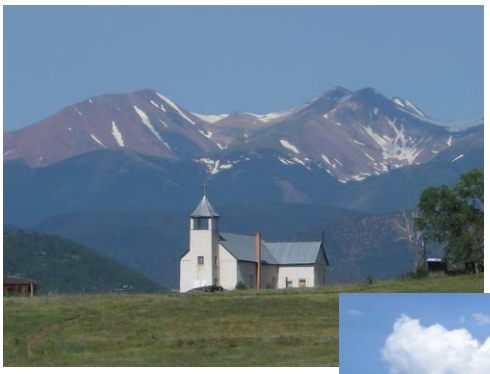
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COGCC PROJECT #1925
OIL AND GAS CONSERVATION RESPONSE FUND



DECEMBER 2007

Prepared for:

COLORADO OIL AND GAS CONSERVATION COMMISSION
Denver, Colorado

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Prepared for:

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EXECUTIVE SUMMARY

LT Environmental, Inc. (LTE) has been retained by the Colorado Oil and Gas Conservation Commission (COGCC) to conduct a Phase II Raton Basin Gas Seep Investigation (Phase II Gas Seep Investigation) in Las Animas and Huerfano Counties, Colorado.

The primary objectives of this Phase II Gas Seep Investigation are to proactively and systematically locate and survey methane gas seepage within the Raton Basin of Colorado as well as document areas where gas seepage is not occurring. These objectives will help ensure the safety of the public by identifying areas of methane seepage and assessing the potential for methane to create hazardous conditions in these areas. The Phase II Gas Seep Investigation included the following tasks:

- Ground survey to identify suspected seep areas;
- Detailed mapping of suspected seep areas;
- Sampling and analysis of gas collected from selected seep areas;
- Sampling and analysis of water from selected water wells in the project area;
- Methane detection system installation in an affected residence;
- Preparation of letters summarizing detailed mapping results to landowners of affected areas; and
- Preparation of letters summarizing water quality sampling results to water well owners.

Ground Survey

The 2007 ground survey covered 3,187 miles of roads in the Raton Basin and identified 59 seeps. In comparison, the 2000/2001 ground survey covered 2,789 miles of roads within the Raton Basin and identified 67 seeps. The 2007 ground survey identified more seep sites in the northern part of the Raton Basin and fewer sites in the southern part of the Raton Basin as compared to the 2000/2001 ground survey.

The ground survey is a good screening tool to identify the presence or absence of methane across large areas. However, influencing factors such as season, temperature, barometric pressure, wind direction, and wind speed affect the concentration of methane detected. Therefore, it's effectiveness at quantifying changes in methane seepage rates or concentration over time at a given seep area is limited.

Detailed Mapping

LTE conducted detailed mapping at 55 sites within the project area. The detailed mapping events account for 31 of the original 59 sites identified during the 2007 ground survey and 24 additional

sites amended to the detailed mapping program. Methane was detected at 35 of the 55 sites. Based on the data, many of the sites exhibited seeping thermogenic methane, likely associated with the coal beds present at or near the ground surface or at depth throughout the Raton Basin. The extent to which the change in seepage rates is occurring or the cause of the seepage cannot be determined from this investigation alone as this was the first detailed mapping program conducted in the Raton Basin.

Gas Sampling

Gas samples were collected and analyzed from 32 seep locations in the Raton Basin. Methane gas was detected in all of the gas samples collected. Generally, the methane gas was determined to be of thermogenic origin and similar in composition to the methane derived from the coal beds in the Raton Basin.

Water Well Sampling

Water samples were collected and analyzed from 17 locations in the Raton Basin. Methane gas was detected in all but two of the samples collected. While there is no known toxicity from methane gas, the hazard lies in the accumulation of methane in confined spaces potentially creating an explosive and/or an oxygen deficient environment. Six of the 17 samples collected contained sufficient methane content to conduct composition and isotopic analysis. Four of the six samples appear to be of thermogenic origin while the remaining two samples with methane gas appear to be of biogenic origin.

Methane Detection System

The methane detection system recently installed in the residence at Apogee 643 appears to be functioning properly and is an effective tool to provide a warning to the occupants of the structure prior to the accumulation of methane to explosive levels.

General Considerations

One of the primary concerns prompting this Phase II Gas Seep Investigation and investigations prior to this, is whether or not coal bed methane (CBM) production is influencing methane seepage conditions in the Raton Basin.

There are no data or conclusions in this investigation that can directly link the methane seepage observed to the ongoing gas production or historic coal mining operations at this time. Further study is required to investigate this relationship. However, it is understood that CBM production involves the dewatering of coal beds, resulting in a reduction of pore pressures in the coal, and ultimately liberating methane gas from the coal. The methane gas is then captured by a network of production wells. Surface expression of methane seepage can be the result of inefficient capture of the liberated gas; indirect dewatering of coal beds hydraulically connected to a production zone; or the natural dewatering and release of methane from coal beds due to drought conditions. Subsurface systems of fractures, preferential pathways, hydraulically connected formations, and soil and rock permeability further complicate fully understanding a cause and effect relationship.

Specific Concerns

Based on the findings of this Phase II Gas Seep Investigation, LTE has developed a list of specific concerns that should be noted separately. The specific concerns are as follows (in no particular order):

- Coal mine vents, coreholes, and/or mineshafts are strongly suspected to be the source seeping methane gas and should be plugged to reduce seepage;

Sites with Vents, Coreholes, and/or Mineshafts
Apogee 605
Apogee 607
Apogee 612
Sinkhole – Apogee 644
Apogee 641
Apogee 646
Golden Eagle Mine

- Pipelines and/or gas production wells have the potential to be leaking and should be repaired to conserve resources; and

Seep ID	Nearby Pipeline Owner/Operator
Apogee 9	Potential XTO Energy Gathering Line
Apogee 11	Potential XTO Energy Gathering Line
Apogee 15	Potential XTO Energy Gathering Line
Apogee 19	Potential XTO Energy Gathering Line
Apogee 27 & 34	Leaking well API 05-071-06045, City of Trinidad
Apogee 28	Leaking Valve for Pioneer Gathering Line at well API 05-071-06795
Apogee 637	Potential Pioneer Gathering Line
Apogee 638	Potential Pioneer Gathering Line
Apogee 649	Potential Pioneer Gathering Line
Apogee 652	Potential Pioneer Gathering Line
Apogee 656	Potential Pioneer Gathering Line or Leak at well API 05-071-06248
Golden Cycle 1, and Golden Cycle Land Co 1	Potential leak from casing of well at API 05-055-06023 or API 05-055-06038

- Six water wells contain methane gas at dissolved concentrations above 2 milligrams per liter (mg/L). The COGCC has established 2 mg/L as a threshold level at which water well systems have the potential to accumulate explosive vapors in confined spaces.

Water Well ID (permit #)	Methane Concentration (mg/L)
Bounds (181278)	5.240
Dubis (NA)	6.330
Hopke (256504)	3.420
Manning (259501)	4.140
Slevec-2 (NA)	21.200
Van Artsdalen (201674)	27.200

NA = not applicable

SECTION 1.0

INTRODUCTION

LT Environmental, Inc. (LTE) has been retained by the Colorado Oil and Gas Conservation Commission (COGCC) to conduct a Phase II Raton Basin Gas Seep Investigation (Phase II Gas Seep Investigation) in Las Animas and Huerfano Counties, Colorado (Figure 1).

1.1 BACKGROUND INFORMATION

1.1.1 Raton Basin

Location

The Raton Basin, located in southeastern Colorado and northern New Mexico, covers a total area of approximately 2,200 square miles. The Raton Basin is approximately 50 miles wide at its widest east to west point and approximately 80 miles from north to south. The portion of the Raton Basin in Colorado measures approximately 50 miles from the northern boundary to the southern Colorado border. Within Colorado, the Raton Basin includes Las Animas and Huerfano Counties and lies west of the towns of Walsenburg and Trinidad. The Raton Basin is bordered to the west by the Sangre de Cristo mountain range and to the east by the high plains located east of the Front Range foothills. Figure 1 illustrates the location of the project area.

Geology

Structurally, the Raton Basin consists of an asymmetric synclinal sedimentary basin. The coal occurs in the Vermejo Formation (Kv) of Cretaceous Age and the Raton Formation (TKr) of Tertiary and Cretaceous Age. The Trinidad Sandstone forms the lower boundary of the Raton coal basin.

The total coal thickness in the Kv ranges from approximately 5 feet to 35 feet. Total coal thickness in the TKr ranges from approximately 10 feet to greater than 140 feet. Although the TKr is much thicker and contains more total coal than the Kv, individual coal seams in the TKr are less continuous and generally thinner. Additionally, because of extensive erosion of the TKr, particularly in the eastern part of the basin, much of the original coal is no longer present (Stevens et al., 1992).

Recent History

Mining

The Raton Basin was the host to an active coal mining industry in the late 1800's and early 1900's. Both the Trinidad coal field and the Walsenburg coal field were active, driven primarily by the need for coal coke as the fuel in the iron smelting process underway in Pueblo, Colorado. Coal mining activity varied in intensity depending on the market, World War II, and other factors and continued up through the 1970's and 1980's. The last mines (Golden Eagle and New

Elk) were closed in 1996 and the railroads serving them have been removed (Sangres.com, 2007).

The importance of understanding the mining history in the Raton Basin as related to this seep investigation is that the mining industry has constructed many subsurface features that may act as preferential pathways to methane gas migration. Not only were there many underground mines with large rooms, but the underground mines were equipped with gas vents. Exploration and resource management efforts also included the advancement of hundreds of soil coreholes in the Raton Basin. The historic vents and coreholes have the potential to act as preferential pathways for methane gas migration if not properly sealed.

Natural Gas Production

Development of coal bed methane (CBM) has focused on development of the Kv coals rather than the TKr coals because the individual seams in the TKr unit are less continuous and generally thinner. The coal beds in both units are of limited extent and cannot be correlated over more than a few miles.

Commercial CBM production of the Raton Basin began around 1993 though some pilot projects pre-date this development. Currently, there are approximately 2,600 active gas production wells in the Raton Basin. The three largest producers include XTO Energy, Inc. (XTO), Pioneer Natural Resources Company (Pioneer), and El Paso Exploration and Production Company LP (El Paso). Recently, Pioneer acquired all of the Petrogulf Corporation (Petrogulf) assets in the Raton Basin.

1.1.2 Phase I Study

A Phase I Study was conducted within the Raton Basin between 2000 and 2003. The Phase I Study documented the existing conditions of known methane seep areas within the Raton Basin through a ground survey conducted in late 2000 and early 2001 (2000/2001 ground survey). Evaluations of groundwater quality from water wells and active CBM wells were also performed. Detailed results of this study are available on the COGCC website library at http://oil-gas.state.co.us/Library/RatonBasinReports.htm.

The number of CBM production wells in the Raton Basin has increased rapidly over the past few years. In 2004, landowner complaints indicated that methane gas was seeping from the ground surface along the Purgatoire River within the Raton Basin. This seepage created an increased awareness of the potential hazardous conditions associated with CBM seepage in the vicinity of houses and/or other structures. This Phase II Gas Seep Investigation is a follow-up of the studies completed between 2000 and 2003 to help address landowner concerns.

1.2 OBJECTIVE

The primary objectives of this Phase II Gas Seep Investigation are to proactively and systematically locate and survey methane gas seepage within the Raton Basin of Colorado as well as document areas where gas seepage is not occurring. These objectives will help ensure the safety of the public by identifying areas of methane seepage and assessing the potential for

methane to create hazardous conditions in these areas. The seep areas identified and surveyed during the Phase II Gas Seep Investigation will be compared to the results of the Phase I Study to determine whether conditions of methane seepage are changing.

1.3 SCOPE OF WORK

The scope of work for this investigation was specified in the Request For Proposal (RFP) PHA-704. However, as the project progressed, the scope of work was amended to address various emergency response issues, landowner complaints, and findings from each of the tasks completed. The final scope of work is presented below.

1.3.1 Historical Research

Historical research into known or suspected historical seep areas was performed to better prepare the work plan. The research included interviews with various local, municipal, and state government agencies, oil and gas industry operators, and local landowners to identify known or suspected historic seep areas within the project area.

1.3.2 Work Plan Preparation

Prior to initiation of the ground survey in Task 1, LTE prepared a work plan that was submitted to the COGCC for approval. The work plan addressed how LTE was going to accomplish each of the various tasks requested in the RFP. The work plan also included a site-specific health and safety plan (HASP) for the project area. A copy of the work plan is included in Appendix A.

1.3.3 Ground Survey

A ground survey of the Raton Basin was performed as a screening tool to identify potential methane seep areas. A vehicle equipped with gas detection equipment surveyed accessible roads and marked locations where methane was detected. The ground survey, conducted by Apogee Scientific, Inc. (Apogee), identified suspected seep areas and noted methane concentration, wind speed, wind direction, and geographic coordinates for each location where methane was detected. Apogee conducted a similar ground survey during the Phase I Study in 2000/2001.

1.3.4 Detailed Mapping

Once the ground survey was complete, the detailed mapping was performed at locations where methane was detected by the Apogee Leak Detection System (LDS) to define the extent of seepage and identify potential sources for the seeping methane gas. Not all suspected seep areas identified during the ground survey were included in the detailed mapping task due to budgetary constraints. The suspected seep areas to be mapped were prioritized based on concentration, distance from potential sensitive receptors, and other factors.

During the project, emergency response needs and landowner complaints prompted detailed mapping at additional sites not identified during the ground survey. In addition, some seep areas or suspected seep areas were investigated on multiple occasions.

The COGCC also requested detailed mapping using an alternate measurement technique, a portable gas flux meter, at two seep locations.

1.3.5 Gas Sampling

Gas sampling was performed at various identified seep locations to assist in source identification and to collect baseline data for gas composition within the Raton Basin.

1.3.6 Water Well Sampling

Sampling was performed in water wells nearest many of the seep areas identified, whenever access was provided. The groundwater quality analysis was performed to assist in the identification of sensitive receptors to methane gas seeps.

1.3.7 Methane Detection Systems

Following the completion of detailed mapping activities at a seep area in Huerfano County, a methane detection system was installed within a residential structure located on the active methane seep. The detection system was installed to provide occupants of the structure with advance warning of the accumulation of explosive vapors within an enclosed area. This work was not included in the original scope of work.

1.3.8 Landowner Results Notification

Following completion of the detailed mapping and water well sampling, LTE prepared site-specific letters to various landowners within the project area informing them of the results of the survey activities and water well sampling activities. The preparation of the individual notification letters was not included in the original scope of work.

1.4 REPORT ORGANIZATION

This report is organized into five sections including this introduction. The methodology used to complete the Phase II Gas Seep Investigation is described in Section 2.0. Section 3.0 presents the results of the investigation. The conclusions and recommendations are summarized in Section 4.0. References used in the preparation of this report are presented in Section 5.0. Tables and figures summarizing the findings of the investigation are presented in separate sections following the text. Other supporting documentation such as laboratory analytical reports and equipment specifications are included as appendices.

SECTION 2.0

METHODOLOGY

2.1 HISTORICAL RESEARCH

Prior to preparation of the work plan and mobilization of the field crew, LTE conducted interviews with the COGCC, Colorado Division of Reclamation Mining & Safety (DRMS), the major gas operators in the Raton Basin (Pioneer, XTO, and Petrogulf), Las Animas-Huerfano Counties District Health Department (LAHC Health), and the county commissioners and lead administrators from Huerfano and Las Animas Counties, Colorado. The interviews were conducted in an effort to locate methane seeps not already identified or possibly not present during the initial Raton Basin 2000/2001 ground survey and to ensure that all known seeps had been accounted for and would be included in this Phase II Gas Seep Investigation. The following table summarizes the names of those people contacted as part of the historical research.

Name	Organization
Margaret Ash	COGCC
Jim Milne	COGCC
Kent Gorham	DRMS
Ray Gorka	Petrogulf
Carol Amota	LAHC Health
Bob Lucero	Las Animas County
Phil Dorenkamp	Las Animas County
Sam Montoya	XTO
Mary Anne Squires	Pioneer
Gary Hill	Las Animas County
Ken Torres	Las Animas County
Jim Montoya	Las Animas County
John Galusha	Huerfano County
Scott King	Huerfano County

In addition to the interviews, LTE also reviewed available files regarding historic seeps at the COGCC and the DRMS.

2.2 GROUND SURVEY TO LOCATE METHANE SEEPS

As part of the Phase II Gas Seep Investigation, a ground survey was completed in a manner similar to the Phase I Study 2000/2001 ground survey conducted by Apogee. In April and May of 2007, Apogee conducted a survey of roads, jeep trails, and lease roads within the Colorado portion of the Raton Basin using the Apogee LDS mounted on a 4-wheel drive vehicle. The routes covered during the Apogee 2007 ground survey are illustrated on Figure 2.

The LDS is an infrared spectrometer (IRS) based gas analyzer designed to locate methane emission sources from mobile platforms (cars, trucks, helicopters, ATVs, etc.) in real time. The

LDS system measures methane, total hydrocarbons, and carbon dioxide with sub-parts per million (ppm) detection limits and displays the data in real time on the control computer. The LDS also incorporates a Global Positioning System (GPS) that records the track taken by the survey vehicle. The Apogee LDS is an enhanced version of the instrument used for the 2000/2001 ground survey. Wind direction and ambient temperature sensors were also mounted on the survey vehicle. Measurements from these sensors were recorded manually at approximately 15 minute intervals throughout the survey. Appendix B contains the specifications of the LDS system.

Based on the results of the 2000/2001 ground survey, Apogee slightly modified the survey techniques to provide better value to the COGCC. The Phase I data indicated that the methane seeps were predominantly located in the southern portion of the Raton Basin in the Purgatoire River drainage. Therefore, Apogee only surveyed the main arterial roads and jeep trails in the northern areas of the Raton Basin where seeps had never been detected. If methane was identified, additional surveys of nearby roads and trails were performed. This approach provided the COGCC with the requested basin-wide survey and allowed for a more focused survey covering more lease roads and trails in areas where methane seeps were anticipated.

As the LDS was driven along the roads, jeep trails, and lease roads within the Raton Basin, any increase in methane concentration above the local background concentration was marked and investigated to try and locate the source of the methane. Marking a potential seep involved recording the latitude, longitude, wind speed, wind direction, temperature, and other pertinent data about the location. If the source of the methane gas was evident (mine vent, coal outcrop, leaking gas well, etc), this information was also recorded.

2.2 DETAILED MAPPING OF IDENTIFIED METHANE SEEPS

Upon completion of the Apogee ground survey, LTE reviewed the seep data and conducted a limited review of risk to public health and safety. Generally, LTE evaluated distance to the nearest residence or other structure, water wells, or surface water body. Those seep areas with the highest potential to cause impact were prioritized accordingly. LTE made recommendations to conduct detailed field mapping at as many seeps areas as possible based on the resources available. Following approval of the areas selected for detailed field mapping, LTE initiated land access requests for those areas located on private lands.

Once access to selected parcels had been obtained, LTE mobilized to the area to initiate detailed mapping of the potential methane seeps.

Initially, LTE used the wind direction data from the Task 1 survey to identify the actual seep locations on the ground. Sensitive field meters and observations of vegetative condition also assisted the field crew in identifying the general location of the seep area.

Once the seep area was located, LTE overlaid a mapping grid onto each of the selected mapping areas. The sampling grid was generally based on a 200-foot grid spacing and programmed into a Trimble GeoXT® GPS. Grids using 150-foot, 100-foot, and 50-foot spacing were also used occasionally, depending on the seepage present, terrain, and other spatial considerations. The

grid overlay facilitated the collection of survey points in an accurate and efficient manner while in the field. LTE also collected additional sampling points in between grid nodes when the field personnel determined that additional delineation was warranted. The specifications of the GPS used during this project are presented in Appendix C.

At each grid node location, LTE advanced a ½-inch diameter steel rod a maximum of 3 feet below ground surface (bgs) using a slide-hammer. The rod was removed from the borehole and polyethylene tubing (perforated at the bottom 6 inches) was inserted into the borehole. LTE attached an MSA GasPort® to the tubing and measured the concentration of methane, hydrogen sulfide, oxygen, and carbon monoxide at each location. Following the collection of the aforementioned gas measurements, LTE attached an ADM 2000® flow meter to the tubing and measured the total gas flow rate at the sampling point. Appendix D contains equipment specifications for LTE's methane meter and flow meter.

Concurrent with gas concentration and flow measurements, LTE used the GPS to log the location of each survey point. Field data collected at the survey point were directly input into the GPS and attributed to the survey position information. LTE expanded the survey grid in all directions until field data and field crew observations of vegetative condition indicated that the seep area had been defined.

In addition to the survey grid, LTE attempted to map the prominent vegetative features that were common at methane seep areas. These features included, but were not limited to, clusters of dead/stressed trees, areas of dead/stressed forbs (grasses and bushes), and visible seeps in surface water bodies. This activity is highly subjective and strongly influenced by climatic conditions within the study area. Nonetheless, the vegetation data can be used as an indicator of methane seepage and can provide information as to changes in extent of the methane seep, provided the data are coupled with subsurface measurements of methane concentration.

Where appropriate, LTE took photographs of vegetative conditions, visible seeps, and sensitive receptors. Photographs of pertinent sites are presented throughout the text of this report.

LTE mapped several areas that were not identified during the Apogee ground survey. These areas were mapped as the result of emergency response activities, landowner complaints, and/or based on other knowledge indicating the potential for methane seepage. These areas were generally mapped using the same methodology as described above. The locations of all the sites mapped are illustrated on Figure 3 and summarized on Table 1.

2.3 GAS SEEP SAMPLING

LTE collected 32 gas samples from the various seep areas identified during this Phase II Gas Seep Investigation (Figure 4). The gas samples were collected from the area within the seep with the highest observed methane concentration. The gas sample location information is summarized in Table 3.

LTE used a hand pump attached to the tubing inserted into a borehole to collect the sample. The tubing was purged of the ambient air and a Cali-5-bond® mylar bag was filled with a sample of the gas within the borehole for analysis of the following:

- Fixed Gas Chromatography: Hydrogen (H_2), Argon (Ar), Nitrogen (N_2), Oxygen (O_2), and Carbon Dioxide (CO_2);
- Hydrocarbon Gas Chromatography: Methane, Ethane, Propane, i-Butane, n-Butane, i-Pentane, n-Pentane, and Hexane+; and
- Stable Isotopic Analysis: carbon and hydrogen isotopes of Methane.

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

LTE evaluated the gas composition and stable isotopic analysis data to determine the significant aspects of the gas composition assessment for each seep area. The data set will assist in the identification of potential sources of the gas seep and observe and evaluate seep characteristics across the Raton Basin in Colorado.

2.4 WATER WELL SAMPLING

The RFP requested resampling of 10 private water wells, which had been sampled previously in the Raton Basin plus an additional 15 water wells based on the results of the detailed mapping. The wells selected for sampling were based on geographic location, accessibility, proximity to methane seeps, well depth, and representativeness within the study area. After a review of the detailed mapping results, available water well records, and COGCC records, LTE identified only eight water wells that had been previously sampled. LTE proposed an additional 17 water wells for sampling and analysis. Figure 5 illustrates the locations of the water wells sampled as part of this investigation. The location information is summarized in Table 4.

LTE attempted to obtain access from the landowner to each of the wells prior to sampling. LTE prepared a letter explaining the scope of the study, the benefits available to the well owners, and a request for their participation. The letter included a self-addressed and stamped response card to be returned to LTE. The response card asked a few short questions about the well yield, depth, and accessibility. The card also requested a phone contact number to be used in coordinating sampling events but more importantly, information pertaining to the preferred sampling time. With this information, LTE was able to build a sampling schedule that meet the needs of the landowner and optimizes the logistics of the samplers.

The letter to landowners requesting participation in the study included information on access to the property. The response card contained a statement agreeing to access and a signature and date. LTE's field crew carried copies of these response cards in the field in order to deal with any miscommunication problems during the access process.

Prior to initiation of the field work, LTE's field crew created an organized sampling schedule based on well location, access, estimated sampling time, and producers and landowner availability.

LTE originally requested access to sample water from 25 water wells. Following submittal of the requests, 12 owners responded to grant access for sampling and 3 denied access. Three well owners replied stating that the subject well did not exist. Seven of the well owners did not respond to LTE's request for access. During sampling activities, three well owners requested that alternate water samples be collected. Mr. Robinson requested that additional samples be collected from the sawmill site and two nearby relative's water wells. Mr. Skowron requested that the creek nearby his residence be sampled. Mr. Slevec requested a sample be collected from an additional water well. The table below summarizes the water well sampling access information.

Existing COGCC Facility ID	DWR Permit No.	WELL OWNER	Access Granted	No Response	Access Denied	Well Does Not Exist	Sample Added at Request of Landowner
NA	157649	DOMINGUEZ, STEVEN		X			
NA	161353	HITT MARY		X			
NA	17829	HITT MARY		X			
NA	229078	BUITRON, ALMA D & LUANN THOMPKINSON		X			
NA	259501	MANNING, BRIAN F & ANDREA L	X				
NA	206886	GARZA-VELA, ARMONDO & RENE		X			
NA	217289	SCHULTZ, KL & WJ		X			
NA	35915	SCHULTZ, KL & WJ		X			
NA	4558	HOPKE, BRUCE & SHARON	X				
NA	256504	HOPKE, BRUCE & SHARON				X	
NA	181278	BOUNDS, BEN	X				
NA	242139	SLEVEC ROSE & FRANK CONDER	X				
702012	NA	ROBINSON, JEFFERY & ELLEN	X				
703789	NA	TOKAR, WANDA JANE				X	
702017	NA	TOKAR, WANDA JANE	X				
703763	120462	BARTH BILL & JEAN	X				
703755	112020	SKOWRON THADDEUS & MARCIA	X				

Existing COGCC Facility ID	DWR Permit No.	WELL OWNER	Access Granted	No Response	Access Denied	Well Does Not Exist	Sample Added at Request of Landowner
NA	NA	DUBIS, GLEN & MELANIE	X				
703771	NA	ROBINSON SAWMILL	X				
702023	94106	ROBINSON ALBERT & MELANIE	X				
703858	201674	VANARTSDALEN VAL & JACKIE	X				
NA	206821	FLC LTD A CO LIMITED PARTNERSHI C/O CHARLIE & LORETTA MONTOYA			X		
NA	182421	FLC LTD A CO LIMITED PARTNERSHI C/O CHARLIE & LORETTA MONTOYA			X		
NA	16337R	RUPRECHT, SUSAN R.				X	
703863	231257	ROSE, ANDREW & TERRY			X		
NA	124186	ROBINSON SAWMILL - 2	X				X
NA	157474	ROBINSON, GREG	X				X
NA	67268	ROBINSON, STEPHEN	X				X
NA	NA	SKOWRON CREEK SURFACE WATER SAMPLE	X				X
NA	85616	SLEVEC - 2	X				X
		TOTALS	**17**	**7**	**3**	**3**	**5**

DWR – Division of Water Resources
NA – not applicable

Prior to sampling the well, LTE interviewed the well owner in an attempt to the obtain water well conditions including type of pump, casing material and size, location of well and access point, typical daily water use, well yield, depth of well and screened interval, and a brief description of the area around the well. Some of this information was available from water well records and already incorporated into the database. This information assisted in determining if low flow purging and sampling was required. All data obtained were directly input into the GPS in the field.

Prior to water well purging and sampling, all equipment was cleaned and disinfected to maintain sample integrity. Purging and sampling were conducted at points closest to the wellhead, prior to pressure tanks or pretreatment systems such as filtration and/or water softeners. LTE purged each

well using a flow-through cell and field parameters of pH, specific electrical conductance (EC), and temperature were collected using an Oakton ph/Con 10 Meter®. The specifications for the water quality meter are included in Appendix E. Purging was considered to be complete when stability of field parameters was demonstrated through three consecutive measurements at 3 to 5 minute intervals, where pH varied by less than 0.1 units, temperature varied by less than 0.2 degrees Celsius (C) and EC varied by less than 5 percent (%) for values less than 100 micro-Siemens per centimeter (uS/cm) or 3% for values greater than 100 uS/cm.

Flow rates during purging were measured using a graduated bucket and a stopwatch. LTE also noted color, clarity, odors, effervescence, produced sediment, and evidence of bacterial fouling.

Once purging was complete, LTE initiated sampling under low-flow rate conditions. All samples were collected in laboratory prepared sample bottles. The samples were placed on ice and shipped via overnight delivery with a completed chain-of-custody (COC) form to Accutest Laboratories, Inc. in Houston, Texas.

The following table presents the analyses that were performed on each groundwater sample, the laboratory method, and the sample bottle requirement:

Analyte	**Laboratory Method**	**Bottle Requirement**
Major Cations (dissolved Na, Ca, Mg, K, Fe)	EPA Method 6010/6020	500 milliliter (mL) plastic - unpreserved, filtered at laboratory
Dissolved Metals (As, Ag, Ba, Cd, Cr, Pb, Se, Mn, and Cu)	EPA Method 6010/6020	500 mL plastic - unpreserved, filtered at laboratory
Alkalinity (carbonate/bicarbonate)	EPA 300	500 mL plastic - unpreserved
Fluoride	EPA 300	1-liter (L) plastic - unpreserved
Chloride	EPA 300	
Bromide	EPA 300	
Sulfate	EPA 300	
pH	EPA 150.1	
Nitrate as Nitrogen (N)	EPA 353.3	250 mL plastic - preserved with sulfuric acid (H_2SO_4)
Nitrite as Nitrogen (N)	EPA 353.3	250 mL plastic - preserved with sulfuric acid (H_2SO_4)
Specific Conductance	EPA 120.1	500 mL plastic – unpreserved
Total Dissolved Solids	EPA 160.1	500 mL plastic – unpreserved
Dissolved Methane	RSK 175	3 40-mL VOA unpreserved
Boron	EPA 212.3	500 mL plastic - unpreserved, filtered at laboratory

All sample bottles were filled directly from the sample tubing with the exception of the bottles used for dissolved methane analysis. Samples for dissolved methane analysis were collected using a 5-gallon bucket and a length of polyvinyl tubing connected to an adapter and the source tap. Flow rates were reduced during the dissolved methane sampling process in order to maximize the amount of dissolved gas in each sample. The end of the tubing and a capped sample bottle were submerged in water in a 5-gallon bucket. The cap was then removed from the bottle and the tubing was inserted while submerged in the bucket of water. Water from the tubing was allowed to flow into the bottle and displace approximately three volumes of the bottle. The cap was placed on the bottle while submerged in the water and the bottle was removed from the bucket.

LTE attempted to collect free gas samples from all water wells. LTE used a 1-liter bottle containing a benzalkonium chloride capsule (preservative) to collect each sample. The bottle was filled with water and then inverted and submerged in water in a 5-gallon bucket. The polyvinyl tubing was inserted into the inverted bottle. The flow rates were increased to approximately 2 to 3 gallons per minute (gpm) during this process. Any free gas from within the water stream was allowed to displace the water in the bottle until approximately half of the bottle contained free gas. The cap was then placed on the inverted bottle while submerged. The sample was packaged and submitted to Isotech for analysis of gas composition and carbon and hydrogen isotopes of methane.

If free gas was not observed during the sampling process, a bottle was filled via the aforementioned procedures and placed in a cooler on ice. The bottle was submitted to Isotech if the dissolved methane concentration from the water sample was 2 milligrams per liter (mg/L) or greater. If the dissolved methane concentration was less than 2 mg/L, the sample was not submitted for isotopic analysis.

The location of each water well was recorded using the Trimble GeoXT® GPS following sampling. Flow rates and observations were recorded directly into the GPS and photographs of water condition and sampling location were collected at each well.

2.6 METHANE DETECTION SYSTEM

During the detailed mapping task, LTE identified elevated concentrations of methane beneath and around an existing residential structure. At that time, LTE made a recommendation to install a methane detection system within the structure to provide a safety measure for the occupants such that the building could be evacuated if methane gas accumulated to potentially explosive levels. The COGCC agreed with the recommendation and requested that the structure be equipped with a detection system.

In July 2007, LTE conducted a methane survey of the interior portions of the residence and installed two temporary 120-volt AC adapter methane detectors within the interior of the structure. LTE ordered three Macurco® brand residential detectors for the structure that were to be hard-wired into the existing electrical system. The hard-wired detectors were installed in the residence on September 13, 2007. The specifications for the Macurco® gas detectors are presented in Appendix F.

2.7 LIMITATIONS

Generally, readings collected with the GPS unit can be located within one-meter radius of accuracy. But the type of terrain that exists in some areas can present difficulties for both the GPS unit and collection of subsurface methane samples with the slide hammer. North-facing slopes and heavily wooded areas are difficult to obtain accurate positioning by the GPS, therefore the GPS accuracy decreases. Satellite signals are frequently bounced among the trees or lost completely. When satellite signals are limited, positioning accuracy decreases. In some cases, the GPS unit can not obtain a signal. In these situations, LTE field personnel took subsurface methane measurements and noted the limited location information on the maps.

The ground survey is limited by the access to roads and requires the seep to be in close proximity and up wind of the survey vehicle in order to be detected. Seeps located at great distances from the surveyed roads will likely go undetected. Seeps located down wind of the vehicle will also likely go undetected.

Soil probing in consolidated materials was limited. LTE used the slide hammer to probe to a maximum depth of 36 inches below ground surface (bgs). In some cases, probing depths of 18 inches bgs were laborious to achieve. If refusal occurred, measurements were taken at the depth bored. All probe holes were advanced to a depth ranging from 6 inches to 36 inches bgs depending on the type of surface cover present.

Soil gas sampling methods employ the use of a hand pump to collect the gas in the sample container. The vacuum induces flow to the tubing and also collects ambient air in the sample. The concentration reported is therefore influenced by this mixing.

SECTION 3.0

RESULTS

3.1 HISTORICAL RESEARCH

The historical research revealed a long history of methane seepage in the Raton Basin, particularly along the Purgatoire River valley. Local residents and Ms. Amato, formerly of the LAHC Health recalled noting gas bubbles within the Purgatoire River as children more than 40 years ago. Ms. Amato also noted potential seepage at the mouth to Wet Canyon, though field data could not confirm this information.

