/5/2014	12:33:44pm	CHIMNEYROCKMINE08051	1186016.900	2469931.596
20.9	0.00	0.00	0.00	0.00	15.0	8/5/2014	12:35:32pm	CHIMNEYROCKMINE08051	1185978.806	2469927.054
20.6	0.00	0.00	0.00	1000.00	15.0	8/5/2014	12:36:52pm	CHIMNEYROCKMINE08051	1185969.914	2469880.774
20.8	0.00	0.00	0.00	1000.00	16.0	8/5/2014	12:40:41pm	CHIMNEYROCKMINE08051	1185910.500	2469880.875
20.5	0.00	0.00	0.00	1000.00	15.0	8/5/2014	12:41:39pm	CHIMNEYROCKMINE08051	1185927.917	2469939.402
20.6	0.00	0.00	0.00	1000.00	16.0	8/5/2014	12:43:18pm	CHIMNEYROCKMINE08051	1185871.996	2469931.939
20.6	0.00	0.00	0.00	1000.00	15.0	8/5/2014	12:46:30pm	CHIMNEYROCKMINE08051	1185865.852	2469881.111
20.1	0.00	0.00	0.00	3000.00	16.0	8/5/2014	12:48:14pm	CHIMNEYROCKMINE08051	1185827.504	2469879.093
19.7	0.00	0.00	0.00	6000.00	16.0	8/5/2014	12:50:02pm	CHIMNEYROCKMINE08051	1185817.305	2469930.269
20.5	0.00	0.00	0.00	1000.00	17.0	8/5/2014	12:51:59pm	CHIMNEYROCKMINE08051	1185767.918	2469983.969
20.8	0.00	0.00	0.00	0.00	15.0	8/5/2014	12:53:56pm	CHIMNEYROCKMINE08051	1185766.069	2469926.295
20.6	0.00	0.00	0.00	1000.00	16.0	8/5/2014	12:55:33pm	CHIMNEYROCKMINE08051	1185766.379	2469880.859
20.4	0.00	0.00	0.00	1000.00	15.0	8/5/2014	12:57:22pm	CHIMNEYROCKMINE08051	1185715.613	2469883.620
20.7	0.00	0.00	0.00	0.00	15.0	8/5/2014	12:59:23pm	CHIMNEYROCKMINE08051	1185732.728	2469928.966
20.0	0.00	0.00	0.00	3000.00	15.0	8/5/2014	01:01:42pm	CHIMNEYROCKMINE08051	1185674.417	2469927.239
19.6	0.00	0.00	0.00	4000.00	15.0	8/5/2014	01:03:32pm	CHIMNEYROCKMINE08051	1185670.255	2469873.086
18.9	0.00	0.00	0.00	7000.00	16.0	8/5/2014	01:05:27pm	CHIMNEYROCKMINE08051	1185671.221	2469832.169
20.3	0.00	0.00	0.00	2000.00	16.0	8/5/2014	01:07:14pm	CHIMNEYROCKMINE08051	1185667.970	2469777.520
20.5	0.00	0.00	0.00	2000.00	16.0	8/5/2014	01:08:55pm	CHIMNEYROCKMINE08051	1185625.905	2469782.063
20.6	0.00	0.00	0.00	1000.00	15.0	8/5/2014	01:11:10pm	CHIMNEYROCKMINE08051	1185620.848	2469829.094
19.6	0.00	0.00	0.00	5000.00	16.0	8/5/2014	01:13:04pm	CHIMNEYROCKMINE08051	1185622.112	2469883.999
20.7	0.00	0.00	0.00	5000.00	-1.0	5/30/2014	10:18:04am	COLUMBINEMINE_053014	1235000.502	2425381.584
20.6	0.00	0.00	0.00	3000.00	0.0	5/30/2014	10:21:47am	COLUMBINEMINE_053014	1234995.780	2425444.713
20.4	0.00	0.00	0.00	7000.00	0.0	5/30/2014	10:23:28am	COLUMBINEMINE_053014	1234991.956	2425483.899
20.8	0.00	0.00	0.00	2000.00	0.0	5/30/2014	10:25:45am	COLUMBINEMINE_053014	1234995.324	2425525.753
20.8	0.00	0.00	0.00	1000.00	-1.0	5/30/2014	10:27:50am	COLUMBINEMINE_053014	1235046.185	2425522.834
20.9	0.00	0.00	0.00	0.00	0.0	5/30/2014	10:30:20am	COLUMBINEMINE_053014	1235056.685	2425495.024
20.8	0.00	0.00	0.00	2000.00	0.0	5/30/2014	10:32:32am	COLUMBINEMINE_053014	1235100.279	2425527.988
20.7	0.00	0.00	0.00	2000.00	3.0	5/30/2014	10:34:26am	COLUMBINEMINE_053014	1235150.564	2425524.506
20.8	0.00	0.00	0.00	1000.00	6.0	5/30/2014	10:36:44am	COLUMBINEMINE_053014	1235200.568	2425570.960
20.7	0.00	0.00	0.00	3000.00	7.0	5/30/2014	10:38:28am	COLUMBINEMINE_053014	1235198.941	2425611.137
20.9	0.00	0.00	0.00	1000.00	6.0	5/30/2014	10:41:35am	COLUMBINEMINE_053014	1235251.942	2425624.634
20.9	0.00	0.00	0.00	0.00	6.0	5/30/2014	10:43:11am	COLUMBINEMINE_053014	1235265.741	2425646.285
20.5	0.00	0.00	0.00	6000.00	4.0	5/30/2014	10:45:31am	COLUMBINEMINE_053014	1235294.275	2425628.168
20.5	0.00	0.00	0.00	3000.00	4.0	5/30/2014	10:49:23am	COLUMBINEMINE_053014	1235339.943	2425629.515
20.6	0.00	0.00	0.00	2000.00	5.0	5/30/2014	10:52:20am	COLUMBINEMINE_053014	1235412.336	2425637.646
20.7	0.00	0.00	0.00	2000.00	4.0	5/30/2014	10:53:55am	COLUMBINEMINE_053014	1235455.626	2425625.600
20.7	0.00	0.00	0.00	3000.00	4.0	5/30/2014	10:55:42am	COLUMBINEMINE_053014	1235457.702	2425585.659
20.8	0.00	0.00	0.00	1000.00	0.0	5/30/2014	10:57:03am	COLUMBINEMINE_053014	1235414.052	2425575.975
20.6	0.00	0.00	0.00	1000.00	2.0	5/30/2014	10:59:29am	COLUMBINEMINE_053014	1235362.926	2425581.741
20.7	0.00	0.00	0.00	1000.00	2.0	5/30/2014	11:02:39am	COLUMBINEMINE_053014	1235316.212	2425581.847
20.8	0.00	0.00	0.00	0.00	0.0	5/30/2014	11:08:14am	COLUMBINEMINE_053014	1235246.396	2425592.819
20.8	0.00	0.00	0.00	0.00	3.0	5/30/2014	11:11:17am	COLUMBINEMINE_053014	1235203.134	2425537.095
20.4	0.00	0.00	0.00	4000.00	3.00	5/30/2014	11:13:35am	COLUMBINEMINE_053014	1235258.674	2425549.485

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
20.7	0.00	0.00	0.00	1000.00	4.0	5/30/2014	11:16:24am	COLUMBINEMINE_053014	1235314.872	2425529.444
20.9	0.00	0.00	0.00	0.00	0.0	5/30/2014	11:18:16am	COLUMBINEMINE_053014	1235349.936	2425534.377
20.7	0.00	0.00	0.00	1000.00	0.0	5/30/2014	11:20:05am	COLUMBINEMINE_053014	1235411.817	2425530.885
20.6	0.00	0.00	0.00	2000.00	1.0	5/30/2014	11:22:02am	COLUMBINEMINE_053014	1235449.513	2425511.462
20.7	0.00	0.00	0.00	2000.00	1.0	5/30/2014	11:24:23am	COLUMBINEMINE_053014	1235438.073	2425474.966
20.6	0.00	0.00	0.00	1000.00	1.0	5/30/2014	11:26:42am	COLUMBINEMINE_053014	1235414.908	2425485.989
20.6	0.00	0.00	0.00	1000.00	-1.0	5/30/2014	11:29:15am	COLUMBINEMINE_053014	1235359.567	2425485.705
20.6	0.00	0.00	0.00	3000.00	1.0	5/30/2014	11:31:39am	COLUMBINEMINE_053014	1235318.633	2425477.083
20.6	0.00	0.00	0.00	2000.00	-1.0	5/30/2014	11:34:12am	COLUMBINEMINE_053014	1235263.699	2425470.096
20.6	0.00	0.00	0.00	2000.00	-1.0	5/30/2014	11:36:57am	COLUMBINEMINE_053014	1235231.291	2425484.576
20.7	0.00	0.00	0.00	2000.00	0.0	5/30/2014	11:40:38am	COLUMBINEMINE_053014	1235213.938	2425486.168
20.2	0.00	0.00	0.00	5000.00	4.0	5/30/2014	11:43:15am	COLUMBINEMINE_053014	1235163.195	2425487.419
20.7	0.00	0.00	0.00	0.00	6.0	5/30/2014	11:45:35am	COLUMBINEMINE_053014	1235094.447	2425474.776
20.9	0.00	0.00	0.00	1000.00	5.0	5/30/2014	11:48:00am	COLUMBINEMINE_053014	1235059.485	2425432.931
20.8	0.00	0.00	0.00	1000.00	6.0	5/30/2014	11:50:49am	COLUMBINEMINE_053014	1235046.655	2425377.553
20.9	0.00	0.00	0.00	0.00	8.0	5/30/2014	11:52:37am	COLUMBINEMINE_053014	1235051.719	2425322.831
20.7	0.00	0.00	0.00	2000.00	7.0	5/30/2014	11:54:14am	COLUMBINEMINE_053014	1235002.252	2425311.622
20.8	0.00	0.00	0.00	1000.00	7.0	5/30/2014	11:55:49am	COLUMBINEMINE_053014	1234993.913	2425276.564
20.9	0.00	0.00	0.00	1000.00	8.0	5/30/2014	11:57:44am	COLUMBINEMINE_053014	1234998.043	2425225.011
20.7	0.00	0.00	0.00	1000.00	6.0	5/30/2014	11:59:22am	COLUMBINEMINE_053014	1235004.323	2425173.000
20.8	0.00	0.00	0.00	1000.00	4.0	5/30/2014	12:01:20pm	COLUMBINEMINE_053014	1235058.413	2425175.518
20.8	0.00	0.00	0.00	1000.00	1.0	5/30/2014	12:03:29pm	COLUMBINEMINE_053014	1235039.462	2425225.802
20.9	0.00	0.00	0.00	1000.00	4.0	5/30/2014	12:05:41pm	COLUMBINEMINE_053014	1235063.734	2425276.828
20.7	0.00	0.00	0.00	1000.00	6.0	5/30/2014	12:07:41pm	COLUMBINEMINE_053014	1235097.626	2425285.637
20.6	0.00	0.00	0.00	4000.00	8.0	5/30/2014	12:10:07pm	COLUMBINEMINE_053014	1235113.097	2425338.074
20.7	0.00	0.00	0.00	1000.00	8.0	5/30/2014	12:12:08pm	COLUMBINEMINE_053014	1235115.976	2425377.804
20.9	0.00	0.00	0.00	1000.00	4.0	5/30/2014	12:13:59pm	COLUMBINEMINE_053014	1235113.583	2425425.364
20.9	0.00	0.00	0.00	1000.00	4.0	5/30/2014	12:16:01pm	COLUMBINEMINE_053014	1235155.402	2425422.529
20.4	0.00	0.00	0.00	5000.00	1.0	5/30/2014	12:18:00pm	COLUMBINEMINE_053014	1235207.078	2425420.627
20.6	0.00	0.00	0.00	4000.00	2.0	5/30/2014	12:20:03pm	COLUMBINEMINE_053014	1235252.708	2425429.383
20.5	0.00	0.00	0.00	3000.00	2.0	5/30/2014	12:21:59pm	COLUMBINEMINE_053014	1235324.674	2425433.069
20.7	0.00	0.00	0.00	2000.00	3.0	5/30/2014	12:24:01pm	COLUMBINEMINE_053014	1235358.597	2425422.058
20.9	0.00	0.00	0.00	0.00	1.0	5/30/2014	12:26:03pm	COLUMBINEMINE_053014	1235411.234	2425434.600
20.7	0.00	0.00	0.00	2000.00	-2.0	5/30/2014	12:28:16pm	COLUMBINEMINE_053014	1235442.399	2425442.057
20.3	0.00	0.00	0.00	5000.00	0.0	5/30/2014	12:31:11pm	COLUMBINEMINE_053014	1235461.606	2425369.042
20.5	0.00	0.00	0.00	4000.00	0.0	5/30/2014	12:33:18pm	COLUMBINEMINE_053014	1235412.514	2425377.352
20.5	0.00	0.00	0.00	3000.00	3.0	5/30/2014	12:35:21pm	COLUMBINEMINE_053014	1235369.204	2425364.927
20.9	0.00	0.00	0.00	1000.00	-1.0	5/30/2014	12:37:54pm	COLUMBINEMINE_053014	1235311.816	2425378.767
20.8	0.00	0.00	0.00	1000.00	1.0	5/30/2014	12:39:50pm	COLUMBINEMINE_053014	1235254.938	2425360.719
20.7	0.00	0.00	0.00	1000.00	1.0	5/30/2014	12:42:37pm	COLUMBINEMINE_053014	1235203.666	2425376.290
20.9	0.00	0.00	0.00	0.00	-1.0	5/30/2014	12:44:38pm	COLUMBINEMINE_053014	1235158.402	2425383.651
20.8	0.00	0.00	0.00	1000.00	3.0	5/30/2014	12:48:51pm	COLUMBINEMINE_053014	1235150.081	2425320.972
20.9	0.00	0.00	0.00	0.00	6.0	5/30/2014	12:51:13pm	COLUMBINEMINE_053014	1235219.391	2425327.914
20.7	0.00	0.00	0.00	0.00	0.0	5/30/2014	12:53:37pm	COLUMBINEMINE_053014	1235269.017	2425329.513
20.4	0.00	0.00	0.00	3000.00	0.0	5/30/2014	12:56:11pm	COLUMBINEMINE_053014	1235306.463	2425325.336
20.5	0.00	0.00	0.00	3000.00	5.0	5/30/2014	12:58:35pm	COLUMBINEMINE_053014	1235358.414	2425328.394
20.6	0.00	0.00	0.00	4000.00	4.0	5/30/2014	01:00:49pm	COLUMBINEMINE_053014	1235418.708	2425340.109
20.8	0.00	0.00	0.00	1000.00	2.0	5/30/2014	01:03:20pm	COLUMBINEMINE_053014	1235449.927	2425329.151
20.7	0.00	0.00	0.00	1000.00	2.0	5/30/2014	01:05:18pm	COLUMBINEMINE_053014	1235446.140	2425276.992
20.3	0.00	0.00	0.00	4000.00	6.0	5/30/2014	01:07:56pm	COLUMBINEMINE_053014	1235411.699	2425278.643
20.5	0.00	0.00	0.00	3000.00	5.0	5/30/2014	01:09:59pm	COLUMBINEMINE_053014	1235359.604	2425276.241
20.8	0.00	0.00	0.00	1000.00	0.0	5/30/2014	01:12:15pm	COLUMBINEMINE_053014	1235311.637	2425269.340
20.7	0.00	0.00	0.00	1000.00	1.0	5/30/2014	01:14:17pm	COLUMBINEMINE_053014	1235241.325	2425284.750
20.7	0.00	0.00	0.00	5000.00	0.0	5/30/2014	01:16:21pm	COLUMBINEMINE_053014	1235197.396	2425277.315
20.8	0.00	0.00	0.00	1000.00	2.0	5/30/2014	01:17:57pm	COLUMBINEMINE_053014	1235163.676	2425263.561
20.9	0.00	0.00	0.00	1000.00	6.0	5/30/2014	01:21:06pm	COLUMBINEMINE_053014	1235108.151	2425222.975