Information obtained from Mr. Gorham at the DRMS, identified active methane seeps at the Golden Eagle Mine near Weston, Colorado from vent wells or other coreholes associated with mining activities. Mr. Gorham also stated that methane seepage was occurring in the pasture of property owned by John Toupal located east of the Golden Eagle Mine and is believed to be related to historic mining activities. Permanent probes to monitor methane seepage on an annual basis are also present north of the Toupal property. The seepage at Cow Canyon was also noted by Mr. Gorham.

Ms. Ash of the COGCC provided historic information regarding seepage at the Mondragon/Saint Property along Highway 12, Longs Canyon, Primero School, and the bridge to Madrid Canyon. These seep areas have been investigated as part of landowner complaints in the past.

Interviews with oil and gas operators and county administrators did not identify any methane seepage sites or suspected methane seepage sites other than those sites already discussed above.

LTE used the information acquired in the interview to scope the work plan for the surveys. The ground survey and detailed mapping surveys were designed to specifically investigate these areas as well as the planned survey routes for the basin-wide investigation. The results of the investigations conducted in these areas are described in Sections 3.2 and 3.3.

3.2 GROUND SURVEY TO LOCATE METHANE SEEPS

3.2.1 Findings Summary

During the ground survey, Apogee drove 3,187 miles along public roads, jeep trails, and lease roads within the Raton Basin (Figure 2). A total of 59 separate methane seep locations were noted during the survey. Figure 3 illustrates the location of the 59 methane seeps identified during the Apogee ground survey.

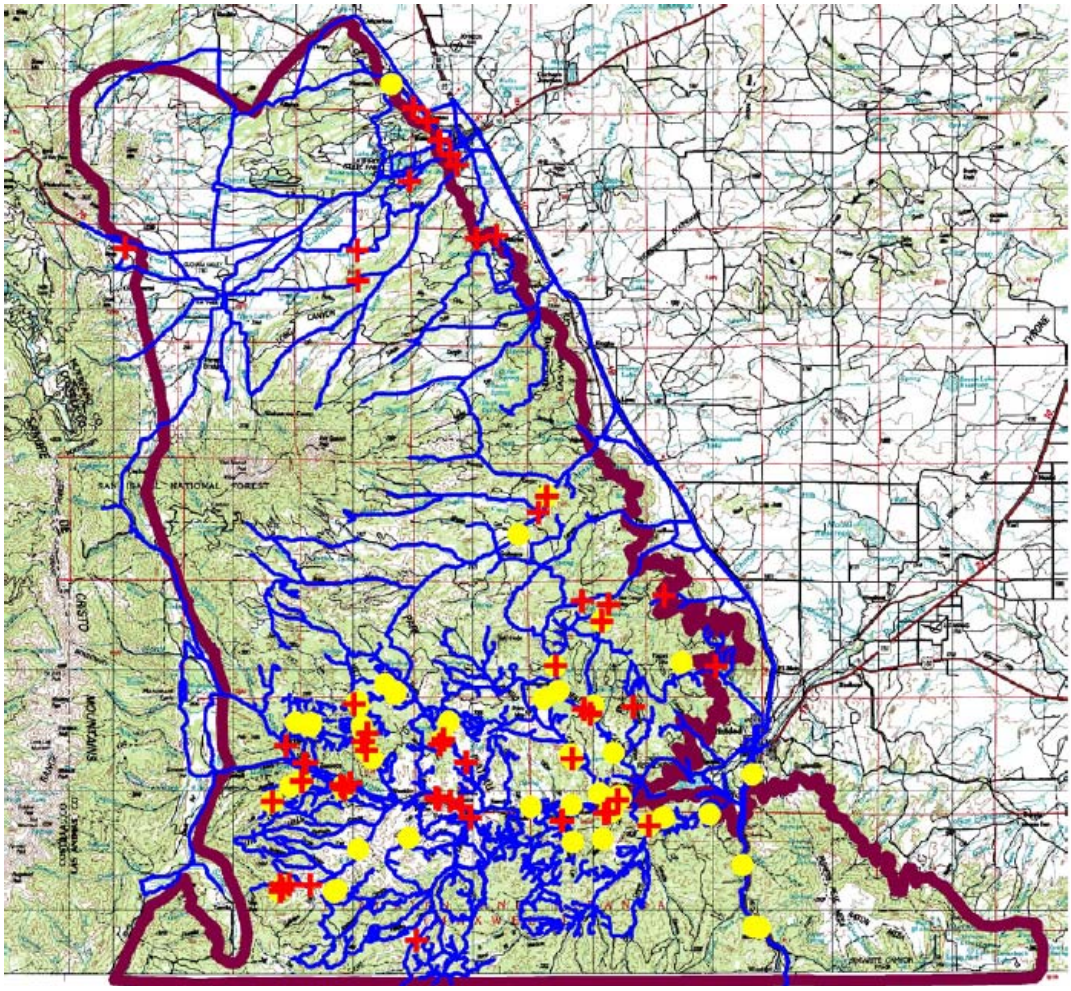
The majority of the identified seeps were located in the southern portion of the project area. Specifically, several seeps were noted along Highway 12 through the Purgatoire River valley. Although the majority of the seeps were located in the southern portion of the project area, several seeps were noted in the northern portion near Walsenburg, Colorado.

Concentrations of methane detected above background levels ranged between 0.3 ppm and 99.4 ppm. The average methane concentration detected by Apogee was 12.8 ppm. Figure 6 illustrates the results of the 2007 ground survey including detected methane concentration, wind speed, and wind direction. The full report prepared by Apogee is presented in Appendix G.

3.2.2 Comparison to 2000/2001 Ground Survey

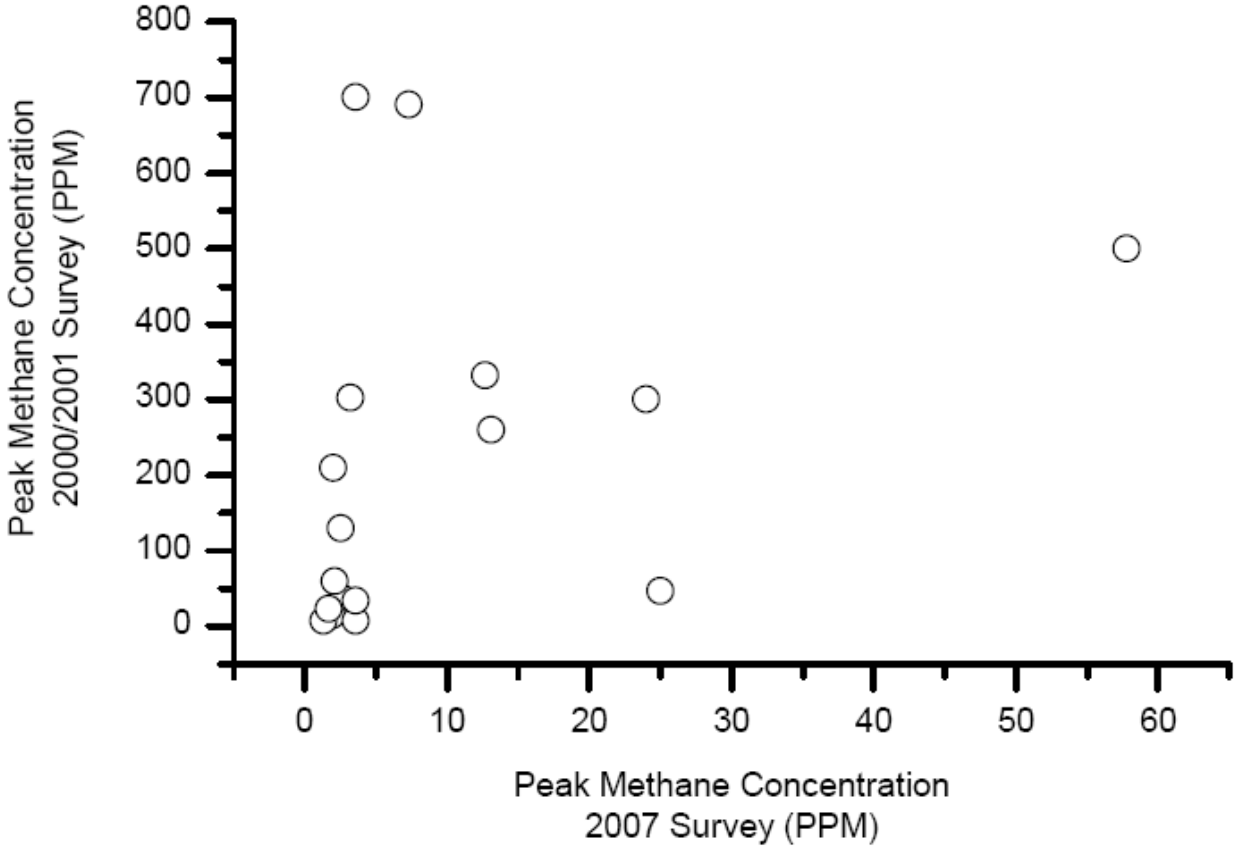
The 2000/2001 ground survey covered 2,789 miles of roads within the Raton Basin and identified 67 seeps. The 2007 ground survey covered 3,187 miles of roads within the Raton Basin and identified 59 seeps. Figure 7 illustrates a comparison of the survey tracks from the 2000/2001 ground survey and the 2007 ground survey.

As observed during the ground survey performed by Apogee, most seeps identified in 2007 are clustered in the Purgatoire River valley. Approximately 25 of the 59 seeps identified in 2007 were located in close proximity (within 500 feet) to seeps identified in the 2000/2001 ground survey. The following map from Apogee's final report shows the locations of the seeps identified in 2000 (yellow circles) and the seeps identified in 2007 (red crosses). The blue line shows the survey track of the vehicles during the 2007 survey.



The 2007 ground survey identified 11 seeps in the northern Raton Basin within Huerfano County that were not detected during the 2000/2001 ground survey. Five of these 11 seeps appeared to follow a northwest-southeast linear trend near Walsenburg, Colorado. These five seeps also have some correlation and proximity to the coal-bearing Kv and historic coal mining features.

The peak methane concentrations observed during the 2007 ground survey were significantly lower than the peak methane concentrations observed during the 2000/2001 ground survey for the same seep locations. This difference in survey results is difficult to ascertain but may be attributed to factors such as changes in seepage conditions, seasonal variations, wind direction, and/or wind speed. The chart below from the Apogee report illustrates the concentration comparison.



3.2.3 Potential Source Evaluation

Based on the data collected during the ground survey, LTE compiled a summary table of all the seep areas identified (Table 1). Using aerial photographs, GIS information about mines and mine features, oil and gas production information, and field observations, LTE attempted to identify potentials sources of the methane detected. The potential sources considered include: coal outcrops (CO); natural gas production wells (G); water well (W); natural gas pipeline (P); coal mine (M); coal mine features (F) such as a mine vent; corehole for mining exploration (C); other (O) such as manure piles; and unknown (U). The Phase II Gas Seep Investigation was not

designed to identify the source of the methane seeps, but rather to identify the presence or absence of seeps. Therefore, it is not surprising that the suspected source of many of the identified seeps has multiple possible sources or is unknown. Further site-specific study and likely additional investigation will be required to confirm the source of an identified seep. Table 1 summarizes the data compiled as part of the potential source evaluation. The table also summarizes the location and data collected during the ground survey including concentration, wind speed, and wind direction.

3.3 DETAILED MAPPING

3.3.1 Findings Summary

LTE conducted detailed mapping soil gas surveys at 55 sites as part of the field activities for this Phase II Gas Seep Investigation. Twenty-five (25) of the 55 sites were mapped twice and 17 of the 55 sites were mapped three times during the course of the investigation. LTE advanced more than 3,600 soil gas probes as part of this investigation. Methane was detected at 35 of the 55 sites where detailed mapping was conducted. The locations of the detailed mapping sites are illustrated in Figure 3.

During the course of the investigation, the COGCC received various complaints from landowners in the project area. The scope of work for the detailed mapping investigation was modified to investigate many of the complaints and the results were incorporated into the Phase II Gas Seep Investigation. LTE investigated 20 sites, primarily plugged and abandoned production wells, in an attempt to evaluate if the wells were acting as sources of methane seepage. Methane gas was detected at 5 of the 20 sites investigated at the request of the COGCC. Two of the sites were water wells with methane; one site was a sinkhole near Apogee Seep ID 640; one site was a well casing venting methane (Golden Cycle 1 or Golden Cycle Land Co 1); and the other location was the Lively 03-10 production well. The mapping area names, mapping dates, and gas sampling information for each area mapped are presented in Table 2.

3.3.2 Site-Specific Results

The following subsections describe the findings at each site mapped. Information about potential sources for methane is presented, where applicable. Site-specific detailed maps for each site are presented in Appendix H in the same order as presented in the text in the following subsections. Data from sites where multiple mapping events occurred are presented on multiple maps.

Apogee 5b (Madrid Bridge)

The Apogee 5b site, also known as Madrid Bridge, is located on the south side of Colorado State Highway 12, approximately 7 miles west of Trinidad, Colorado. The Madrid Bridge carries Adobe Ranch Road southward from Highway 12. Seepage at this location has been known since at least 2004 when methane gas was identified at the Mondragon/Saint property located approximately 1,300 feet to the southwest. Methane remains at the Mondragon/Saint property including areas near the residential structures and is discussed later in this report. Seep bubbles have long been observed within the Purgatoire River below the bridge.

LTE's mapping event of this site occurred on June 19, 2007. Elevated concentrations of methane were detected along the northern bank of the river on both the west and east sides of the bridge.

Methane gas was also detected at seven locations south of Adobe Ranch Road south of Madrid Bridge. Residential structures are located approximately 150 feet from the nearest sample location where methane was detected. LTE conducted soil gas surveys in the areas surrounding these structures and did not detect methane.

Dead Vegetation near Madrid Bridge

The suspected source of the methane seepage appears to be coal bed subcrop beneath the alluvium in the river valley.

LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4

LTE noted at least six residences within 700 feet of this seep area including the Mondragon and Saint residences, which have been vacated.

Apogee 11

The Apogee 11 site is located at the confluence of the South Fork Purgatoire River and Gallegos Canyon approximately 6 miles southeast of Stonewall, Colorado.

The mapping event at this site occurred on July 16, 2007. Methane was detected at 5 of the 21 measurements collected. Detected methane concentrations ranged between 17,000 ppm (1.7%) and 710,000 ppm (75%). LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

A gas pipeline was present within the seep area and is a suspected source for the seep. XTO is the likely owner/operator of the pipeline based on the operator names of the nearest active production wells. Coal outcrops observed at the confluence of these two valleys may also be a source of the seepage.

Apogee 15

The Apogee 15 site is located along the South Fork Purgatoire River approximately 6 miles southeast of Stonewall, Colorado.

The mapping event at this site occurred on July 15, 2007. Methane was detected at 3 of the 25 measurements collected. Detected concentrations ranged between 3,500 ppm and 640,000 ppm (75%). LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

A gas pipeline was present within the seep area and is a suspected source of the seep. XTO is the likely owner/operator of the pipeline based on the operator names of the nearest active production wells. Coal outcrops observed at the confluence of these two valleys may also be a source of the seepage.

Apogee 19

The Apogee 19 site is located along the South Fork Purgatoire River approximately 6 miles southeast of Stonewall, Colorado.

The mapping event at this site occurred on July 15, 2007. Methane was detected at 2 of the 33 measurements collected at concentrations of 20,000 ppm (2%) and 640,000 ppm (64%). Methane was detected in one sample location approximately 1 foot from a gas pipeline valve. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

The pipeline is a suspected source of the seep identified. XTO is the likely owner/operator of the pipeline based on the operator names of the nearest active production wells.

Pipeline Valve at Apogee 19

Methane gas was also detected at one location approximately 600 feet south of the pipeline. It appears that the seep to the south may be from coal outcrops on the hillside south of the river.

Apogee 27 & 34

The Apogee 27 and 34 sites are believed to be associated with the Trinidad MGP #1 seep site located approximately 6 miles east of Weston, Colorado. The Trinidad MGP #1 seep site was identified following an emergency response to an explosion at a new residential construction site on April 17, 2007. Investigations that followed identified the presence of a leaking plugged and abandoned well (Trinidad MGP #1 API#05-071-06045).

A full investigation of this seep area was performed on April 24, 2007, May 24, 2007, and August 29, 2007. The results of the first two surveys are presented in a comprehensive emergency response investigation report dated June 2007 and submitted to the COGCC under separate cover. The results of the August 29, 2007 survey indicated that methane was detected at one location adjacent to the Trinidad MGP #1 well casing.

LTE collected a gas sample from this site on April 23, 2007. Results of the sample analysis are discussed in Section 3.4.

Apogee 28

The Apogee 28 site is located approximately 50 feet from the Leef 23-33 (API #05-071-06795) active production well. Inspection of this site identified a pipeline valve from the Leef 23-33 well that appeared to be leaking. Methane was detected at this location at a concentration of 100% but not at any of the other 18 measurements collected. It is LTE's understanding that the operator of the well repaired the leak shortly after the survey was completed.

Leaking Valve at Apogee 28

Apogee 605

The Apogee 605 site is located in Huerfano County approximately one mile west of Walsenburg, Colorado. Access to the property south of County Road 599 was not granted, therefore, LTE could not define the extent of impact on the private property.

The initial mapping event occurred on July 31, 2007. LTE advanced 62 probes to measure subsurface gas concentrations. Methane was detected at 16 of the 62 sample locations. Detected methane concentrations ranged from 1,000 ppm to 170,000 ppm (17%).

LTE advanced 35 measurement probes on October 31, 2007. Methane was detected at 9 of the 35 measurement locations at concentrations ranging from 1,000 ppm to 50,000 ppm (5%).

Abandoned Mine Features near Apogee 605

LTE collected a gas sample from this site on August 4, 2007. Results of the sample analysis are discussed in Section 3.4.

The suspected sources for this seep area appear to be coal mines, coal mine features, coreholes, or coal outcrops.

Based on observations of vegetative condition and the presence of methane in four locations south of the property line, it is suspected that methane seepage extends southward of County Road 599. A residence is located approximately 500 feet south of the road.

Apogee 607

The Apogee 607 site is located in Huerfano County approximately one mile southwest of Walsenburg, Colorado. Mapping was conducted on July 17, 2007, August 11, 2007, and October 31, 2007. The surveys generally included the advancement of 16 to 20 measurement probes centered on the Apogee 607 ID point on County Road 340. Methane was only detected in one sample location at a concentration of 5,000 ppm during the third mapping event at this site. The

surface features suggest that the area may have been a surface coal mine. The source of this seepage may be coal outcrops, coal mines, or mine coreholes.

Apogee 612

The Apogee 612 site is located approximately 4 miles southwest of Walsenburg, Colorado in Huerfano County. Mapping events were performed on July 18, 2007, August 11, 2007, and November 2, 2007. Methane was detected in one soil probe location during the first two of the three mapping events at concentrations of 6,000 ppm and 23,000 ppm (2.3%), respectively. Methane was not detected in any of the soil probe locations during the November 2, 2007 mapping event.

Abandoned Mine Feature at Apogee 612

LTE collected a gas sample from this site on August 1, 2007. Results of the sample analysis are discussed in Section 3.4.

It appears that the methane detected at Apogee 612 is related to a historic coal mine and/or associated mine vents or core holes. Coal outcrops may also be a source of the seepage detected.

Apogee 613

The Apogee 613 site is located approximately 8 miles southwest of Walsenburg, Colorado in Huerfano County. The point where methane was detected by Apogee's ground survey was located north of the county road approximately 700 feet north of the Hopke residence.

The initial detailed mapping survey was performed on July 10, 2007. LTE could not identify methane in the vicinity of the Apogee 613 site, so LTE expanded the survey area to the south and west. In doing so, LTE inspected the exterior portions of the structures on the Hopke property and identified a water well with methane gas. LTE advanced a total of 58 soil gas probes including sample points near the Lively 10-04 (API # 05-055-06149) production well and along the two buried pipelines west of the Hopke residence. Methane was not detected at any of the 58

measurement locations except for two points located adjacent to the Hopke water well at a concentration of 12,000 ppm (1.2%) and 900,000 ppm (90%), respectively.

A follow-up survey performed on August 3, 2007 included the advancement of 35 soil gas probes. Methane was not detected at any of the measurement locations except for a point advanced near the water well at the Hopke residence. A third survey performed on November 2, 2007 did not detect methane in any of the 28 soil gas probes advanced. However, methane was measured at a concentration of 100% venting from the water well adjacent to Hopke and methane was detected at a concentration of 2,000 ppm venting from the water vault adjacent to the barn on the Hopke property.

Hopke Water Well

LTE collected a gas sample from this site on August 4, 2007. Results of the gas sample analysis are discussed in Section 3.4. LTE collected a water sample from the Hopke water well on September 19, 2007. Results of the water sample analysis are discussed in Section 3.5.

Apogee 615

The Apogee 615 site is located approximately 18 miles west of Walsenburg, Colorado in Huerfano County along County Road 441. Mapping events were performed on July 17, 2007, August 2, 2007, and November 1, 2007. Each mapping event included the advancement of approximately 20 to 25 soil gas probes in the areas along the road, near the pipeline to the west of the road and around the residence located approximately 500 feet northwest of the Apogee 615 point. Methane has not been detected during any of the three mapping events. The pipeline may be a potential source of the gas identified during the ground survey but no leaks were noted during the detailed mapping surveys. Coal mines, mine features, or coal outcrops may also be the source of the seepage detected during the Apogee ground survey.

Apogee 623

The Apogee 623 site is located approximately 5 miles northeast of Stonewall, Colorado in Las Animas County along North Fork Road. Methane was detected in 3 of the 21 measurement locations at concentrations ranging from 1,000 ppm to 320,000 ppm (32%). An abandoned residence is located approximately 250 feet from this methane seep. LTE collected a gas sample from this site on August 4, 2007. Results of the sample analysis are discussed in Section 3.4.

The potential source is unknown but may be associated with coal outcrops, mines, mine features, coreholes, or manure piles.

Apogee 631

The Apogee 631 site is located in Wet Canyon approximately 5 miles northeast of Weston, Colorado. The methane survey was performed on July 14, 2007. Methane was not detected in any of the 23 soil probes advanced. LTE inspected the area around the residence located approximately 200 feet north of the Apogee 631 point but did not detect the presence of methane.

A pipeline was present along the east side of the road and appears to be operated by Pioneer based on the active production well Guy 34-10 (API#05-071-07781) located approximately 350 feet southeast of the Apogee 631 point. A water well is also present but methane was not detected around the well. Coal outcrops may also be a source of the seepage detected during the Apogee ground survey.

Apogee 633

The Apogee 633 site is located in Wet Canyon approximately 4.5 miles northeast of Weston, Colorado. The methane survey was performed on July 13, 2007. Methane was not detected in any of the 44 soil probes advanced. LTE inspected around four residences located to the northwest of the Apogee 631 point but did not detect the presence of methane. LTE also inspected the hillside to the northeast toward the active production well Erin 21-15 (API #05-071-08713).

Water wells are reported to be located nearby but were not observed by LTE during the mapping event. No pipeline markers or mine features were noted. Coal outcrops may be a source of the seepage detected during the Apogee ground survey.

Apogee 636

The Apogee 636 site is located approximately 800 feet northwest of the Primero School in a small residential development. The soil gas survey was performed on July 16, 2007 and included the advancement of 62 soil gas probes. Methane was detected in 3 of the 62 locations at concentrations ranging from 9,500 ppm to 300,000 ppm (75%). LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Apogee 636

It is possible that the methane detected may be from coal outcrops in the area or an unknown gas pipeline that might service the residences.

Due to the incident at the Trinidad MGP #1 site located approximately one mile to the west of this site, LTE inspected the area around each of the 12 residences located within 1,500 feet of the Apogee 636 point. Methane was not detected immediately adjacent to these residences. The proximity of these residences (approximately 100 feet to 550 feet) to the seep at Apogee 636 and the Primero school increases the hazard risk.

Apogee 637

The Apogee 637 site is located at the confluence of San Pablo Canyon and Wet Canyon in Las Animas County approximately 5 miles northwest of Weston, Colorado. The soil gas survey was performed on July 1, 2007 and included the advancement of 44 soil gas probes.

Methane gas was detected in 3 of the 44 soil gas probes at concentrations ranging from 50,000 ppm (5%) to 130,000 ppm (13%). LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

The detected gas was identified approximately 25 feet from a buried gas pipeline that appears to be servicing the Lynn 32-4 (API #05-071-08123) production well. The Lynn 32-4 is operated by Pioneer.

The survey area included two residential structures. No methane was detected in soil gas probes advanced within 10 feet of the residences.

Apogee 638

The Apogee 638 site is located in Sarcillo Canyon along County Road 41.7 approximately 8 miles east of Weston, Colorado. The mapping event was performed on June 29, 2007 and included the advancement of 49 soil gas probes.

Methane was detected along a hillside south of the Apogee 638 point in eight soil gas measurement locations at concentrations ranging from 100,000 ppm (10%) to 550,000 ppm (55%). LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

The seep appears to be sourced by a coal outcrop. Field observations indicated additional dead vegetation to the south west from the identified seep area toward Apogee ID 31 and methane seepage is suspected in this area. However, access to this property was denied.

A "test well" at the Apogee 638 site, no methane detected

The seepage may be from coal outcrops, gas production wells, water wells, or mine coreholes in the area.

Apogee 640 and Sinkhole

The Apogee 640 site is located on County Road 525 approximately 4 miles northwest of Walsenburg, Colorado in Huerfano County. The site is located approximately 1,000 feet west of the sinkhole discussed below. A concern over the seeps detected in the area prompted LTE to advance 59 soil gas probes in the vicinity of Apogee 640 on July 14, 2007, particularly in the area to the south near a residential structure (mobile trailer).

Methane was detected at concentrations between 500 ppm and 280,000 ppm (28%) in 15 of the 59 measurements collected including the area adjacent to the residence. Water wells were also noted within 200 feet of the seep area. LTE collected a gas sample from this site on August 6, 2007. Results of the sample analysis are discussed in Section 3.4.

Residence and Water Well South of Apogee 640

A complaint by a landowner to the COGCC prompted a survey of a sinkhole that contained dead animals and a strong odor. LTE investigated the property on July 14, 2007 and identified the hole, which appears to be a corehole or mine vent hole that has collapsed. A dead rabbit and dead snake were noted in the bottom of the hole. Methane concentrations in the hole were greater than 500,000 ppm (50%) and the bottom of the hole was oxygen deficient, which likely caused the death of the rabbit and subsequently the snake attempting to eat the rabbit. The strong odor was a result of the decaying animals. LTE collected a gas sample from the sinkhole on August 6, 2007. Results of the sample analysis are discussed in Section 3.4. The sinkhole appeared to have been filled with soil during the third survey event conducted on October 30, 2007.

Sinkhole East of Apogee 640

Additional mapping events were performed on August 6, 2007 and October 30, 2007. Fewer methane seeps were noted at both the sinkhole and south of Apogee 640 during each of the subsequent surveys. Methane concentrations ranged from 500 ppm to 180,000 ppm (18%) on August 6, 2007 and 2,500 ppm to 80,000 ppm (8%) on October 30, 2007. The mobile home south of Apogee 640 is located directly on a methane seep. The potential sources for the observed seepage include coal outcrops, coal mines, water wells, or mine features.

Apogee 641

The Apogee 641 site is located on County Road 598 approximately 2.5 miles northwest of Walsenburg, Colorado in Huerfano County. LTE conducted the initial mapping on July 12, 2007 that included the advancement of 44 soil gas probes. Methane was detected in 4 of the 44 measurement locations at concentrations ranging from 500 ppm to 120,000 ppm (12%). The mapping included subsurface gas measurements around six residences. No methane was detected adjacent to the residences during the initial survey.

Subsequent mapping events were performed on August 6, 2007 and again on October 30, 2007. During the subsequent surveys, approximately 20 to 25 measurements were collected and methane was detected in 4 locations on August 6, 2007 at concentrations ranging from 1,000 ppm to 240,000 ppm (24%). Methane was detected at 3 locations on October 30, 2007 at concentrations less than 1,000 ppm. Methane was detected in soil gas probes near two residential structures during the two subsequent mapping events. LTE identified at least 10 residences within 900 feet of this seep area. LTE collected a gas sample from this site on August 6, 2007. Results of the sample analysis are discussed in Section 3.4.

The site appears to be located on an area with historic mining activity including tailings piles. It is possible that the seepage is related to coal outcrops, underground mines, coreholes, or other mine feature.

Apogee 643

The Apogee 643 site is located along Bear Creek Road approximately 3 miles south of Walsenburg, Colorado in Huerfano County.

The initial methane mapping event was performed on July 12, 2007. The survey included the advancement of 133 soil gas probes over an area of approximately 30 acres. Methane was detected in 60 of the 133 measurement locations at concentrations ranging from 1,000 ppm to 420,000 ppm (42%). Elevated concentrations were noted directly adjacent and beneath two residential structures.

The results of the initial survey prompted a recommendation to the COGCC to install a methane detection system in the residence located within the seep area. The COGCC concurred and authorized installation of a methane detection system in the residence. Further discussion regarding the methane detection system is presented in Section 3.6.

A subsequent mapping event was performed on August 4, 2007, which detected methane at 44 of 107 soil gas probe locations at concentrations ranging from 500 ppm to 470,000 ppm (47%). Methane was detected during the third mapping event on October 31, 2007 at 30 of 70 soil gas probe locations at concentrations ranging from 1,000 ppm to 340,000 ppm (34%). LTE collected a gas sample from this site on August 4, 2007. Results of the sample analysis are discussed in Section 3.4. The source of the methane seepage may be coal outcrops, coal mines, or mine features.

Abandoned Mine Shaft at Apogee 643

On November 5, 2007, LTE conducted an additional survey of this seep area using a West Systems, Inc. portable gas flux meter. This unit is designed to measure flux (flow rate per area)

with a high degree of accuracy. The area was surveyed using the grid method and measured the flux at 50 locations. The estimated methane flux from the seep at Apogee 643 is 155,554 moles of methane per square meter per day. Using an approximate density of 31.65 cubic feet per pound (ft^3/lb) based on the ambient pressure at the site, LTE estimated a flow rate of approximately 174 thousand cubic feet per day (MCFD) for the Apogee 643 seep. The equipment specifications and flux calculations used in this estimate are presented in Appendix I.

An existing residence comprised of a mobile home is located south of the residence and within the Apogee 643 seep area. Currently, there is no skirt surrounding the base of the mobile home. However, if a skirt were added, the residential structure has the potential to accumulate seeping methane gas and create a hazardous environment. The residents also mentioned plans to construct a home on the property. The new home would also be at risk of accumulating seeping methane gas in confined spaces if not properly mitigated.

Apogee 644

Apogee 644 is located on County Road 358 approximately 10 miles southwest of Walsenburg, Colorado in Huerfano County.

LTE conducted the initial survey on July 11, 2007 by advancing 36 soil gas probes in the area of the Apogee 644 point. Methane was detected in 7 of the 36 soil gas probes near Apogee 644 at concentrations ranging from 1,000 ppm to 250,000 ppm (25%).

Seep at Apogee 644

A follow-up survey at this site was performed on August 2, 2007. LTE detected methane at 6 of the 37 soil gas probes advanced near Apogee 644. A third survey event was performed on

November 1, 2007. LTE advanced a total of 41 soil gas probes in which 3 soil gas probes detected methane near Apogee 644.

LTE collected a gas sample from the Apogee 644 site on August 2. Results of the sample analysis are discussed in Section 3.4.

On November 5, 2007, LTE conducted an additional survey of this seep area using a West Systems, Inc. portable gas flux meter. The area was surveyed using the grid method and measured the flux at 21 locations. The estimated methane flux from the seep at Apogee 644 is 14,649 moles per square meter per day. Based on an approximated methane density of 31.65 ft^3/lb, LTE estimated a flow rate of 25 MCFD at the Apogee 644 site. The equipment specifications and flux calculations used in this estimate are presented in Appendix I.

Apogee 646

The Apogee 646 site is located along County Road 330 approximately 5 miles south of Walsenburg, Colorado. The initial survey was performed on July 17, 2007 and included the advancement of 36 soil gas probes. Methane was detected along the east side of the road in 11 measurement locations at concentrations ranging from 2,000 ppm to 300,000 ppm (30%).

A follow-up survey was performed on August 3, 2007 and included additional investigation to the west of the County Road 330 and east of Walsen Arroyo. Methane was detected in 14 of the 82 soil gas probes advanced at concentrations ranging from 500 ppm to 390,000 ppm (39%). LTE collected a gas sample from this site on August 3, 2007. Results of the sample analysis are discussed in Section 3.4.

A third survey event was performed on November 2, 2007 and included 36 soil gas probes. Methane was detected in four of the 36 measurement locations at concentrations ranging from 6,000 ppm to 18,500 ppm (1.85%). In addition, LTE observed methane venting from a water well to the west of County Road 330 at a concentration of 21,500 ppm (2.15%) and from a casing (possible vent or corehole) at a concentration of 240,000 ppm (24%).

Casing Venting Methane at Apogee 646

Based on field observations, the seepage at Apogee 646 appears to be related to coal outcrops and/or historic mining activities. Water wells and steel casings are also providing a conduit for methane seepage at the surface.

Apogee 647

The Apogee 647 site is located on Rowell Road approximately 5 miles south of Walsenburg, Colorado. The initial survey was performed on July 17, 2007 and included the advancement of 38 soil gas probes. Methane was detected in 4 of the 38 soil gas probes at the site at concentrations ranging from 1,000 ppm to 8,000 ppm.

A follow-up survey was performed on August 1, 2007. Methane was detected at concentrations ranging from 1,000 ppm to 8,000 ppm in 6 of the 38 measurements collected. LTE collected a gas sample from this site on August 1, 2007. Results of the sample analysis are discussed in Section 3.4.

A third survey event was performed on November 2, 2007 and included the advancement of 32 soil gas probes. Methane was detected at 3 of the 32 probes advanced at similar concentrations as the August 1, 2007 survey.