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
20.8	0.00	0.00	0.00	2000.00	6.0	5/30/2014	01:23:08pm	COLUMBINEMINE_053014	1235143.392	2425221.038
20.2	0.00	0.00	2.00	7000.00	3.0	5/30/2014	01:25:02pm	COLUMBINEMINE_053014	1235198.705	2425225.270
20.6	0.00	0.00	0.00	2000.00	6.0	5/30/2014	01:27:27pm	COLUMBINEMINE_053014	1235268.231	2425232.256
20.8	0.00	0.00	0.00	0.00	6.0	5/30/2014	01:29:44pm	COLUMBINEMINE_053014	1235308.621	2425224.912
20.2	0.00	0.00	0.00	6000.00	4.0	5/30/2014	01:31:43pm	COLUMBINEMINE_053014	1235367.694	2425228.035
20.4	0.00	0.00	0.00	4000.00	3.0	5/30/2014	01:33:46pm	COLUMBINEMINE_053014	1235411.348	2425231.679
20.3	0.00	0.00	0.00	5000.00	4.0	5/30/2014	01:35:50pm	COLUMBINEMINE_053014	1235451.584	2425236.175
20.7	0.00	0.00	0.00	2000.00	4.0	5/30/2014	01:38:34pm	COLUMBINEMINE_053014	1235453.540	2425176.166
20.6	0.00	0.00	0.00	2000.00	4.0	5/30/2014	01:40:32pm	COLUMBINEMINE_053014	1235407.575	2425169.522
20.9	0.00	0.00	0.00	0.00	9.0	5/30/2014	01:42:40pm	COLUMBINEMINE_053014	1235355.189	2425172.792
20.8	0.00	0.00	0.00	1000.00	8.0	5/30/2014	01:44:22pm	COLUMBINEMINE_053014	1235316.510	2425174.499
20.8	0.00	0.00	0.00	0.00	4.0	5/30/2014	01:46:55pm	COLUMBINEMINE_053014	1235263.636	2425188.026
20.7	0.00	0.00	0.00	1000.00	6.0	5/30/2014	01:48:58pm	COLUMBINEMINE_053014	1235193.794	2425181.967
20.9	0.00	0.00	0.00	0.00	5.0	5/30/2014	01:50:55pm	COLUMBINEMINE_053014	1235155.448	2425170.360
20.8	0.00	0.00	0.00	0.00	4.0	5/30/2014	01:52:25pm	COLUMBINEMINE_053014	1235105.560	2425181.688
20.6	0.00	0.00	0.00	1000.00	5.0	8/6/2014	08:00:21am	STOLSTIEMERMINE08061	1185738.132	2471566.660
20.5	0.00	0.00	0.00	2000.00	5.0	8/6/2014	08:03:02am	STOLSTIEMERMINE08061	1185778.201	2471572.635
20.6	0.00	0.00	0.00	3000.00	6.0	8/6/2014	08:05:54am	STOLSTIEMERMINE08061	1185770.273	2471621.053
20.7	0.00	0.00	0.00	1000.00	6.0	8/6/2014	08:09:18am	STOLSTIEMERMINE08061	1185714.761	2471625.738
20.8	0.00	0.00	0.00	1000.00	7.0	8/6/2014	08:11:49am	STOLSTIEMERMINE08061	1185734.103	2471671.290
20.9	0.00	0.00	0.00	0.00	5.0	8/6/2014	08:13:47am	STOLSTIEMERMINE08061	1185767.400	2471678.155
20.9	0.00	0.00	0.00	0.00	6.0	8/6/2014	08:16:27am	STOLSTIEMERMINE08061	1185768.835	2471729.476
20.8	0.00	0.00	0.00	0.00	4.0	8/6/2014	08:18:37am	STOLSTIEMERMINE08061	1185730.737	2471715.780
20.7	0.00	0.00	0.00	1000.00	5.0	8/6/2014	08:21:27am	STOLSTIEMERMINE08061	1185718.335	2471770.715
20.6	0.00	0.00	0.00	1000.00	6.0	8/6/2014	08:24:19am	STOLSTIEMERMINE08061	1185761.152	2471763.480
20.5	0.00	0.00	0.00	4000.00	6.0	8/6/2014	08:27:27am	STOLSTIEMERMINE08061	1185770.447	2471832.229
20.6	0.00	0.00	0.00	2000.00	7.0	8/6/2014	08:30:50am	STOLSTIEMERMINE08061	1185727.372	2471823.202
20.6	0.00	0.00	0.00	1000.00	4.0	8/6/2014	08:32:28am	STOLSTIEMERMINE08061	1185730.092	2471868.394
20.7	0.00	0.00	0.00	4000.00	8.0	8/6/2014	08:35:37am	STOLSTIEMERMINE08061	1185761.972	2471884.060
20.5	0.00	0.00	0.00	2000.00	9.0	8/6/2014	08:39:15am	STOLSTIEMERMINE08061	1185720.758	2471943.675
20.8	0.00	0.00	0.00	0.00	10.0	8/6/2014	08:42:05am	STOLSTIEMERMINE08061	1185760.326	2471918.244
20.8	0.00	0.00	0.00	0.00	5.0	8/6/2014	08:45:25am	STOLSTIEMERMINE08061	1185721.564	2471976.141
20.8	0.00	0.00	0.00	0.00	6.0	8/6/2014	08:48:04am	STOLSTIEMERMINE08061	1185732.025	2472016.316
20.8	0.00	0.00	0.00	1000.00	6.0	8/6/2014	08:53:04am	STOLSTIEMERMINE08061	1185785.474	2472017.837
20.9	0.00	0.00	0.00	0.00	8.0	8/6/2014	08:55:19am	STOLSTIEMERMINE08061	1185771.494	2471981.357
20.7	0.00	0.00	0.00	1000.00	9.0	8/6/2014	08:57:43am	STOLSTIEMERMINE08061	1185820.955	2471985.424
20.9	0.00	0.00	0.00	0.00	7.0	8/6/2014	08:59:44am	STOLSTIEMERMINE08061	1185827.820	2472020.285
20.6	0.00	0.00	0.00	2000.00	5.0	8/6/2014	09:02:02am	STOLSTIEMERMINE08061	1185875.857	2472027.955
20.7	0.00	0.00	0.00	0.00	6.0	8/6/2014	09:04:21am	STOLSTIEMERMINE08061	1185871.337	2471992.444
20.7	0.00	0.00	0.00	0.00	6.0	8/6/2014	09:06:19am	STOLSTIEMERMINE08061	1185917.690	2471967.912
20.6	0.00	0.00	0.00	1000.00	10.0	8/6/2014	09:08:54am	STOLSTIEMERMINE08061	1185924.080	2472020.849
20.7	0.00	0.00	0.00	1000.00	7.0	8/6/2014	09:10:46am	STOLSTIEMERMINE08061	1185983.506	2472031.060
20.6	0.00	0.00	0.00	0.00	8.0	8/6/2014	09:12:33am	STOLSTIEMERMINE08061	1185973.638	2471980.080
20.8	0.00	0.00	0.00	0.00	8.0	8/6/2014	09:14:55am	STOLSTIEMERMINE08061	1186017.890	2471977.332
20.5	0.00	0.00	0.00	1000.00	7.0	8/6/2014	09:17:30am	STOLSTIEMERMINE08061	1186030.788	2472023.122
20.6	0.00	0.00	0.00	1000.00	6.0	8/6/2014	09:19:48am	STOLSTIEMERMINE08061	1186078.997	2472023.372
20.8	0.00	0.00	0.00	1000.00	9.0	8/6/2014	09:21:59am	STOLSTIEMERMINE08061	1186069.357	2471981.333
20.6	0.00	0.00	0.00	9.00	0.0	8/6/2014	09:24:09am	STOLSTIEMERMINE08061	1186117.157	2471990.661
20.5	0.00	0.00	0.00	1000.00	5.0	8/6/2014	09:27:05am	STOLSTIEMERMINE08061	1186132.314	2472033.647
20.4	0.00	0.00	0.00	0.00	10.0	8/6/2014	09:29:04am	STOLSTIEMERMINE08061	1186174.948	2472031.846
20.8	0.00	0.00	0.00	0.00	8.0	8/6/2014	09:31:23am	STOLSTIEMERMINE08061	1186169.250	2471985.304
20.7	0.00	0.00	0.00	0.00	9.0	8/6/2014	09:33:24am	STOLSTIEMERMINE08061	1186173.135	2471924.834
20.8	0.00	0.00	0.00	0.00	10.0	8/6/2014	09:35:40am	STOLSTIEMERMINE08061	1186115.421	2471922.975
20.5	0.00	0.00	0.00	0.00	9.0	8/6/2014	09:37:34am	STOLSTIEMERMINE08061	1186128.806	2471886.373
20.8	0.00	0.00	0.00	0.00	9.0	8/6/2014	09:40:07am	STOLSTIEMERMINE08061	1186184.961	2471889.269
20.7	0.00	0.00	0.00	0.00	11.0	8/6/2014	09:42:46am	STOLSTIEMERMINE08061	1186178.594	2471833.742

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
20.6	0.00	0.00	0.00	1000.00	9.0	8/6/2014	09:44:28am	STOLSTIEMERMINE08061	1186120.704	2471819.413
20.8	0.00	0.00	0.00	0.00	10.0	8/6/2014	09:46:39am	STOLSTIEMERMINE08061	1186117.692	2471777.784
20.6	0.00	0.00	0.00	0.00	11.0	8/6/2014	09:48:20am	STOLSTIEMERMINE08061	1186173.012	2471776.717
20.8	0.00	0.00	0.00	1000.00	9.0	8/6/2014	09:50:27am	STOLSTIEMERMINE08061	1186165.537	2471737.432
20.7	0.00	0.00	0.00	0.00	11.0	8/6/2014	09:52:14am	STOLSTIEMERMINE08061	1186119.405	2471728.600
20.9	0.00	0.00	0.00	0.00	10.0	8/6/2014	09:54:23am	STOLSTIEMERMINE08061	1186129.532	2471673.271
19.8	0.00	0.00	0.00	0.00	11.0	8/6/2014	09:55:37am	STOLSTIEMERMINE08061	1186175.234	2471676.724
20.7	0.00	0.00	0.00	0.00	7.0	8/6/2014	09:58:13am	STOLSTIEMERMINE08061	1186177.786	2471633.699
20.8	0.00	0.00	0.00	0.00	9.0	8/6/2014	10:01:14am	STOLSTIEMERMINE08061	1186122.138	2471639.819
20.9	0.00	0.00	0.00	0.00	8.0	8/6/2014	10:04:51am	STOLSTIEMERMINE08061	1186124.668	2471569.881
20.8	0.00	0.00	0.00	0.00	10.0	8/6/2014	10:06:32am	STOLSTIEMERMINE08061	1186166.095	2471584.323
20.9	0.00	0.00	0.00	0.00	11.0	8/6/2014	10:10:27am	STOLSTIEMERMINE08061	1186074.759	2471623.823
20.8	0.00	0.00	0.00	0.00	10.0	8/6/2014	10:11:49am	STOLSTIEMERMINE08061	1186062.219	2471582.503
20.8	0.00	0.00	0.00	0.00	8.0	8/6/2014	10:13:27am	STOLSTIEMERMINE08061	1186024.105	2471595.101
20.7	0.00	0.00	0.00	0.00	11.0	8/6/2014	10:16:06am	STOLSTIEMERMINE08061	1186022.327	2471639.538
20.8	0.00	0.00	0.00	0.00	12.0	8/6/2014	10:18:21am	STOLSTIEMERMINE08061	1185973.278	2471641.450
20.9	0.00	0.00	0.00	0.00	9.0	8/6/2014	10:20:42am	STOLSTIEMERMINE08061	1185970.880	2471576.613
20.8	0.00	0.00	0.00	0.00	9.0	8/6/2014	10:22:49am	STOLSTIEMERMINE08061	1185908.781	2471581.351
20.6	0.00	0.00	0.00	1000.00	8.0	8/6/2014	10:24:32am	STOLSTIEMERMINE08061	1185923.940	2471638.575
20.8	0.00	0.00	0.00	0.00	6.0	8/6/2014	10:26:46am	STOLSTIEMERMINE08061	1185865.679	2471632.945
20.8	0.00	0.00	0.00	0.00	7.0	8/6/2014	10:28:53am	STOLSTIEMERMINE08061	1185882.913	2471581.035
20.6	0.00	0.00	0.00	1000.00	6.0	8/6/2014	10:31:16am	STOLSTIEMERMINE08061	1185812.951	2471575.665
20.5	0.00	0.00	0.00	0.00	12.0	8/6/2014	10:33:23am	STOLSTIEMERMINE08061	1185807.596	2471625.363
20.6	0.00	0.00	0.00	0.00	14.0	8/6/2014	10:35:20am	STOLSTIEMERMINE08061	1185806.652	2471676.361
20.8	0.00	0.00	0.00	0.00	13.0	8/6/2014	10:37:12am	STOLSTIEMERMINE08061	1185804.113	2471727.051
20.5	0.00	0.00	0.00	1000.00	15.0	8/6/2014	10:39:47am	STOLSTIEMERMINE08061	1185795.994	2471786.277
20.4	0.00	0.00	0.00	1000.00	14.0	8/6/2014	10:42:02am	STOLSTIEMERMINE08061	1185814.174	2471827.921
20.7	0.00	0.00	0.00	0.00	10.0	8/6/2014	10:44:19am	STOLSTIEMERMINE08061	1185820.014	2471884.544
20.5	0.00	0.00	0.00	0.00	8.0	8/6/2014	10:47:39am	STOLSTIEMERMINE08061	1185809.660	2471935.309
20.5	0.00	0.00	0.00	0.00	9.0	8/6/2014	10:49:11am	STOLSTIEMERMINE08061	1185863.517	2471931.838
20.5	0.00	0.00	0.00	0.00	15.0	8/6/2014	10:51:31am	STOLSTIEMERMINE08061	1185918.160	2471922.242
20.5	0.00	0.00	0.00	0.00	9.0	8/6/2014	10:53:48am	STOLSTIEMERMINE08061	1185970.286	2471929.595
20.6	0.00	0.00	0.00	1000.00	11.0	8/6/2014	10:56:02am	STOLSTIEMERMINE08061	1186017.498	2471926.044
20.8	0.00	0.00	0.00	0.00	12.0	8/6/2014	10:59:36am	STOLSTIEMERMINE08061	1186072.480	2471936.919
20.7	0.00	0.00	0.00	0.00	14.0	8/6/2014	11:01:27am	STOLSTIEMERMINE08061	1186108.227	2471882.062
20.3	0.00	0.00	0.00	1000.00	10.0	8/6/2014	11:03:18am	STOLSTIEMERMINE08061	1186079.094	2471879.755
20.6	0.00	0.00	0.00	0.00	10.0	8/6/2014	11:05:08am	STOLSTIEMERMINE08061	1186047.847	2471877.096
20.8	0.00	0.00	0.00	0.00	15.0	8/6/2014	11:06:46am	STOLSTIEMERMINE08061	1186022.400	2471874.760
20.4	0.00	0.00	0.00	0.00	12.0	8/6/2014	11:07:57am	STOLSTIEMERMINE08061	1186002.488	2471870.311
20.5	0.00	0.00	0.00	0.00	13.0	8/6/2014	11:09:50am	STOLSTIEMERMINE08061	1185972.690	2471867.594
20.3	0.00	0.00	0.00	1000.00	16.0	8/6/2014	11:12:15am	STOLSTIEMERMINE08061	1185922.340	2471875.431
20.4	0.00	0.00	0.00	1000.00	10.0	8/6/2014	11:14:26am	STOLSTIEMERMINE08061	1185880.104	2471877.240
20.6	0.00	0.00	0.00	0.00	9.0	8/6/2014	11:18:11am	STOLSTIEMERMINE08061	1185862.591	2471834.936
20.6	0.00	0.00	0.00	0.00	16.0	8/6/2014	11:20:48am	STOLSTIEMERMINE08061	1185924.252	2471832.968
20.5	0.00	0.00	0.00	0.00	12.0	8/6/2014	11:22:55am	STOLSTIEMERMINE08061	1185968.604	2471824.629
20.1	0.00	0.00	0.00	0.00	15.0	8/6/2014	11:24:46am	STOLSTIEMERMINE08061	1186022.204	2471830.502
20.5	0.00	0.00	0.00	0.00	20.0	8/6/2014	11:27:46am	STOLSTIEMERMINE08061	1186075.364	2471826.551
20.4	0.00	0.00	0.00	1000.00	15.0	8/6/2014	11:30:02am	STOLSTIEMERMINE08061	1186060.228	2471780.406
20.6	0.00	0.00	0.00	0.00	16.0	8/6/2014	11:32:29am	STOLSTIEMERMINE08061	1186021.730	2471780.735
20.5	0.00	0.00	0.00	1000.00	16.0	8/6/2014	11:35:05am	STOLSTIEMERMINE08061	1185973.884	2471762.909
20.5	0.00	0.00	0.00	0.00	17.0	8/6/2014	11:38:40am	STOLSTIEMERMINE08061	1185919.544	2471777.442
20.0	0.00	0.00	0.00	2000.00	17.0	8/6/2014	11:41:02am	STOLSTIEMERMINE08061	1185875.479	2471781.929
20.1	0.00	0.00	0.00	2000.00	15.0	8/6/2014	11:43:11am	STOLSTIEMERMINE08061	1185877.871	2471724.291
20.6	0.00	0.00	0.00	0.00	15.0	8/6/2014	11:45:30am	STOLSTIEMERMINE08061	1185938.003	2471733.591
20.5	0.00	0.00	0.00	0.00	17.0	8/6/2014	11:48:08am	STOLSTIEMERMINE08061	1185979.463	2471723.746
20.1	0.00	0.00	0.00	0.00	18.0	8/6/2014	11:50:12am	STOLSTIEMERMINE08061	1186026.622	2471728.123