Field observations suggest that the source of the seepage is coal outcrops or historic mines, which are present in the area.

Apogee 649

The Apogee 649 site is located at the mouth of Lorencito Canyon approximately 16 miles west of Trinidad, Colorado in Las Animas County. The site is located on the north side of Hill Ranch Road.

On July 16, 2007, LTE advanced 14 soil gas probes. Methane was detected venting from a small hole along the side of the road at a concentration of 540,000 ppm (54%). The sound of gas bubbling through water was heard emanating from the hole. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Hole with Bubbling Gas Sounds, Potential Pipeline Leak

Based on the field observations, it appears that the methane seep may be a result of a leaking gas pipeline. Based on the nearby production well ownership, the pipeline owner/operator may be Pioneer.

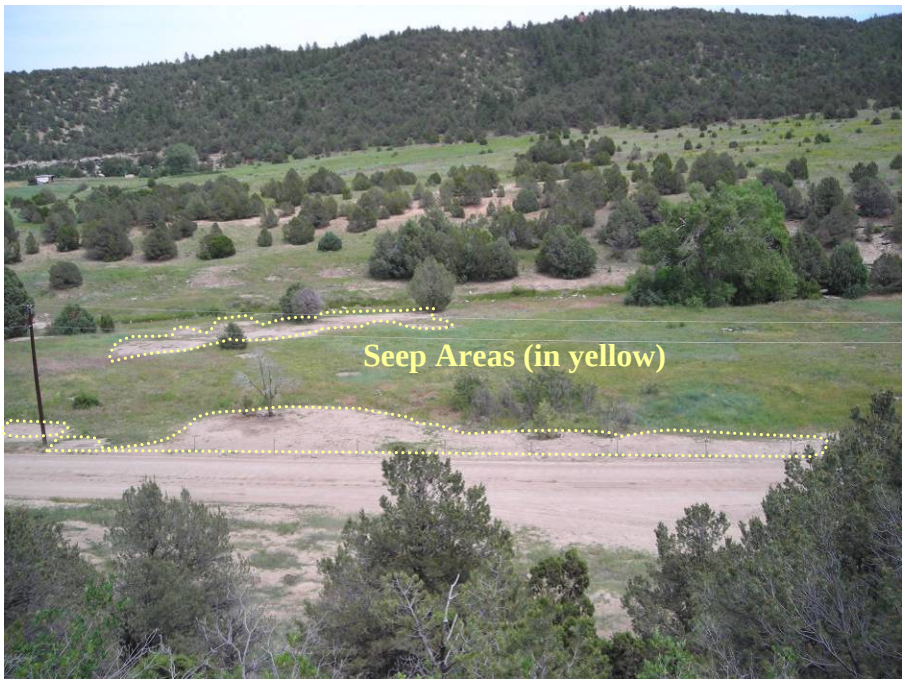
Apogee 652

The Apogee 652 site is located approximately 12 miles west of Trinidad in Widow Womans Canyon in Las Animas County, Colorado. LTE advanced 26 soil gas probes in the area on June 30, 2007. Methane was only detected at a water well at a concentration of 340,000 ppm (34%) and not near the residential structure. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Apogee 655

The Apogee 655 site is located on County Road 53.1 approximately 6 miles southwest of Trinidad, Colorado in Las Animas County in Longs Canyon. On June 20, 2007, LTE advanced 49 soil gas probes in the seep area. Methane was detected at 16 of the 49 measurement locations at concentrations ranging from 500 ppm to 590,000 ppm (59%). LTE identified a residential

structure approximately 400 feet north of the seep area. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.



Seeps at Apogee 655, note areas of dead vegetation

The source of the methane appears to be coal outcrops or from coal subcrop beneath the alluvial fill in the valley. Lineaments observed in the area suggest the potential for subsurface fractures that may be acting as a preferential pathway for the migration of methane gas in the subsurface.

Apogee 656

The Apogee 656 site is located along County Road 53.5 in Burro Canyon approximately 10 miles west of Trinidad, Colorado in Las Animas County. The seep detected during the detailed mapping event was located adjacent from the Annette 21-21 (API #05-071-06248) gas production well, which is currently operated by Pioneer.

LTE conducted the initial survey on June 28, 2007. The survey included the advancement of 30 soil gas probes. Methane was only detected at one location approximately 50 feet from the Annette 21-21 (API #05-071-06248) production well at a concentration of 18,500 ppm (1.85%). The production well or associated piping may be the source of the methane detected. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Apogee 658

The Apogee 658 site is located in Cottonwood Canyon approximately 7 miles northwest of Trinidad, Colorado in Las Animas County. LTE conducted the survey on June 30, 2007, which included the advancement of 36 soil gas probes. Methane was detected in 3 of the 36 soil gas

probes at concentrations ranging from 1,500 ppm to 33,500 ppm (3.35%). Stressed and dead vegetation was noted during the field mapping but did not coincide with detectable concentrations of methane. Field observations suggest that the methane detected is from coal outcrops in the area. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Apogee 660

The Apogee 660 site is located approximately 0.25 miles northwest of the intersection of County Road 43.7 and County Road 50.9. LTE conducted the survey on June 28, 2007, which included the advancement of 35 soil gas probes including around the exterior of the residential structure on the property. Methane was detected at 2 of the 35 soil gas probes in the manure pile area south of the residence at concentrations of 2,500 ppm and 4,500 ppm. The detected methane is suspected to be emanating from the manure. LTE identified a residence approximately 150 feet from this seep and a barn within 10 feet of this seep. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Manure Area with Methane near Apogee 660

Apogee 663

The Apogee 663 site is located approximately 12 miles northwest of Trinidad, Colorado in Las Animas County. LTE conducted a survey on June 28, 2007, which included the advancement of 28 soil gas probes. Methane was not detected at any of the measurement locations during the detailed mapping event.

It is unclear at this time what the source of the methane detected during the ground survey may have been. However, coal outcrops and mine coreholes are present in the area. There are no apparent pipelines or gas wells in the vicinity.

Andreatta 14-10 (05-055-06170)

The Andreatta 14-10 production well is a plugged and abandoned well located between Bear Creek and County Road 340 approximately 12 miles southwest of Walsenburg, Colorado in Huerfano County. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 8, 2007, which included the advancement of 17 soil gas probes. Methane gas was not detected at any of the measurement locations.

Angeley

The Angeley site is located along the north side of County Road 342.1 approximately 960 feet east of the Apogee 613 seep in Huerfano County, Colorado. LTE conducted the initial survey on July 2, 2007 at the request of the COGCC, who had received a complaint by Mr. Angeley.

LTE advanced 23 soil gas probes during the initial mapping event including the areas around the Angeley residence and the Angeley water well. Methane was not detected at any of the 23 soil gas probe locations except for one located immediately adjacent to the Angeley water well at a concentration of 60,000 ppm (6%).

Additional surveys were performed on August 8, 2007 and again on November 1, 2007 with a similar number of measurement locations. Methane was consistently noted at the Angeley water well. During the November 1, 2007 event, LTE recorded a concentration of 100% methane venting from the water well. It appears that the water well is acting as a conduit for subsurface methane to migrate to the surface. LTE collected a gas sample from this well on August 8, 2007. Results of the sample analysis are discussed in Section 3.4.

Bounds

At the time of the investigation at Apogee 644, Mr. Bounds filed a complaint with the COGCC concerning methane in his water well. LTE investigated the Bounds water well as part of the methane seep survey at Apogee 644.

LTE advanced a total of 18 soil gas probes in the vicinity of the residential structure, two water wells, and two exploratory water wells. Methane was detected in and immediately adjacent to the Bounds water well. No methane was detected around the residence or the other test hole locations.

A follow-up survey at this site was performed on August 8, 2007. Methane was detected venting from the Bounds water well at a concentration of 680,000 ppm (68%). Methane was not detected from any of the 20 soil gas probes advanced around the water well or residential structure.

A third survey was performed on November 1, 2007. Methane was not detected in the soil gas probes advanced around the water well and residence. However, methane was detected at a concentration of 100% venting from the water well and a concentration of 2,500 ppm venting from the cistern adjacent to the residence.

LTE collected a gas sample from the Bounds water well on August 8, 2007. Results of the sample analysis are discussed in Section 3.4. LTE collected a water sample from the Bounds water well on September 17, 2007. Results of the water sample analysis are discussed in Section 3.5.

Coleman

The Coleman site is located in Section 10 of Township 29 South, Range 67 West in Huerfano County. The Coleman site was investigated on November 2, 2007 at the request of the COGCC. LTE advanced 19 soil gas probes in the vicinity of the well and around the residential structure. Methane was not detected at any of the measurement locations. Methane was also not detected venting from the water well.

Cow Canyon

The Cow Canyon site is located approximately 18 miles west of Trinidad, Colorado in Las Animas County, south of the Purgatoire River valley. LTE conducted a survey of this suspected seep area on June 20, 2007, which included the advancement 33 soil gas probes. Methane was detected in 6 of the 33 soil gas probes at concentrations ranging from 8,500 ppm to 950,000 ppm (95%). LTE collected a gas sample from this site on August 29, 2007. Results of the sample analysis are discussed in Section 3.4.

LTE noted the sounds of gas bubbling through water within Cow Creek more than 500 feet away from where the seep area was detected. Based on LTE's observations, the seepage at Cow Canyon appears to be one of the most prolific active seeps in the Raton Basin.

Cow Canyon Seep Area

Field observations suggest that the methane source is coal outcrops or possibly methane gas migrating vertically through subsurface fractures from coal beds at depth.

Visible Seeps in Cow Creek

Derowitsch

The Derowitsch site is located in Section 3 of Township 29 South, Range 67 West in Huerfano County. The Derowitsch site was investigated on November 1, 2007 at the request of the COGCC.

LTE advanced 20 soil gas probes in the vicinity of the well and around the residential structure. Methane was not detected at any of the measurement locations. Methane was also not detected venting from the water well. Methane was detected venting from the cistern at a concentration of 7,000 ppm.

Dick Realty & Inv Co 1 (05-055-05027)

The Dick Realty & Inv Co 1 production well is a plugged and abandoned well located in Section 3, Township 29 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 9, 2007, which included the advancement of 21 soil gas probes. Methane gas was not detected at any of the measurement locations.

Ferdinand B Rohr 1 (05-055-05012)

The Ferdinand B Rohr 1 is a former gas production well that has been converted to a water well under permit #84106 . The well located in Section 9, Township 29 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 7, 2007, which included the advancement of 17 soil gas probes. Methane gas was not detected at any of the measurement locations.

A follow-up investigation was conducted on November 1, 2007. LTE advanced 16 soil gas probes. Methane gas was not detected at any of the measurement locations or within the well casing shown above.

Goemmer Land Co 1 (05-055-06004), Golden Cycle 1 (05-055-06023), and Golden Cycle Land Co 1 (05-055-06038)

The Goemmer Land Co 1, Golden Cycle 1, and Golden Cycle Land Co 1 production wells are plugged and abandoned wells located within 500 feet of each other in Section 11, Township 29 South, Range 67 West in Huerfano County, Colorado. The Goemmer Land Co 1 well was converted to a water well under permit #16861 and #4557. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 7, 2007, August 29, 2007, and November 1, 2007. The initial survey included the advancement of 31 soil gas probes. The August 29, 2007 survey included 17 soil gas probes and the November 1, 2007 included 24 soil gas probes. Methane gas was not detected at any of the measurement locations during any of the surveys. However, methane was detected at a concentration of 390,000 ppm (39%) venting from an abandoned production well casing located approximately 50 feet south of the Goemmer Land Co 1 location during the August 29, 2007 survey.

Well casing venting methane at Goemmer Land Co 1

The presence of the venting methane from a plugged and abandoned production well indicates that the well may not have been plugged properly. It is possible for this production well casing to act as a conduit for subsurface methane to impact subsurface water bearing units.

Golden Cycle 2 (05-055-06024) and Golden Cycle 2A (05-055-06034)

The Golden Cycle 2 and Golden Cycle 2A production wells are plugged and abandoned wells located in Section 2, Township 29 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on July 10, 2007, which included the advancement of 16 soil gas probes at the Golden Cycle 2 site and 19 soil gas probes at the Golden Cycle 2A site. Methane gas was not detected at any of the measurement locations.

A follow-up investigation was conducted on August 8, 2007. LTE advanced 17 soil gas probes at each of the sites. Methane gas was not detected at any of the measurement locations.

Golden Eagle Mine

The Golden Eagle Mine is located on the south side of Highway 12 in Las Animas County, approximately 2 miles east of Weston, Colorado. LTE conducted a survey of the area on June 18, 2007. The survey included the advancement of 93 soil gas probes. Methane was detected at 5 of the 93 soil gas probes at concentrations ranging from 100,000 ppm (10%) to 830,000 ppm (83%) methane. LTE collected a gas sample from this site on August 29, 2007. Results of the sample analysis are discussed in Section 3.4.

The methane gas was detected at two locations on the site. The seep detected in the northwest corner of the site is related to a mine corehole that had not been sealed. The seep detected in the center of the site appears to be located in the area of the former mine shaft. The source of the seepage appears to be from historic mining activities.

Methane Seep in Vicinity of Former Mine Shaft

Hurtado 13-04 (05-055-06168)

The Hurtado 13-04 production well is a plugged and abandoned well located in Section 13, Township 29 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 8, 2007, which included the advancement of 17 soil gas probes. Methane gas was not detected at any of the measurement locations.

Leef

The Leef site is located approximately 9 miles east of Weston, Colorado in Las Animas County. The Leef site was investigated at the request of Mr. Leef over a concern for dead vegetation on his ranch near the Spindle Top 21-33 (API #05-071-06797) production well.

On July 2, 2007, LTE advanced 38 soil gas probes in the valley west of the production well pad. Methane was detected at 8 of the 38 measurement locations at concentrations ranging from 1,000 ppm to 930,000 ppm (93%). Methane was not detected on the production well pad. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Based on field observations, it appears that the seepage observed is sourced from coal bed outcrops or from subsurface fractures providing a preferential pathway for the vertical migration of methane gas.

Lively 03-03 (05-055-06086)

The Lively 03-03 production well is a plugged and abandoned well located in Section 3, Township 29 South, Range 67 West in Huerfano County, Colorado. It appears that this well was converted to a water well under permit #222539. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 7, 2007, which included the advancement of 17 soil gas probes. Methane gas was not detected at any of the measurement locations.

A follow-up survey was performed on November 1, 2007 and included the advancement of 17 soil gas probes. Methane gas was not detected at any of the measurement locations.

Lively 03-10 (05-055-06146)

The Lively 03-10 production well is a producing well located in Section 3, Township 29 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on November 1, 2007, which included the advancement of 17 soil gas probes. Methane gas was detected at the soil gas probe immediately adjacent to the active well currently owned/operated by Petroglyph Energy at a concentration of 1,000 ppm.

Lively 10-02 (05-055-06148)

The Lively 10-02 production well is a plugged and abandoned well located in Section 10, Township 29 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on July 10, 2007, which included the advancement of 17 soil gas probes. Methane gas was not detected at any of the soil gas probes advanced.

A follow-up survey was performed on August 7, 2007. Methane gas was not detected at any of the 17 soil gas probes advanced at the site.

Lively 10-02

Lively 35-11 (05-055-06159)

The Lively 35-10 production well is a producing well located in Section 35, Township 29 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 7, 2007, which included the advancement of 18 soil gas probes. Methane gas was not detected at any of the soil gas probes immediately adjacent to the active well currently owned/operated by Petroglyph Energy.

Mondragon/Saint

The Mondragon/Saint site is a known seep area that has been investigated by the COGCC in 2004 following complaints by the landowner. Results of initial investigations are available from the COGCC. LTE conducted an additional survey of the seep site as part of the Phase II Gas Seep Investigation on May 23 and 24, 2007. The seep area is currently undergoing investigation by a local gas operator.

The survey included the advancement of 174 soil gas probes on the property. Methane gas was detected in 42 of the 174 measurement locations at concentrations ranging from 500 ppm to 850,000 ppm (85%). Areas of dead and stressed vegetation were noted at the site.

Dead Vegetation near Mondragon/Saint and Madrid Bridge

Field observations indicate that the source of the methane seep is likely seepage from the coal subcrop beneath the alluvial fill in the Purgatoire River valley. The lineaments in the area suggest the potential for subsurface fractures to exist and act as preferential pathways of gas migration from coal beds in the subsurface.

Ploski

The Ploski site is located 6 miles southwest of Trinidad, Colorado in Las Animas County. LTE was asked to inspect the Ploski property at the request of the landowner following our inquiry to investigate Apogee 655. Mr. Ploski reported seeing seepage on his property along Saruche Canyon Road.

Seep in Creek at Ploski Property

LTE conducted a survey of the area on June 20, 2007. LTE advanced 22 soil gas probes as part of the survey. Methane was detected at one location in a wet soil area at a concentration of 12,000 ppm (1.2%). LTE suspects that the methane detected is of biogenic origin. LTE collected a gas sample from this site on August 30, 2007. Results of the sample analysis are discussed in Section 3.4.

Primero

The Primero seep site is located at the Primero School approximately 16 miles west of Trinidad, Colorado in Las Animas County. The Primero seep is a known seep area that was investigated in 2005 at the request of COGCC Commissioners on a tour of the area. Methane seepage was detected in the vicinity of the bus garage but not around the school or residential properties occupied by school employees.

LTE conducted an additional survey of the Primero seep as part of this Phase II Gas Seep Investigation on May 22, 2007. LTE advanced 136 soil gas probes at the site in which 18 measurement locations reported concentrations of methane ranging from 500 ppm to 890,000 (89%). LTE collected a gas sample from this site on April 23, 2007. Results of the sample analysis are discussed in Section 3.4.

Methane was generally detected around the bus garage. Methane was also detected in the vicinity of the residence directly north of the school and along the north side of Highway 12. A comprehensive investigation report for the Primero seep dated June 2007 was prepared for the COGCC and submitted under separate cover.

There are at least 12 residences in close proximity (ranging from 50 feet to 1,500 feet) to the school. Methane detection systems have been installed in eight of the residences and the bus garage for the school.

Stan Searle 1 (05-055-06060)

The Stan Searle 1 is a former production well that has been converted and permitted as a water well under permit #260097. The well is located in Section 33, Township 28 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 7, 2007, which included the advancement of 18 soil gas probes. Methane gas was not detected at any of the soil gas probes advanced.

A follow-up survey was performed on November 1, 2007. Methane gas was not detected at any of the 16 soil gas probes advanced at the site.

State 10W (05-055-06222)

The State 10W production well is a plugged and abandoned well located in Section 36, Township 28 South, Range 67 West in Huerfano County, Colorado. This site was investigated at the request of the COGCC in response to the identification of methane in nearby water wells.

LTE conducted a survey of the area on August 8, 2007, which included the advancement of 17 soil gas probes. Methane gas was not detected at any of the soil gas probes advanced.

3.4 GAS SAMPLING

LTE collected gas samples from 33 locations as part of the Phase II Gas Seep Investigation. Table 3 summarizes the gas sample identification and location information. Gas sample locations for the Raton Basin are depicted in Figure 4.

3.4.1 Composition

Gas compositional analysis was performed on each of the 33 samples collected. Analytical results are presented in Table 5. Laboratory analytical reports are included in Appendix J.

In general, methane was detected within each of the samples collected. Concentrations were highly varied due, in part, to the sample collection method. Since the samples are collected directly from seeps using a hand vacuum pump to fill the sample container, it is not unusual for ambient air to enter the sample stream. The methane concentrations reported ranged from 0.0757 mole % to 89.49 mole %.

Ethane was detected in 12 of the 33 samples collected at concentrations ranging from 0.003 mole % to 0.0188 mole %. Ethylene, propane, butane, pentane, and hexanes were not detected in any of the samples except for the Bounds sample, which reported a concentration of propane at 0.0018 mole %. The presence of propane in the sample is suspect since CBM generally does not contain propane hydrocarbons. The concentration is only slightly above the method detection limit. It is likely that this detection of propane is a false positive.

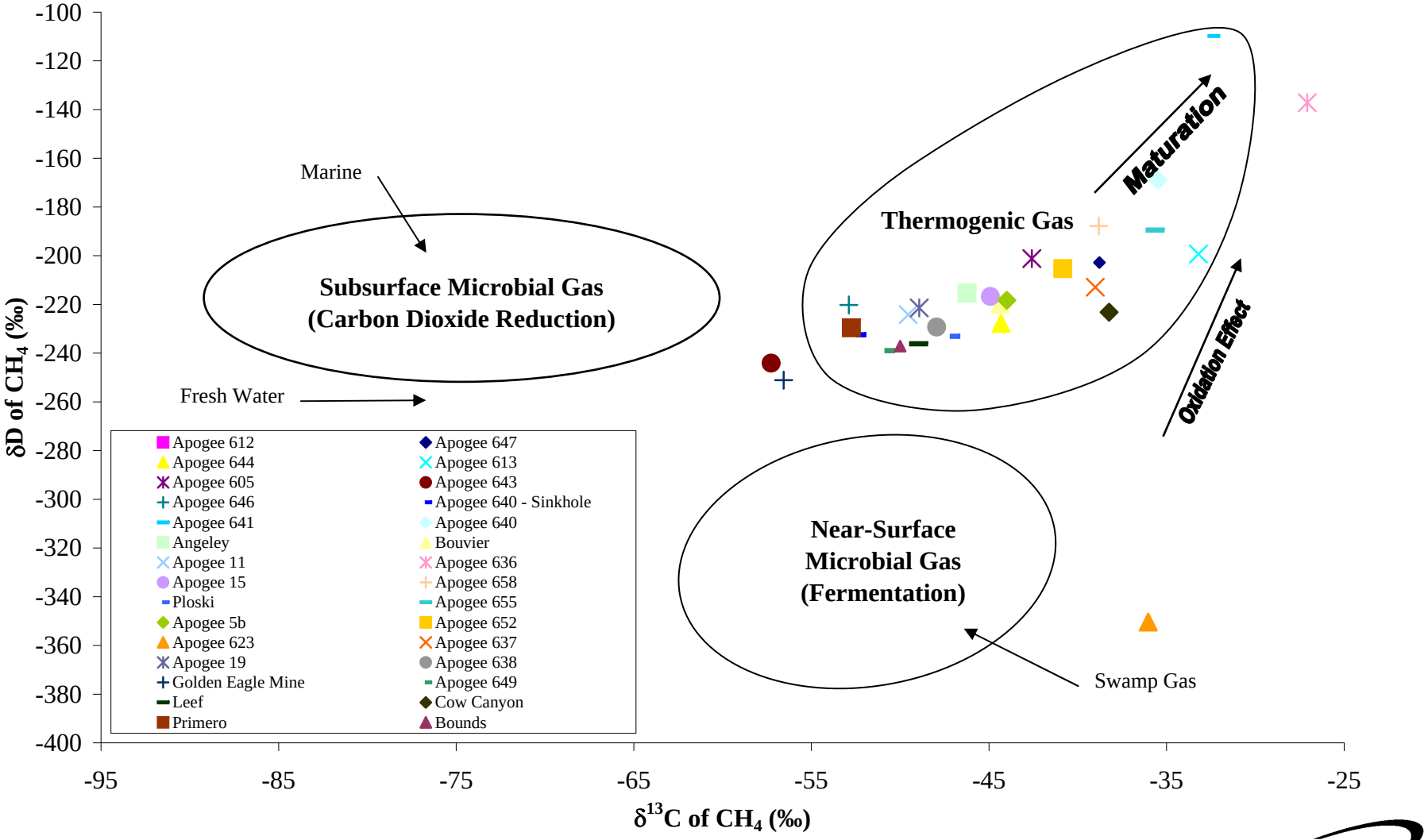
3.4.2 Isotopic Analysis

Each of the 33 gas samples was analyzed for the carbon and hydrogen isotopes of methane. Isotopic results are presented on Table 5. Isotopic analysis assists in the identification of the source of methane gas. It is best viewed as a cross plot with the carbon isotope concentration plotted on the x-axis and the hydrogen isotope concentration plotted on the y-axis. The location of the plotted point coupled with the analytical research from Coleman, et al (1995). Chart 1 on the following page illustrates the cross-plots of the isotopic analytical results for each of the 33 samples collected.

In general, the isotopic signature for all of the gas samples suggests thermogenic methane except for the gas at Apogee 623. The gas sample from Apogee 643 and the Golden Eagle Mine are likely mixtures of biogenic and thermogenic gas. The samples from Apogee 641 and Apogee 636 plot outside the thermogenic region but are likely highly oxidized samples of thermogenic gas.

Another sample from Apogee 612 plots off of the chart presented and is also a result of a highly oxidized sample of thermogenic gas.

CHART 1
ISOTOPIC ANALYSIS
SOIL GAS SAMPLES



Source: Coleman et al., 1995

The gas at Apogee 623 appears to be of biogenic origin yet there was no indication of a source during the field mapping. It is possible that organics from the North Fork of the Purgatoire River may be the source. An abandoned residence was noted approximately 400 feet north of the seep. It is possible that the gas detected is related to a septic system from the former residence.

The gas samples from Apogee 640 and the sinkhole east of Apogee 640 were collected approximately 1,000 feet apart. However, the signature from the isotopic analysis is markedly different. The sample from the sinkhole plots closer to the biogenic region than does the sample from Apogee 640. It is possible that the decaying organic matter from the dead animals in the sinkhole is contributing to this difference. Oxidation of the gas in the sample from the Apogee 640 may also explain the difference.

The isotopic results from the sample collected at Apogee 643 plots in the thermogenic region, similar to many gas wells in the area. The sample collected from the Apogee 644 also plots in the thermogenic region.

The isotopic data from the gas sample from the Bounds water well suggest that the Bounds water well may include a mixture of biogenic gas and thermogenic gas.

The sample from the Hopke water well (Apogee 613) plots well into the thermogenic region. The gas sample from Apogee 652 was collected adjacent to a water well but also plots in the thermogenic region suggesting the well is acting as a conduit.

The gas collected from Apogee 656 and Apogee 660 contained insufficient methane concentrations to analyze them for isotopes. Apogee 656 was collected adjacent to the operating Annette 21-21 production well and is suspected to be thermogenic methane. Apogee 660 was collected in the manure area and is suspected to be biogenic methane.

The gas collected from the Angeley water well plots in the thermogenic region suggesting the aquifer in the Poison Canyon Formation has been impacted by CBM.

The gas sample collected from the Ploski site plots in the thermogenic region suggesting that the gas is sourced by coal bed outcrops. This was unexpected since the seep area was very small and located adjacent to a wetland-type area where biogenic gas is common.

LTE prepared a chart comparing the isotope concentrations from the gas samples collected as part of this Phase II Gas Seep Investigation to isotope concentrations from gas samples collected from various gas production wells, which are maintained in a database by the COGCC. The results of the comparison show that the two data sets generally plot in the same region as thermogenic gas. However, the isotope concentrations from the gas samples collected as part of the Phase II Gas Seep Investigation may have a tendency to be more oxidized as they plot higher on the chart. Chart 2 illustrates the comparison between the two gas sample data sets.

3.5 WATER WELL SAMPLING

LTE collected 17 water samples from 15 water wells and one surface water body as part of the Phase II Gas Seep Investigation. One sample (Gabe) was a duplicate sample of the Dubis water well. Table 4 summarizes the water well samples and their locations are illustrated on Figure 5.

LTE had difficulty getting responses from well owners to grant access to sample the water wells in the region. This is due in large part to the absence of local landowners. Many of the landowners in the region live out of state.

While conducting sampling activities, LTE was requested by the landowner to collect water samples from additional sources. LTE obliged the request, whenever possible.

3.5.1 Water Quality Parameters

During purging activities, LTE collected field measurements of pH, temperature, and electrical conductivity. The initial and final field measurements of these parameters are summarized on Table 6.

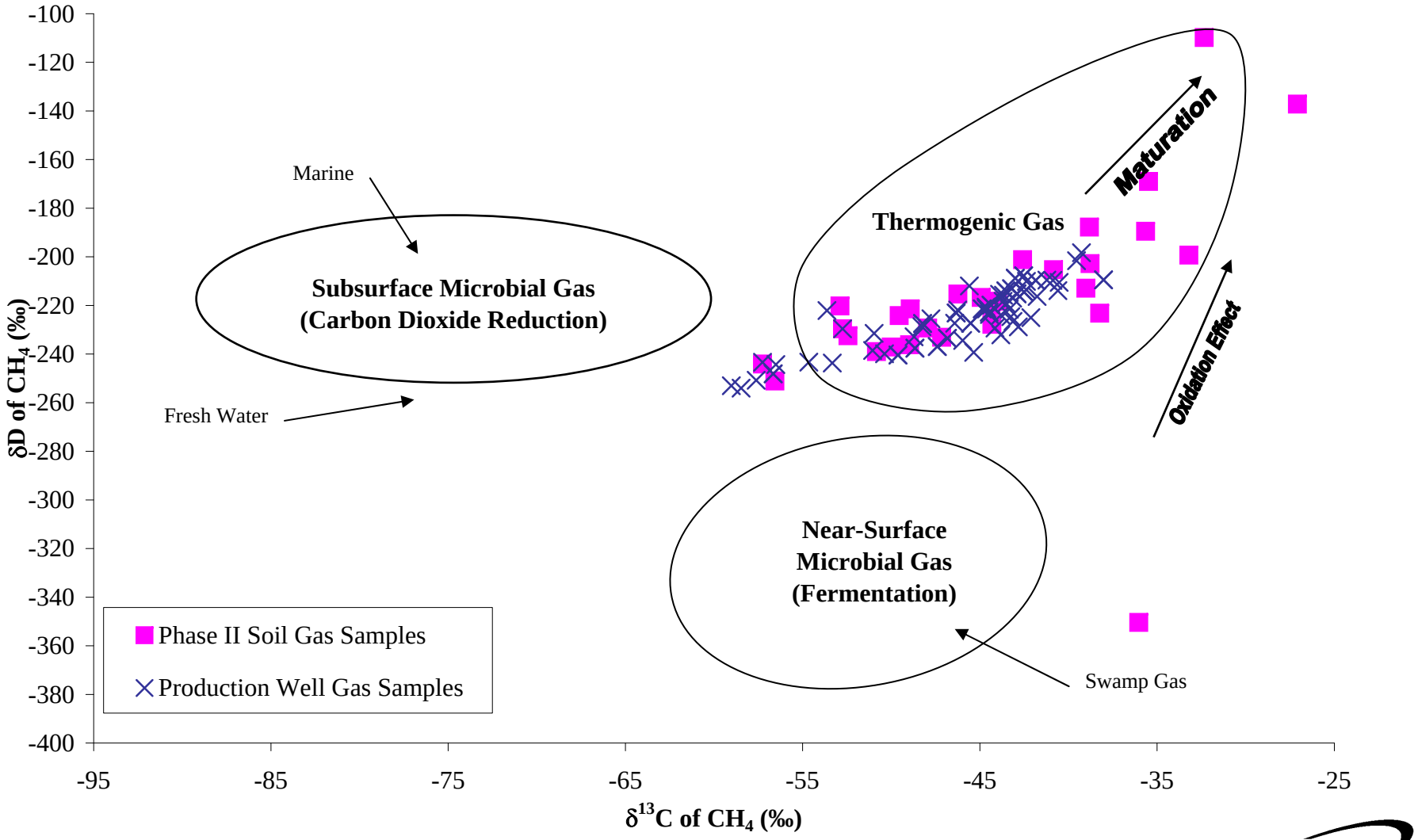
LTE utilized AqQa® software to analyze the water quality data. LTE prepared stiff diagrams for each sample and a piper diagram of all samples. Generally, the water type was sodium bicarbonate water at each well with the exception of the Robinson Sawmill 1, Skowron, Slevec 1, and Tokar water, which was a calcium bicarbonate water type. The Hopke water was also an exception as it was a sodium sulfate water type. The stiff diagrams for each water sample and the piper diagram for all of the water samples is presented in Appendix K. An illustration of the water types using Stiff diagrams for the various water sample locations is presented as Figure 8.

Water quality results for dissolved metals and the various cations and anions were generally found at concentrations below the Colorado Groundwater Quality Standards (CGWQS) where applicable. Table 7 summarizes the groundwater analytical results. One exception is the concentration of manganese found in the Robinson Sawmill 2. This sample was collected adjacent to a former wood shop for the sawmill. The concentration of manganese found in the water sample was 1.51 mg/L, more than 20 times the regulatory standard. The laboratory analytical reports for the water quality analyses are presented in Appendix L.

3.5.2 Dissolved Methane

Dissolved methane was detected in all of the water samples collected except for the sample from the Barth water well and the sample from the Skowron water well. Detected concentrations ranged from 0.069 micrograms per liter (ug/L) to 27,200 ug/L. The detected concentrations exceeded the COGCC's threshold level of 2 mg/L in six wells (Bounds, Dubis, Hopke, Manning, Slevec-2, and Van Artsdalen). The dissolved methane concentration measured in each well is presented on Table 7. Laboratory analytical reports are presented in Appendix L.

CHART 2
ISOTOPIC ANALYSIS
SOIL GAS SAMPLES AND PRODUCTION WELL SAMPLES



Source: Coleman et al., 1995

3.5.3 Composition and Isotopic Analysis of Well Gas

If dissolved methane was detected above 2.0 mg/L in the water sample, a sample of the water was submitted for analysis of gas composition and the carbon and hydrogen isotopes of methane. Seven samples were submitted for composition and isotopic analysis.

The methane concentration reported in the gas samples ranged from 43.72 mole % to 99.12 mole %. Ethane was also detected at concentrations ranging from 0.0137 mole % to 0.0353 mole %. The Gabe sample (a duplicate of Dubis) reported a concentration of n-pentane at a concentration of 0.0061 mole %. This appears to be a false positive as the compound was not detected in the Dubis sample nor has n-pentane been observed in the production gas of the Raton Basin CBM field.

Isotopic analysis indicates that the Dubis and Gabe samples are very similar, as expected. These two samples plot near the region of subsurface microbial methane (biogenic) generated during the process of carbon dioxide reduction. The gas in the Manning well also plots in this region. It is likely that this biogenic gas has been generated within the wells and may be remedied with maintenance and cleaning of the well.