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
20.7	0.00	0.00	0.00	0.00	18.0	8/6/2014	11:52:35am	STOLSTIEMERMINE08061	1186072.717	2471727.003
20.7	0.00	0.00	0.00	0.00	20.0	8/6/2014	11:55:37am	STOLSTIEMERMINE08061	1186088.680	2471678.648
20.8	0.00	0.00	0.00	0.00	12.0	8/6/2014	11:57:17am	STOLSTIEMERMINE08061	1186026.570	2471675.749
20.9	0.00	0.00	0.00	0.00	15.0	8/6/2014	11:59:17am	STOLSTIEMERMINE08061	1185976.314	2471677.538
20.7	0.00	0.00	0.00	0.00	15.0	8/6/2014	12:01:15pm	STOLSTIEMERMINE08061	1185909.454	2471684.832
20.6	0.00	0.00	0.00	0.00	13.0	8/6/2014	12:03:06pm	STOLSTIEMERMINE08061	1185862.901	2471693.231
20.5	0.00	0.00	0.00	0.00	8.0	8/7/2014	08:08:25am	TRIPPLESMINE080714.c	1229355.913	2432163.079
20.4	0.00	0.00	0.00	1000.00	9.0	8/7/2014	08:12:20am	TRIPPLESMINE080714.c	1229382.062	2432148.520
20.6	0.00	0.00	0.00	0.00	10.0	8/7/2014	08:14:23am	TRIPPLESMINE080714.c	1229385.890	2432105.653
20.4	0.00	0.00	0.00	1000.00	10.0	8/7/2014	08:16:43am	TRIPPLESMINE080714.c	1229383.240	2432046.131
20.5	0.00	0.00	0.00	0.00	8.0	8/7/2014	08:19:27am	TRIPPLESMINE080714.c	1229445.160	2432063.177
20.4	0.00	0.00	0.00	2000.00	7.0	8/7/2014	08:21:32am	TRIPPLESMINE080714.c	1229435.806	2432112.664
20.1	0.00	0.00	0.00	3000.00	7.0	8/7/2014	08:23:43am	TRIPPLESMINE080714.c	1229435.633	2432157.035
20.5	0.00	0.00	0.00	3000.00	6.0	8/7/2014	08:27:09am	TRIPPLESMINE080714.c	1229434.640	2432197.788
20.6	0.00	0.00	0.00	1000.00	0.0	8/7/2014	08:30:44am	TRIPPLESMINE080714.c	1229432.680	2432260.823
20.7	0.00	0.00	0.00	0.00	5.0	8/7/2014	08:34:04am	TRIPPLESMINE080714.c	1229422.404	2432305.615
20.5	0.00	0.00	0.00	1000.00	4.0	8/7/2014	08:36:20am	TRIPPLESMINE080714.c	1229418.674	2432359.938
20.8	0.00	0.00	0.00	0.00	5.0	8/7/2014	08:39:17am	TRIPPLESMINE080714.c	1229432.943	2432406.389
20.7	0.00	0.00	0.00	1000.00	5.0	8/7/2014	08:41:42am	TRIPPLESMINE080714.c	1229427.388	2432452.306
20.2	0.00	0.00	0.00	2000.00	6.0	8/7/2014	08:45:04am	TRIPPLESMINE080714.c	1229438.839	2432507.538
20.9	0.00	0.00	0.00	0.00	8.0	8/7/2014	08:48:14am	TRIPPLESMINE080714.c	1229388.092	2432498.806
19.9	0.00	0.00	0.00	1000.00	7.0	8/7/2014	08:49:34am	TRIPPLESMINE080714.c	1229385.292	2432458.219
20.6	0.00	0.00	0.00	1000.00	8.0	8/7/2014	08:52:32am	TRIPPLESMINE080714.c	1229372.860	2432405.589
20.8	0.00	0.00	0.00	0.00	5.5	8/7/2014	08:57:29am	TRIPPLESMINE080714.c	1229393.628	2432368.231
20.8	0.00	0.00	0.00	0.00	7.0	8/7/2014	09:00:24am	TRIPPLESMINE080714.c	1229381.712	2432311.835
20.6	0.00	0.00	0.00	2000.00	6.0	8/7/2014	09:03:46am	TRIPPLESMINE080714.c	1229400.396	2432265.189
20.8	0.00	0.00	0.00	0.00	5.0	8/7/2014	09:07:01am	TRIPPLESMINE080714.c	1229390.227	2432214.043
20.6	0.00	0.00	0.00	0.00	7.0	8/7/2014	09:09:33am	TRIPPLESMINE080714.c	1229334.151	2432209.619
20.4	0.00	0.00	0.00	5000.00	4.0	8/7/2014	09:13:02am	TRIPPLESMINE080714.c	1229336.762	2432111.444
20.4	0.00	0.00	0.00	3000.00	7.0	8/7/2014	09:15:15am	TRIPPLESMINE080714.c	1229318.255	2432055.292
20.7	0.00	0.00	0.00	0.00	8.0	8/7/2014	09:16:52am	TRIPPLESMINE080714.c	1229284.347	2432065.425
20.7	0.00	0.00	0.00	1000.00	7.0	8/7/2014	09:18:33am	TRIPPLESMINE080714.c	1229283.603	2432105.355
20.3	0.00	0.00	0.00	4000.00	10.0	8/7/2014	09:20:39am	TRIPPLESMINE080714.c	1229276.413	2432165.017
20.5	0.00	0.00	0.00	3000.00	8.0	8/7/2014	09:22:56am	TRIPPLESMINE080714.c	1229243.135	2432211.383
20.5	0.00	0.00	0.00	2000.00	7.0	8/7/2014	09:25:03am	TRIPPLESMINE080714.c	1229283.846	2432221.396
20.5	0.00	0.00	0.00	1000.00	8.0	8/7/2014	09:26:52am	TRIPPLESMINE080714.c	1229283.195	2432263.110
20.8	0.00	0.00	0.00	0.00	8.0	8/7/2014	09:29:37am	TRIPPLESMINE080714.c	1229332.504	2432265.673
20.5	0.00	0.00	0.00	2000.00	6.0	8/7/2014	09:32:29am	TRIPPLESMINE080714.c	1229340.276	2432316.935
20.7	0.00	0.00	0.00	0.00	5.0	8/7/2014	09:34:20am	TRIPPLESMINE080714.c	1229324.342	2432341.315
20.8	0.00	0.00	0.00	0.00	7.0	8/7/2014	09:37:26am	TRIPPLESMINE080714.c	1229342.988	2432408.650
20.6	0.00	0.00	0.00	1000.00	12.0	8/7/2014	09:41:36am	TRIPPLESMINE080714.c	1229326.765	2432464.851
20.6	0.00	0.00	0.00	1000.00	10.0	8/7/2014	09:43:04am	TRIPPLESMINE080714.c	1229330.853	2432510.900
20.5	0.00	0.00	0.00	2000.00	10.0	8/7/2014	09:44:55am	TRIPPLESMINE080714.c	1229275.748	2432515.985
20.7	0.00	0.00	0.00	1000.00	11.0	8/7/2014	09:46:32am	TRIPPLESMINE080714.c	1229234.462	2432528.339
20.7	0.00	0.00	0.00	0.00	13.0	8/7/2014	09:48:24am	TRIPPLESMINE080714.c	1229269.466	2432462.111
20.1	0.00	0.00	0.00	4000.00	7.0	8/7/2014	09:50:27am	TRIPPLESMINE080714.c	1229230.718	2432464.247
20.8	0.00	0.00	0.00	0.00	7.0	8/7/2014	09:52:54am	TRIPPLESMINE080714.c	1229281.912	2432410.950
20.8	0.00	0.00	0.00	0.00	5.0	8/7/2014	09:54:46am	TRIPPLESMINE080714.c	1229280.795	2432363.665
20.8	0.00	0.00	0.00	0.00	7.0	8/7/2014	09:57:03am	TRIPPLESMINE080714.c	1229264.494	2432316.363
20.6	0.00	0.00	0.00	0.00	6.0	8/7/2014	09:58:51am	TRIPPLESMINE080714.c	1229239.254	2432269.201
19.8	0.00	0.00	0.00	5000.00	12.0	8/7/2014	10:01:13am	TRIPPLESMINE080714.c	1229233.640	2432158.426
20.7	0.00	0.00	0.00	0.00	5.0	8/7/2014	10:03:29am	TRIPPLESMINE080714.c	1229237.140	2432095.774
20.8	0.00	0.00	0.00	0.00	5.0	8/7/2014	10:05:20am	TRIPPLESMINE080714.c	1229230.242	2432060.972
20.7	0.00	0.00	0.00	0.00	3.0	8/7/2014	10:07:20am	TRIPPLESMINE080714.c	1229199.133	2432047.851
20.6	0.00	0.00	0.00	1000.00	4.0	8/7/2014	10:09:34am	TRIPPLESMINE080714.c	1229195.944	2432112.128
20.3	0.00	0.00	0.00	2000.00	3.0	8/7/2014	10:11:27am	TRIPPLESMINE080714.c	1229191.522	2432156.439

APPENDIX F - ABANDONED COAL MINE SUB GAS AND TEMERATURE MEASURMENTS

Sub_O_2	Sub_CH_4	Sub_H_2S	Sub_CO	Sub_CO_2	Temp__°C	GPS_Date	GPS_Time	Datafile	Northing	Easting
20.8	0.00	0.00	0.00	1000.00	4.0	8/7/2014	10:15:21am	TRIPPLESMINE080714.c	1229146.259	2432186.419
20.6	0.00	0.00	0.00	3000.00	5.0	8/7/2014	10:18:09am	TRIPPLESMINE080714.c	1229119.045	2432100.186
20.8	0.00	0.00	0.00	0.00	4.0	8/7/2014	10:20:25am	TRIPPLESMINE080714.c	1229119.302	2432060.395
20.7	0.00	0.00	0.00	0.00	3.0	8/7/2014	10:22:55am	TRIPPLESMINE080714.c	1229084.038	2432054.363
20.3	0.00	0.00	0.00	2000.00	4.0	8/7/2014	10:26:28am	TRIPPLESMINE080714.c	1229061.623	2432114.563
20.8	0.00	0.00	0.00	0.00	4.0	8/7/2014	10:29:15am	TRIPPLESMINE080714.c	1229079.928	2432163.089
20.5	0.00	0.00	0.00	3000.00	6.0	8/7/2014	10:36:20am	TRIPPLESMINE080714.c	1229026.338	2432177.017
20.8	0.00	0.00	0.00	0.00	4.0	8/7/2014	10:38:50am	TRIPPLESMINE080714.c	1229031.024	2432124.772
20.4	0.00	0.00	0.00	3000.00	5.0	8/7/2014	10:41:46am	TRIPPLESMINE080714.c	1229041.956	2432054.014
20.8	0.00	0.00	0.00	1000.00	3.0	8/7/2014	10:45:01am	TRIPPLESMINE080714.c	1228993.892	2432070.687
20.7	0.00	0.00	0.00	1000.00	4.0	8/7/2014	10:47:49am	TRIPPLESMINE080714.c	1228985.320	2432111.684
20.7	0.00	0.00	0.00	0.00	6.0	8/7/2014	10:50:26am	TRIPPLESMINE080714.c	1228987.085	2432156.076
20.8	0.00	0.00	0.00	0.00	3.0	8/7/2014	10:53:32am	TRIPPLESMINE080714.c	1229007.608	2432214.658
20.8	0.00	0.00	0.00	1000.00	7.0	8/7/2014	11:07:37am	TRIPPLESMINE080714.c	1229033.255	2432213.586
20.5	0.00	0.00	0.00	2000.00	4.0	8/7/2014	11:09:35am	TRIPPLESMINE080714.c	1229029.453	2432278.519
20.8	0.00	0.00	0.00	0.00	5.0	8/7/2014	11:12:53am	TRIPPLESMINE080714.c	1228986.606	2432262.868
20.7	0.00	0.00	0.00	1000.00	5.0	8/7/2014	11:15:27am	TRIPPLESMINE080714.c	1228984.205	2432313.794
20.8	0.00	0.00	0.00	0.00	4.0	8/7/2014	11:18:33am	TRIPPLESMINE080714.c	1229009.680	2432317.102
20.7	0.00	0.00	0.00	1000.00	6.0	8/7/2014	11:20:39am	TRIPPLESMINE080714.c	1229010.085	2432377.066
20.4	0.00	0.00	0.00	3000.00	6.0	8/7/2014	11:25:09am	TRIPPLESMINE080714.c	1229037.413	2432411.321
20.9	0.00	0.00	0.00	0.00	5.0	8/7/2014	11:29:44am	TRIPPLESMINE080714.c	1228996.401	2432363.574
20.5	0.00	0.00	0.00	2000.00	7.0	8/7/2014	11:32:48am	TRIPPLESMINE080714.c	1228997.711	2432412.390
20.8	0.00	0.00	0.00	0.00	6.0	8/7/2014	11:35:49am	TRIPPLESMINE080714.c	1228983.386	2432466.516
20.7	0.00	0.00	0.00	0.00	6.0	8/7/2014	11:38:33am	TRIPPLESMINE080714.c	1229009.413	2432525.762
20.6	0.00	0.00	0.00	1000.00	5.0	8/7/2014	11:40:49am	TRIPPLESMINE080714.c	1229045.143	2432523.602
20.7	0.00	0.00	0.00	1000.00	4.0	8/7/2014	11:43:09am	TRIPPLESMINE080714.c	1229087.684	2432503.252
20.5	0.00	0.00	0.00	2000.00	4.0	8/7/2014	11:45:19am	TRIPPLESMINE080714.c	1229085.626	2432466.105
20.7	0.00	0.00	0.00	1000.00	6.0	8/7/2014	11:49:39am	TRIPPLESMINE080714.c	1229080.305	2432414.258
20.6	0.00	0.00	0.00	1000.00	5.0	8/7/2014	11:51:26am	TRIPPLESMINE080714.c	1229080.265	2432371.543
20.1	0.00	0.00	0.00	5000.00	6.0	8/7/2014	11:53:46am	TRIPPLESMINE080714.c	1229074.449	2432329.381
20.7	0.00	0.00	0.00	1000.00	7.0	8/7/2014	11:56:50am	TRIPPLESMINE080714.c	1229065.004	2432248.702
20.6	0.00	0.00	0.00	2000.00	6.0	8/7/2014	11:59:17am	TRIPPLESMINE080714.c	1229088.601	2432207.968
20.7	0.00	0.00	0.00	0.00	7.0	8/7/2014	12:01:34pm	TRIPPLESMINE080714.c	1229131.148	2432210.296
20.7	0.00	0.00	0.00	1000.00	4.0	8/7/2014	12:03:16pm	TRIPPLESMINE080714.c	1229123.896	2432250.178
20.7	0.00	0.00	0.00	1000.00	5.0	8/7/2014	12:06:15pm	TRIPPLESMINE080714.c	1229143.105	2432305.485
20.6	0.00	0.00	0.00	1000.00	4.0	8/7/2014	12:08:39pm	TRIPPLESMINE080714.c	1229122.227	2432348.697
20.8	0.00	0.00	0.00	0.00	8.0	8/7/2014	12:12:35pm	TRIPPLESMINE080714.c	1229127.621	2432409.326
20.5	0.00	0.00	0.00	2000.00	6.0	8/7/2014	12:15:27pm	TRIPPLESMINE080714.c	1229116.137	2432460.182
20.7	0.00	0.00	0.00	1000.00	7.0	8/7/2014	12:18:42pm	TRIPPLESMINE080714.c	1229143.637	2432527.964
20.8	0.00	0.00	0.00	0.00	12.0	8/7/2014	12:20:55pm	TRIPPLESMINE080714.c	1229188.020	2432523.139
20.8	0.00	0.00	0.00	0.00	12.0	8/7/2014	12:22:27pm	TRIPPLESMINE080714.c	1229162.849	2432490.584
20.4	0.00	0.00	0.00	2000.00	7.0	8/7/2014	12:24:16pm	TRIPPLESMINE080714.c	1229182.873	2432455.217
20.5	0.00	0.00	0.00	2000.00	8.0	8/7/2014	12:27:47pm	TRIPPLESMINE080714.c	1229187.805	2432421.699
20.6	0.00	0.00	0.00	2000.00	5.0	8/7/2014	12:29:56pm	TRIPPLESMINE080714.c	1229184.515	2432364.298
20.7	0.00	0.00	0.00	1000.00	6.0	8/7/2014	12:33:43pm	TRIPPLESMINE080714.c	1229193.206	2432328.353
20.6	0.00	0.00	0.00	1000.00	4.0	8/7/2014	12:37:35pm	TRIPPLESMINE080714.c	1229169.830	2432257.211
20.9	0.00	0.00	0.00	0.00	10.0	8/7/2014	12:40:36pm	TRIPPLESMINE080714.c	1229228.566	2432303.658
20.1	0.00	0.00	0.00	5000.00	9.0	8/7/2014	12:42:07pm	TRIPPLESMINE080714.c	1229224.430	2432358.996
20.8	0.00	0.00	0.00	0.00	6.0	8/7/2014	12:43:53pm	TRIPPLESMINE080714.c	1229219.846	2432404.267
20.7	0.00	0.00	0.00	0.00	9.0	8/7/2014	12:52:16pm	TRIPPLESMINE080714.c	1229118.731	2432211.714

APPENDIX G

NATURAL SPRINGS LABORATORY ANALYTICAL REPORTS

Four Corners Geoscience,Inc.
P.O. Box 4224
Durango, CO 81302

Methane Analysis Report

Client

L T Environmental,Inc.
2243 Main Avenue Suite 3
Durango,CO 81301

Project Name:	Archuleta County	Springs
Project Number	19114001	
Report Date:	5/28/2014	
Sampled By:	Devin Hencmann	

Analysis:	Lynn Fechter			**Results:**	
FCGeo #	**Sample Date**	**Sample Time *(Hrs)***	**Site ID-Location**	***CH4 (mg/L)***	***Limit (mg/L)***
051314-L1	5/13/2014	1320	Willow Spring	<0.02	0.02
051314-L2	5/13/2014	10:20	Thick Spring	<0.02	0.02
051914-L4	5/19/2014	12:20	GOV-02	<0.02	0.02
051914-L5	5/19/2014	14:25	Reich Sec 14 spring	<0.02	0.02
052014-L3	5/20/2014	12:10	Vance Spring #1	<0.02	0.02
052014-L4	5/20/2014	13:10	Munger Spring 2	<0.02	0.02
052214-L8	5/22/2014	13:40	Watson Well spring	<0.02	0.02
052214-L9	5/22/2014	14:10	Grassy Spring	<0.02	0.02
051314-LBK1		NA	LAB BLANK	<0.02	0.02
051314-LBK2		NA	LAB BLANK	<0.02	0.02
051914-LBK4		NA	LAB BLANK	<0.02	0.02
051914-LBK5		NA	LAB BLANK	<0.02	0.02
052014-LBK3		NA	LAB BLANK	<0.02	0.02
052014-LBK4		NA	LAB BLANK	<0.02	0.02
052214-LBK8		NA	LAB BLANK	<0.02	0.02
052214-LBK9		NA	LAB BLANK	<0.02	0.02

Samples delivered to FCGEO by LTE Geologist-analysis by Lynn Fechter
Analyses conducted-SRI gas chromatograph within 24 hours of delivery.
Conducted Methane analysis per protocol and method established
by BLM San Juan Resource Area 1993 and USGS method.
Laboratory calibration quality control conducted for project.
Lab blanks-(duplicated runs if received from techs.

Analyst Lynn M. Fechter, B.S. Geology

75 Suttle Street
Durango, CO 81303
970.247.4220 Phone
970.247.4227 Fax
www.greenanalytical.com

11 June 2014

Devin Hencmann
LT Environmental
2243 Main Ave, Suite 3
Durango, CO 81301

RE: Archuletta Springs

Enclosed are the results of analyses for samples received by the laboratory on 05/20/14 15:48.
If you need any further assistance, please feel free to contact me.

Sincerely,

Debbie Zufelt
Reports Manager

All accredited analytes contained in this report are denoted by an asterisk (*). For a complete list of accredited analytes please do not hesitate to contact us via any of the contact information contained in this report. All of our certifications can be viewed at http://greenanalytical.com/certifications/

Green Analytical Laboratories is NELAP accredited through the Texas Commission on Environmental Quality. Accreditation applies to drinking water and non-potable water matrices for trace metals and a variety of inorganic parameters. Green Analytical Laboratories is also accredited through the Colorado Department of Public Health and Environment and EPA region 8 for trace metals, Cyanide, Fluoride, Nitrate, and Nitrite in drinking water.

Our affiliate laboratory, Cardinal Laboratories, is also NELAP accredited through the Texas Commission on Environmental Quality for a variety of organic constituents in drinking water, non-potable water and solid matrices. Cardinal is also accredited for regulated VOCs, TTHM, and HAA-5 in drinking water

dzufelt@greenanalytical.com p: 970.247.4220 f: 970.247.4227 75 Suttle Street Durango, CO 81303

www.GreenAnalytical.com

LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Vance 1 Spring	1405198-01	Water	05/20/14 12:10	05/20/14 15:48
Munger Spring 1	1405198-02	Water	05/20/14 13:10	05/20/14 15:48

Green Analytical Laboratories

Debbie Zufelt

Debbie Zufelt, Reports Manager

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Green Analytical Laboratories
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www.GreenAnalytical.com

LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

Vance 1 Spring

1405198-01 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	**152**	10.0		mg/L	1	06/03/14	2320 B		ABP
Alkalinity, Carbonate*	<10.0	10.0		mg/L	1	06/03/14	2320 B		ABP
Alkalinity, Hydroxide*	<10.0	10.0		mg/L	1	06/03/14	2320 B		ABP
Alkalinity, Total*	**152**	10.0		mg/L	1	06/03/14	2320 B		ABP
Bromide	<2.00	2.00		mg/L	20	05/24/14	4500-Br- B		ABP
Chloride*	<10.0	10.0	5.00	mg/L	1	05/29/14	4500-Cl- C		ABP
Conductivity*	**298**	10.0		uS/cm	1	05/20/14	2510 B		MJV
Fluoride*	<0.200	0.200	0.0194	mg/L	1	06/07/14	4500-F- C		ABP
Nitrate/Nitrite as N*	<0.020	0.020	0.010	mg/L	1	06/10/14	EPA353.2		KLJ
pH*	**7.40**			pH Units	1	05/20/14	EPA150.1		MJV
TDS*	**215**	10.0		mg/L	1	05/27/14	EPA160.1		ABP
Sulfate	**26.0**	10.0	1.08	mg/L	1	06/05/14	4500-SO42- E		ABP
Dissolved Metals by ICP									
Calcium*	**45.2**	1.00	0.004	mg/L	1	05/22/14	EPA200.7		JGS
Iron*	<0.050	0.050	0.004	mg/L	1	05/22/14	EPA200.7		JGS
Magnesium*	**5.44**	1.00	0.019	mg/L	1	05/22/14	EPA200.7		JGS
Potassium*	**8.75**	1.00	0.364	mg/L	1	05/22/14	EPA200.7		JGS
Sodium*	**12.4**	1.00	0.004	mg/L	1	05/22/14	EPA200.7		JGS

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

Munger Spring 1

1405198-02 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	**162**	10.0		mg/L	1	06/03/14	2320 B		ABP
Alkalinity, Carbonate*	<10.0	10.0		mg/L	1	06/03/14	2320 B		ABP
Alkalinity, Hydroxide*	<10.0	10.0		mg/L	1	06/03/14	2320 B		ABP
Alkalinity, Total*	**162**	10.0		mg/L	1	06/03/14	2320 B		ABP
Bromide	**0.425**	0.100		mg/L	1	05/24/14	4500-Br- B		ABP
Chloride*	**77.0**	10.0	5.00	mg/L	1	05/29/14	4500-Cl- C		ABP
Conductivity*	**522**	10.0		uS/cm	1	05/20/14	2510 B		MJV
Fluoride*	<0.200	0.200	0.0194	mg/L	1	06/07/14	4500-F- C		ABP
Nitrate/Nitrite as N*	**0.109**	0.020	0.010	mg/L	1	06/10/14	EPA353.2		KLJ
pH*	**7.14**			pH Units	1	05/20/14	EPA150.1		MJV
TDS*	**320**	10.0		mg/L	1	05/27/14	EPA160.1		ABP
Sulfate	**33.0**	10.0	1.08	mg/L	1	06/05/14	4500-SO42- E		ABP
Dissolved Metals by ICP									
Calcium*	**73.7**	1.00	0.004	mg/L	1	05/22/14	EPA200.7		JGS
Iron*	<0.050	0.050	0.004	mg/L	1	05/22/14	EPA200.7		JGS
Magnesium*	**15.9**	1.00	0.019	mg/L	1	05/22/14	EPA200.7		JGS
Potassium*	**2.76**	1.00	0.364	mg/L	1	05/22/14	EPA200.7		JGS
Sodium*	**20.9**	1.00	0.004	mg/L	1	05/22/14	EPA200.7		JGS

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www.GreenAnalytical.com

LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405182 - General Prep - Wet Chem										
Duplicate (B405182-DUP1)		**Source: 1405172-01**		Prepared & Analyzed: 05/20/14						
Conductivity	12200	10.0	uS/cm		12300			0.977	20	
Reference (B405182-SRM1)				Prepared & Analyzed: 05/20/14						
Conductivity	434		uS/cm	452		96.0	90-110			
Batch B405185 - General Prep - Wet Chem										
Duplicate (B405185-DUP2)		**Source: 1405179-05**		Prepared & Analyzed: 05/20/14						
pH	7.38		pH Units		7.35			0.407	20	
Reference (B405185-SRM1)				Prepared & Analyzed: 05/20/14						
pH	8.61		pH Units	9.10		94.6	90-110			
Batch B405221 - General Prep - Wet Chem										
Blank (B405221-BLK1)				Prepared & Analyzed: 05/24/14						
Bromide	ND	0.100	mg/L							
LCS (B405221-BS1)				Prepared & Analyzed: 05/24/14						
Bromide	0.582	0.100	mg/L	0.600		97.0	85-115			
LCS Dup (B405221-BSD1)				Prepared & Analyzed: 05/24/14						
Bromide	0.602	0.100	mg/L	0.600		100	85-115	3.48	20	
Batch B405232 - General Prep - Wet Chem										
Blank (B405232-BLK1)				Prepared & Analyzed: 05/27/14						
TDS	ND	10.0	mg/L							