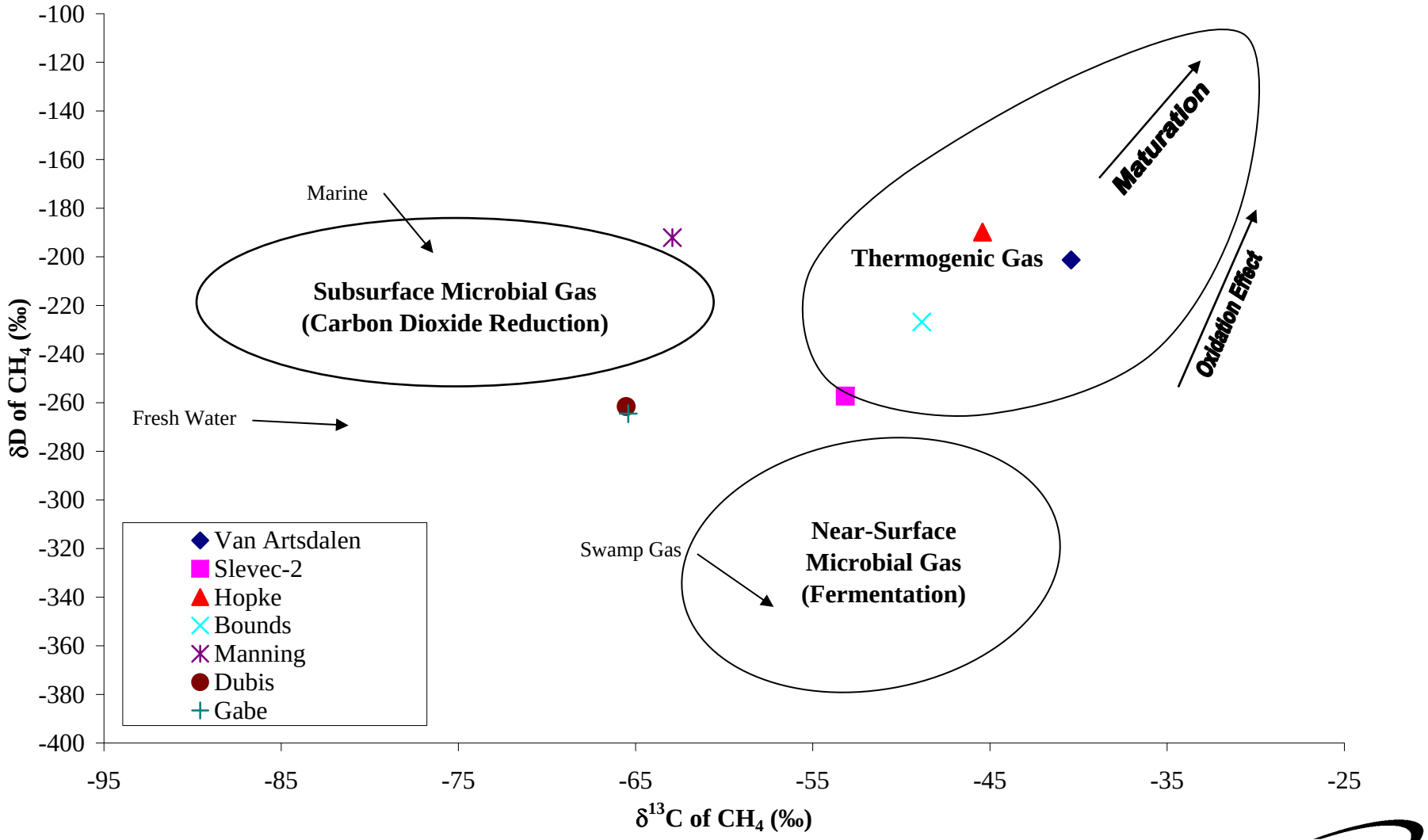
The remaining four gas samples indicate the presence of thermogenic gas, though the Slevec-2 water well may contain a mixture of both biogenic and thermogenic methane gas. Table 8 presents the results of the gas composition and isotopic analysis from the water well samples. The laboratory analytical reports from the gas composition and isotopic analysis from the water well samples is presented in Appendix M. A chart illustrating the results of the isotopic analysis from the water samples is presented on the following page.

3.6 METHANE DETECTION SYSTEMS

As previously stated, a large methane seep was identified directly beneath the residence located at 983 County Road 340, Walsenburg, Colorado. At the request of the COGCC, LTE installed two temporary methane detectors within the residence while orders for permanent hard-wired methane detectors were made.

On September 13, 2007, LTE personnel installed three Macurco® gas detectors in the residence. The units were hard-wired into the existing electrical system. Two units were installed on the main level of the house and one unit was installed in the basement/crawlspace. LTE bump-checked each unit after installation using butane gas and found all three units to be operating according to the manufacturers specifications. The units are made with solid-state technology and do not require calibration.

CHART 3
ISOTOPIC ANALYSIS
WATER WELLS



Source: Coleman et al., 1995

SECTION 4.0

CONCLUSIONS AND RECOMMENDATIONS

4.1 GROUND SURVEY

The ground survey covered approximately 3,200 miles of roads in the Raton Basin and identified 59 seeps. The ground survey method appears to be an effective means by which to screen the large project area for methane seeps. However, the method is limited by the roads which are accessible, and wind direction. These two limiting factors will undoubtedly result in missing active seep areas within the Raton Basin. Nonetheless, it is a reasonable method for screening large areas and particularly those areas near residences since residential areas typically have a good system of roads.

In comparison, the 2000/2001 ground survey covered 2,789 miles of roads within the Raton Basin and identified 67 seeps. The 2007 ground survey covered 3,187 miles of roads within the Raton Basin and identified 59 seeps. The 2007 ground survey identified more seepage sites in the northern part of the Raton Basin and fewer sites in the southern part of the Raton Basin than were identified in the 2000/2001 ground survey.

There are insufficient data to conclude whether the methane seepage has increased or decreased over the past 7 years based on the ground survey alone. Due to various factors that affect this detection method, it appears to be unreasonable to make judgments on the magnitude of changes in methane seepage using this method. The ground survey is a good screening tool to identify the presence or absence of methane across large areas. However, influencing factors such as time of year, time of day, barometric pressure, wind direction, and wind speed affect the concentration detected. Therefore, it's effectiveness at quantifying changes in methane seepage rates or concentration over time at a given seep area is limited.

LTE recommends resurveying the Raton Basin project area for methane seeps within the next 3 to 5 years. It may be prudent to investigate the use of Boreal laser technology mounted on a helicopter as a potential screening tool to cover the large project area and reduce the limitations imposed by road access and wind direction.

4.2 DETAILED MAPPING

LTE conducted detailed mapping at 55 sites within the project area. The detailed mapping events account for 31 of the original 59 sites identified during the 2007 ground survey and 24 additional sites amended to the detailed mapping program. Methane was detected at 35 of the 55 sites investigated. Based on the data collected, many of the sites exhibit seeping thermogenic methane, likely associated with the coal beds present at the ground surface or at depth throughout the Raton Basin. The extent to which the change in seepage rates is occurring or the cause of the seepage cannot be determined from this investigation alone. Further research and repeated field surveys are required.

Residential structures in close proximity to methane seeps are at risk to explosive hazards should the methane gas be allowed to accumulate in confined spaces and then be ignited by an open flame, electrical spark, or even static electricity. Domestic water supplies accessing water from coal-bearing formations or in contact with active seeps provide preferential pathways for gas migration and are at risk to explosive hazards should the gas accumulate in confined spaces. Active and abandoned production wells can act as conduits for methane seepage at the ground surface. Structures built on or within close proximity to oil and gas facilities, including leaking pipelines or improperly sealed wells, are at risk to explosive hazards if methane gas is allowed to accumulate in confined spaces.

Detailed mapping was not performed at 28 of the 59 sites identified in the 2007 ground survey. Based on a comparison of the 2000/2001 ground survey and the 2007 ground survey, there are an additional 42 sites identified using the Apogee LDS method in 2000/2001 that have never been investigated using detailed mapping procedures. LTE recommends further detailed mapping at the existing seepage sites; the 42 historic seeps identified during the 2000/2001 ground survey that were not identified during the 2007 ground survey; and the 28 potential seep areas identified in 2007 that were not investigated as part of the detailed mapping program.

During future mapping events, LTE recommends the use of a portable flux meter to quantify flux rates for comparison to future surveys and to identify trends over time. A portable flux meter reduces error in survey techniques since it strictly measures seepage at the ground surface; has a known radius of influence; and does not induce flow to the measurement location.

LTE recommends the implementation of a public outreach program to the residents and landowners of property in the Raton Basin and the governmental agencies in Huerfano and Las Animas Counties. The vast area of geologic outcrops containing coal-bearing formations near the ground surface along with extensive historic and current coal mining operations and extensive natural gas production operations increase the risk for methane to migrate to the ground surface or into water wells and affect sensitive receptors. Education about how to recognize seepage, identify active and historic gas production well locations, coal mines, coal mine vents and coreholes, coal outcrops, and gas pipelines will reduce the potential for structures to be built on high risk methane seep areas without engineering controls and allow for the appropriate mitigation techniques to be used to reduce the hazards to human health and the environment. The outreach program may also facilitate the implementation of land use policies that reduce the risks to its residents.

4.3 GAS SAMPLING

Methane gas was detected in all of the samples collected. Generally, the gas was determined to be thermogenic in origin and similar in composition to methane derived from coal beds. The sampling and analysis of methane gas are important steps in identifying the source of the gas seep and ultimately addressing a remedy, if possible.

LTE recommends further soil gas sampling in suspected seep areas that have not been investigated to date. Repeated sampling events at a select number of known seep areas may also be valuable in monitoring changes in seep conditions over time.

4.4 WATER WELL SAMPLING

Methane gas was detected in nearly all of the water wells sampled. This is likely due to the fact that coal beds are plentiful throughout the Raton Basin and are present at depths commonly encountered by domestic water wells. It is important to remember that even though a given coal interval in the subsurface may not be commonly accessed as a CBM production zone, methane gas is likely still present. Water wells accessing and dewatering these coal zones act similar to a CBM production wells and can result in the production of methane gas. While there is no known toxicity from methane gas, the hazard lies in the accumulation of this gas in confined spaces ultimately creating an explosive environment or an oxygen deficient environment. Water wells with dissolved methane concentrations greater than 2 mg/L should be considered for pretreatment to prevent the accumulation of explosive vapors in confined spaces within the water system. Gas samples should also be collected for analysis of gas composition and isotopes of carbon and hydrogen for methane.

It is also not uncommon for biological activity within the well to generate methane gas that can accumulate in confined spaces and create a hazardous condition. Well owners should be encouraged to maintain a clean water well and performed routine cleaning and maintenance on the well casing and pump equipment to reduce the potential for methane-generating biological activity. Information about understanding domestic water wells can be obtained from the COGCC website at: http://oil-gas.state.co.us/Library/WaterWellBooklet.pdf or by referring to *Groundwater and Wells* (Driscoll, 1986).

LTE recommends a public outreach program to educate well owners, drillers, developers, and municipal governments about drilling domestic water wells in an area containing a vast amount of coal bed, historic coal mines, and CBM production. The program should include content about treating water and equipping water systems to remove and/or vent methane gas safely.

4.5 METHANE DETECTION SYSTEM

The methane detection system in the residence near Apogee 643 appears to be functioning properly and is an effective tool to provide a warning to the occupants of the structure prior to the accumulation of methane to explosive levels.

LTE recommends that all structures with the potential to be impacted by gas seepage should be equipped with a methane detection system that alarms prior to gas concentrations reaching explosive levels. LTE encourages the local governments to educate the residents of Huerfano and Las Animas Counties about the risks of methane gas accumulating in confined spaces. The county building departments should also consider implementing regulations that require soil gas surveys, methane detection, and methane mitigation systems prior to new construction of structures within each of the counties.

4.6 GENERAL CONSIDERATIONS

One of the primary concerns prompting this Phase II Gas Seep Investigation and investigations prior to this is whether or not CBM production is influencing seepage conditions in the Raton Basin.

There are no data or conclusions in this investigation that can directly link methane seepage to the ongoing gas production or historic coal mining operations at this time. Further study is required to investigate this relationship. However, it is understood that CBM production involves the dewatering of coal beds, reducing pore pressures, and ultimately liberating methane gas from the coal. The methane gas is then captured by the network of production wells. Seepage can be the result of inefficient capture of liberated gas; indirect dewatering of coal beds hydraulically connected to a production zone; or the natural dewatering and release of coal beds from drought conditions. Subsurface systems of fractures, preferential pathways, hydraulically connected intervals, and soil and rock permeability further complicate the cause and effect relationship.

LTE recommends a comprehensive study of the Raton Basin from a reservoir engineering perspective that develops, through modeling and geochemical analysis, the hydrologic regime, CBM reservoirs, gas production, coal mining activities, water well usage, geologic setting, and gas seepage to evaluate and predict future conditions within the system. A similar study was performed in the San Juan Basin during the late 1990's.

4.7 SPECIFIC CONCERNS REGARDING IDENTIFIED SEEPAGE

Based on the findings of this Phase II Gas Seep Investigation, LTE has developed a list of specific concerns that should be noted separately. The specific concerns are as follows (in no particular order):

- Coal mine vents, coreholes, and/or mineshafts are strongly suspected to be the source seeping methane gas and should be plugged to reduce seepage.

Sites with Vents, Coreholes, and/or Mineshafts
Apogee 605
Apogee 607
Apogee 612
Sinkhole – Apogee 644
Apogee 641
Apogee 646
Golden Eagle Mine

The DRMS should be notified of these seep areas so that mitigation measures can be implemented, if appropriate.

- Pipelines and/or gas production wells have the potential to be leaking and should be repaired to conserve resources.

Seep ID	Nearby Pipeline Owner/Operator
Apogee 9	Potential XTO Energy Gathering Line
Apogee 11	Potential XTO Energy Gathering Line
Apogee 15	Potential XTO Energy Gathering Line
Apogee 19	Potential XTO Energy Gathering Line
Apogee 27 & 34	Leaking well API 05-071-06045, City of Trinidad
Apogee 28	Leaking Valve for Pioneer Gathering Line at well API 05-071-06795
Apogee 637	Potential Pioneer Gathering Line
Apogee 638	Potential Pioneer Gathering Line
Apogee 649	Potential Pioneer Gathering Line
Apogee 652	Potential Pioneer Gathering Line
Apogee 656	Potential Pioneer Gathering Line or Leak at well API 05-071-06248
Golden Cycle 1, and Golden Cycle Land Co 1	Potential leak from casing of well at API 05-055-06023 or or API 05-055-06038

- Six water wells contain methane gas at dissolved concentrations above 2 milligrams per liter (mg/L). The COGCC has established 2 mg/L as a threshold level at which water well systems have the potential to accumulate explosive vapors in confined spaces.

Water Well ID (DWR permit #)	Methane (mg/L)
Bounds (181278)	5.240
Dubis (NA)	6.330
Hopke (256504)	3.420
Manning (259501)	4.140
Slevec-2 (NA)	21.200
Van Artsdalen (201674)	27.200

NA = not applicable

Water wells with dissolved methane concentrations greater than 2 mg/L should be monitored and tested including measurements of dissolved concentrations being delivered into the residence, water treatment systems, and potential confined spaces.

- Seeps have been identified in close proximity to residential structures.

Seep ID	Distance From Seep to Structures (feet)	No. of Structures Potentially Affected	Recommended Actions
Apogee 5b	0 to 700	4	Monitor seep, evaluate need for methane detection systems
Apogee 605	500	1	Monitor seep, evaluate need for methane detection system
Apogee 623	250	1 (abandoned)	Monitor seep
Apogee 636	100 to 550	12	Monitor seep, maintain existing detection systems, evaluate need for additional methane detection systems
Apogee 637	250 to 350	2	Monitor seep, evaluate need for methane detection system
Apogee 640	0	1	Monitor seep, evaluate need for methane detection system
Apogee 641	125 to 900	10	Monitor seep, evaluate need for methane detection system, notify DRMS
Apogee 643	0	2	Monitor seep, maintain existing detection systems, conduct additional flux measurements
Apogee 655	400	1	Monitor seep, conduct methane flux measurements
Primero	50 to 1,500	12	Monitor seep, maintain existing detection systems, evaluate need for additional methane detection systems
Mondragon/Saint	0 to 700	2	Monitor seep, maintain existing detection systems, maintain existing mitigation system

SECTION 5.0

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FIGURES

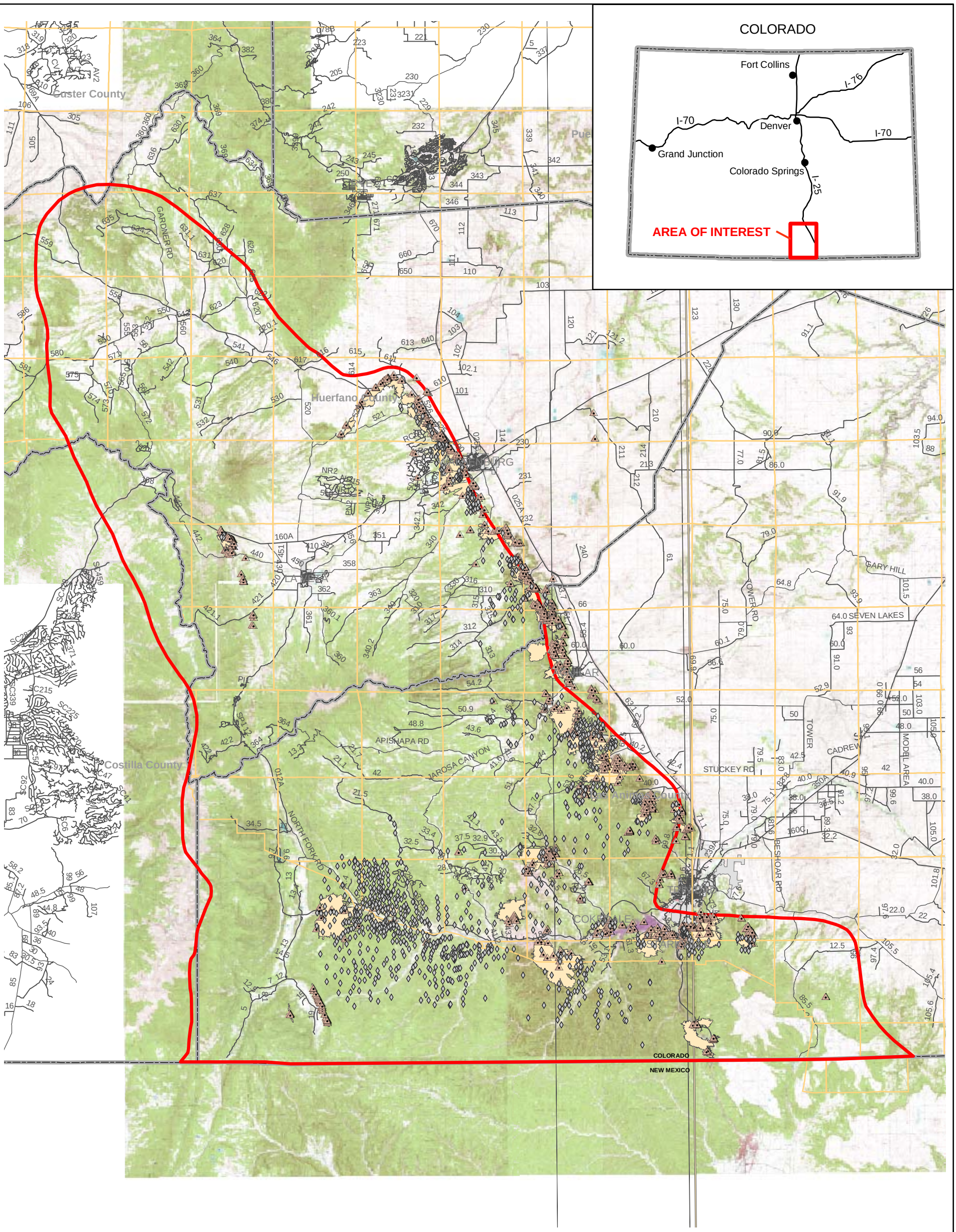

IMAGE COURTESY OF USGS, 1983

LEGEND

- LEWICKI COREHOLE
- LEWICKI MINE FEATURE
- LEWICKI MINE BOUNDARY
- RATON BASIN BOUNDARY
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

0 7 14
Miles

N

FIGURE 1
PROJECT AREA
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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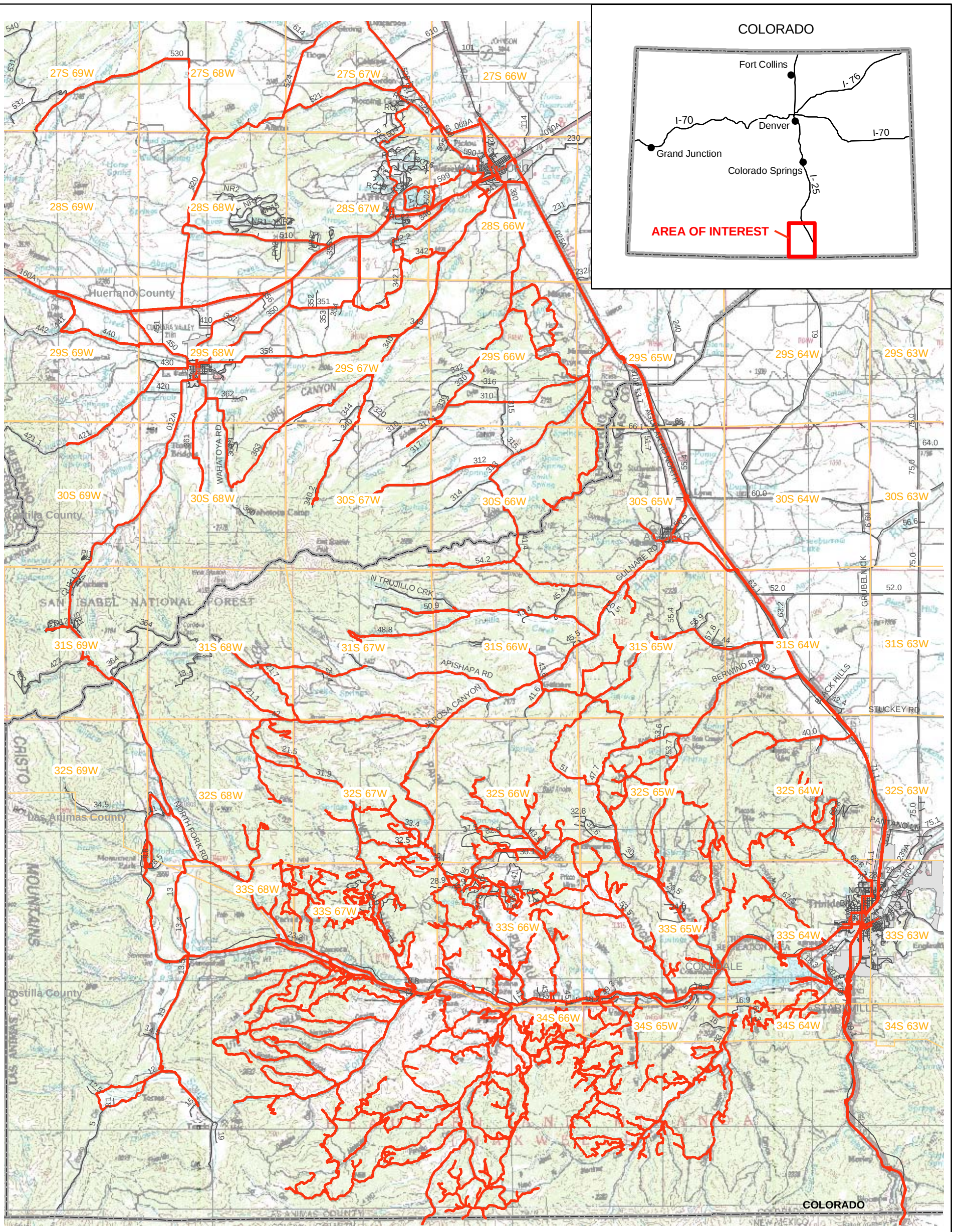

IMAGE COURTESY OF USGS, 1983

LEGEND

- APOGEE SURVEY ROUTE
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

0 4 8
Miles

N

FIGURE 2
GROUND SURVEY ROUTE
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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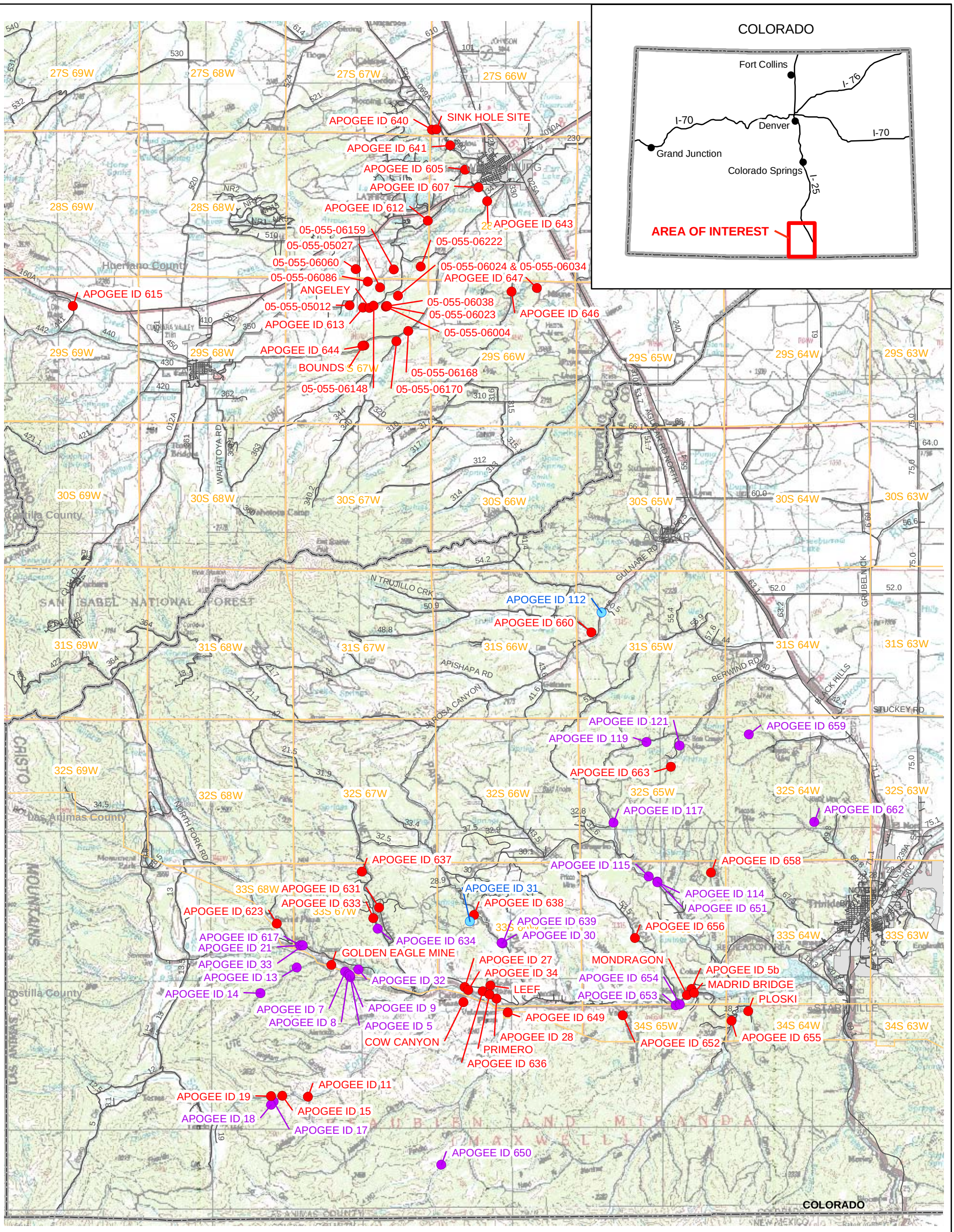

IMAGE COURTESY OF USGS, 1983

LEGEND

- MAPPED AREA
- UNMAPPED AREA
- ACCESS DENIED FOR DETAILED SURVEY
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

(05-055-06060) - API NUMBER FOR ACTIVE OR PLUGGED & ABANDONED PRODUCTION WELL

0 4 8
Miles

N

FIGURE 3
2007 DETAILED MAPPING SITES
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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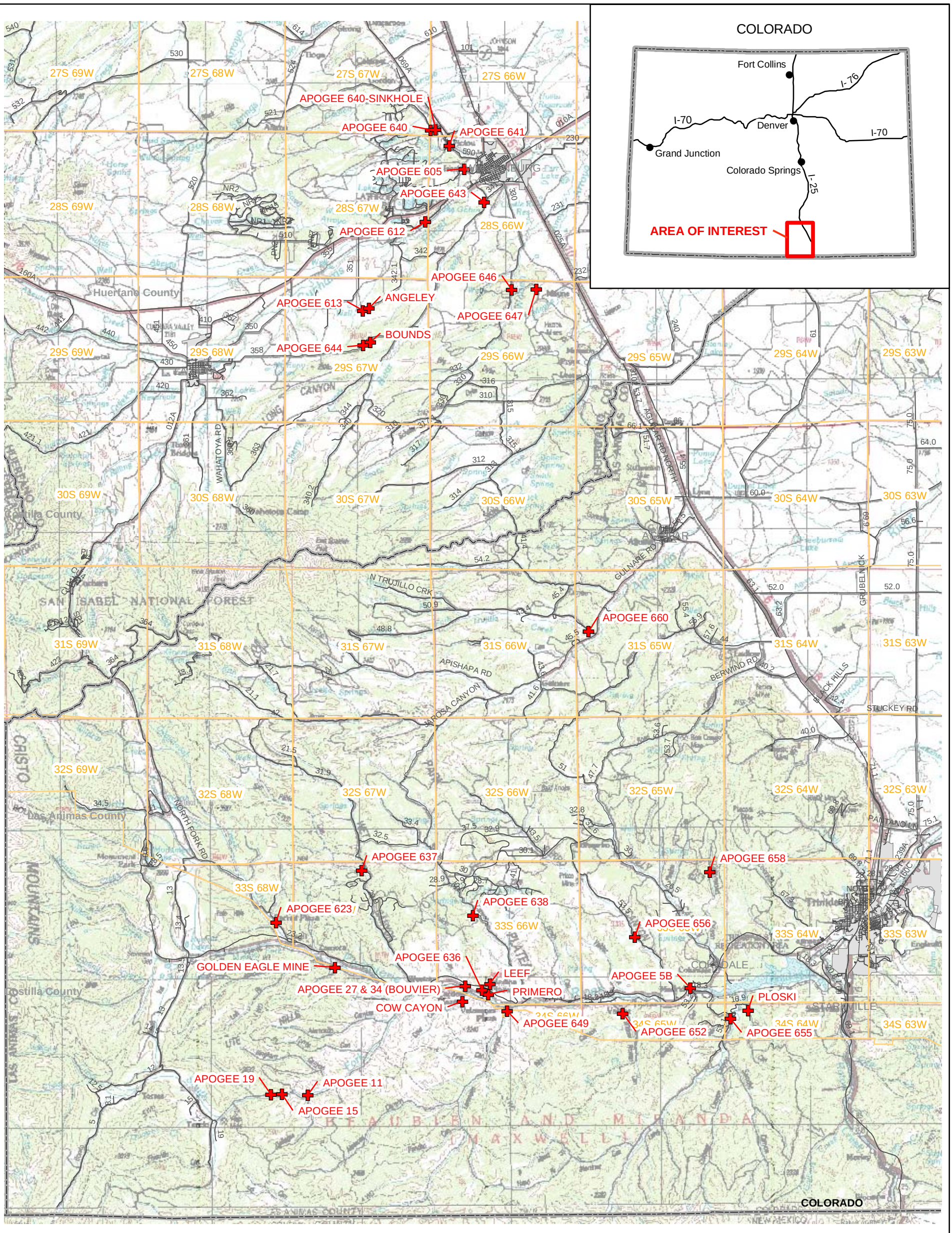