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405232 - General Prep - Wet Chem										
Duplicate (B405232-DUP1)	**Source: 1405196-01**			Prepared & Analyzed: 05/27/14						
TDS	500	10.0	mg/L		485			3.05	20	
Reference (B405232-SRM1)				Prepared & Analyzed: 05/27/14						
TDS	1000	10.0	mg/L	1090		91.7	85-115			
Batch B406006 - General Prep - Wet Chem										
Blank (B406006-BLK1)				Prepared & Analyzed: 05/29/14						
Chloride	ND	10.0	mg/L							
LCS (B406006-BS1)				Prepared & Analyzed: 05/29/14						
Chloride	102	10.0	mg/L	100		102	85-115			
LCS Dup (B406006-BSD1)				Prepared & Analyzed: 05/29/14						
Chloride	100	10.0	mg/L	100		100	85-115	1.98	20	
Batch B406043 - General Prep - Wet Chem										
Blank (B406043-BLK1)				Prepared & Analyzed: 06/03/14						
Alkalinity, Total	ND	10.0	mg/L							
LCS (B406043-BS1)				Prepared & Analyzed: 06/03/14						
Alkalinity, Total	101	10.0	mg/L	100		101	85-115			
LCS Dup (B406043-BSD1)				Prepared & Analyzed: 06/03/14						
Alkalinity, Total	101	10.0	mg/L	100		101	85-115	0.00	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B406060 - General Prep - Wet Chem										
Blank (B406060-BLK1)				Prepared & Analyzed: 06/05/14						
Sulfate	ND	10.0	mg/L							
LCS (B406060-BS1)				Prepared & Analyzed: 06/05/14						
Sulfate	48.0	10.0	mg/L	50.0		96.0	85-115			
LCS Dup (B406060-BSD1)				Prepared & Analyzed: 06/05/14						
Sulfate	48.0	10.0	mg/L	50.0		96.0	85-115	0.00	20	
Batch B406067 - General Prep - Wet Chem										
Blank (B406067-BLK1)				Prepared & Analyzed: 06/07/14						
Fluoride	ND	0.200	mg/L							
LCS (B406067-BS1)				Prepared & Analyzed: 06/07/14						
Fluoride	0.939	0.200	mg/L	1.00		93.9	85-115			
LCS Dup (B406067-BSD1)				Prepared & Analyzed: 06/07/14						
Fluoride	0.988	0.200	mg/L	1.00		98.8	85-115	5.09	20	
Batch B406086 - General Prep - Wet Chem										
Blank (B406086-BLK1)				Prepared & Analyzed: 06/10/14						
Nitrate/Nitrite as N	ND	0.020	mg/L							
LCS (B406086-BS1)				Prepared & Analyzed: 06/10/14						
Nitrate/Nitrite as N	1.03	0.020	mg/L	1.00		103	90-110			

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B406086 - General Prep - Wet Chem										
LCS Dup (B406086-BSD1)				Prepared & Analyzed: 06/10/14						
Nitrate/Nitrite as N	1.01	0.020	mg/L	1.00		101	90-110	1.96	20	

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Debbie Zufelt, Reports Manager

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

Dissolved Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405191 - Dissolved Metals, E200.7/E200.8										
Blank (B405191-BLK1)				Prepared & Analyzed: 05/22/14						
Calcium	ND	1.00	mg/L							
Iron	ND	0.050	mg/L							
Magnesium	ND	1.00	mg/L							
Potassium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
LCS (B405191-BS1)				Prepared & Analyzed: 05/22/14						
Calcium	4.68	1.00	mg/L	5.00		93.6	85-115			
Iron	4.86	0.050	mg/L	5.00		97.3	85-115			
Magnesium	24.9	1.00	mg/L	25.0		99.5	85-115			
Potassium	9.27	1.00	mg/L	10.0		92.7	85-115			
Sodium	7.45	1.00	mg/L	8.10		92.0	85-115			
LCS Dup (B405191-BSD1)				Prepared & Analyzed: 05/22/14						
Calcium	4.54	1.00	mg/L	5.00		90.8	85-115	3.08	20	
Iron	4.72	0.050	mg/L	5.00		94.5	85-115	2.91	20	
Magnesium	24.1	1.00	mg/L	25.0		96.3	85-115	3.22	20	
Potassium	9.17	1.00	mg/L	10.0		91.7	85-115	1.10	20	
Sodium	7.22	1.00	mg/L	8.10		89.1	85-115	3.15	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:47

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
	*Results reported on as received basis unless designated as dry.
RPD	Relative Percent Difference
LCS	Laboratory Control Sample (Blank Spike)
RL	Report Limit
MDL	Method Detection Limit

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CHAIN OF CUSTODY RECORD

Page 1 of 1

Client: LT Environmental
Contact: Denn Hencmann
Address: 2243 main Ave #3

Phone Number: 970-385-1096
Email: DHencmann@ltenv.com

NOTES:
1) Ensure proper container packaging.
2) Ship samples promptly following collection.
3) Designate Sample Reject Disposition.

PO# 0191140001
Project Name: Archuleta Springs

Table 1. – Matrix Type
1 = Surface Water, 2 = Ground Water
3 = Soil/Sediment, 4 = Prod.W., 5 = Oil
6 = Waste, 7 = Other (Specify) 1

FOR GAL USE ONLY
GAL JOB # 1405-198

Samplers Signature:

Lab Name: Green Analytical Laboratories (970) 247-4220 FAX (970) 247-4227
Address: 75 Suttle Street, Durango, CO 81303 www.greenanalytical.com

Sample ID	Collection		Miscellaneous				Preservative(s)						Analyses Required									Comments
	Date	Time	Collected by: (Init.)	Matrix Type From Table 1	No. of Containers	Sample Filtered ? Y/N	Unpreserved (Ice Only)	HNO3	HCL	H2SO4	NAOH	Other (Specify)	See Attached									
1. Vance Spring	5/20/19	1210	DH	1	3	N	2				1		X									15°C #18 on ice
2. Munger Spring	5/20/19	1310	DH	1	3	N	2				1		X									
3.																						
4.																						
5.																						
6.																						
7.																						
8.																						
9.																						
10.																						

Relinquished by:	Date: 5/20/19	Time: 1548	Received by: Michael Valentine	Date: 5-20-19	Time: 1548
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

* Sample Reject: [ ] Return [ ] Dispose [ ] Store (30 Days)

LT ENV ✓

Archuleta springs (21 sets)

- Major cations [dissolved sodium (Na), calcium (Ca), magnesium (Mg), potassium (K), and iron (Fe)] by Environmental Protection Agency (EPA) Method 200.7/4500;

- Alkalinity (carbonate/bicarbonate) by EPA Method 2320 B;

- Major Anions [chloride (Cl), sulfate (SO4), bromide (Br), and fluoride (F)] by EPA Method 200.7/4500;

- pH by EPA Method150.1

- SC by MCA Method WW 120.1 (conductivity?)

- Nitrate/Nitrite as Nitrogen (N) by EPA Method 353.3

- Total dissolved solids (TDS) by EPA Method 2540 C; and

Unpres - 500 x 1
H_2SO_4 - 125 x 1
HNO_3 - 250 x 1 no acid

> x 21

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11 June 2014

Devin Hencmann
LT Environmental
2243 Main Ave, Suite 3
Durango, CO 81301

RE: Archuletta Springs

Enclosed are the results of analyses for samples received by the laboratory on 05/22/14 14:55.
If you need any further assistance, please feel free to contact me.

Sincerely,

Debbie Zufelt
Reports Manager

All accredited analytes contained in this report are denoted by an asterisk (*). For a complete list of accredited analytes please do not hesitate to contact us via any of the contact information contained in this report. All of our certifications can be viewed at http://greenanalytical.com/certifications/

Green Analytical Laboratories is NELAP accredited through the Texas Commission on Environmental Quality. Accreditation applies to drinking water and non-potable water matrices for trace metals and a variety of inorganic parameters. Green Analytical Laboratories is also accredited through the Colorado Department of Public Health and Environment and EPA region 8 for trace metals, Cyanide, Fluoride, Nitrate, and Nitrite in drinking water.

Our affiliate laboratory, Cardinal Laboratories, is also NELAP accredited through the Texas Commission on Environmental Quality for a variety of organic constituents in drinking water, non-potable water and solid matrices. Cardinal is also accredited for regulated VOCs, TTHM, and HAA-5 in drinking water

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Watson Well Spring	1405226-01	Water	05/22/14 13:40	05/22/14 14:55
Grassy Spring	1405226-02	Water	05/22/14 14:10	05/22/14 14:55

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Debbie Zufelt

Debbie Zufelt, Reports Manager

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

Watson Well Spring

1405226-01 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	**324**	10.0		mg/L	2	06/03/14	2320 B		ABP
Alkalinity, Carbonate*	<10.0	10.0		mg/L	2	06/03/14	2320 B		ABP
Alkalinity, Hydroxide*	<10.0	10.0		mg/L	2	06/03/14	2320 B		ABP
Alkalinity, Total*	**324**	10.0		mg/L	2	06/03/14	2320 B		ABP
Bromide	**0.550**	0.100		mg/L	1	05/24/14	4500-Br- B		ABP
Chloride*	<10.0	10.0	5.00	mg/L	1	05/29/14	4500-Cl- C		ABP
Conductivity*	**665**	10.0		uS/cm	1	05/22/14	2510 B		MJV
Fluoride*	<0.200	0.200	0.0194	mg/L	1	06/07/14	4500-F- C		ABP
Nitrate/Nitrite as N*	**5.95**	0.100	0.051	mg/L	5	06/10/14	EPA353.2		KLJ
pH*	**6.99**			pH Units	1	05/22/14	EPA150.1		MJV
TDS*	**430**	10.0		mg/L	1	05/27/14	EPA160.1		ABP
Sulfate	**78.0**	20.0	2.16	mg/L	2	06/10/14	4500-SO42- E		ABP
Dissolved Metals by ICP									
Calcium*	**103**	1.00	0.004	mg/L	1	06/03/14	EPA200.7		JGS
Iron*	<0.050	0.050	0.004	mg/L	1	06/03/14	EPA200.7		JGS
Magnesium*	**40.1**	1.00	0.019	mg/L	1	06/03/14	EPA200.7		JGS
Potassium*	**2.36**	1.00	0.364	mg/L	1	06/03/14	EPA200.7		JGS
Sodium*	**20.4**	1.00	0.004	mg/L	1	06/03/14	EPA200.7		JGS

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Debbie Zufelt

Debbie Zufelt, Reports Manager

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

Grassy Spring

1405226-02 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	**248**	10.0		mg/L	2	06/03/14	2320 B		ABP
Alkalinity, Carbonate*	<10.0	10.0		mg/L	2	06/03/14	2320 B		ABP
Alkalinity, Hydroxide*	<10.0	10.0		mg/L	2	06/03/14	2320 B		ABP
Alkalinity, Total*	**248**	10.0		mg/L	2	06/03/14	2320 B		ABP
Bromide	**0.717**	0.100		mg/L	1	05/24/14	4500-Br- B		ABP
Chloride*	**50.0**	10.0	5.00	mg/L	1	05/29/14	4500-Cl- C		ABP
Conductivity*	**695**	10.0		uS/cm	1	05/22/14	2510 B		MJV
Fluoride*	<0.200	0.200	0.0194	mg/L	1	06/07/14	4500-F- C		ABP
Nitrate/Nitrite as N*	**0.935**	0.020	0.010	mg/L	1	06/10/14	EPA353.2		KLJ
pH*	**6.85**			pH Units	1	05/22/14	EPA150.1		MJV
TDS*	**490**	10.0		mg/L	1	05/27/14	EPA160.1		ABP
Sulfate	**176**	20.0	2.16	mg/L	2	06/10/14	4500-SO42- E		ABP
Dissolved Metals by ICP									
Calcium*	**98.9**	1.00	0.004	mg/L	1	06/03/14	EPA200.7		JGS
Iron*	<0.050	0.050	0.004	mg/L	1	06/03/14	EPA200.7		JGS
Magnesium*	**31.0**	1.00	0.019	mg/L	1	06/03/14	EPA200.7		JGS
Potassium*	**4.62**	1.00	0.364	mg/L	1	06/03/14	EPA200.7		JGS
Sodium*	**32.1**	1.00	0.004	mg/L	1	06/03/14	EPA200.7		JGS