IMAGE COURTESY OF USGS, 1983

LEGEND

- GAS SAMPLE LOCATION
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

0 4 8
Miles

N

FIGURE 4
SOIL GAS SAMPLE LOCATIONS
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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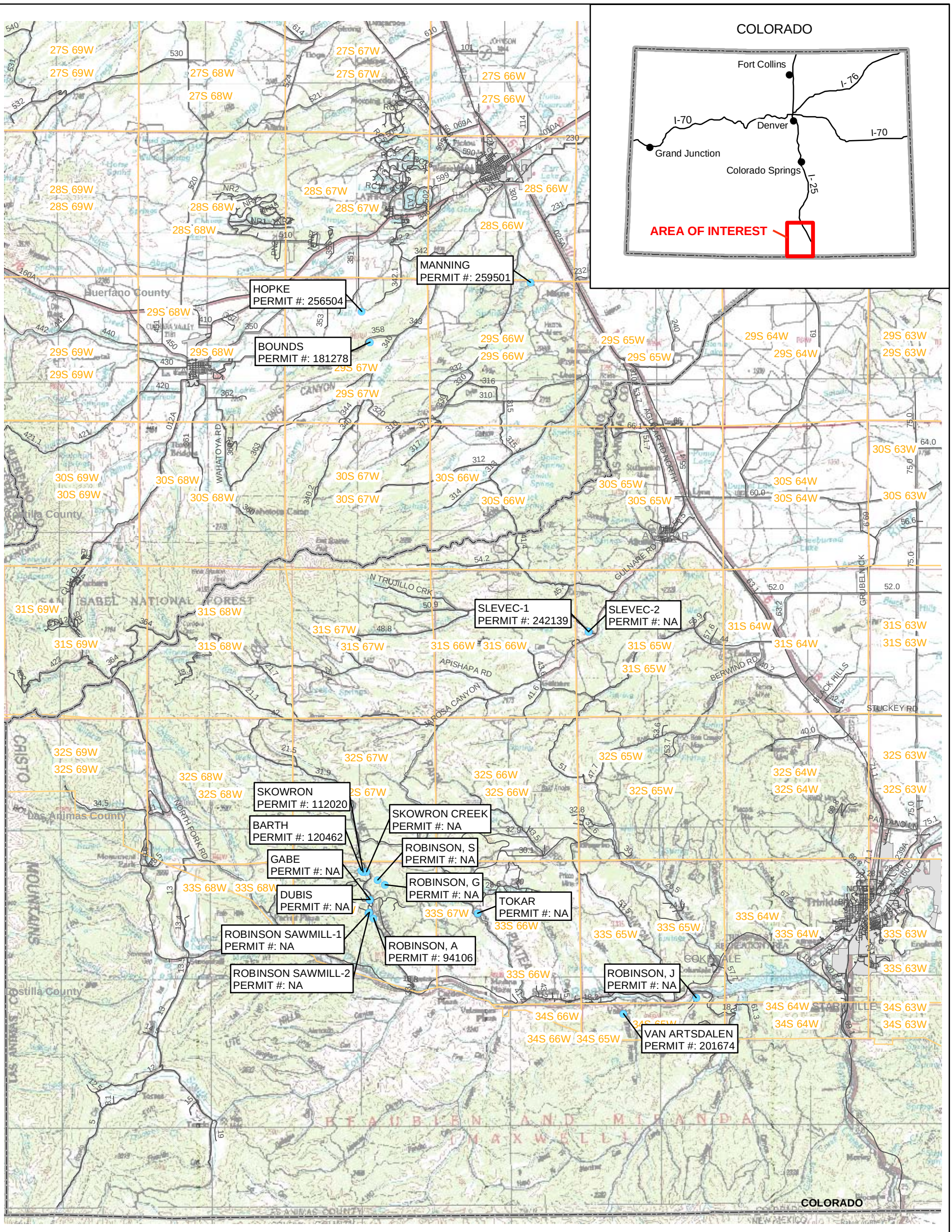

LEGEND

- WATER SAMPLE LOCATION
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

SAMPLE ID
PERMIT NUMBER FROM DIVISION OF WATER RESOURCES

0 4 8
Miles

N

FIGURE 5
WATER SAMPLE LOCATIONS
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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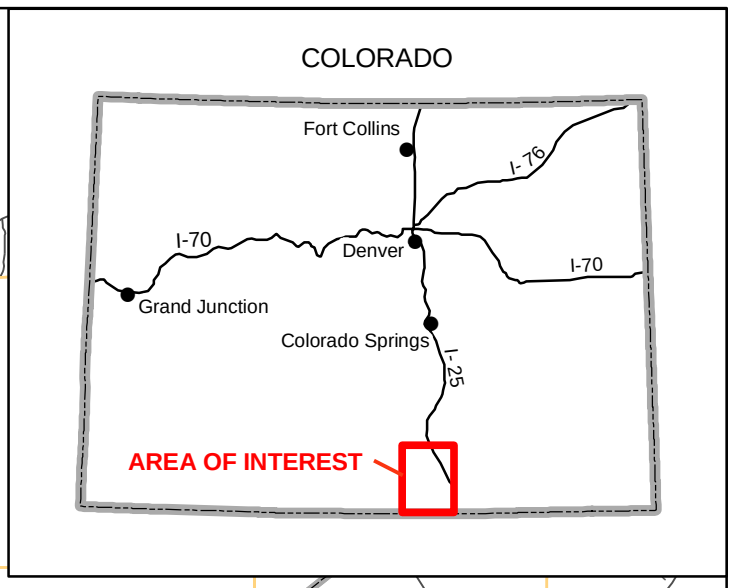

APOGEE ID 640
CH_4: 5.2 PPM
17 MPH - 173°

APOGEE ID 605
CH_4: 12.5 PPM
6 MPH - 127°

APOGEE ID 641
CH_4: 13.7 PPM
5 MPH - 3°

APOGEE ID 607
CH_4: 2 PPM
9 MPH - 62°

APOGEE ID 612
CH_4: 4.2 PPM
19 MPH - 257°

APOGEE ID 643
CH_4: 41.4 PPM
9 MPH - 218°

APOGEE ID 613
CH_4: 1.9 PPM
10 MPH - 235°

APOGEE ID 646
CH_4: 3.7 PPM
5 MPH - 136°

APOGEE ID 647
CH_4: 3.2 PPM
5 MPH - 109°

APOGEE ID 615
CH_4: 2.2 PPM
25 MPH - 244°

APOGEE ID 644
CH_4: 1.4 PPM
2 MPH - 263°

APOGEE ID 633
CH_4: 2.5 PPM
6 MPH - 0°

APOGEE ID 33
CH_4: 5.7 PPM
7 MPH - 240°

APOGEE ID 21
CH_4: 4.7 PPM
7 MPH - 132°

APOGEE ID 623
CH_4: 5 PPM
3 MPH - 297°

APOGEE ID 617
CH_4: 11 PPM
7 MPH - 11°

APOGEE ID 13
CH_4: 2.6 PPM
3 MPH - 233°

APOGEE ID 14
CH_4: 1.9 PPM
2 MPH - 217°

APOGEE ID 19
CH_4: 11.4 PPM
1 MPH - 75°

APOGEE ID 18
CH_4: 1.3 PPM
0 MPH - 0°

APOGEE ID 17
CH_4: 8.4 PPM
15 MPH - 156°

APOGEE ID 7
CH_4: 4.8 PPM
6 MPH - 85°

APOGEE ID 5
CH_4: 12.7 PPM
5 MPH - 358°

APOGEE ID 8
CH_4: 3.2 PPM
3 MPH - 133°

APOGEE ID 9
CH_4: 57.8 PPM
5 MPH - 21°

APOGEE ID 11
CH_4: 21.2 PPM
1 MPH - 155°

APOGEE ID 15
CH_4: 28.5 PPM
5 MPH - 344°

APOGEE ID 650
CH_4: 5.5 PPM
7 MPH - 8°

APOGEE ID 660
CH_4: 25 PPM
0 MPH - 0°

APOGEE ID 112
CH_4: 1.7 PPM
6.8 MPH - 35°

APOGEE ID 121
CH_4: 0.3 PPM
3 MPH - 232°

APOGEE ID 659
CH_4: 7 PPM
0 MPH - 0°

APOGEE ID 119
CH_4: 1.9 PPM
5.1 MPH - 43°

APOGEE ID 663
CH_4: 13.1 PPM
0 MPH - 0°

APOGEE ID 637
CH_4: 41.5 PPM
3 MPH - 66°

APOGEE ID 117
CH_4: 3.6 PPM
3.4 MPH - 320°

APOGEE ID 115
CH_4: 1.7 PPM
2 MPH - 45°

APOGEE ID 662
CH_4: 5.5 PPM
4 MPH - 184°

APOGEE ID 631
CH_4: 99.4 PPM
3 MPH - 298°

APOGEE ID 30
CH_4: 8.9 PPM
1.7 MPH - 95°

APOGEE ID 658
CH_4: 49 PPM
0 MPH - 0°

APOGEE ID 634
CH_4: 2 PPM
6 MPH - 141°

APOGEE ID 114
CH_4: 1.9 PPM
7 MPH - 45°

APOGEE ID 651
CH_4: 2.1 PPM
7 MPH - 154°

APOGEE ID 656
CH_4: 25 PPM
5 MPH - 120°

APOGEE ID 639
CH_4: 7.6 PPM
6 MPH - 158°

APOGEE ID 0
CH_4: 1.7 PPM
3.4 MPH - 220°

APOGEE ID 31
CH_4: 23.6 PPM
10 MPH - 162°

APOGEE ID 638
CH_4: 3.6 PPM
5 MPH - 263°

APOGEE ID 654
CH_4: 7.3 PPM
0 MPH - 0°

APOGEE ID 32
CH_4: 10 PPM
10 MPH - 329°

APOGEE ID 649
CH_4: 45.3 PPM
11 MPH - 39°

APOGEE ID 655
CH_4: 24 PPM
3 MPH - 53°

APOGEE ID 653
CH_4: 3.6 PPM
3 MPH - 346°

APOGEE ID 652
CH_4: 20 PPM
6 MPH - 76°

APOGEE ID 636
CH_4: 22.6 PPM
5 MPH - 245°

APOGEE ID 34
CH_4: 1.6 PPM
12 MPH - 260°

APOGEE ID 27
CH_4: 10 PPM
5 MPH - 130°

Huerfano County
Las Animas County
Custilla County
COLORADO

LEGEND

- APOGEE SEEP WIND DIRECTION
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

SAMPLE ID
CH_4: METHANE CONCENTRATION IN PARTS PER MILLION (PPM)
WIND SPEED IN MILES PER HOUR (MPH)
WIND DIRECTION IN DEGREES (°)
0° = WIND FROM NORTH
90° = WIND FROM EAST
180° = WIND FROM SOUTH
270° = WIND FROM WEST

0 4 8
Miles

N

FIGURE 6
2007 GROUND SURVEY RESULTS
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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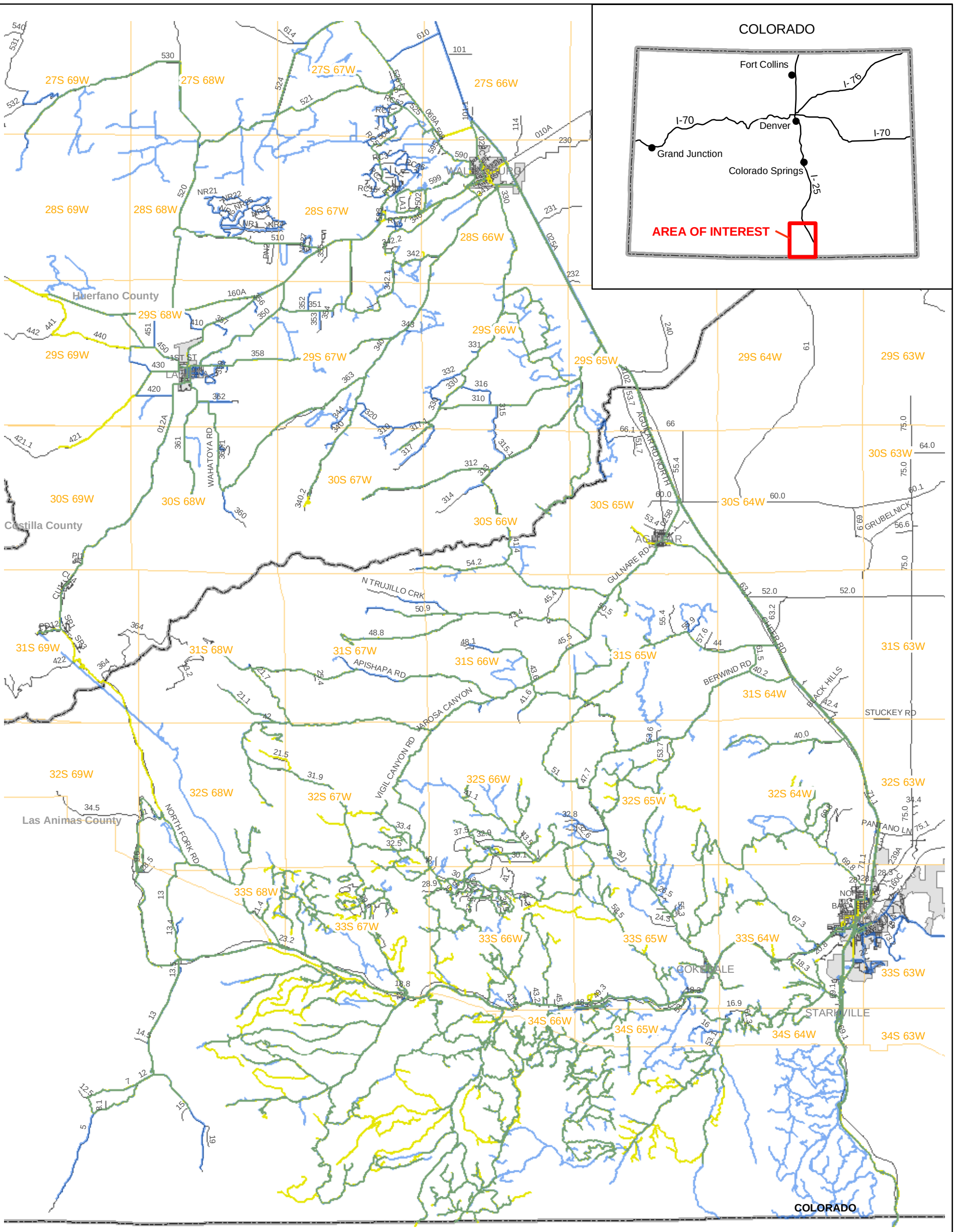

LEGEND

- APOGEE SURVEY ROUTE 2000/2001
- OVERLAPPING 2000/2001 & 2007 APOGEE SURVEY ROUTE
- APOGEE SURVEY ROUTE 2007
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

0 4 8
Miles

N

FIGURE 7
GROUND SURVEY ROUTE COMPARISON
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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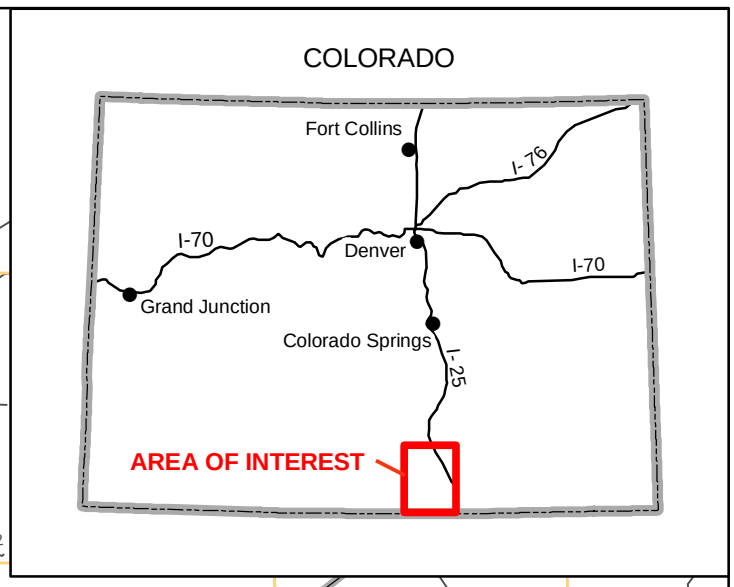

HOPKE
PERMIT #: 256504

MANNING
PERMIT #: 259501

BOUNDS
PERMIT #: 181278

SLEVEC-1
PERMIT #: 242139

SLEVEC-2
PERMIT #: NA

SKOWRON
PERMIT #: 112020

SKOWRON CREEK
PERMIT #: NA

BARTH
PERMIT #: 120462

ROBINSON, S
PERMIT #: NA

ROBINSON, G
PERMIT #: NA

DUBIS
PERMIT #: NA

TOKAR
PERMIT #: NA

ROBINSON, A
PERMIT #: 94106

ROBINSON, J
PERMIT #: NA

ROBINSON SAWMILL-1
PERMIT #: NA

ROBINSON SAWMILL-2
PERMIT #: NA

VAN ARTSDALEN
PERMIT #: 201674

Huerfano County
Costilla County
Las Animas County
COLORADO

27S 69W | 27S 68W | 27S 67W | 27S 66W
28S 69W | 28S 68W | 28S 67W | 28S 66W
29S 69W | 29S 68W | 29S 67W | 29S 66W | 29S 65W | 29S 64W | 29S 63W
30S 69W | 30S 68W | 30S 67W | 30S 66W | 30S 65W | 30S 64W | 30S 63W
31S 69W | 31S 68W | 31S 67W | 31S 66W | 31S 65W | 31S 64W | 31S 63W
32S 69W | 32S 68W | 32S 66W | 32S 65W | 32S 64W | 32S 63W
33S 68W | 33S 67W | 33S 64W | 33S 65W | 33S 63W
34S 66W | 34S 65W | 34S 64W | 34S 63W

1ST ST | AGUILAR RD NORTH | GULNARE RD | CHEER RD | BLACK HILLS | STUCKEY RD | PANTANO LN | GRUBELNICK | N TRUJILLO CRK | APISHAPA RD

STIFF DIAGRAMS

SODIUM BICARBONATE WATER TYPE

SODIUM SULFATE WATER TYPE

CALCIUM BICARBONATE WATER TYPE

LEGEND

- WATER SAMPLE LOCATION
- COUNTY LINE
- TOWNSHIP AND RANGE LINE
- CITY
- ROAD

SAMPLE ID
PERMIT NUMBER FROM DIVISION OF WATER RESOURCES

0 4 8
Miles

N

FIGURE 8
STIFF DIAGRAMS MAP
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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TABLES

TABLE 1
SEEP SUMMARY AND POTENTIAL SOURCE EVALUATION
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMANS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Seep ID	PLSS Location	Latitude (GPS)	Longitude (GPS)	Potential Methane Source									CH4 (ppm)	Wind Speed (mph)	Wind Direction	Previously Mapped	Field Mapping Conducted by LTE	Remarks
				CO	G	W	P	M	F	C	O	U						
Apogee 5	MAXWELL LAND GRANT	37.138860	-104.895637	X	X			X				X	12.7	5	358	Y	N	Several peaks along lower road were detected. The methane might have been coming from the compressor at the top of the hill, but this is the same location as seep 110900-05 from the first survey.
Apogee 5b (Madrid Bridge)	T33S R65W SEC35	37.130122	-104.639073	X								X	1.7			N	Y	Several seeps coming from river near bridge.
Apogee 7	MAXWELL LAND GRANT	37.142193	-104.899374	X	X			X	X			X	4.8	6	85	N	N	Down hill in gully past "Reclamation Area" sign.
Apogee 8	MAXWELL LAND GRANT	37.140612	-104.896979	X	X			X		X		X	3.2	3	133	Y	N	Leak down in gully from mark location.
Apogee 9	MAXWELL LAND GRANT	37.139900	-104.895913	X	X		X	X					57.8	5	21	Y	N	Near big pipe/valve coming out of ground. Seems to be coming from valley to north of mark location. Near seep 110900-07 from first survey.
Apogee 11	MAXWELL LAND GRANT	37.066857	-104.927918	X			X					X	21.2	1	155	N	Y	Seep near stream. Source unclear from aerial photographs and wind direction and field observations.
Apogee 13	MAXWELL LAND GRANT	37.144873	-104.935814	X	X					X		X	2.6	3	233	Y	N	Near seep 110900-01 from first survey.
Apogee 14	MAXWELL LAND GRANT	37.129468	-104.963196	X	X			X	X	X		X	1.9	2	217	Y	N	Near seep 110900-03 from first survey. Possibly from mine vent a few hundred yards upwind.
Apogee 15	MAXWELL LAND GRANT	37.067512	-104.947312	X			X						28.5	5	344	N	Y	Seep appears to be very close to the road, possibly on north side. Small methane detection from pipeline tap.
Apogee 17	MAXWELL LAND GRANT	37.064094	-104.953863	X	X					X		X	8.4	15	156	N	N	Several methane peaks picked up as driving up hill. Source unclear from aerial photographs and wind direction.
Apogee 18	MAXWELL LAND GRANT	37.062110	-104.955920	X	X					X		X	1.3	0	0	Y	N	Near seep 111000-01 from first survey. Slight wind blowing up gully.
Apogee 19	MAXWELL LAND GRANT	37.067441	-104.955794	X	X		X						11.4	1	75	N	Y	Methane venting from pipeline tap.
Apogee 21	T33S R67W SEC19	37.158233	-104.932811	X	X					X			4.7	7	132	N	N	Seep south of road near stream. Three distinct peaks detected when driving slowly through plume.
Apogee 27	T33S R66W SEC32	37.132450	-104.809547		X								10.0	5	130	N	Y	Methane detected in soil around nearby abandoned production well.
Apogee 28	T33S R66W SEC33	37.125175	-104.785727				X						2.7	5	180	N	Y	Near production well. Methane detected in soil along drainage to west. Also detected venting from pipeline valve.
Apogee 30	T33S R66W SEC21	37.158964	-104.781540	X	X							X	8.9	2	95	N	N	Production wells in area.
Apogee 31	T33S R66W SEC17	37.172009	-104.805489	X	X	X						X	23.6	10	162	N	N	Several water wells in area. Access denied.
Apogee 32	T33S R67W SEC28	37.143447	-104.889475	X				X	X			X	10.0	10	329	N	N	Historic seep area. John Toupal pasture.
Apogee 33	T33S R67W SEC19	37.158138	-104.931293	X	X							X	5.7	7	240	N	N	Creek and production wells nearby.
Apogee 34	T33S R66W SEC32	37.13061	-104.807007		X							X	1.6	12	260	N	Y	Methane detected in soil around nearby abandoned production well.
Apogee 112	T31S R65W SEC8	37.357697	-104.704401	X	X					X		X	1.7	7	35	Y	N	Seep appears to be near stream east of road. Access denied.
Apogee 114	T33S R65W SEC3	37.194631	-104.663971	X	X							X	1.9	7	45	Y	N	Seep coming from area of stream east of road.
Apogee 115	T33S R65W SEC4	37.198249	-104.670484	X	X							X	1.7	2	45	N	N	Seep in area of stream.
Apogee 117	T32S R65W SEC29	37.230925	-104.696793	X								X	3.6	3	320	Y	N	N/A
Apogee 119	T32S R65W SEC9	37.279377	-104.671362	X									1.9	5	43	N	N	Gas found throughout canyon west of mark. Wind is blowing up canyon from east. Gas appears to be coming from stream to South of road and 100 feet down
Apogee 121	T32S R65W SEC11	37.277125	-104.646417	X				X	X				0.3	3	232	N	N	Slightly elevated methane through canyon near mine enterance
Apogee 605	T28S R66W SEC8	37.625455	-104.804921	X				X	X	X		X	12.5	6	127	N	N	N/A
Apogee 607	T28S R66W SEC16	37.614818	-104.794820	X				X	X			X	2.0	9	62	N	Y	Could not detect when backtracked (wind was swirling), did notice gas pipeline marker several hundred meters over a hill upwind. No methane detected by LTE.
Apogee 612	T28S R67W SEC24	37.594917	-104.833371	X				X	X			X	4.2	19	257	N	Y	Mine appears to be source.
Apogee 613	T29S R67W SEC10	37.542880	-104.882809	X	X	X	X						1.9	10	235	N	Y	Water well venting methane.
Apogee 615	T29S R69W SEC10	37.544755	-105.102257	X			X	X	X			X	2.2	25	244	N	Y	Private property in area (La Veta Oil CO) No methane detected by LTE.

TABLE 1
SEEP SUMMARY AND POTENTIAL SOURCE EVALUATION
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMANS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Seep ID	PLSS Location	Latitude (GPS)	Longitude (GPS)	Potential Methane Source									CH4 (ppm)	Wind Speed (mph)	Wind Direction	Previously Mapped	Field Mapping Conducted by LTE	Remarks
				CO	G	W	P	M	F	C	O	U						
Apogee 617	T33S R67W SEC19	37.158201	-104.933040	X	X					X		X	11.0	7	11	N	N	Private property in area.
Apogee 623	T33S R68W SEC13	37.171476	-104.950621	X				X	X	X	X	X	5.0	3	297	N	Y	Methane detected in nearby area of cow manure.
Apogee 631	T33S R67W SEC10	37.180651	-104.873818	X	X	X	X					X	99.4	3	298	N	Y	Private property in area. No methane detected by LTE.
Apogee 633	T33S R67W SEC15	37.174266	-104.878075	X	X	X						X	2.5	6	0	Y	Y	Same as 111700-04 last time. No methane detected by LTE.
Apogee 634	T33S R67W SEC15	37.167850	-104.874713	X									2.0	6	141	Y	N	Same as 111700-05 last time.
Apogee 636	T33S R66W SEC32	37.129705	-104.796033	X			X					X	22.6	5	245	N	Y	Private property in area (down wind of exploded house).
Apogee 637	T33S R67W SEC4	37.202473	-104.886450		X	X	X						41.5	3	66	N	Y	Methane detected in soil near gas pipeline.
Apogee 638	T33S R66W SEC17	37.175800	-104.802312	X	X		X			X			3.6	5	263	Y	Y	Methane detected along nearby hillside. Stressed vegetation and coal outcrop observed on hillside.
Apogee 639	T33S R66W SEC21	37.158440	-104.780929	X									7.6	6	158	N	N	N/A
Apogee 640 (Sinkhole)	T27S R66W SEC31	37.649845	-104.829618	X				X	X			X	5.2	17	173	N	Y	Private property in area, but downwind. Sinkhole observed with methane venting and dead animals present.
Apogee 641	T28S R66W SEC6	37.640233	-104.815896	X				X	X		X	X	13.7	5	3	N	Y	Private property in area.
Apogee 643	T28S R66W SEC16	37.606471	-104.788305	X				X	X			X	41.4	9	218	N	Y	Methane detected at several locations including around houses.
Apogee 644	T29S R67W SEC15	37.519899	-104.882145	X		X						X	1.4	2	263	N	Y	Landowners water well venting methane. Methane detected in other areas as well.
Apogee 646	T29S R66W SEC3	37.551825	-104.770214	X				X					3.7	5	136	N	Y	Source appears to be coal bed methane seep.
Apogee 647	T29S R66W SEC2	37.553794	-104.751019	X				X				X	3.2	5	109	N	Y	noticed mining point of interest in mapping software nearby.
Apogee 649	T34S R66W SEC4	37.116848	-104.777345				X						45.3	11	39	N	Y	Pipeline appears to be the source.
Apogee 650	MAXWELL LAND GRANT	37.025255	-104.828190	X								X	5.5	7	8	N	Y	N/A
Apogee 651	T33S R65W SEC3	37.195022	-104.664130	X								X	2.1	7	154	Y	N	Same as 011601-01 last time.
Apogee 652	T34S R65W SEC5	37.114584	-104.691061		X	X	X	X					20.0	6	76	N	Y	Methane observed venting from nearby water well and in soil next to water well casing.
Apogee 653	T34S R65W SEC3	37.120220	-104.651026	X								X	3.6	3	346	Y	N	Near 121500-02 and 121500-01 last time.
Apogee 654	T34S R65W SEC2	37.120918	-104.647869	X								X	7.3	0	0	Y	N	Couldn't pick up when backtracked (wind swirling) near 121500-01 and 121500-02 last time. Continued shortly there after to pick up <5PPM for next 1/4 mile.
Apogee 655	T34S R64W SEC6	37.110626	-104.609256	X									24.0	3	53	Y	Y	Methane detected in soil along roadside. Stressed vegetation observed along roadside.
Apogee 656	T33S R65W SEC21	37.161032	-104.681377		X		X						25.0	5	120	Y	Y	Methane detected in soil on nearby natural gas production well pad.
Apogee 658	T33S R65W SEC1	37.200077	-104.623496	X								X	49.0	0	0	N	Y	Methane detected in soil along roadside. Stressed vegetation observed along roadside.
Apogee 659	T32S R64W SEC5	37.283565	-104.593963	X								X	7.0	0	0	N	N	N/A
Apogee 660	T31S R65W SEC18	37.345934	-104.712253								X	X	25.0	0	0	N	Y	Methane detected in nearby area of cow manure and at one location on stream bank.
Apogee 662	T32S R64W SEC27	37.230169	-104.545640	X								X	5.5			N	N	N/A
Apogee 663	T32S R65W SEC15	37.264358	-104.653003	X						X		X	13.1	0	0	Y	Y	Unknown source. No methane detected during soil gas survey.
Andreatta 14-10 (05-055-06170)	T29S R67W SEC14	37.522366	-104.857872	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Angeley	T29S R67W SEC10	37.542535	-104.877969			X							N/A	N/A	N/A	N	Y	Methane detected in soil next to water well and venting directly from water well.
Ben Bounds	T29S R67W SEC15	37.519716	-104.883340			X							N/A	N/A	N/A	N	Y	
Coleman	T29S R67W SEC10	37.537989	-104.877809	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Cow Canyon	MAXWELL LAND GRANT	37.123308	-104.810605	X									N/A	N/A	N/A	N	Y	Known historical seep area.
Derowitch	T29S R67W SEC03	37.548422	-104.870035	N/A									N/A	N/A	N/A	N	Y	No methane detected in subsurface, methane detected in well.
Dick Realty & Inv Co 1 (05-055-05027)	T29S R67W SEC3	37.554845	-104.869809	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Ferdinand B Rohr 1 (05-055-05012)	T29S R67W SEC9	37.544215	-104.892833	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Goemmer Land Co 1 (05-055-06004)	T29S R67W SEC11	37.543361	-104.865472	N/A									N/A	N/A	N/A	N	Y	No methane detected.

TABLE 1
SEEP SUMMARY AND POTENTIAL SOURCE EVALUATION
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMANS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Seep ID	PLSS Location	Latitude (GPS)	Longitude (GPS)	Potential Methane Source									CH4 (ppm)	Wind Speed (mph)	Wind Direction	Previously Mapped	Field Mapping Conducted by LTE	Remarks
				CO	G	W	P	M	F	C	O	U						
Golden Cycle 1 (05-055-06023)	T29S R67W SEC11	37.543526	-104.865192	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Golden Cycle Land Co 1 (05-055-06038)	T29S R67W SEC11	37.543716	-104.864552	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Golden Cycle 2 (05-055-06024)	T29S R67W SEC2	37.551315	-104.856182	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Golden Cycle 2A (05-055-06034)	T29S R67W SEC2	37.549165	-104.855812	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Golden Eagle Mine	T33S R67W SEC29	37.146287	-104.909903					X	X	X			N/A	N/A	N/A	N	Y	Known historical seep area.
Hurtado 13-04 (05-055-06168)	T29S R67W SEC13	37.528496	-104.848771	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Leef	T33S R66W SEC33	37.133265	-104.790208	X									N/A	N/A	N/A	N	Y	Methane seeps detected in drainage west of Anette 21-21 production well.
Lively 03-03 (05-055-06086)	T29S R67W SEC3	37.558475	-104.879052	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Lively 10-02 (05-055-06148)	T29S R67W SEC10	37.543775	-104.874652	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Lively 3-10 (05-055-06146)	T29S R67W SEC3	37.550745	-104.875102	N/A									N/A	N/A	N/A	N	Y	Methane detected in the subsurface next to the water well.
Lively 35-11 (05-055-06159)	T28S R67W SEC35	37.565765	-104.859242	N/A									N/A	N/A	N/A	N	Y	No methane detected.
Madrid Bridge (Apogee 5b)	T33S R65W SEC35	37.129288	-104.639710	X									N/A	N/A	N/A	Y	Y	Known historical seep area.
Mondragon/Saint	T33S R65W SEC35	37.126492	-104.641855	X									N/A	N/A	N/A	Y	Y	Known historical seep area.
Ploski	T34S R64W SEC6 / SEC5	37.116380	-104.596519	X								X	N/A	N/A	N/A	Y	Y	Methane detected in one soil boring along stream bank.
Primero School	T33S R66W SEC33	37.127564	-104.791375	X									N/A	N/A	N/A	Y	Y	Known historical seep area.
Sink Hole Site (Apogee 640)	T27S R66W	37.649998	-104.826159	X					X				N/A	N/A	N/A	N	Y	Methane venting from sink hole with dead animals.
Stan Searle 1	T28S R67W SEC33	37.566083	-104.887917	N/A									N/A	N/A	N/A	N	Y	No methane detected.
State 10W	T28S R67W SEC36	37.567295	-104.838911	N/A									N/A	N/A	N/A	N	Y	No methane detected.

Notes:
SEC - Section
T - Township
R - Range
GPS - Global positioning system
CO - Coal outcrop
G - Natural gas production well
W - Water well
P - Pipeline
CH4 - methane
M - Coal mine
F - Coal mine features
C - Core holes for coal exploration
O - Other
U - Unknown
ppm - Parts per million
N/A - Not applicable
PLSS - Public Land Survey System
Y- Yes
N- No

TABLE 2
DETAILED MAPPING EVENT SUMMARY
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

DETAILED MAPPING LOCATION	1ST MAPPING EVENT DATE	2ND MAPPING EVENT DATE	3RD MAPPING EVENT DATE	GAS SAMPLE DATE
APOGEE 5b (Madrid Bridge)	6/19/2007			8/30/2007
APOGEE 11	7/16/2007			8/30/2007
APOGEE 15	7/15/2007			8/30/2007
APOGEE 19	7/15/2007			8/30/2007
APOGEE 27&34	4/24/2007	5/24/2007	8/29/2007	4/23/2007
APOGEE 28	7/16/2007			
APOGEE 605	7/31/2007	10/31/2007		8/4/2007
APOGEE 607	7/17/2007	8/11/2007	10/31/2007	
APOGEE 612	7/18/2007	8/11/2007	11/2/2007	8/1/2007
APOGEE 613	7/10/2007	8/3/2007	11/2/2007	8/3/2007
APOGEE 615	7/17/2007	8/2/2007	11/1/2007	
APOGEE 623	7/1/2007			8/30/2007
APOGEE 631	7/14/2007			
APOGEE 633	7/13/2007			
APOGEE 636	7/16/2007			8/30/2007
APOGEE 637	7/1/2007			8/30/2007
APOGEE 638	6/29/2007			8/30/2007
APOGEE 640	7/14/2007	8/6/2007	10/30/2007	8/6/2007
SINKHOLE (APOGEE 640)	7/14/2007	8/6/2007	10/30/2007	8/6/2007
APOGEE 641	7/12/2007	8/6/2007	10/30/2007	8/6/2007
APOGEE 643	7/12/2007	8/4/2007	10/31/2007	8/4/2007
APOGEE 644	7/11/2007	8/2/2007	11/1/2007	8/2/2007
APOGEE 646	7/17/2007	8/3/2007	11/2/2007	8/3/2007
APOGEE 647	7/17/2007	8/1/2007	11/2/2007	8/1/2007
APOGEE 649	7/16/2007			8/30/2007
APOGEE 652	6/30/2007			8/30/2007
APOGEE 655	6/20/2007			8/30/2007
APOGEE 656	6/28/2007			8/30/2007
APOGEE 658	6/30/2007			8/30/2007
APOGEE 660	6/28/2007			8/30/2007
APOGEE 663	6/28/2007			
ANDREATTA 14-10 (05-055-06170)	8/8/2007			
ANGELEY	7/2/2007	8/8/2007	11/1/2007	8/8/2007
BOUNDS	7/11/2007	8/8/2007	11/1/2007	8/8/2007
COLEMAN	11/2/2007			
COW CANYON	6/20/2007			8/29/2007
DEROWITSCH	11/1/2007			
DICK REALTY & INV CO 1 (05-055-05027)	8/9/2007			
FERDINAND B ROHR 1 (05-055-05012)	8/7/2007	11/1/2007		
GOEMMER LAND CO 1 (05-055-06004)	8/7/2007	8/29/2007	11/1/2007	
GOLDEN CYCLE 1 (05-055-06023)	8/7/2007	8/29/2007	11/1/2007	
GOLDEN CYCLE LAND CO 1 (05-055-06038)	8/7/2007	8/29/2007	11/1/2007	
GOLDEN CYCLE 2 (05-055-06024)	7/10/2007	8/8/2007		
GOLDEN CYCLE 2A (05-055-06034)	7/10/2007	8/8/2007		
GOLDEN EAGLE MINE	6/18/2007			8/29/2007
HURTADO 13-04 (05-055-06168)	8/8/2007			
LEEF	7/2/2007			8/30/2007
LIVELY 03-03 (05-055-06086)	8/7/2007	11/1/2007		
LIVELY 03-10 (05-055-06146)	11/1/2007			
LIVELY 10-02 (05-055-06148)	7/10/2007	8/7/2007		
LIVELY 35-11 (05-055-06159)	8/7/2007			
MONDRAGON/SAINT	5/23-24/2007			
PLOSKI	6/20/2007			8/30/2007
PRIMERO	4/24/2007	5/22/2007		4/23/2007
STAN SEARLE 1 (05-055-06060)	8/7/2007	11/1/2007		
STATE 10W (05-055-06222)	8/8/2007			
Totals	**55**	**25**	**17**	**32**

RED indicates methane gas was detected during one or more mapping events.
GREEN indicates methane gas was not detected at the site.