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Debbie Zufelt, Reports Manager

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405210 - General Prep - Wet Chem										
Duplicate (B405210-DUP2)		**Source: 1405226-01**		Prepared & Analyzed: 05/22/14						
pH	6.99		pH Units		6.99			0.00	20	
Reference (B405210-SRM1)				Prepared & Analyzed: 05/22/14						
pH	8.49		pH Units	9.10		93.3	90-110			
Batch B405211 - General Prep - Wet Chem										
Duplicate (B405211-DUP1)		**Source: 1405199-01**		Prepared & Analyzed: 05/22/14						
Conductivity	666	10.0	uS/cm		660			0.905	20	
Reference (B405211-SRM1)				Prepared & Analyzed: 05/22/14						
Conductivity	465		uS/cm	452		103	90-110			
Batch B405221 - General Prep - Wet Chem										
Blank (B405221-BLK1)				Prepared & Analyzed: 05/24/14						
Bromide	ND	0.100	mg/L							
LCS (B405221-BS1)				Prepared & Analyzed: 05/24/14						
Bromide	0.582	0.100	mg/L	0.600		97.0	85-115			
LCS Dup (B405221-BSD1)				Prepared & Analyzed: 05/24/14						
Bromide	0.602	0.100	mg/L	0.600		100	85-115	3.48	20	
Batch B405232 - General Prep - Wet Chem										
Blank (B405232-BLK1)				Prepared & Analyzed: 05/27/14						
TDS	ND	10.0	mg/L							

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405232 - General Prep - Wet Chem										
Duplicate (B405232-DUP2)		**Source: 1405226-01**		Prepared & Analyzed: 05/27/14						
TDS	490	10.0	mg/L		430			13.0	20	
Reference (B405232-SRM1)				Prepared & Analyzed: 05/27/14						
TDS	1000	10.0	mg/L	1090		91.7	85-115			
Batch B406006 - General Prep - Wet Chem										
Blank (B406006-BLK1)				Prepared & Analyzed: 05/29/14						
Chloride	ND	10.0	mg/L							
LCS (B406006-BS1)				Prepared & Analyzed: 05/29/14						
Chloride	102	10.0	mg/L	100		102	85-115			
LCS Dup (B406006-BSD1)				Prepared & Analyzed: 05/29/14						
Chloride	100	10.0	mg/L	100		100	85-115	1.98	20	
Batch B406043 - General Prep - Wet Chem										
Blank (B406043-BLK1)				Prepared & Analyzed: 06/03/14						
Alkalinity, Total	ND	10.0	mg/L							
LCS (B406043-BS1)				Prepared & Analyzed: 06/03/14						
Alkalinity, Total	101	10.0	mg/L	100		101	85-115			
LCS Dup (B406043-BSD1)				Prepared & Analyzed: 06/03/14						
Alkalinity, Total	101	10.0	mg/L	100		101	85-115	0.00	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B406067 - General Prep - Wet Chem										
Blank (B406067-BLK1)				Prepared & Analyzed: 06/07/14						
Fluoride	ND	0.200	mg/L							
LCS (B406067-BS1)				Prepared & Analyzed: 06/07/14						
Fluoride	0.939	0.200	mg/L	1.00		93.9	85-115			
LCS Dup (B406067-BSD1)				Prepared & Analyzed: 06/07/14						
Fluoride	0.988	0.200	mg/L	1.00		98.8	85-115	5.09	20	
Batch B406085 - General Prep - Wet Chem										
Blank (B406085-BLK1)				Prepared & Analyzed: 06/10/14						
Sulfate	ND	10.0	mg/L							
LCS (B406085-BS1)				Prepared & Analyzed: 06/10/14						
Sulfate	50.0	10.0	mg/L	50.0		100	85-115			
LCS Dup (B406085-BSD1)				Prepared & Analyzed: 06/10/14						
Sulfate	51.0	10.0	mg/L	50.0		102	85-115	1.98	20	
Batch B406087 - General Prep - Wet Chem										
Blank (B406087-BLK1)				Prepared & Analyzed: 06/10/14						
Nitrate/Nitrite as N	ND	0.020	mg/L							
LCS (B406087-BS1)				Prepared & Analyzed: 06/10/14						
Nitrate/Nitrite as N	0.937	0.020	mg/L	1.00		93.7	90-110			

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B406087 - General Prep - Wet Chem										
LCS Dup (B406087-BSD1)				Prepared & Analyzed: 06/10/14						
Nitrate/Nitrite as N	1.01	0.020	mg/L	1.00		101	90-110	7.50	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

Dissolved Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B406003 - Dissolved Metals, E200.7/E200.8										
Blank (B406003-BLK1)				Prepared & Analyzed: 06/02/14						
Calcium	ND	1.00	mg/L							
Iron	ND	0.050	mg/L							
Magnesium	ND	1.00	mg/L							
Potassium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
LCS (B406003-BS1)				Prepared & Analyzed: 06/02/14						
Calcium	5.34	1.00	mg/L	5.00		107	85-115			
Iron	5.35	0.050	mg/L	5.00		107	85-115			
Magnesium	27.5	1.00	mg/L	25.0		110	85-115			
Potassium	10.5	1.00	mg/L	10.0		105	85-115			
Sodium	9.11	1.00	mg/L	8.10		112	85-115			
LCS Dup (B406003-BSD1)				Prepared & Analyzed: 06/02/14						
Calcium	5.40	1.00	mg/L	5.00		108	85-115	1.23	20	
Iron	5.41	0.050	mg/L	5.00		108	85-115	1.24	20	
Magnesium	28.0	1.00	mg/L	25.0		112	85-115	1.92	20	
Potassium	10.3	1.00	mg/L	10.0		103	85-115	1.72	20	
Sodium	9.11	1.00	mg/L	8.10		112	85-115	0.0362	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/11/14 11:56

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
	*Results reported on as received basis unless designated as dry.
RPD	Relative Percent Difference
LCS	Laboratory Control Sample (Blank Spike)
RL	Report Limit
MDL	Method Detection Limit

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CHAIN OF CUSTODY RECORD

Page 1 of 1

Client: LT Environmental
Contact: Devin Hencmann
Address: 2243 main Ave #3

Phone Number: 970-385-1096
Email: DHencmann@ltenv.com

NOTES:
1) Ensure proper container packaging.
2) Ship samples promptly following collection.
3) Designate Sample Reject Disposition.

PO# 0191140001
Project Name: Archuleta Springs

Table 1. – Matrix Type
1 = Surface Water, 2 = Ground Water
3 = Soil/Sediment, 4 = Prod.W., 5 = Oil
6 = Waste, 7 = Other (Specify) 1

FOR GAL USE ONLY
GAL JOB # 1405-226

Samplers Signature:

Lab Name: Green Analytical Laboratories (970) 247-4220 FAX (970) 247-4227
Address: 75 Suttle Street, Durango, CO 81303 www.greenanalytical.com

Sample ID	Collection: Date	Collection: Time	Misc: Collected by: (Init.)	Misc: Matrix Type From Table 1	Misc: No. of Containers	Misc: Sample Filtered ? Y/N	Preservative(s): Unpreserved (Ice Only)	Preservative(s): HNO3	Preservative(s): HCL	Preservative(s): H2SO4	Preservative(s): NAOH	Preservative(s): Other (Specify)	Analyses Required: See Attached.	Comments
1. Watson wellspring	5/22	1340	DH	1	3	N	2				1			received on ice @ 12.0°C
2. Grassy Spring	5/22	1410	DH	1	3	N	2				1			
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

Relinquished by:	Date: 5/22/14	Time: 1455	Received by:	Date: 5-22-14	Time: 1455
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

* Sample Reject: [ ] Return [ ] Dispose [ ] Store (30 Days)

Project Information

LT Environmental
2243 Main Ave, Suite 3
Durango, CO 81301
Laboratory PM: **Debbie Zufelt**
Phone:(970) 385-1096
Fax:-

LTE
5/22/2014

Project Name:	Archuletta Springs	**Invoice To:**	LT Environmental
Project Number:	[none]	**Invoice Bid:**	(list pricing)
Client PM:	Devin Hencmann	**Invoice Manager:**	Julie Linn
Comments:			

Analysis	Comment
Iron Dissolved by ICP	
Alkalinity, Carbonate	
Alkalinity, Hydroxide	
Alkalinity, Total	
Bromide	
Calcium Dissolved by ICP	
Chloride	
Alkalinity, Bicarbonate	
Fluoride	
Sulfate	
Magnesium Dissolved by ICP	
Nitrate/Nitrite as N	
pH	
Potassium Dissolved by ICP	
Sodium Dissolved by ICP	
Solids, Total Dissolved (TDS)	
Conductivity	

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07 June 2014

Devin Hencmann
LT Environmental
2243 Main Ave, Suite 3
Durango, CO 81301

RE: Archuletta Springs

Enclosed are the results of analyses for samples received by the laboratory on 05/19/14 16:47.
If you need any further assistance, please feel free to contact me.

Sincerely,

Debbie Zufelt
Reports Manager

All accredited analytes contained in this report are denoted by an asterisk (*). For a complete list of accredited analytes please do not hesitate to contact us via any of the contact information contained in this report. All of our certifications can be viewed at http://greenanalytical.com/certifications/

Green Analytical Laboratories is NELAP accredited through the Texas Commission on Environmental Quality. Accreditation applies to drinking water and non-potable water matrices for trace metals and a variety of inorganic parameters. Green Analytical Laboratories is also accredited through the Colorado Department of Public Health and Environment and EPA region 8 for trace metals, Cyanide, Fluoride, Nitrate, and Nitrite in drinking water.

Our affiliate laboratory, Cardinal Laboratories, is also NELAP accredited through the Texas Commission on Environmental Quality for a variety of organic constituents in drinking water, non-potable water and solid matrices. Cardinal is also accredited for regulated VOCs, TTHM, and HAA-5 in drinking water

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

ANALYTICAL REPORT FOR SAMPLES

Sample ID	Laboratory ID	Matrix	Date Sampled	Date Received
Gov-2	1405174-01	Water	05/19/14 12:20	05/19/14 16:47
Section 14 (Reich)	1405174-02	Water	05/19/14 14:25	05/19/14 16:47

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

Gov-2

1405174-01 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	**272**	10.0		mg/L	2	05/31/14	2320 B		ABP
Alkalinity, Carbonate*	<10.0	10.0		mg/L	2	05/31/14	2320 B		ABP
Alkalinity, Hydroxide*	<10.0	10.0		mg/L	2	05/31/14	2320 B		ABP
Alkalinity, Total*	**272**	10.0		mg/L	2	05/31/14	2320 B		ABP
Bromide	**0.519**	0.100		mg/L	1	05/24/14	4500-Br- B		ABP
Chloride*	<10.0	10.0	5.00	mg/L	1	05/28/14	4500-Cl- C		ABP
Conductivity*	**539**	10.0		uS/cm	1	05/20/14	2510 B		MJV
Fluoride*	<0.200	0.200	0.0194	mg/L	1	06/06/14	4500-F- C		ABP
Nitrate/Nitrite as N*	**0.022**	0.020	0.010	mg/L	1	05/30/14	EPA353.2		KLJ
pH*	**7.19**			pH Units	1	05/20/14	EPA150.1		MJV
TDS*	**365**	10.0		mg/L	1	05/22/14	EPA160.1		ABP
Sulfate	**72.0**	10.0	1.08	mg/L	1	06/05/14	4500-SO42- E		ABP
Dissolved Metals by ICP									
Calcium*	**87.7**	1.00	0.004	mg/L	1	05/21/14	EPA200.7		JGS
Iron*	<0.050	0.050	0.004	mg/L	1	05/21/14	EPA200.7		JGS
Magnesium*	**25.2**	1.00	0.019	mg/L	1	05/21/14	EPA200.7		JGS
Potassium*	**1.23**	1.00	0.364	mg/L	1	05/21/14	EPA200.7		JGS
Sodium*	**15.9**	1.00	0.004	mg/L	1	05/21/14	EPA200.7		JGS

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Debbie Zufelt, Reports Manager

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

Section 14 (Reich)

1405174-02 (Water)

Analyte	Result	RL	MDL	Units	Dilution	Analyzed	Method	Notes	Analyst
General Chemistry									
Alkalinity, Bicarbonate*	**222**	10.0		mg/L	2	05/31/14	2320 B		ABP
Alkalinity, Carbonate*	<10.0	10.0		mg/L	2	05/31/14	2320 B		ABP
Alkalinity, Hydroxide*	<10.0	10.0		mg/L	2	05/31/14	2320 B		ABP
Alkalinity, Total*	**222**	10.0		mg/L	2	05/31/14	2320 B		ABP
Bromide	**0.477**	0.100		mg/L	1	05/24/14	4500-Br- B		ABP
Chloride*	<10.0	10.0	5.00	mg/L	1	05/28/14	4500-Cl- C		ABP
Conductivity*	**481**	10.0		uS/cm	1	05/20/14	2510 B		MJV
Fluoride*	**0.442**	0.200	0.0194	mg/L	1	06/06/14	4500-F- C		ABP
Nitrate/Nitrite as N*	**0.021**	0.020	0.010	mg/L	1	05/30/14	EPA353.2		KLJ
pH*	**7.33**			pH Units	1	05/20/14	EPA150.1		MJV
TDS*	**255**	10.0		mg/L	1	05/22/14	EPA160.1		ABP
Sulfate	**66.0**	10.0	1.08	mg/L	1	06/05/14	4500-SO42- E		ABP
Dissolved Metals by ICP									
Calcium*	**84.5**	1.00	0.004	mg/L	1	05/21/14	EPA200.7		JGS
Iron*	<0.050	0.050	0.004	mg/L	1	05/21/14	EPA200.7		JGS
Magnesium*	**9.24**	1.00	0.019	mg/L	1	05/21/14	EPA200.7		JGS
Potassium*	**1.19**	1.00	0.364	mg/L	1	05/21/14	EPA200.7		JGS
Sodium*	**26.8**	1.00	0.004	mg/L	1	05/21/14	EPA200.7		JGS

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Debbie Zufelt

Debbie Zufelt, Reports Manager

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www.GreenAnalytical.com

LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405182 - General Prep - Wet Chem										
Duplicate (B405182-DUP1)		**Source: 1405172-01**		Prepared & Analyzed: 05/20/14						
Conductivity	12200	10.0	uS/cm		12300			0.977	20	
Reference (B405182-SRM1)				Prepared & Analyzed: 05/20/14						
Conductivity	434		uS/cm	452		96.0	90-110			
Batch B405185 - General Prep - Wet Chem										
Duplicate (B405185-DUP2)		**Source: 1405179-05**		Prepared & Analyzed: 05/20/14						
pH	7.38		pH Units		7.35			0.407	20	
Reference (B405185-SRM1)				Prepared & Analyzed: 05/20/14						
pH	8.61		pH Units	9.10		94.6	90-110			
Batch B405216 - General Prep - Wet Chem										
Blank (B405216-BLK1)				Prepared & Analyzed: 05/22/14						
TDS	ND	10.0	mg/L							
Duplicate (B405216-DUP2)		**Source: 1405179-02**		Prepared & Analyzed: 05/22/14						
TDS	7780	10.0	mg/L		8030			3.16	20	
Reference (B405216-SRM1)				Prepared & Analyzed: 05/22/14						
TDS	1040	10.0	mg/L	1090		95.0	85-115			
Batch B405221 - General Prep - Wet Chem										
Blank (B405221-BLK1)				Prepared & Analyzed: 05/24/14						
Bromide	ND	0.100	mg/L							

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405221 - General Prep - Wet Chem										
LCS (B405221-BS1)				Prepared & Analyzed: 05/24/14						
Bromide	0.582	0.100	mg/L	0.600		97.0	85-115			
LCS Dup (B405221-BSD1)				Prepared & Analyzed: 05/24/14						
Bromide	0.602	0.100	mg/L	0.600		100	85-115	3.48	20	
Batch B405238 - General Prep - Wet Chem										
Blank (B405238-BLK1)				Prepared & Analyzed: 05/28/14						
Chloride	ND	10.0	mg/L							
LCS (B405238-BS1)				Prepared & Analyzed: 05/28/14						
Chloride	100	10.0	mg/L	100		100	85-115			
LCS Dup (B405238-BSD1)				Prepared & Analyzed: 05/28/14						
Chloride	100	10.0	mg/L	100		100	85-115	0.00	20	
Batch B406009 - General Prep - Wet Chem										
Blank (B406009-BLK1)				Prepared & Analyzed: 05/30/14						
Nitrate/Nitrite as N	ND	0.020	mg/L							
LCS (B406009-BS1)				Prepared & Analyzed: 05/30/14						
Nitrate/Nitrite as N	0.537	0.020	mg/L	0.500		107	90-110			
LCS Dup (B406009-BSD1)				Prepared & Analyzed: 05/30/14						
Nitrate/Nitrite as N	0.532	0.020	mg/L	0.500		106	90-110	0.935	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B406011 - General Prep - Wet Chem										
Blank (B406011-BLK1)				Prepared & Analyzed: 05/31/14						
Alkalinity, Total	ND	10.0	mg/L							
LCS (B406011-BS1)				Prepared & Analyzed: 05/31/14						
Alkalinity, Total	105	10.0	mg/L	100		105	85-115			
LCS Dup (B406011-BSD1)				Prepared & Analyzed: 05/31/14						
Alkalinity, Total	99.0	10.0	mg/L	100		99.0	85-115	5.88	20	
Batch B406059 - General Prep - Wet Chem										
Blank (B406059-BLK1)				Prepared & Analyzed: 06/05/14						
Sulfate	ND	10.0	mg/L							
LCS (B406059-BS1)				Prepared & Analyzed: 06/05/14						
Sulfate	47.0	10.0	mg/L	50.0		94.0	85-115			
LCS Dup (B406059-BSD1)				Prepared & Analyzed: 06/05/14						
Sulfate	52.0	10.0	mg/L	50.0		104	85-115	10.1	20	
Batch B406063 - General Prep - Wet Chem										
Blank (B406063-BLK1)				Prepared & Analyzed: 06/06/14						
Fluoride	ND	0.200	mg/L							
LCS (B406063-BS1)				Prepared & Analyzed: 06/06/14						
Fluoride	1.03	0.200	mg/L	1.00		103	85-115			

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

General Chemistry - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B406063 - General Prep - Wet Chem										
LCS Dup (B406063-BSD1)				Prepared & Analyzed: 06/06/14						
Fluoride	1.06	0.200	mg/L	1.00		106	85-115	2.69	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

Dissolved Metals by ICP - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B405160 - Dissolved Metals, E200.7/E200.8										
Blank (B405160-BLK1)				Prepared & Analyzed: 05/19/14						
Calcium	ND	1.00	mg/L							
Iron	ND	0.050	mg/L							
Magnesium	ND	1.00	mg/L							
Potassium	ND	1.00	mg/L							
Sodium	ND	1.00	mg/L							
LCS (B405160-BS1)				Prepared & Analyzed: 05/19/14						
Calcium	4.79	1.00	mg/L	5.00		95.9	85-115			
Iron	4.98	0.050	mg/L	5.00		99.5	85-115			
Magnesium	25.3	1.00	mg/L	25.0		101	85-115			
Potassium	9.89	1.00	mg/L	10.0		98.9	85-115			
Sodium	7.89	1.00	mg/L	8.10		97.4	85-115			
LCS Dup (B405160-BSD1)				Prepared & Analyzed: 05/19/14						
Calcium	4.80	1.00	mg/L	5.00		96.0	85-115	0.0954	20	
Iron	4.98	0.050	mg/L	5.00		99.7	85-115	0.130	20	
Magnesium	25.3	1.00	mg/L	25.0		101	85-115	0.352	20	
Potassium	9.65	1.00	mg/L	10.0		96.5	85-115	2.44	20	
Sodium	7.88	1.00	mg/L	8.10		97.3	85-115	0.0885	20	

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LT Environmental	Project: Archuletta Springs	
2243 Main Ave, Suite 3	Project Name / Number: [none]	**Reported:**
Durango CO, 81301	Project Manager: Devin Hencmann	06/07/14 07:26

Notes and Definitions

DET	Analyte DETECTED
ND	Analyte NOT DETECTED at or above the reporting limit
NR	Not Reported
dry	Sample results reported on a dry weight basis
	*Results reported on as received basis unless designated as dry.
RPD	Relative Percent Difference
LCS	Laboratory Control Sample (Blank Spike)
RL	Report Limit
MDL	Method Detection Limit

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CHAIN OF CUSTODY RECORD

Page 1 of 1

Green Analytical Laboratories

Client: LT Environmental
Contact: Dean Henemann
Address: 2243 Main Ave #3
Durango, CO 81301
Phone Number: 970-385-1096
Email: DHenemann@LTenv.com

NOTES:
1) Ensure proper container packaging.
2) Ship samples promptly following collection.
3) Designate Sample Reject Disposition.

PO# 0191140001
Project Name: Arcuretta Springs

Table 1. – Matrix Type
1 = Surface Water, 2 = Ground Water
3 = Soil/Sediment, 4 = Rinsate, 5 = Oil
6 = Waste, 7 = Other (Specify) _____

FOR GAL USE ONLY
GAL JOB # 1405-174

Samplers Signature:

Lab Name: Green Analytical Laboratories (970) 247-4220 FAX (970) 247-4227
Address: 75 Suttle Street, Durango, CO 81303 www.greenanalytical.com

Sample ID	Collection: Date	Collection: Time	Misc: Collected by: (Init.)	Misc: Matrix Type From Table 1	Misc: No. of Containers	Misc: Sample Filtered ? Y/N	Preservative(s): Unpreserved (Ice Only)	Preservative(s): HNO3	Preservative(s): HCL	Preservative(s): H2SO4	Preservative(s): NAOH	Preservative(s): Other (Specify)	Analyses Required: See Attached	Comments
1. GOV-2	5/19	1220	DH	1	3	N	2			1			X	
2. Section 14/Ranch	5/19	1425	DH	1	3	N	2			1			X	
3.														
4.														
5.														
6.														
7.														
8.														
9.														
10.														

#18
14.1°c
on ice

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	DH 5/19/14	1647	[signature]	5-19-14	1647
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

* Sample Reject: [ ] Return [ ] Dispose [ ] Store (30 Days)

LT ENV

Archuleta springs (21 sets)

- Major cations [dissolved sodium (Na), calcium (Ca), magnesium (Mg), potassium (K), and iron (Fe)] by Environmental Protection Agency (EPA) Method 200.7/4500;

- Alkalinity (carbonate/bicarbonate) by EPA Method 2320 B;

- Major Anions [chloride (Cl), sulfate (SO4), bromide (Br), and fluoride (F)] by EPA Method 200.7/4500;

- pH by EPA Method150.1

- SC by MCA Method WW 120.1 (conductivity?)

- Nitrate/Nitrite as Nitrogen (N) by EPA Method 353.3

- Total dissolved solids (TDS) by EPA Method 2540 C; and

Unpres - 500 x 1
H_2SO_4 - 125 x 1
HNO_3 - 250 x 1 no acid

x 21