TABLE 3
SOIL GAS SAMPLE LOCATIONS
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Sample ID	Twp	Rng	SEC	QtrQtr	Latitude	Longitude
Apogee 5b	T33S	R65W	35	SWNE	37.129785	-104.639046
Apogee 11	Maxwell Land Grant				37.066833	-104.92783
Apogee 15	Maxwell Land Grant				37.067768	-104.94728
Apogee 19	Maxwell Land Grant				37.067468	-104.955429
Apogee 605	T28S	R66W	8	SENW	37.625948	-104.804747
Apogee 612	T28S	R67W	24	NESE	37.594111	-104.834428
Apogee 613	T29S	R67W	10	SWNW	37.540934	-104.882458
Apogee 623	T33S	R68W	13	NESW	37.171504	-104.950855
Apogee 636	T33S	R66W	32	SENE	37.1297	-104.796027
Apogee 637	T33S	R67W	4	SENE	37.202448	-104.886226
Apogee 638	T33S	R66W	17	SWNE	37.17491	-104.802587
Apogee 640	T27S	R66W	31	SWSW	37.649584	-104.829992
Apogee 640-Sinkhole	T27S	R66W	31	NWSW	37.649729	-104.826151
Apogee 641	T28S	R66W	6	SENE	37.640246	-104.815913
Apogee 643	T28S	R66W	16	SESW	37.605948	-104.789826
Apogee 644	T29S	R67W	15	SWSW	37.519872	-104.882401
Apogee 646	T29S	R66W	3	SENW	37.55292	-104.769475
Apogee 647	T29S	R66W	2	SENW	37.552964	-104.750784
Apogee 649	T34S	R66W	4	SENE	37.116926	-104.777239
Apogee 652	T34S	R65W	5	SWNE	37.114723	-104.690049
Apogee 655	T34S	R64W	6	NWSW	37.11106	-104.608923
Apogee 656	T33S	R65W	21	NENW	37.161147	-104.680418
Apogee 658	T33S	R65W	1	NESW	37.200045	-104.623498
Apogee 660	T31S	R65W	18	SWNE	37.345822	-104.713356
Angeley	T29S	R67W	10	NENW	37.542247	-104.877725
Bounds	T29S	R67W	15	NESW	37.521731	-104.877056
Bouvier	T33S	R66W	32	NWNW	37.13233	-104.808722
Cow Canyon	Maxwell Land Grant				37.122904	-104.810731
Golden Eagle Mine	Maxwell Land Grant				37.143861	-104.906644
Leef	T33S	R66W	33	NWNW	37.13336	-104.790138
Ploski	T34S	R64W	6	SENE	37.11602	-104.595682
Primero	T33S	R66W	33	NWSW	37.126979	-104.791439

Latitude and Longitude were measured by GPS, North American Datum 1983 (NAD 83).
Twp - Township
Rng - Range
SEC - Section
QtrQtr - Quarter Quarter

TABLE 4
WATER WELL LOCATIONS
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Sample ID	Twp	Rng	SEC	QtrQtr	Latitude	Longitude
Barth	T33S	R67W	4	SENE	37.20357	-104.88617
Bounds	T29S	R67W	15	NESW	37.5218	-104.87722
Dubis	T33S	R67W	10	NWSW	37.18478	-104.88008
Hopke	T29S	R67W	10	SWNW	37.54068	-104.88268
Manning	T29S	R66W	2	NWNW	37.55682	-104.7554
Robinson A	T33S	R67W	15	SENW	37.17488	-104.87933
Robinson G	T33S	R67W	3	SESE	37.1937	-104.86861
Robinson J	T33S	R65W	35	SESE	37.12381	-104.63457
Robinson S	T33S	R67W	3	SWSE	37.19651	-104.87405
Robinson Sawmill-1	T33S	R67W	15	NWNW	37.17667	-104.88125
Robinson Sawmill-2	T33S	R67W	15	NWNW	37.177	-104.88049
Skowron	T33S	R67W	4	SENE	37.20188	-104.88483
Skowron Creek	T33S	R67W	4	SWNW	37.20156	-104.88258
Slevec-1	T31S	R65W	18	SWNE	37.34629	-104.71357
Slevec-2	T31S	R65W	18	SWNE	37.34603	-104.71312
Tokar	T33S	R66W	17	NWNE	37.17601	-104.7989
Van Artsdalen	T34S	R65W	5	SENE	37.11464	-104.69001

Latitude and Longitude were measured by global positioning system, North American Datum 1983 (NAD 83).
Twp - Township
Rng - Range
SEC - Section
QtrQtr - Quarter Quarter

TABLE 5
GAS COMPOSITION AND ISOTOPIC ANALYSIS - SOIL GAS SAMPLES
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Sample ID	Sample Date	He %	H_2 %	Ar %	O_2 %	CO_2 %	N_2 %	CO %	C_1 %	C_2 %	C_2H_4 %	C_3 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	C_{6+} %	$\delta^{13}C_1$ ‰	δDC_1 ‰	Specific Gravity	BTU
Apogee 5b	8/30/2007	0	0	0.35	5.82	1.73	31.66	0	60.43	0.0093	0	0	0	0	0	0	0	-44.00	-218.3	0.736	612
Apogee 11	8/30/2007	0.0041	0	0.617	13.07	0.39	50.17	0	35.75	0.0039	0	0	0	0	0	0	0	-49.55	-224.2	0.842	362
Apogee 15	8/30/2007	0	0.002	0.707	14.55	0.86	57.48	0	26.4	0.003	0	0	0	0	0	0	0	-44.92	-216.7	0.886	267
Apogee 19	8/30/2007	0	0	0.927	19.9	0.39	70.02	0	8.76	0	0	0	0	0	0	0	0	-48.93	-221.4	0.964	89
Apogee 605	8/4/2007	0	0	0.943	17.81	1.60	75.46	0	4.19	0	0	0	0	0	0	0	0	-42.59	-201.2	0.987	42
Apogee 612	8/1/2007	0	0.0012	0.952	16.81	2.59	78.29	0	1.36	0	0	0	0	0	0	0	0	-10.44	-68.1	1.003	14
Apogee 613	8/3/2007	0	0	1.01	21.75	0.82	75.30	0	1.12	0	0	0	0	0	0	0	0	-33.21	-199.3	1.001	11
Apogee 623	8/30/2007	0	0	0.91	19.06	4.37	67.05	0	8.61	0	0	0	0	0	0	0	0	-36.03	-350.4	0.986	87
Apogee 636	8/30/2007	0	0	0.959	18.84	2.08	76.2	0	1.92	0	0	0	0	0	0	0	0	-27.08	-137.2	1.001	19
Apogee 637	8/30/2007	0	0	0.913	18.7	1.02	76.74	0	2.63	0	0	0	0	0	0	0	0	-39.02	-212.9	0.992	27
Apogee 638	8/30/2007	0	0.0035	0.495	10.58	0.35	39.89	0	48.68	0.003	0	0	0	0	0	0	0	-47.95	-229.3	0.785	493
Apogee 640	8/6/2007	0	0	0.952	20.18	0.45	77.72	0	0.703	0	0	0	0	0	0	0	0	-35.48	-169.0	0.999	7
Apogee 640 - Sinkhole	8/6/2007	0.0015	0	0.712	2.27	14.29	59.05	0	23.67	0.0037	0	0	0	0	0	0	0	-52.44	-232.5	0.954	240
Apogee 641	8/6/2007	0	0.0013	0.947	18.20	2.02	77.77	0	1.06	0	0	0	0	0	0	0	0	-32.34	-109.8	1.003	11
Apogee 643	8/4/2007	0	0	0.945	20.85	0.16	76.39	0	1.66	0	0	0	0	0	0	0	0	-57.26	-244.1	0.994	17
Apogee 644	8/2/2007	0.0013	0.0021	0.491	6.76	6.35	42.19	0	44.20	0.0085	0	0	0	0	0	0	0	-44.32	-227.8	0.831	448
Apogee 646	8/3/2007	0	0.0040	0.920	18.28	0.93	75.52	0	4.35	0	0	0	0	0	0	0	0	-52.89	-220.2	0.983	44
Apogee 647	8/1/2007	0	0	0.943	20.27	0.59	77.66	0	0.535	0	0	0	0	0	0	0	0	-38.78	-202.8	1.000	5
Apogee 649	8/30/2007	0.0034	0	0.63	13.94	0.16	49.93	0	35.33	0.0043	0	0	0	0	0	0	0	-50.83	-239	0.844	358
Apogee 652	8/30/2007	0	0	0.741	16.04	0.31	57.35	0	25.56	0.0038	0	0	0	0	0	0	0	-40.84	-205.3	0.888	259
Apogee 655	8/30/2007	0	0	0.88	14.32	3.29	75.43	0	6.08	0	0	0	0	0	0	0	0	-35.65	-189.5	0.984	62
Apogee 656	8/30/2007	0	0	0.988	21.82	0.21	76.86	0	0.119	0	0	0	0	0	0	0	0	*	*	1.002	1
Apogee 658	8/30/2007	0	0	0.977	17.92	2.04	76.42	0	2.64	0	0	0	0	0	0	0	0	-38.82	-187.8	0.996	27
Apogee 660	8/30/2007	0	0	0.908	19.74	0.81	78.47	0	0.0757	0	0	0	0	0	0	0	0	*	*	1.002	1
Angeley	8/8/2007	0	0	0.926	18.87	0.83	75.21	0	4.16	0	0	0	0	0	0	0	0	-46.24	-215.3	0.984	42
Bounds	8/8/2007	0.0035	0	0.0989	1.47	0.21	8.71	0	89.49	0.0188	0	0.0018	0	0	0	0	0	-50.00	-237.1	0.601	908
Bouvier	4/27/2007	0	0	0.21	4.36	1.28	11.74	0	82.4	0.012	0	0	0	0	0	0	0	-44.37	-219.9	0.660	770
Cow Canyon	8/30/2007	0	0	0.775	16.56	0.41	64.05	0	18.21	0	0	0	0	0	0	0	0	-38.24	-223.2	0.92	184
Golden Eagle Mine	8/30/2007	0	0.0023	0.722	14.14	1.35	57.03	0	26.75	0.0049	0	0	0	0	0	0	0	-56.56	-251.1	0.887	271
Leef	8/30/2007	0	0	0.285	5.53	0.56	24.45	0	69.17	0.0034	0	0	0	0	0	0	0	-48.96	-236.2	0.693	701
Ploski	8/30/2007	0	0	0.977	21.61	0.17	75.46	0	1.78	0	0	0	0	0	0	0	0	-47.15	-233.1	0.995	18
Primero	4/23/2007	0	0	0.67	4.53	5.86	54.95	0	33.99	0.0030	0	0	0	0	0	0	0	-52.75	-229.6	0.868	344

Notes:

% - percent
‰ - per mil
BTU - British Thermal Units
He - Helium
H_2 - Hydrogen
Ar - Argon
O_2 - Oxygen
CO_2 - Carbon Dioxide
N_2 - Nitrogen
CO - Carbon Monoxide
C_1 - Methane
C_2 - Ethane
C_2H_4 - Ethylene
C_3 - Propane
iC_4 - Isobutane
nC_4 - Butane
iC_5 - Isopentane
nC_5 - Pentane
C_{6+} - Hexanes +
$\delta^{13}C_1$ - Carbon isotope of Methane
δDC_1 - Hydrogen isotope of Methane

* = denotes insufficient concentration for analysis

TABLE 6
WATER SAMPLE FIELD PARAMETERS
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Sample ID	Sample Date	INITIAL			FINAL		
		pH	Temp °C	EC (uS/cm)	pH	Temp °C	EC (uS/cm)
Barth	9/18/2007	7.7	15.4	859	7.9	10.5	859
Bounds	9/17/2007	8.2	12.7	558	8.4	14.0	551
Dubis	9/19/2007	8.6	14.0	816	8.6	12.9	839
Hopke	9/17/2007	8.2	17.2	728	8.2	16.7	721
Manning	9/18/2007	8.9	19.1	2,240	8.9	18.9	2,250
Robinson A	9/18/2007	7.6	17.0	1,156	7.7	14.3	1,158
Robinson G	9/19/2007	8.0	18.5	1,032	8.0	18.3	1,030
Robinson J	9/17/2007	7.4	14.1	1,015	7.5	14.0	1,001
Robinson S	9/19/2007	7.8	16.8	1,130	7.8	15.6	1,157
Robinson Sawmill-1	9/18/2007	7.2	13.6	1,247	7.29	12	1,239
Robinson Sawmill-2	9/18/2007	7.3	14.6	1,120	7.3	13.2	1,121
Skowron	9/18/2007	7.6	15.4	899	7.6	12.1	907
Skowron Creek	9/19/2007	8.6	8.9	1,309	NA	NA	NA
Slevec-1	9/17/2007	7.1	14.0	653	7.2	12.1	655
Slevec-2	9/17/2007	9.0	16.4	1,400	9.0	16.8	1,373
Tokar	9/18/2007	7.4	13.3	1,194	7.4	13.2	1,179
Van Artsdalen	9/19/2007	8.2	20.4	3,540	8.3	19.7	3,450

Notes:

°C - degrees celsius

EC - Electrical Conductance

uS/cm - micro-Siemens per centimeter

NA - not applicable

TABLE 7
GROUNDWATER ANALYTICAL RESULTS
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Sample ID	Sample Date	Methane (ug/L)	MAJOR ANIONS						MAJOR CATIONS					HALIDES	
			CO_3 (mg/L)	HCO_3 (mg/L)	Cl (mg/L)	NO_3-N (mg/L)	NO_2-N (mg/L)	SO_4 (mg/L)	Ca (mg/L)	Fe (mg/L)	K (mg/L)	Mg (mg/L)	Na (mg/L)	F (mg/L)	Br (mg/L)
Barth	9/18/2007	<0.50	<5.0	360	38.4	0.25	<0.10	58.9	68.4	<0.300	<10.0	15.7	86.6	0.66	0.61
Bounds	9/17/2007	5240	<5.0	183	14.1	<0.10	<0.10	71.7	12.2	<0.300	<10.0	<5.0	90.9	1.4	0.53
Dubis	9/19/2007	6330	<5.0	437	14.4	<0.10	<0.10	10.7	3.95	<0.300	<10.0	<5.0	168	2.0	<0.50
Gabe*	9/19/2007	12500	<5.0	449	14.4	<0.10	<0.10	10.7	4.01	<0.300	<10.0	<5.0	168	2.0	<0.50
Hopke	9/17/2007	3420	<5.0	155	35.7	<0.10	<0.10	138	12.1	<0.300	<10.0	<5.0	123	4.0	0.65
Manning	9/18/2007	4140	11.7	1130	49.1	<0.10	<0.10	65.5	2.03	<0.300	<10.0	<5.0	451	5.2	0.82
Robinson A	9/18/2007	17.6	<5.0	499	64.4	0.19	<0.10	45.5	56.4	<0.300	<10.0	15.8	148	1.1	0.85
Robinson G	9/19/2007	0.50	<5.0	423	41.8	0.20	<0.10	58.8	28.0	<0.300	<10.0	<5.0	177	0.57	0.67
Robinson J	9/17/2007	3.45	<5.0	344	37.4	<0.10	<0.10	127	43.2	<0.300	<10.0	15.4	127	0.64	0.53
Robinson S	9/19/2007	0.80	<5.0	521	53.9	<0.10	<0.10	40.2	60.1	<0.300	<10.0	16.4	164	1.4	0.83
Robinson Sawmill-1	9/18/2007	14.2	<5.0	433	105	0.12	<0.10	76.6	111	<0.300	<10.0	27.7	101	0.59	1.2
Robinson Sawmill-2	9/18/2007	17.2	<5.0	495	72.0	<0.10	<0.10	42.1	80.4	<0.300	<10.0	20.8	121	0.71	0.92
Skowron	9/18/2007	<0.50	<5.0	395	42.6	0.18	<0.10	55.6	77.1	<0.300	<10.0	18.6	80.5	0.66	0.61
Skowron Creek	9/19/2007	1.1	<5.0	582	57.3	<0.10	<0.10	40.2	39.3	<0.300	<10.0	12.8	213	2.3	0.83
Slevec-1	9/17/2007	4.24	<5.0	310	9.5	0.13	<0.10	43.5	73.8	<0.300	<10.0	19.4	32.9	0.33	<0.50
Slevec-2	9/17/2007	21200	12.2	783	9.9	<0.10	<0.10	<2.0	1.54	<0.300	<10.0	<5.0	304	3.7	<0.50
Tokar	9/18/2007	0.069	<5.0	455	70.5	0.48	<0.10	123	101	<0.300	<10.0	34.1	96.6	0.50	0.90
Van Artsdalen	9/19/2007	27200	8.7	1900	305	0.14	<0.10	67.3	8.62	<0.300	<10.0	8.16	698	2.9	3.1
Water Quality Standard		--	--	--	250	10.0	1.0	250	--	0.3	--	--	--	--	--

Sample ID	Sample Date	DISSOLVED METALS										pH (su)	TDS (mg/L)	EC (uS/cm)
		As (mg/L)	Ba (mg/L)	B (mg/L)	Cd (mg/L)	Cr (mg/L)	Cu (mg/L)	Pb (mg/L)	Se (mg/L)	Ag (mg/L)	Mn (mg/L)			
Barth	9/18/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.010	<0.010	<0.015	7.4	756	808
Bounds	9/17/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.010	<0.010	<0.015	7.0	657	519
Dubis	9/19/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.005	<0.010	<0.010	<0.015	8.0	757	802
Gabe*	9/19/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.005	<0.010	<0.010	<0.015	8.3	398	803
Hopke	9/17/2007	<0.010	<0.200	<0.100	<0.005	<0.010	0.0496	<0.010	<0.010	<0.010	<0.015	6.8	445	707
Manning	9/18/2007	<0.010	<0.200	0.316	<0.005	<0.010	<0.025	<0.010	<0.010	<0.010	<0.015	8.3	1860	2,150
Robinson A	9/18/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.010	<0.010	<0.015	7.2	712	1,100
Robinson G	9/19/2007	<0.010	0.340	<0.100	<0.005	<0.010	<0.025	<0.005	<0.010	<0.010	0.0441	7.6	363	976
Robinson J	9/17/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.010	<0.010	0.0476	6.3	789	946
Robinson S	9/19/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.005	<0.010	<0.010	<0.015	7.4	634	1,120
Robinson Sawmill-1	9/18/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.020	<0.010	0.0258	7.1	818	1,190
Robinson Sawmill-2	9/18/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.010	<0.010	1.51	7.1	703	1,040
Skowron	9/18/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.020	<0.010	<0.015	7.3	275	859
Skowron Creek	9/19/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.005	<0.010	<0.010	<0.015	7.1	688	1,260
Slevec-1	9/17/2007	<0.10	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.020	<0.010	<0.015	6.7	316	629
Slevec-2	9/17/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.010	<0.010	<0.015	8.2	699	1,320
Tokar	9/18/2007	<0.010	<0.200	<0.100	<0.005	<0.010	<0.025	<0.010	<0.020	<0.010	<0.015	7.4	814	1,130
Van Artsdalen	9/19/2007	<0.010	0.966	<0.100	<0.005	<0.010	<0.025	<0.005	<0.010	<0.010	<0.015	7.9	1900	3,280
Water Quality Standard		0.05	2.0	--	0.005	0.1	--	0.05	0.05	--	0.05	6.5-8.5	--	--

Notes:
< = less than stated laboratory detection limit
mg/L = milligrams per liter
uS/cm - micro-Siemens per centimeter
Water Quality Standards established by Colorado Department of Public Health and Environment, Regulation 41
-- indicates water quality standard not established
* Gabe sample is duplicate of Dubis sample.

B - Boron
CO_3- Carbonate
HCO_3-Bicarbonate
Cl - Chloride
NO_3-N - Nitrate
NO_2-N - Nitrite
SO_4 - Sulfate
Fe - Iron

Cu - Copper
K - Potassium
Mg - Magnesium
Na - Sodium
As - Arsenic
Ba - Barium
Cd - Cadmium
Pb - Lead

Ag - Silver
Se - Selenium
Mn - Manganese
Br - Bromide
F - Flouride
TDS - Total Dissolved Solids
EC - Electrical conductance

TABLE 8
GAS COMPOSITION AND ISOTOPIC ANALYSIS - WATER WELLS
PHASE II RATON BASIN GAS SEEP INVESTIGATION
LAS ANIMAS AND HUERFANO COUNTIES, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

Sample ID	Sample Date	He %	H_2 %	Ar %	O_2 %	CO_2 %	N_2 %	CO %	C_1 %	C_2 %	C_2H_4 %	C_3 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	C_{6+} %	$\delta^{13}C_1$ ‰	δDC_1 ‰	Specific Gravity	BTU
Bounds	9/17/2007	0	0	0.682	0.251	0.35	37.96	0	60.74	0.0218	0	0	0	0	0	0	0	-48.85	-226.8	0.721	616
Dubis	9/19/2007	0	0	0.43	1.13	0.47	19.36	0	78.59	0.0212	0	0	0	0	0	0	0	-65.53	-261.6	0.648	797
Gabe*	9/19/2007	0	0	0.441	1.20	0.45	19.99	0	77.89	0.0256	0	0	0	0	0	0.0061	0	-65.41	-264.5	0.651	790
Hopke	9/17/2007	0	0	0.931	3.62	0.48	51.21	0	43.72	0.0353	0	0	0	0	0	0	0	-45.42	-189.8	0.798	443
Manning	9/18/2007	0	0	0.789	0.111	0.51	42.96	0	55.62	0.0137	0	0	0	0	0	0	0	-62.92	-192.1	0.744	564
Slevec-2	9/17/2007	0.003	0	0.0117	0.215	0.093	0.53	0	99.12	0.0295	0	0	0	0	0	0	0	-53.16	-257.3	0.558	1006
Van Artsdalen	10/31/2007	0	0	0.0271	0.705	2.28	1.39	0	95.58	0.0186	0	0	0	0	0	0	0	-40.42	-201.3	0.586	969

Notes:

% - percent

‰ - per mil

BTU - British Thermal Unit

-- denotes insufficient sample volume or concentration for analysis

He - Helium

H_2 - Hydrogen

Ar - Argon

O_2 - Oxygen

CO_2 - Carbon Dioxide

N_2 - Nitrogen

CO - Carbon Monoxide

C_1 - Methane

C_2 - Ethane

C_2H_4 - Ethylene

C_3 - Propane

iC_4 - Isobutane

nC_4 - Butane

iC_5 - Isopentane

nC_5 - Pentane

C_{6+} - Hexanes +

$\delta^{13}C_1$ - Carbon isotope of Methane

δDC_1 - Hydrogen isotope of Methane

* Gabe sample is duplicate of Dubis sample.

APPENDIX A

WORK PLAN FOR
PHASE II RATON BASIN SEEP INVESTIGATION

WORK PLAN FOR
PHASE II RATON BASIN SEEP INVESTIGATION
RATON BASIN, COLORADO

DNR RFP PHA 704

MARCH 2007

Prepared for:

COLORADO OIL & GAS CONSERVATION COMMISSION
Denver, Colorado

WORK PLAN FOR

PHASE II RATON BASIN SEEP INVESTIGATION
RATON BASIN, COLORADO

DNR RFP PHA 704

MARCH 2007

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SECTION 1.0

INTRODUCTION

This submittal presents the LT Environmental, Inc. (LTE) and Apogee Scientific, Inc. (Apogee) work plan to conduct the Phase II Raton Basin Seep Investigation (Project) based on the Request for Proposal (RFP) PHA-704 released by the State Colorado Department of Natural Resources (DNR) for the Colorado Oil and Gas Conservation Commission (COGCC).

This work plan includes the following tasks:

- Task 1 - Ground Survey to Locate Methane Seeps (Section 2.0);
- Task 2 - Field Mapping of Identified Methane Seeps (Section 3.0);
- Task 3 - Gas Seep Sampling (Section 4.0);
- Task 4 - Water Well Sampling (Section 5.0); and
- Task 5 - Report Preparation (Section 6.0).

In addition to the scope of work described herein, LTE has included a project-specific health and safety plan (HASP) and a revised project schedule.

Pertinent figures and tables are presented in sections following the text. The HASP and revised project schedule are presented in Appendix A and B, respectively. Procedures for gas sample collection are presented in Appendix C. Appendix D contains the well purging procedures. Appendix E presents well sampling procedures. Data submission requirements are presented in Appendix F.

SECTION 2.0

GROUND SURVEY TO LOCATE METHANE SEEPS

As discussed in our RFP submittal, Apogee will conduct a ground survey to locate methane seeps using the Leak Detection System (LDS) developed by Apogee in the project area. This is the initial screening for the basin-wide project to focus field mapping efforts in identified areas of seepage.

2.1 PRELIMINARY INTERVIEWS

Prior to mobilization of the field crew to perform the ground survey, LTE/Apogee will conduct interviews with COGCC personnel, the top three major gas operators in the Raton Basin (Pioneer Resources, XTO Energy, Inc., and Petrogulf Corporation), and county commissioners from Huerfano and Las Animas Counties, Colorado in an effort to locate methane seeps not identified or possibly not present during the initial Raton Basin ground survey conducted in 2001.

As of the date of publication of this work plan, LTE has attempted to contact the three operators and the six county commissioners on multiple attempts but has not yet received a response from many of the parties. LTE will continue to attempt to contact each party throughout the duration of the planning and ground survey activities. The parties contacted include: Elton Smith (Pioneer Natural Resources); Sam Montoya (XTO Energy); John Whisler (Petrogulf Corporation); Jim Montoya, Ken Torres, and Robert Valdez (Las Animas County Commissioners); and Arthur Bobian, Roger Cain, and Scott King (Huerfano County Commissioners).

Elton Smith stated that methane seeps are present at the Mondragon/Saint property west of Trinidad, Colorado along the Purgatoire River. These seeps have already been documented by the COGCC. Mr. Smith also stated that Evergreen Resources may have done a survey four or five years ago and will try to find the information in the coming weeks.

2.2 GROUND SURVEY

This ground survey will be completed in a manner similar to the initial ground survey completed by Apogee between November 2000 and April 2001. Apogee will conduct a survey of roads, jeep trails, and lease roads within the Raton Basin using the Apogee LDS mounted on a 4-wheel drive vehicle. The LDS is an IRS based gas analyzer designed to locate methane emission sources from mobile platforms (cars, trucks, helicopters, ATVs, etc.) in real time. The LDS system measures methane, total hydrocarbons and carbon dioxide with sub-ppm detection limits and displays the data in real time on the control computer. The LDS also incorporates a GPS that records the track taken by the survey vehicle. The Apogee LDS is an enhanced version of the instrument used for the initial Raton Basin study. Wind direction and ambient temperature sensors will also be mounted on the survey vehicle. Measurements from these sensors will be recorded manually at approximately 15 minute intervals throughout the survey.

The Phase I Gas Survey data indicated that the methane seeps were predominantly located in the southern portion of the Raton Basin in the Purgatoire River drainage. Therefore, the ground survey in the northern areas of the Raton Basin will include the main arterial roads and jeep trails. If methane is identified, additional surveys of nearby roads and trails will be performed. This approach will provided the COGCC with the requested basin-wide survey and allow for a more focused survey covering more lease roads and trails in areas where methane seeps are anticipated. In the southern portion of the Raton Basin, the survey will include the main arterial roads and tributary side roads. A map of the proposed roads included in the ground survey is presented as Figure 1.

Due to weather conditions that delayed the start of this Project, Apogee plans to utilize two vehicles over a 10 business day period to expedite survey activities.

As the LDS is driven along the roads, jeep trails and lease roads within the Raton Basin, any increase in methane concentration above the local background concentration will be marked and investigated to try and locate the source of the methane plume. Marking a potential seep involves recording the latitude, longitude, wind speed, wind direction, temperature, and other pertinent data about the location. If the source of the methane plume is evident (mine vent, coal outcrop, leaking gas well, etc), this information will also be recorded.

2.3 DATA COMPARISON

The seep data collected during the ground survey will be compared to the initial Phase I survey results. For the seeps identified as part of the initial study, the comparison will include peak methane concentration measured and the width of the methane plume where it crosses the road. For each new seep identified as part of this task, the survey track and wind direction data from the Phase I study will be used to determine if the seep was not detected due to the wind direction or if it is a seep that has occurred since the initial study.

Based on the data from the Phase I gas survey, approximately 35 of the 67 locations where methane was detected appear to be related to methane seeps from the outcrop rather than seeps from man-made structures (i.e. wells, mine vents, or pipeline leaks). During the ground survey, Apogee will make similar notes to assist in the identification of those areas that are likely to be natural seeps and pose the greatest risk to human health and safety.

2.4 INTERIM SUMMARY REPORT

A brief report will be prepared and submitted to the COGCC Project Manager at the end of this task. This report will include the location of methane seeps identified, a description of nearby features (gas well, coal outcrop, mine vent, etc.), a brief comparison of the baseline data and current data, and other relevant information.

SECTION 3.0

FIELD MAPPING OF IDENTIFIED METHANE SEEPS

This task includes the assessment and delineation of selected methane seeps identified during the ground survey. It will be completed by LTE following approval of the selected sites for detailed mapping by the COGCC.

3.1 MAPPING SITE SELECTION

Upon review of the ground survey data, LTE will review the seep data and conduct a limited review of risk to public health, safety, and welfare. Those seep areas with the potential to cause impact will be prioritized accordingly. LTE will make recommendations to conduct detailed field mapping at as many seeps areas as possible based on the resources available. Following approval of the areas selected for detailed field mapping, LTE will initiate land access negotiations for those areas located on private lands.

3.2 IDENTIFYING THE SEEP AREA

Initially, LTE will use the wind direction data from the Task 1 survey to identify the actual seep location on the ground. Sensitive field meters and observations of vegetative condition will also assist the field crew in identifying the general location of the seep area.

Once the seep area is located, LTE will overlay a mapping grid onto each of the selected mapping areas. The sampling grid will be based on a 200-foot grid spacing and programmed into the GPS. This overlay feature will facilitate the collection of survey points in an accurate and efficient manner while in the field.

3.3 FIELD MAPPING

Once the COGCC has approved the proposed sites and access to selected parcels has been obtained, LTE will mobilize to the area to initiate detailed field mapping of the methane seeps.

Seep areas previously mapped by LTE in the Raton Basin ranged in size from approximately 1 acre to more than 55 acres. Assuming 50 to 60 seep areas are identified in the Project area during the ground survey, and that each seep area is approximately 50 acres in size, the anticipated detailed field mapping area is approximately 2,500 to 3,000 acres (4 to 5 square miles) for the entire Colorado Raton Basin.

At each grid node, LTE will advance a ½-inch diameter steel rod a maximum of 3 feet below ground surface using a slide-hammer. The rod will be removed from the borehole and polyethylene tubing (perforated at the bottom 6 inches) will be inserted into the borehole. LTE has established a depth of 2 feet to 3 feet bgs as a reasonable sample depth to collect quality data and maintain feasible cost considerations. Once the borehole is advanced, LTE will attach an MSA GasPort® gas meter to the tubing and measure the concentration of methane, hydrogen sulfide, oxygen, and carbon monoxide at each location. LTE will also measure gas flow using an

ADM 2000 flow meter at each borehole exhibiting methane concentrations to facilitate estimates of methane flux.

Concurrent with gas concentration and flow measurements, LTE will use the GPS to log the location of each survey point. Field data collected at the survey point will be directly input into the GPS and attributed to the survey position information. LTE will expand the survey grid in all directions until field data and field crew observations of vegetative condition indicate that the seep area has been defined.

In most cases, the methane seep area identified will be smaller than 40,000 square feet (the area of one 200-foot grid cell). If so, LTE will decrease the grid spacing in order to best characterize the horizontal extent of the seep observed.

In addition to the survey grid, LTE will attempt to map the prominent vegetative features that are common at methane seep areas. These features include clusters of dead/stressed trees, areas of dead/stressed forbs (grasses and bushes), and visible seeps in surface water bodies. This activity is highly subjective and strongly influenced by climatic conditions within the study area. Nonetheless, the vegetation data can be used as an indicator to methane seepage and can provide information as to changes in extent of the methane seep, provided the data is coupled with subsurface measurements of methane concentration.

Where appropriate, LTE will collect photographs of vegetative conditions, visible seeps, and sensitive receptors.

3.4 INTERIM SUMMARY REPORT

Following the completion of the field activities, LTE will prepare a brief summary report of the findings. The report will include the location and extent of the methane seeps identified, a description of nearby source features (if applicable), an assessment of the potential nearby sensitive receptors, and a brief comparison of previous mapping results where available.

SECTION 4.0

GAS SEEP SAMPLING

During the performance of the field mapping program, LTE will collect up to 25 gas samples from the various seep areas. The gas samples will be collected from the area within the seep with the highest observed methane concentration. LTE will use a hand pump attached to the tubing inserted into a borehole. The tubing will be purged of the ambient air and a Cali-5-bond® mylar bag will be filled with a sample of the gas within the borehole. The procedures for collecting gas samples using a hand pump and gas bags are presented in Appendix C.

Gas samples collected from surface water bodies will be collected using a bottle filled with water that is inverted over the seeping gas. The seeping gas displaces the water in the bottle and is sealed prior to removal from the water. LTE will utilize plastic bottles preserved with benzalkonium chloride provided by Isotech Laboratory to collected gas samples from seeps within surface water bodies.

Gas samples will be submitted to Isotech Laboratory located in Champaign, Illinois for analysis of the following:

- Fixed Gas Chromatography: Hydrogen (H_2), Argon (Ar), Nitrogen (N_2), Oxygen (O_2), Carbon Dioxide (CO_2), and Hydrogen Sulfide (H_2S);
- Hydrocarbon Gas Chromatography: Methane, Ethane, Propane, i-Butane, n-Butane, i-Pentane, n-Pentane, and Hexane+; and
- Stable Isotopic Analysis: carbon and hydrogen isotopes of Methane, carbon isotopes of CO_2, and carbon isotopes of ethane and propane.

Obviously, stable isotopic analysis is dependent on the gas concentration present in the sample. Gas seep concentrations of methane, carbon dioxide, ethane, and propane will vary greatly and may be insufficient to conduct isotopic analysis. All gas compositions will be reported as "air-free" calculated values.

Based on existing data and requests from the COGCC, there are four known areas where gas samples will be collected. These areas include: the Primero School gas seep; the Mondragon/Saint gas seep; Longs Canyon gas seep near the Rose house; and the seep at the Longs Canyon bridge over the Purgatoire River. Additional areas where gas samples will be collected will be added as the project progresses.

The samples will be packaged and shipped by a Department of Transportation (DOT) certified hazardous materials shipper to Isotech located in Champaign, Illinois as described in Appendix C.

LTE's geochemist will evaluate the gas composition and stable isotopic analysis data to determine the significant aspects of the gas composition assessment for each seep area. The

objective is to have a data set that will assist in the identification of potential sources of the gas seep and observe and evaluate seep characteristics across the Colorado Raton Basin. Comparison of the seep data to the existing production gas sample data obtained during the Phase I study will be completed.

LTE will prepare a brief summary report that includes the sampling locations, analytical data, and evaluation of the gas characteristics.

SECTION 5.0

WATER WELL SAMPLING

5.1 RESAMPLING EFFORT

LTE understands that the COGCC is requesting resampling of 10 private water wells which had been sampled previously in the Raton Basin. LTE will work with the COGCC to identify these 10 wells for sampling and an additional 15 wells to assess groundwater quality. The wells selected for sampling will be based on geographic location, accessibility, proximity to methane seeps identified during the ground survey and/or the field mapping, well depth, and representativeness within the study area.

5.2 ACCESS

LTE will obtain access from the landowner to each of the wells prior to sampling. LTE will prepare a letter explaining the scope of the study, the benefits available to the well owners, and a request for their participation.

The letter will include a self-addressed and stamped response card to be returned to LTE. The response card will ask a few short questions about the well yield, depth, and accessibility. The card will also request a phone contact number to be used in coordinating sampling events.

The letter to landowners requesting participation in the study will include information on access to the property. The response card will contain a statement agreeing to access and a signature and date. LTE's field crew will have copies of these response cards in the field should there be any miscommunication during the access process.

Prior to initiation of the field work, LTE's field crew will have an organized sampling schedule based on well location, access, estimated sampling time, and producers and landowner availability. As part of the coordination process, LTE personnel will frequently utilize cell phones to communicate with operators and landowners and make modifications to the anticipated schedule as changes occur such as weather delays, sampling ease/difficulty, or other issues.

5.3 SAMPLE PROCEDURES

LTE understands that the COGCC is requesting that 25 water wells be sampled in this study. Well purging procedures will follow the water well sampling protocol outlined in Appendix D of this work plan. Low flow purging will be used if it is anticipated that the well may run dry.

Prior to sampling the well, LTE will interview the well owner in an attempt to the obtain water well conditions including type of pump, casing material and size, location of well and access point, typical daily water use, well yield, depth of well and screened interval, and a brief description of the area around the well. Some of this information will be available from water well records and already incorporated into the database. This information will assist in

determining if low flow purging and sampling will be required. All data obtained will be directly input into the GPS in the field.

LTE will select the sampling point closest to the wellhead and make sure the point is located prior to any pressure tanks or pretreatment systems such as filtration and/or water softeners.

LTE will collect field parameters of pH, specific electrical conductance (SC), and temperature during purging. Purging will be considered complete when stability is demonstrated through 3 consecutive measurements at 3 to 5 minute intervals where pH varies by less than 0.1 units, temperature varies by less than 0.2 degrees Celsius (C), and SC varies by less than 5% for values less than 100 micro-Siemens per cm (uS/cm) or 3% for values greater than 100 uS/cm.

Flow rates during purging will be measured using a graduated bucket and a stopwatch and recorded in the GPS. LTE will also note color, clarity, odors, effervescence, produced sediment, and evidence of bacterial fouling. Observations will be recorded directly in the GPS.

Once purging is complete, LTE will initiate sampling under low flow rate conditions and will bypass the flow-through cell. LTE will record, in the GPS, the field parameters measured based on the last value recorded.

Procedures for sampling free and dissolved gases in groundwater; field sample handling, packaging, and shipping; quality assurance/quality control (QA/QC); field observations; documenting water conditions, and decontamination prior to sampling are included in Appendix E of this work plan.

5.4 LABORATORY ANALYSES

The following table presents the analyses that will be performed on each groundwater sample, the laboratory method, and the sample bottle requirement:

Analyte	Laboratory Method	Bottle Requirement
Major Cations (dissolved Na, Ca, Mg, K, Fe)	EPA Method 6010/6020	500 milliliter (mL) plastic - unpreserved, filtered at laboratory
Dissolved Metals (As, Ag, Ba, Cd, Cr, Pb, Se, Mn, and Cu)	EPA Method 6010/6020	500 mL plastic - unpreserved, filtered at laboratory
Alkalinity (carbonate/bicarbonate)	EPA 300	500 mL plastic - unpreserved
Chloride	EPA 300	1-liter (L) plastic - unpreserved
Floride	EPA 300	
Bromide	EPA 300	
Sulfate	EPA 300	
pH	EPA 150.1	
Nitrate as Nitrogen (N)	EPA 353.3	250 mL plastic - preserved with sulfuric acid (H_2SO_4)
Nitrite as Nitrogen (N)	EPA 353.3	250 mL plastic - preserved with sulfuric acid (H_2SO_4)

Specific Conductance	EPA 120.1	500 mL plastic – unpreserved
TDS	EPA 160.1	500 mL plastic – unpreserved
Dissolved Methane	RSK 175	3 40-mL VOA unpreserved
Boron	EPA 212.3	500 mL plastic - unpreserved, filtered at laboratory

LTE will fill laboratory-provided clean sample bottles for analysis of the parameters identified above. The method used to fill the sample bottles will be based on the presence or absence of effervescent gas. Sampling for dissolved methane will follow protocol outlined in Appendix E. All groundwater samples collected will be submitted in coolers under strict chain-of-custody documentation to Accutest in Houston, Texas at the end of each day.

LTE will collect gas samples for analysis of fixed gas and hydrocarbon gas concentration and stable isotopic analysis if methane is detected at high enough concentrations. LTE's experience has shown that the dissolved methane concentration must be at least 2 mg/L in order to attempt this analysis. In our cost proposal, we have assumed that all water samples will have sufficient gas present for the stable isotopic analysis. Sampling for free gas in water will follow procedures outlined in Appendix E. These samples will be submitted to Isotech located in Champaign, Illinois.

5.5 INTERIM SUMMARY REPORT

Upon completion of the water sampling and analysis, LTE will prepare a brief summary report outlining the finding of the data gathering effort. LTE will make a brief comparison to previous data collected, where appropriate.

SECTION 6.0

REPORTING

In the final report, LTE will provide maps of the ground survey results and the field mapping results. Detailed field maps will include subsurface measurement location and concentration, gas seep sample locations, and vegetation features as appropriate.

The final report will also provide maps illustrating the equal distribution (isopleths) of the various water quality parameters. The parameters to be illustrated on maps depend on the analytical results. It is likely they will include major cations, anions, TDS, pH, dissolved methane and any other analytes deemed important to report pictorially. If available, thermogenic versus biogenic gas determination from the water wells will be provided. Geochemical water-type by major cations and anions will be determined using tri-linear diagrams. If appropriate, bar charts will be developed to visually compare significant chemical data between wells.

The draft and final report prepared for this Project will incorporate all the data collected including evaluations of the extent of impact from methane seeps, suspect source areas, potential receptors, and water quality with the study area. Pertinent tables, charts, graphs, and figures will be presented to succinctly convey the information obtained.

LTE/Apogee will collect field data in electronic format wherever possible to facilitate accurate data management and increase reporting efficiency. LTE/Apogee will develop a simple database to manage the various data streams. All data collected will be delivered in electronic format and include the following:

- Corrected GPS coordinates;
- Unique sample identification number;
- Field measurements of methane, temperature, DO, pH, and specific conductance;
- The physical address, phone number, and the well owner contact information and permit number of the water well;
- Water well drillers log and completion report, if available;
- Laboratory analytical data including sample and analysis dates; and
- Additional requirements listed in Appendix F.

Two printed copies of the final report and one electronic copy in Adobe format will be submitted as the final work product.

FIGURE

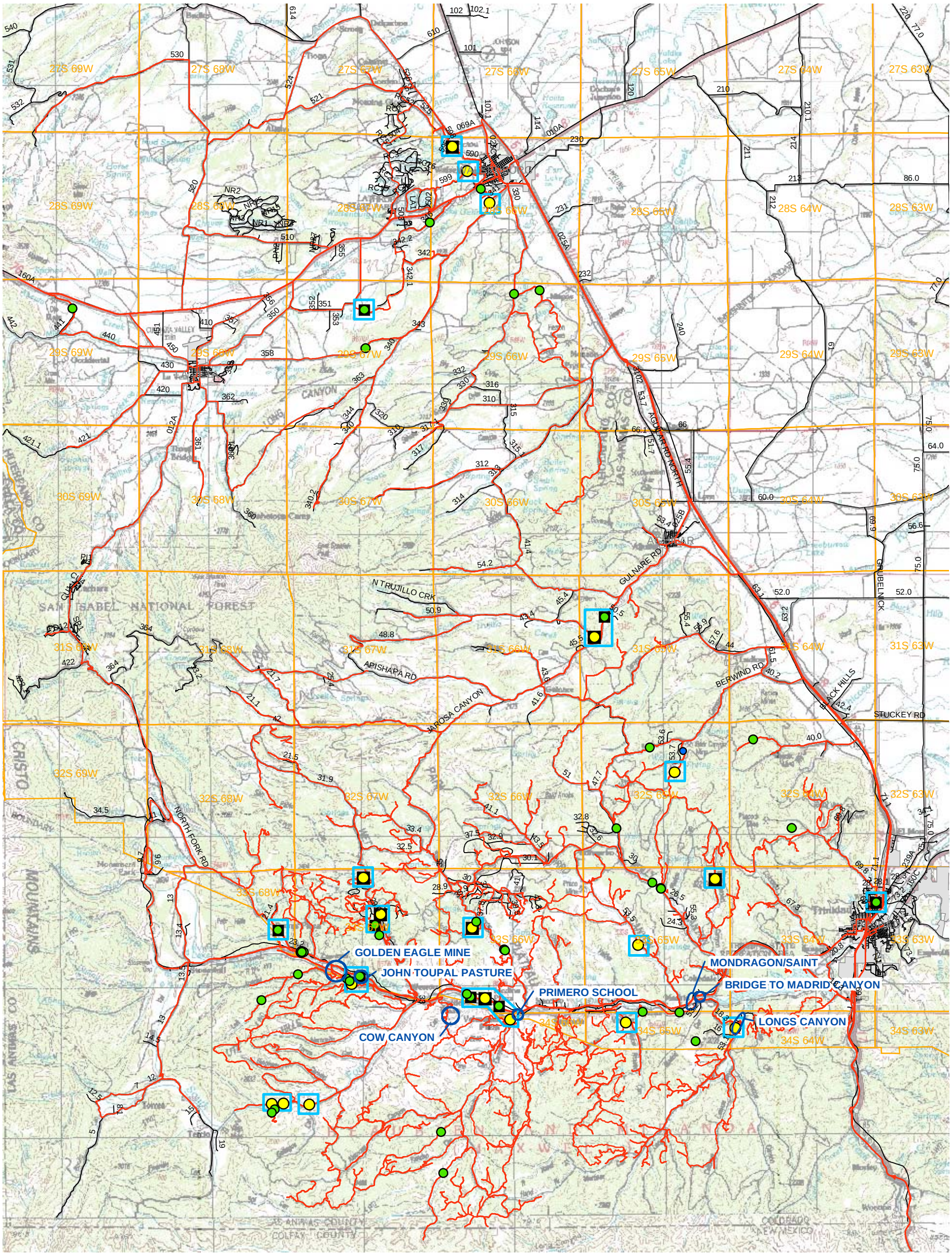

IMAGE COURTESY OF USGS, 1983

LEGEND

- APOGEE SURVEY ROUTE
- ROAD

METHANE SEEPS

- 0.1 - 1.0 ppm
- 1.1 - 10.0 ppm
- 10.1 - 100.0 ppm
- STRUCTURES PRESENT WITHIN 500 FEET OF SEEP LOCATION

- PROPOSED LTE FIELD MAPPING SITE
- KNOWN SEEP AREA
- CITY
- TOWNSHIP AND RANGE LINE

DRAFT

0 4 8
Miles

N

FIGURE 2
PROPOSED FIELD MAPPING SITES
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\11x17_Raton.mxd

IMAGE COURTESY OF USGS, 1983

LEGEND

- APOGEE SURVEY ROUTE
- ROAD

METHANE SEEPS

- 0.1 - 1.0 ppm
- 1.1 - 10.0 ppm
- 10.1 - 100.0 ppm
- STRUCTURES PRESENT WITHIN 500 FEET OF SEEP LOCATION

- LEWICKI COREHOLE
- LEWICKI MINE FEATURE
- LEWICKI MINE BOUNDARY
- CITY
- TOWNSHIP AND RANGE LINE

DRAFT

0 4 8
Miles

N

FIGURE 1
APOGEE 2007 SURVEY ROUTE
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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APPENDIX A

HEALTH AND SAFETY PLAN

HEALTH AND SAFETY PLAN

FIELD ACTIVITIES

Methane Gas Surveys/Water Well Sampling
Raton Basin Area
Southeast Colorado

MARCH 2007

Prepared for:

COLORADO OIL AND GAS CONSERVATION COMMISSION
Denver, Colorado

HEALTH AND SAFETY PLAN

FIELD ACTIVITIES

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Prepared for:

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Denver, Colorado

Prepared by:

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1.0 PURPOSE AND POLICY

The purpose of this Health and Safety Plan (HASP) is to establish personal protection standards and mandatory safety practices and procedures for the work proposed within the project area, including encounters with hazardous materials and other emergencies. The HASP is to provide procedures to protect the safety and health of LT Environmental, Inc. (LTE) personnel; subcontractors; the public; and the surrounding environment from the potential hazards associated with field activities associated with the methane, hydrogen sulfide, water well sampling, and dangerous traffic conditions in the Raton Basin area, Southeast Colorado ("Site"). This HASP applies to all environmental health and safety issues for the project, specifically with regard to field activities and entry activities in the areas with known or potential combustible or poison gas atmospheres. If conditions are encountered which are not expected, this plan will be modified, as needed, to address these issues.

This plan shall be present and readily available during all Site activities. All personnel working on or visiting the Site during actual or potential environmental activities of concern shall attend the kickoff Health and Safety meeting which will identify the requirements of this plan. The LTE Site Safety Officer (SSO) shall be responsible for informing all individuals entering the work area or construction zone of the contents of this plan and ensuring that each person signs the Safety Plan Acknowledgement. All personnel working on or visiting the Site shall adhere to all provisions of this plan. Any supplemental plans used by subcontractors during this activity shall conform to this plan at a minimum.

This HASP applies to all employees, contractors, subcontractors and visitors. All work in areas of contamination or hazardous materials shall conform to all requirements of OSHA (Occupational Safety and Health Administration) regulations for the particular contaminants involved. This HASP has been written with presently available information on the hazards known to be present at this Site. As information is gathered during site activities, amendments to this HASP may be incorporated as appropriate.

2.0 SITE DESCRIPTION

SITE DESCRIPTION: Mainly Rural

SITE NAME: Raton Basin Area, southeast Colorado

PROJECT DATE: March 2007 forward

SURROUNDING POPULATION: Mainly rural and sparse residential.

TOPOGRAPHY: Foothills/mountain terrain.

WEATHER CONDITIONS: Variable. 10 to 90 degrees F.

POTENTIAL HAZARDS: Combustible atmospheres, gas measurement activities, hand drilling/probe activities, hot/cold conditions, heavy vehicle traffic areas, wildlife (mountain lions, rattlesnakes, and bears), trips, slips, and falls.

BACKGROUND: Raton Basin Area is underlain by coal formations that produce methane, hydrogen sulfide, explosive gases, potentially poison gas, and oxygen deficient atmospheres.

3.0 ON SITE ORGANIZATION AND COORDINATION

The following personnel are designated to carry out the stated job functions on site. (Note: One person may carry out more than one job function.)

PROJECT TEAM LEADER	John Peterson, LTE
SCIENTIFIC ADVISOR	John Peterson, LTE
LTE HEALTH AND SAFETY OFFICER	Mike Unger, LTE
SITE SAFETY OFFICER	Kyle Siesser, Dan Moir, various LTE
FIELD TEAM LEADER	Kyle Siesser, LTE
FIELD TEAM MEMBERS	Kyle Siesser, Dan Moir, Steve Sivigliano, Brian Dodek, Various LTE, Apogee Scientific
CONTRACTOR(S)	Apogee Scientific, various others

All personnel arriving or departing the site should log in and out with the Record keeper. Record keeper will not be at all locations with the work teams. Work Team leaders will be responsible for clearing personnel who arrive on site.

4.0 TRAINING REQUIREMENTS

A brief health and safety kickoff meeting will be conducted at the start of the project. All personnel working on this project or visiting the Site during field activities or when environmental concerns exist shall attend this meeting. Additional briefings can be conducted during daily site safety meetings given or during special sessions.

Workers involved with hazardous waste operations or when indicated by the LTE Site Safety Officer (SSO), shall receive training in accordance with the requirements of OSHA Regulations, 29 CFR 1910.120 for Hazardous Waste Operations. Personnel required to wear respirators shall receive training and respirator fit-testing in accordance with the OSHA Regulation 29 CFR 1910.134. If workers are required to enter confined spaces; training in accordance with OSHA Rule 1926.21 shall be required.

All personnel working in a designated hazardous waste area shall receive medical evaluations in accordance with the OSHA Regulations, 29 CFR 1910.120. Pulmonary function tests will be required for all workers required to wear respirators.

In addition to the provisions for the personnel working in any potential areas of hazardous contamination, all personnel working on this project shall be involved in the communication and understanding of the potential hazards through a Hazard Communication Program in accordance

with the provisions of the OSHA Regulations, 29 CFR 1910.120 and 29 CFR 1926.59, the Hazard Communication Standard for the construction industry.

5.0 RESPONSIBILITY OF PERSONNEL

LTE HEALTH AND SAFETY OFFICER (LTE HSO):

- Ensure that personnel are aware of the potential hazards associated with this project;
- Ensure that contractor personnel are in compliance with applicable training and medical surveillance requirements of 29 CFR 1910.120 for Hazardous Waste Operations and Emergency Response;
- Utilizing SSO to ensure that Health and Safety requirements are met;
- Correcting work practices or conditions that may result in accidents, injuries, or chemical exposures to site personnel;
- Approving this HASP and any updates or changes; and
- Coordinating with SSO emergency procedures, evacuation routes, and calling the appropriate emergency contacts.
- The preparation of the HASP including updates or amendments to the HASP.

LTE SITE SAFETY OFFICER (LTE SSO)

- Has overall responsibility for all activities on site, including implementation of the HASP;
- Ensure that personnel involved in this project are aware of the provisions of this HASP, including personal protection standards, safety practices, and emergency procedures;
- Conducting initial HASP meeting;
- Ensure that work crews comply with site environmental safety and health requirements;
- Ensure compliance with HASP;
- Notifying HSO of unsafe or potential unsafe environmental conditions, accidents, or injuries; and
- Monitoring on site intrusive environmental operations and conditions.

PROJECT PERSONNEL

- Complying with HASP;
- Administering necessary precautions to minimize injury or exposure to themselves or other personnel; and

- Notifying SSO or HSO of unsafe or potential unsafe conditions, accidents, or injuries.

6.0 SAFETY AND HEALTH RISK ANALYSIS

Many safety risks are encountered during field activities. These include hazardous atmospheres from seeping methane, hydrogen sulfide (H2S) gas, slips, trips, and falls, extreme temperatures, and dangerous traffic/vehicle conditions.

The major goal of this HASP is to protect the workers from hazardous associated with potentially combustible atmospheres, potentially oxygen deficient atmospheres, dangerous traffic conditions, and the health effects of overexposure to hazardous chemicals, and particulates.

Contractors must inform the SSO and HSO of any new hazards or chemicals they import to the site. Steps will be made to minimize or remove the hazards at all times, and all personnel will be informed of the hazards and the resultant safety procedures. Contaminants and/or hazardous conditions encountered by the contractor(s) at the project site must be reported to the LTE SSO. All work will cease and workers cleared of the hazardous work site until an identification of the contaminant(s) or hazards can be determined. The hazards will be addressed and minimized or eliminated if possible.

6.1 General Site Safety

Hydrogen sulfide gas, methane gas, and dangerous traffic conditions are the primary potential hazards known or suspected to be present at the Site. Hydrogen sulfide is extremely dangerous and methane gas is a highly flammable, slightly lighter than air, and is a simple asphyxiant. Workers may potentially be exposed to toxic vapors.

1. All field activities shall be monitored continuously for the presence of toxic air contaminants and combustible atmospheres. The SSO(s) shall conduct this air monitoring.

2. Field crew(s) members will have two-way radios and will remain in close proximity should an emergency arise.

3. If action levels are exceeded during air monitoring, the work activity in the area shall be stopped for a period of 15 minutes. Air monitoring action levels are listed in Table 2. After this time period, the air monitoring shall continue and work may proceed if levels are below action levels. The SSO must clear the area prior to work commencement. If action levels are exceeded, PPE requirements may be changed.

4. All field work requires gloves, traffic vest, and safety glasses.

5. When signs of hazardous environment are detected (such as elevated combustible gas or toxic gas readings or reduction in oxygen concentration), the SSO will be notified immediately. Workers shall not disturb potentially hazardous materials until the SSO has determined it to be safe for Level D protective equipment.

6. Field personnel should be aware of wind conditions and always try to stay upwind from areas of toxic or combustible gases.

7. Smoking shall not be permitted.

8. Maps are provided in the HASP showing the highways within the project area, and the nearest hospital in Trinidad, Colorado or Walsenburg, Colorado. The closest hospital is dependant on the field crew location within the Raton Basin.

6.2 Airborne Hazards

The toxic and combustible gases may be inhaled during field activities. Contact with areas of elevated gas concentrations and explosive atmospheres shall be minimized or avoided.

1. Personnel shall avoid the area immediately downwind of any visible gas emission areas unless the work area is monitored and declared safe.

2. The atmospheric conditions may be monitored on a continuous basis with a four-gas meter and a carbon dioxide meter.

6.3 Chemical Exposure

Exposure to toxic gases is a low to high concern on this project. The gases identified may be present at high levels. These gases can enter the unprotected body by inhalation, skin absorption, and ingestion. The contaminants can cause injury at the area of contact or can systematically affect other parts of the body.

The affects of exposure not only depend on the gas/chemical itself, its concentration, route of entry, and duration of exposure, but may be influenced by personal factors such as the individual's alcohol consumption, smoking habits, medication used, fitness, nutrition, age, and sex.

The potential hazards and exposure limits of the hazardous substances that may be encountered on the project are summarized in Table 1.

6.4 Radiological Hazards

Radiological hazards are not anticipated.

6.5 Noise

Personnel working around large construction/drilling equipment and loud, congested areas can be exposed to excessive noise causing temporary or permanent damage to hearing. The effects of noise can include:

- Workers being startled, annoyed, or distracted;
- Physical damage to the ear; and
- Communication impediment that may increase potential hazards.

Personal protection against the affects of noise shall be provided whenever personnel noise exposures equal or exceed an 8-hour, time-weighted average sound level of 85 dBA, or a peak of 115 dBA for 15 minutes, in compliance with OSHA Standard 29 CFR 1910.95.

6.6 Demolition, Excavation and Trenching

Demolition, excavation and trenching operations that are known or suspected to be in contaminated areas shall be monitored for the presence of combustible and/or toxic air contaminants. These operations shall be discontinued and personnel shall be removed from the Site when air monitoring action levels for any contaminant have been exceeded.

The use of heavy equipment to create trenches or excavations poses potential physical hazards to employees. Trackhoes, backhoes, or other excavation equipment can cause serious trauma injuries. Such equipment can also roll over, or fall into the excavation in the presence of unstable soil conditions, or if too close to the excavation. Any personnel onsite are to remain clear of operating heavy equipment to the extent feasible.

Trenches and excavations also pose potential cave-in hazards. Under no circumstances are personnel to enter an excavation greater than 4 (four) feet in depth unless the walls of the excavation have been adequately shored or sloped back to the angle of repose (i.e. 1.5:1 for average soil) Liquid accumulation in the excavation may also contribute to cave-ins. Entry or work around excavations should comply with this health and safety plan and with 29 CFR 1926 Subpart P regarding shoring, sloping, escape, and other excavation concerns. Daily inspections of excavations shall be performed by a competent person (site SSO), as defined by OSHA, for evidence that could result in a cave-in. Inspection information will be documented in the project field book.

If necessary, soil and other samples shall be collected from pits, excavations, and trenches by use of the backhoe or other remote sampling device. Personnel shall remain away from the edge of the excavation as the soil may be unstable and may collapse into the excavation. It is acceptable to sample from the backhoe bucket only when it has been lowered to the ground and effectively stabilized. The employee taking the sample must constantly remain vigilant and in visual communication with the backhoe operator to prevent sudden movements. Otherwise the soil in the bucket must be placed on plastic for sampling.

Soils from the excavation must be placed greater than 2 (two) feet from the edge of the excavation. Even if no entry is to occur, a cave-in could topple equipment or injure personnel. Therefore traffic and other sources of vibration nearby shall be controlled to the extent feasible.

Personnel will be protected from traffic by the use of reflective vests, traffic signs, cones, barriers, barricades, and/or flagmen as necessary. Proper fall protection consisting of standard guardrails, safety nets, and/or personal fall protection systems will be constructed or made available for crossings or walkways over excavations and trenches.

No employees shall be permitted underneath loads handled by lifting or digging equipment. Employees are required to stand away from any vehicle being loaded or unloaded to avoid being struck by any spillage or falling materials.

The open holes and excavations shall be protected during non-working hours. Temporary orange plastic or chain-link fencing shall be used to prevent unauthorized individuals from entering trenching areas during not-working hours. No one is allowed into the trench except when installing the overlay of the old liner with the new liner. The SSO will inspect the trenching and excavations daily for safety concerns prior to entry.

6.7 Confined Space Entry

Entry into and work in confined areas shall be allowed only after appropriate monitoring of the confined space. The SSO shall be responsible to ensure that personnel required to enter a confined space are instructed as to the nature of the hazards involved, the necessary precautions to be taken, and in the use of protective and emergency equipment required.

A confined space is defined as any space having a limited means of egress, which is subject to the accumulation of toxic or flammable contaminants or has an oxygen deficient or enriched atmosphere, where employees are not normally stationed. A trench greater than five feet in depth is considered a confined space.

Entry into confined spaces on this project is regulated by OSHA Construction Standard 29 CFR 1926.21 and 1926.353. Work in confined spaces can be extremely hazardous and requires special precautions. OSHA Regulations 29 CFR 1910.46 provides additional guidelines for this type of work.

Air monitoring for the presence of toxic or combustible gases and to determine oxygen levels will occur before any entry occurs in confined spaces. Workers who enter contaminated confined spaces must be informed before entry of the potential hazards of the space, precautions which need to be taken, the protective equipment required, and emergency evacuation procedures. Workers shall know how to use any protective equipment issued for entry into a confined space. Communication protocol shall be determined before entry into the confined space. An attendant who is capable of implementing rescue procedures shall remain outside the confined space for the entire period of the entry.

Equipment which may be required to ensure a contaminated confined space entry is conducted with minimal risk to all employees involved includes fans and blowers for ventilation; harness, lifeline, and man-weighted winch; monitoring equipment; and a properly trained entrant and attendant.

The SSO shall be notified prior to entry into any confined spaces. The SSO or TTI HSO may prevent any entry, require a higher level of respiratory protection, or mandate other precautions at his/her discretion.

6.8 Hot Work

Due to the potential presence of combustible gases on the Site, no welding, cutting, grinding, or brazing shall occur in the areas of subsurface excavations unless air monitoring has been performed. In all areas of the Site, combustible material must be properly stored so as to prevent a fire. Hot work in confined spaces shall only occur when all air monitoring indicates such

activity will not lead to combustion. All hot work must be approved by the HSO prior to commencement.

6.9 Heat Stress

Working at high temperatures (greater than 80^{o} Fahrenheit), especially if workers are wearing Level A, B or C PPE, puts workers at considerable risk of developing heat stress. This can result in health effects ranging from heat fatigue to serious illness or death. Heat stress is caused by a number of interacting elements, including environmental conditions, clothing, workload, and the individual characteristics of the worker.

Signs of Heat Stress

- Heat rash - may result from continuous exposure to heat or humid air.
- Heat cramps - caused by heavy sweating with inadequate electrolyte replacement.

  Signs and symptoms include:
  - muscle spasms
  - pain in hands, feet, and abdomen

- Heat exhaustion - occurs from increased stress on various body organs including inadequate blood circulation due to cardiovascular insufficiency or dehydration.

  Signs and symptoms include:
  - pale, cool, moist skin
  - heavy sweating
  - dizziness
  - nausea
  - fainting

- Heat stroke - the most serious form of heat stress. Temperature regulation fails and the body temperature rises to critical levels. Immediate action must be taken to cool the body before serious injury or death occurs. Competent medical help must be obtained.

  Signs and symptoms are:
  - red, hot, usually dry skin
  - lack of or reduced perspiration
  - nausea
  - dizziness or confusion
  - strong rapid pulse; coma

The potential for heat stress can be minimized by having water and other liquids available at the Site, allowing workers experiencing heat stress to take more frequent rest breaks, having training personnel monitor the work force for signs of heat stress, and having first aid or medical help available. Warning signs of heat stress must be heeded before workers reach the life-threatening stage of heat stroke.

6.10 Cold Stress

Personnel working outdoors in low temperatures, especially at or below freezing are subject to cold stress. Exposure to extreme cold for a short time causes severe injury to the surface of the body. Areas of the body that have high surface area-to-volume ratio such as fingers, toes, and ears are the most susceptible.

Two factors influence the development of a cold injury: ambient temperature and the velocity of the wind. Wind chill is used to describe the chilling effect of moving air in combination with low temperature.

Frostbite

Local injury resulting from cold is included in the generic term frostbite. Frostbite of the extremities can be categorized into:

- "Frost nip or incipient frostbite" is characterized by sudden whitening of skin;
- "Superficial frostbite" is characterized by skin with a waxy or white appearance and is firm to the touch, but tissue beneath is resilient; and
- "Deep frostbite" is characterized by tissues that are cold, pale, and solid.

Hypothermia

Systemic hypothermia is caused by exposure to freezing or rapidly dropping temperature. Its symptoms are usually exhibited in five stages:

- Shivering;
- Apathy, listlessness, sleepiness, and (sometimes) rapid cooling of the body to less than 95^{o} Fahrenheit;
- Unconsciousness, glassy stare, slow pulse, and respiratory rate;
- Freezing of the extremities; and
- Death.

If initial signs of frostbite or hypothermia exist or if equivalent chill temperature is below zero degrees Fahrenheit, the SSO shall determine if the conditions are too hazardous to permit work. All affected personnel shall be kept warm and receive immediate medial care.

Additional notes to remember:

- Do not rub the frostbitten part (this may cause gangrene);
- Do not use ice, snow, gasoline or anything cold on the frostbitten area;
- Do not use heat lamps or hot water bottles to re-warm the part; and

- Give a warm drink - not coffee, tea, or alcohol.

6.11 Drilling Activities

Personnel working with gas and oil well drilling rigs, work-over rigs, direct-push rigs, hollow-stem auger rigs, percussive air hammer rigs, cable-tool rigs, and/or water well rigs should always be aware of the drill rig's moving parts, possible overhead equipment hazards (masts, A-rods, augers, PVC piping, sample barrels, etc.), and the failure of equipment/engine parts (fan blades, drilling bonnets, pumps, etc.) which can act as dangerous projectiles. Personnel should avoid contact with all moving drilling equipment at all times. Required protective equipment includes hard hat, gloves, and steel-toed boots. Care should be taken to avoid other dangerous traffic conditions and use traffic cones and flags as necessary.

6.12 Bloodborne Pathogens

Universal precautions will be utilized in the handling of all human blood and other potentially infectious materials (OPIMs). Employees must wash their hands and any other exposed skin with soap and hot water immediately or as soon as possible after contact with blood or OPIMs, for 15 seconds, in a manner causing friction on both inner and outer surfaces of the hands or exposed skin area. The SSO and HSO should be notified of the exposure as soon as possible.

Any employee who has been exposed to bloodborne pathogens, regardless of personal protection equipment used during the incident, will be treated as an occupational exposure. Testing of the employee will be performed for HIV, Hepatitis B, OPIM as necessary.

6.13 Drug and Alcohol Abuse

It is a violation of company policy for any employee or contractor personnel to possess, sell, trade, or offer for sale illegal drugs or otherwise engage in the illegal use of drugs or alcohol on the job.

It is a violation of company policy for any employee or contractor personnel to report to work under the influence of illegal drugs or alcohol.

The SSO and HSO should be notified of any drug and/or alcohol violations immediately.

6.14 Methane Gas and Hydrogen Sulfide Gas

Methane gas is a colorless, transparent, gas that is lighter than air and often has a landfill/ old trash odor. Hydrogen sulfide gas is a colorless, transparent, gas that is heavier than air and has a characteristic rotten-egg odor at low concentrations. At higher concentrations it has a sweetish odor. However, exposure to hydrogen sulfide causes olfactory fatigue, which results in the inability of an individual to detect its odor. Hydrogen sulfide is an extremely toxic and irritating gas. In sufficiently high concentrations, it can cause instant death. Properly calibrated devices can be used for quantitative estimation of low concentrations of methane and hydrogen sulfide by "spot sampling".

In the event that LTE employees work at a location where methane gas and/or hydrogen sulfide gas are a potential contaminant of concern, only LTE employees who have completed 40-hour HAZWOPER and are current on the yearly updates will be permitted to work at the site.

The (PEL) standard applies to occupational exposures to methane and hydrogen sulfide in all places of employment. It should always be kept in mind that high concentrations of hydrogen sulfide or prolonged exposure to moderate concentrations (10-30 ppm) may dull the sense of smell so that absence of odor should not be considered as indicating a nonhazardous concentration.

OSHA Construction Industry PEL: 10 ppm (15 mg/m3), time weighed average (TWA), 20 ppm ceiling, 50 ppm 10 minute maximum peak. IDLH concentration is 100 ppm.

If hydrogen sulfide concentrations exceed 10 ppm, all field team members will evacuate the area immediately. All personnel will try to migrate upwind away from the dangerous area(s).

Methane gas is a simple asphyxiant that replaces oxygen. Five percent methane gas (100% LEL) represents an explosive atmosphere.

7.0 PERSONAL PROTECTIVE EQUIPMENT (PPE)

Personal Protective Equipment (PPE) such as respirators or dust masks may be required at the Site to protect workers from inhalation hazards such as organic vapors, silica, asbestos, metal dusts, and nuisance dust. Protective clothing such as basic coveralls, Tyvek or Saranex, will prevent organic chemicals from touching and/or penetrating the skin. Based on evaluation of potential hazards, the following levels of personal protection have been designated for the applicable work areas or tasks:

	Level of Protection	
Job Function	Initial	Contingency
Drilling Activities	D	Mod. D, C
Excavation/trenching	D	Mod. D, C
Sampling/Monitoring	D	Mod. D, C
Construction	D	Mod. D, C
Decontamination of Equipment	D	Mod. D, C

Specific protective equipment for each level of protection is as follows:

Level D:

Traffic vest.
Gloves, leather work gloves are recommended while working around heavy equipment.
Safety glasses.

Level D Mod.

Hard hat.
Steel toe work boots with neoprene or PVC disposable boot covers.
Tyvek or Saranex coveralls.
Goggles, safety glasses, and/or face shield.

Neoprene outer gloves.
Disposable inner glove (recommended).

Level C: Same as Mod. D with full-face air-purifying respirator equipped with appropriate cartridges.

Special precaution: Workers at or near the area identified as containing contamination shall stay upwind of the suspected source area. Workers entering a known or suspected contaminated area will wear Level Mod. D PPE to limit contact with these substances. Work practices should be designed to prevent mobilization and inhalation of dust. If dust generation is a problem, PPE requirements will increase to Level C at the discretion of the SSO.

If air-purifying respirators are authorized, dust and organic vapor are the appropriate canisters for use with the involved substances and concentrations.

NO CHANGES TO THE SPECIFIED LEVELS OF PROTECTION SHALL BE MADE WITHOUT THE APPROVAL OF THE SITE SAFETY OFFICER AND THE PROJECT MANAGER.

8.0 HAZARD EVALUATION

The following substance(s) are known or suspected to be on site. The primary hazards of each are identified.

Substances Involved	Primary Hazards
Methane/Hydrogen sulfide Gases	Poison, combustion, asphyxiation

The following additional hazards are also expected on Site: primary hazard includes dangerous traffic conditions and the potential for exposure to extreme temperatures. Wildlife such as mountain lions and rattlesnakes also present a potential hazard to field personnel. Work will be performed according to LTE's Health and Safety protocols.

Overall hazard is low to high depending on individual site conditions, traffic conditions, seeping gas, location of ignition sources, low lying areas, and other potential traps for seeping gas.

9.0 COMMUNICATION PROCEDURES

The SSO will be available via mobile phone throughout the field activities. Personnel in a work team should remain within sight of the Work Party Leader.

A loud whistle is the emergency signal to indicate that all personnel should leave a particular area immediately. The following standard hand signals will be used in case of failure of radio communications:

Hand gripping throat	Out of air, can't breathe
Grip partner's wrist or	Leave area immediately
both hands around waist	Leave area immediately

Hands on top of head	Need assistance
Thumbs up	OK, I am all right, I understand
Thumbs down	No, negative

Telephone communication to the SSO should be established from each remote location as soon as practicable. Cellular phones should be available on site.

10.0 DECONTAMINATION PROCEDURES

If an Exclusion Zone is established, personnel and equipment leaving the Exclusion Zone shall be thoroughly decontaminated. The standard level decontamination protocol shall be used with the following decontamination stations:

(1) Steam cleaning
(2) Low phosphate soap
(3) Tap water Rinse
(4) Methanol Rinse
(5) Deionized water rinse
(6) Towel Dry
(7) Air dry
(8) Other

The following equipment is required: deionized water, Low phosphate soap, methanol, and paper towels. Low phosphate soap and water will be used as the primary decontamination solution.

11.0 AIR MONITORING PROGRAM

Air monitoring will be used to identify and quantify airborne levels of hazardous substances. Monitoring is required during all intrusive on site activities such as drilling, excavations and trenching.

The following air monitoring devices will be used to identify the quality of air in the breathing zone around the employees in the work areas.

Type of Equipment	**Calibration Frequency**	**Parameter Measured**	**Sampling Frequency**
Combustible Gas Meter Carbon Dioxide Meter	Daily Daily	Combustible gases, oxygen, hydrogen sulfide, and methane.	Continuous.

Instrument detection levels are listed below:

Constituent	**Threshold Limit**	**Increments**
Flammable Gas	1% Lower Explosive Limit (LEL)	1%
Oxygen	19% Oxygen	0.1%

Toxic Gas	1ppm	1 ppm

Table 2 presents the air monitoring action levels and PPE action levels to be used for all activities performed within the scope of this project.

The following personal monitoring will be in effect on Site:

Exposure sampling: Continuously around work area and breathing zone. If measurements indicate vapors exceed background levels for five minutes, then work will cease and engineering controls will be implemented and/or appropriate PPE will be upgraded as deemed necessary.

Other instruments used on Site will be calibrated according to manufacturer's instructions.

Medical monitoring: The expected air temperature may vary from 20 to 90 degrees Fahrenheit. If it is determined that heat stress monitoring is required (mandatory if over 70 degrees Fahrenheit when using Level A, B, and C PPE), body temperatures will be monitored as appropriate.

12.0 EMERGENCY PLANNING

Employees must read the site health and safety plan, and must familiarize themselves with the information in this chapter. Employees will be required to have a copy of this plan and a list of the emergency contacts and phone numbers immediately accessible on site and to know the route to the nearest emergency medical services.

12.1 Emergency Recognition

Emergency conditions are considered to exist if:

- Any member of the field crew, visitor, etc. is involved in an accident or experiences any adverse health effects or symptoms of exposure while on site; and
- A condition is discovered that suggests the existence of a situation more hazardous than anticipated.

In the event that any member of the work crew experiences any adverse health effects or symptoms of exposure while on the scene, the entire crew working in that area will immediately halt work and act according to the instructions provided by the SSO.

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated will result in the evacuation of the work crew in the area and re-evaluation of the hazard and the level of protection required.

12.2 Personnel Roles: Emergency Lines of Authority and Communication Procedures

In the event of an emergency situation at any work site, the SSO or the HSO will control the emergency situation and will be responsible for coordinating on site emergency decision making. These individuals will help to resolve disputes about safety and health requirements and precautions. They will also be responsible for coordinating all activities until emergency response teams (ambulance, fire department, etc.) arrive at the site.

The SSO and HSO will ensure that the necessary personnel and agencies are contacted as soon as possible after the emergency occurs.

All on site personnel must know the location of the nearest phone and the location of the emergency phone number list.

12.3 Evacuation Routes and Procedures: Safe Distances and Places of Refuge

In the event of emergency conditions, employees will evacuate the area in an upwind direction, transport injured personnel and take other measures to safely remedy the situation. Evacuation routes and safe distances should be decided upon by the field team prior to initiating work.

In all situations, when an on Site emergency results in evacuation of the work area, personnel shall not reenter until:

- The conditions resulting in the emergency have been corrected;
- The hazards have been reassessed;
- The HASP has been reviewed; and
- Site personnel have been briefed on any changes in the HASP.

12.4 Accident Prevention

All site activities present a degree of risk to on site personnel. During routine operations, risk is minimized by establishing good work practices, staying alert, and using proper personal protective equipment. Unpredictable events such as physical injury, chemical exposure, or fire may occur and must be anticipated. (All employees are encouraged to participate in Red Cross first aid and CPR courses in order to more effectively handle physical and medical emergencies that may arise in the field.)

The discovery of any condition that would suggest the existence of a situation more hazardous than anticipated will result in the evacuation of the work crew and re-evaluation of the hazard and the level of protection required.

Follow-up action must be taken to correct the situation that caused the accident and to prevent the situation from reoccurring.

General emergency procedures, and specific procedures for handling personal injury and chemical exposure, are described in the following sections.

12.5 Emergency Site Security and Control

For this project, the SSO (or designated representative) must know who is in the hazardous areas. Personnel access into the designated areas must be controlled. In an emergency situation, only necessary rescue and response personnel should be allowed into the designated areas.

12.6 Worker Hygiene

To prevent the ingestion of hazardous chemicals from the site, workers should not eat or smoke during the on site activities or after leaving the hazardous site until after decontamination

procedures have been completed. Workers should avoid excessive contact with contaminated media and take a shower or bath as soon as possible after the workday.

12.7 Procedures for Emergency Medical Treatment and First Aid

12.7.1 Chemical Exposure

In the event of chemical exposure (skin contact, inhalation, ingestion), the following procedures should be implemented:

- Contact SSO or HSO immediately.
- A properly trained team member with appropriate PPE should remove the individual from the immediate area of contamination.
- Precautions should be taken to avoid exposure of other individuals to the chemical.
- If the chemical is on the individual's clothing, the clothing should be removed if it is safe to do so and the contaminated clothing should be placed in an approved container.
- If the chemical has contacted the skin, the skin should be washed with large amounts of water, preferably under a shower.
- In case of eye contact, an emergency eyewash should be used. Eyes should be washed for at least 15 minutes.
- If necessary, the victim should be transported to the nearest hospital or medical center. An ambulance should be called to transport the victim. It may be necessary to wrap the victim in a blanket or plastic to avoid contamination of the transport vehicle or hospital emergency room. The hospital should be notified to alert them that a contaminated victim is enroute.

12.7.2 Personal Injury

In the event of personal injury:

- Workers trained in first aid can administer treatment to an injured worker. The victim should be transported to the nearest hospital or medical center. If necessary, an ambulance should be called to transport the victim.

12.7.3 Fire or Explosion

In the event of fire or explosion, personnel will evacuate the area immediately. Administer necessary first aid to injured employees. Personnel will proceed to a safe area and phone the local fire department or emergency support services. Upon contacting the emergency support service, state your name, nature of the hazard (i.e. fire, high combustible vapor levels), the location of the incident, and whether there were any physical injuries requiring an ambulance. Fire extinguishers shall be maintained on vehicles.

12.8 Emergency Medical Care

Two hospitals with emergency care are present in the Raton Basin Area. The **Mount San Rafael Hospital is located in Trinidad** in the southern portion of the Raton Basin and the **Spanish Peaks Regional Health Center is located in Walsenburg** in the northern portion of the Raton Basin. Emergency medical response is provided by contract ambulance service. Emergency fire response is provided by the local Fire Departments. The hospitals/medical centers identified below are the closest to the project site and can provide the necessary medical services if an emergency arises. These facilities are familiar with the type of hazards and chemicals that may be encountered during this project. Maps showing the locations to these facilities are attached as Figures. The fastest route to the facilities is dependent on the location of the field crew. Highways and state highways are shown on the attached figures. The two medical facilities are:

Mount San Rafael Hospital: located at 410 Bendicta Avenue, Trinidad, Colorado (**main phone number 719-846-2752**), **Emergency Services 24-hours or 911**.

Spanish Peaks Regional Medical Health Center: located at 23500 US Highway 160, Walsenburg, Colorado (**main phone number 719-738-5100**), **Emergency Services 24-hours or 911**.

First-aid equipment is available on the Site at the following locations:

First-aid kit	SSO's Field Kit
Emergency eye wash	SSO's Field Kit

Emergency medical information for substances known to be present is presented on Table 1.

Emergency phone numbers are listed below. The SSO will have a mobile (cellular) phone available when on site.

Agency/Facility	Phone Number
Police	911
Fire	911
Mount San Rafael Hospital	**Emergency 911 or 719-846-2752**
Spanish Peaks Regional Health Center	**Emergency 911 or 719-738-5100**
National Response Center	800-424-8802
Poison Control Center	800-332-3073

13.0 SITE CONTROL MEASURES

The following site control measures shall be followed in order to minimize potential contamination of workers, protect the public from potential site hazards, and to prevent unauthorized access to the Site.

13.1 Potential Areas of Contamination

Once individual sites or work activities have been designated as being a hazardous site, the area will be isolated and access to the site shall be controlled. The work area (exclusion zone) shall

be clearly defined to prevent unauthorized or unprotected persons from entering the area. This can be done using tape and/or fencing material.

A site control and security person shall be designated whose responsibility it is to see that the work area is secure and that no one accesses the area without checking with security and signing the Health and Safety Plan. This duty may be performed by the SSO.

An on site staging area shall be established outside of the contaminated area to coordinate the on site activities and to decontaminate personnel leaving the site.

13.2 Non-Hazardous Areas

All excavations and trenches that are left unattended overnight or during work hours shall be clearly marked to prevent unauthorized access and injury to workers or visitors to the site. This may be done with barricades, fencing or fluorescent taping. The barricades shall be checked periodically to ensure that they are in good condition.

All Site personnel, with their signature below, acknowledge they have been briefed on the above Health and Safety Plan and are familiar with its provisions and they have attended the Health and Safety kickoff meeting for the Site. They also acknowledge that they have received 40-Hour OSHA HAZWOPER certification and currently have annual 8-Hour OSHA HAZWOPER certification.

	Name (Print)	Signature/Date
Corporate Health & Safety Officer	Mike Unger	
Site Safety Officer	*Dan Moir*	
Project Team Leader	John Peterson	
Other Site Personnel	Kyle Siesser	
	Brian Dodek	
	Steve Sivigliano	

FIGURES

MT. SAN RAFAEL HOSPITAL

Hom
Cont
Site

About Us

Hospital Services

Medical Staff

Patient Information

Hours of Operation

Career Opportunities

Events Calendar

Map and Driving Directions

Web Links

Notice of Privacy Practices

Map and Directions

Mount San Rafael Hospital
410 Benedicta Avenue
Trinidad, CO 81082
Phone: (719) 846-2752

Brought to you by Microsoft MapPoint.net!

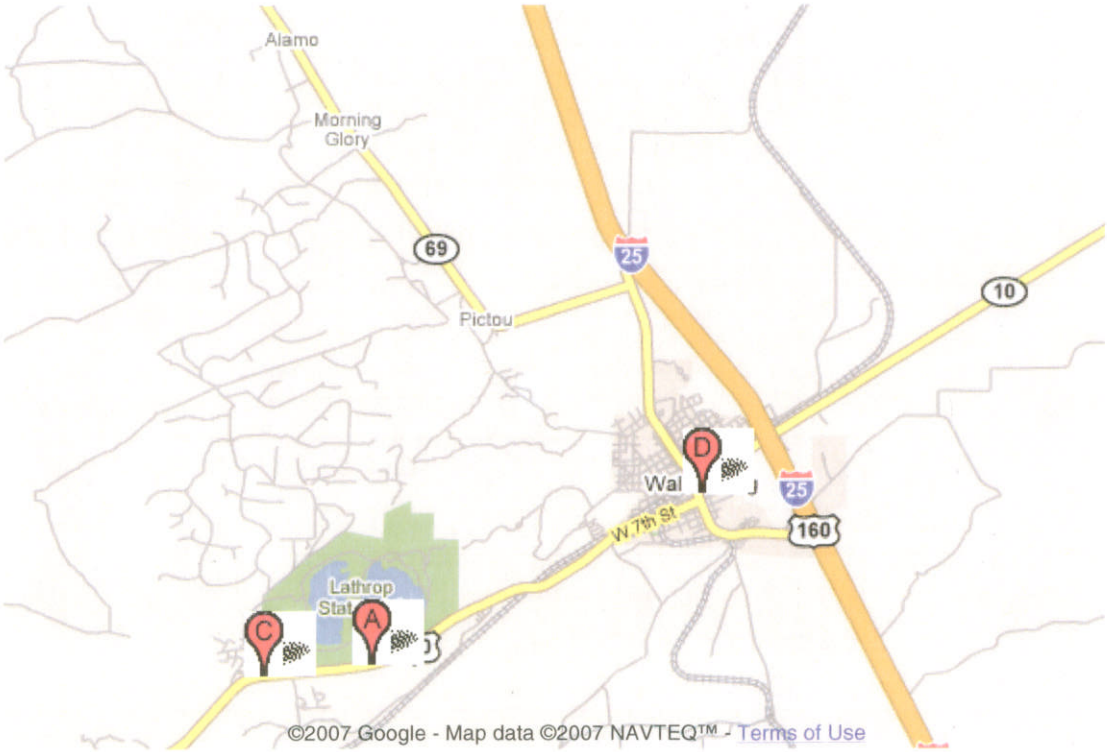
Click on the map to navigate. Map navigation will open in a new window; to return to this site, close the window.

Get Driving Directions To Mount San Rafael Hospital

Directions will open in a new window; to return to this site, close the window.

Google Maps

Results **1-9** of about **1,822** for **hospitals** near **Walsenburg, CO 81089**



A. **Hospitals**: Spanish Peaks Regional Health Center
23500 Us Highway 160, Walsenburg, CO
(719) 738-5100

B. Colorado State Government: Colorado State Veterans Nursing Home
23500 Us Highway 160, Walsenburg, CO
(719) 738-5100

C. Rio Cucharas Veterinary Clinic Inc
22540 Us Highway 160, Walsenburg, CO
(719) 738-1427

D. Outpatient Veterinary Clinic
120 E 6th St, Walsenburg, CO
(719) 738-0800

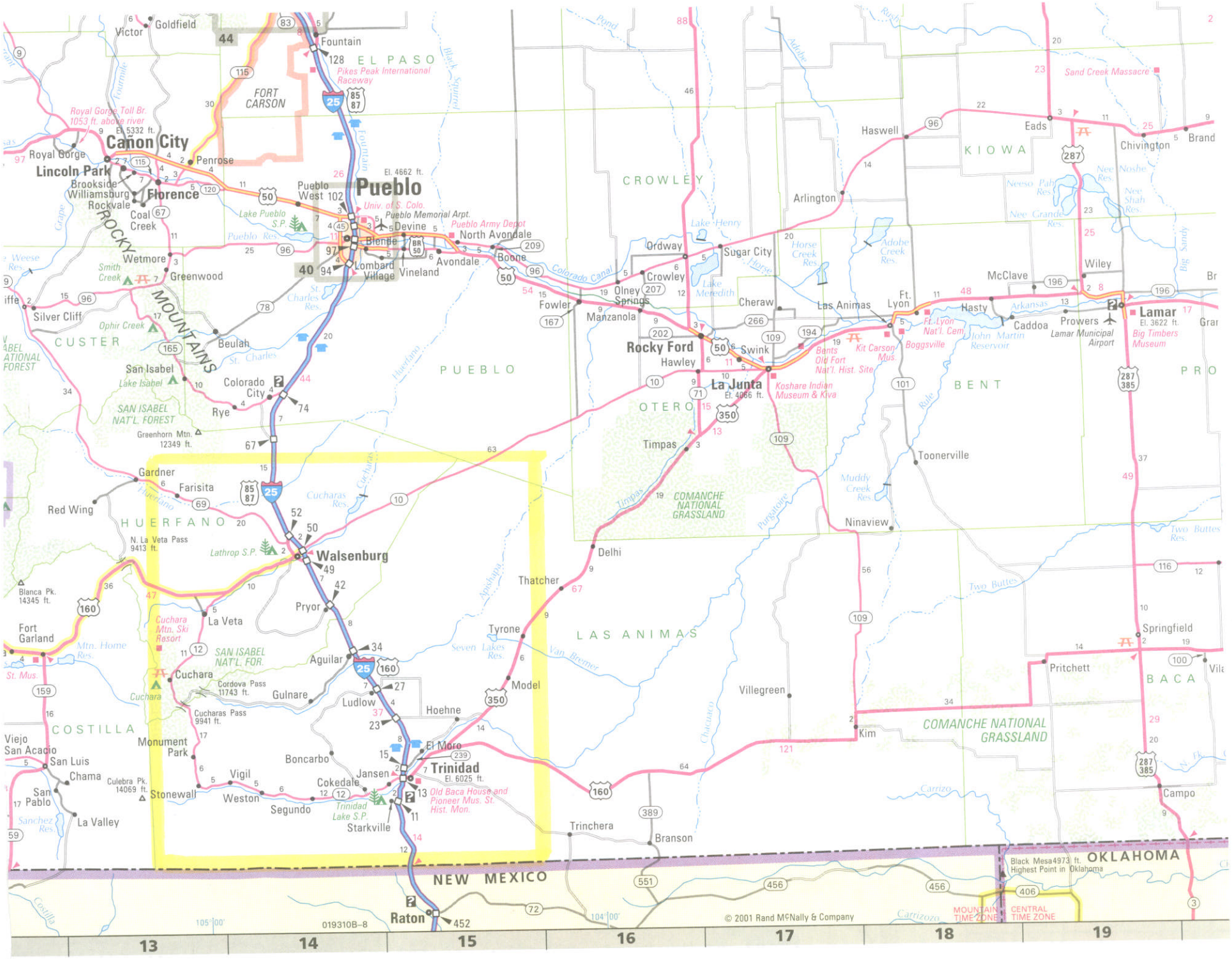
E. MT San Rafael Hospital
410 Benedicta Ave, Trinidad, CO
(719) 846-9213

F. St Mary-Corwin Medical Center
1008 Minnequa Ave, Pueblo, CO
(719) 560-4000

G. Centura Health-Saint Mary
1008 Minnequa Ave, Pueblo, CO
(719) 560-4000

H. Penrose Hospital
2002 Lake Ave, Pueblo, CO
(719) 565-1667

I. Parkview Medical Center Corwin
1500 Lake Ave, Pueblo, CO
(719) 253-6220


Victor
Goldfield
Fountain
EL PASO
Pikes Peak International Raceway
FORT CARSON
Royal Gorge Toll Br. 1053 ft. above river
Canon City
El. 5332 ft.
Royal Gorge
Lincoln Park
Penrose
Florence
Brookside
Williamsburg
Rockvale
Coal Creek
ROCKY MOUNTAINS
Pueblo West
Pueblo
El. 4662 ft.
Univ. of S. Colo.
Pueblo Memorial Arpt.
Pueblo Army Depot
North Avondale
Lake Pueblo S.P.
Pueblo Res.
Blende
Devine
Lombard
Village
Vineland
Avondale
Boone
Wetmore
Greenwood
Smith Creek
Silver Cliff
CUSTER
Ophir Creek
Beulah
San Isabel
Lake Isabel
Colorado City
Rye
SAN ISABEL NAT'L. FOREST
Greenhorn Mtn. 12349 ft.
St. Charles
St. Charles Res.
Huerfano
PUEBLO
Gardner
Farisita
Red Wing
HUERFANO
Cucharas Res.
Cucharas
N. La Veta Pass 9413 ft.
Lathrop S.P.
Walsenburg
Pryor
La Veta
Blanca Pk. 14345 ft.
Fort Garland
Cuchara Mtn. Ski Resort
Mtn. Home Res.
SAN ISABEL NAT'L. FOR.
St. Mus.
Aguilar
Cuchara
Cordova Pass 11743 ft.
Gulnare
Ludlow
Hoehne
Cucharas Pass 9941 ft.
COSTILLA
Viejo San Acacio
San Luis
Chama
Monument Park
Culebra Pk. 14069 ft.
Stonewall
Vigil
Weston
Segundo
Boncarbo
Jansen
Cokedale
El Moro
Trinidad
El. 6025 ft.
Old Baca House and Pioneer Mus. St. Hist. Mon.
Trinidad Lake S.P.
Starkville
San Pablo
La Valley
Sanchez Res.
Costilla
Raton
NEW MEXICO
019310B-8
105°00'
104°00'
© 2001 Rand McNally & Company
Haswell
Eads
Sand Creek Massacre
Chivington
Brand
KIOWA
Arlington
CROWLEY
Lake Henry
Neeso Pah Res.
Nee Noshe Res.
Nee Shah Res.
Nee Grande Res.
Ordway
Sugar City
Horse Creek Res.
Adobe Creek Res.
Crowley
Olney Springs
Lake Meredith
Colorado Canal
Cheraw
Fowler
Manzanola
Rocky Ford
Hawley
Swink
La Junta
El. 4066 ft.
Koshare Indian Museum & Kiva
OTERO
Timpas
COMANCHE NATIONAL GRASSLAND
Las Animas
Ft. Lyon
Ft. Lyon Nat'l. Cem.
Boggsville
Bents Old Fort Nat'l. Hist. Site
Kit Carson Mus.
McClave
Hasty
Arkansas
Caddoa
John Martin Reservoir
Prowers
Lamar Municipal Airport
Lamar
El. 3622 ft.
Big Timbers Museum
Wiley
BENT
Toonerville
Muddy Creek Res.
Ninaview
Delhi
Thatcher
Tyrone
LAS ANIMAS
Seven Lakes Res.
Van Bremer
Model
Villegreen
Kim
Pritchett
Springfield
BACA
Two Buttes
Two Buttes Res.
Purgatoire
Apishapa
Chacuaco
Carrizo
Carrizozo
Trinchera
Branson
OKLAHOMA
Black Mesa 4973 ft.
Highest Point in Oklahoma
MOUNTAIN TIME ZONE
CENTRAL TIME ZONE
13
14
15
16
17
18
19


Hillside
Coal Creek
Wetmore
Greenwood
Westcliffe
Silver Cliff
Beulah
San Isabel
Colorado City
Rye
Crestone
Crestone Pk. 14294 ft.
Greenhorn Mtn. 12349 ft.
Gardner
Farisita
Red Wing
Pinyon Flats
Visitor Center
Head
San Luis Lakes S.P.
San Luis Lake
Blanca Pk. 14345 ft.
Alamosa East
Fort Garland
Blanca
ALAMOSA N.W.R.
San Luis Valley Reg. Arpt.
Fort Garland St. Mus.
Mtn. Home Res.
Smith Res.
Trinchera
Pikes Stockade St. Hist. Mon.
Sanford
Manassa
Jack Dempsey Mus.
Viejo San Acacio
San Acacio
Culebra
San Luis
Chama
San Pablo
Mesita
La Valley
Sanchez Res.
Garcia
Culebra Pk. 14069 ft.
Monument Park
Stonewall
Vigil
Weston
Segundo
Trinidad S.P.
Starkville
Old Baca House and Pioneer Mus. St. Hist. Mon.
Trinidad
El 6025 ft.
El Moro
Boncarbo
Jansen
Cokedale
Ludlow
Hoehne
Aguilar
Gulnare
Cuchara
Cuchara Ski Valley
Cuchara Pass 9941 ft.
Cordova Pass 10743 ft.
La Veta
Pryor
Walsenburg
Lathrop S.P.
N. La Veta Pass 9413 ft.
Red Wing
Cucharas Res.
Huerfano
Pueblo Memorial Arpt.
Pueblo S.P.
Pueblo Res.
Pueblo Army Depot
Devine
Blende
Lombard Village
Vineland
Avondale
North Avondale
Boone
Fowler
Olney Springs
Crowley
Ordway
Sugar City
Manzanola
Rocky Ford
Hawley
Swink
La Junta
El 4066 ft.
Timpas
Delhi
Thatcher
Tyrone
Model
Trinchera
Branson
Villegreen
Lake Henry
Lake Meredith
Colorado Canal
Arkansas
Purgatoire
Seven Lakes Res.
Van Bremer
St. Charles Res.
St. Charles
Huerfano
Cucharas
Apishapa
Timpas
Rayden Creek
Lake Creek
De Weese Res.
Smith Creek
Otter Creek
SANGRE DE CRISTO MTS.
ROCKY MOUNTAINS
RIO GRANDE NATIONAL FOREST
SAN ISABEL NATIONAL FOREST
SAN ISABEL NAT'L FOR.
SAN ISABEL NAT'L FOREST
GREAT SAND DUNES NAT'L MON.
COMANCHE NATIONAL GRASSLAND
CUSTER
PUEBLO
HUERFANO
ALAMOSA
COSTILLA
OTERO
LAS ANIMAS

TABLES

TABLE 1

CHARACTERISTICS OF PRIMARY POTENTIAL CHEMICAL HAZARDS

METHANE				
PEL(TWA)	IDLH	Solubility	IP	VP
Simple asphyxiant	Simple asphyxiant	Negligible (H_2O)		Not Available
Routes of Entry:	Skin contact, inhalation, eye contact			
Symptoms:	Eye, skin, and ingestion exposure are unlikely as product is a gas at room temperature.			
Target Organs:				
First Aid:	Inhalation: prompt medical attention, remove from contaminated area immediately. If breathing has stopped administer artificial resuscitation and supplemental oxygen.			
VOLATILE ORGANIC COMPOUNDS*				
PEL(TWA)	IDLH	Solubility	IP	VP
*	*	*	*	*
Routes of Entry:	Inhalation, ingestion, skin and/or eye contact, absorption			
Symptoms:	*			
Target Organs:	*			
First Aid:	Irrigate immediately, wash skin with soap, respiratory support; if ingested, get medical attention immediately			
HYDROGEN SULFIDE				
PEL(TWA)	IDLH	Solubility	IP	VP
10 ppm	300 ppm	0.4%	10.46 eV	>1 ATM
Routes of Entry:	Inhalation, ingestion, skin and/or eye contact			
Symptoms:	Apnea, coma, convulsions, irrigated eyes, pain, irritated respiratory system, dizziness, headache, fatigue, irritability			
Target Organs:	eyes, respiratory system			
First Aid:	Irrigate immediately, respiratory support			

CARBON MONOXIDE	
PEL (TWA)	IDLH
35 ppm	1,500 ppm
SULFUR DIOXIDE	
PEL (TWA**)**	IDLH
2 ppm	100 ppm
CARBON DIOXIDE	
PEL (TWA): 5,000 PPM	50,000 PPM
KEY:	NA - Not Applicable
Carc. - carcinogen	eV - electron volts
TWA - Time Weighted Average	PEL - permissible exposure limit
STEL - Short term exposure limit	IDLH - immediately dangerous to life or health
Ppm - parts per million	mm - millimeters
IP - Ionization Potential	min - minutes
VP - Vapor Pressure	** no set standard
* Dependent on the individual compound identified.	

TABLE 2

AIR MONITORING AND PPE ACTION LEVELS

HAZARD	MONITORING EQUIPMENT	MEASURED LEVEL	ACTION
Oxygen	Oxygen Meter	20-22% 19.5-20% or 22-25% Less than 19.5% or Greater than 25%	No restrictions, monitor occasionally and use initial PPE. Monitor continuously while personnel are in the area -- use egress pack. For confined spaces: personnel are required to wear an SCBA escape pack and lifeline. Evacuate area, wait or ventilate. No hot work to be performed at greater than 25% oxygen. For confined spaces: personnel may be required to wear an SCBA escape pack and lifeline/entry should only occur in emergency situations.
Explosive Gases - **Methane**	LEL Sensor	Less than 10% LEL 15%-25% LEL Greater than 25% LEL	Monitor continuously and use initial PPE. Monitor continuously, limit access to essential personnel, control ignition sources, and ventilate the area. Evacuate area, notify HSO, ventilate or wait for vapors to dissipate.
Toxic Gases- **Hydrogen Sulfide**	Four Gas Meter	0-10 ppm 10 ppm 10 to 100 ppm or greater	Monitor continuously and use initial PPE. TWA limit , if sustained for 5 minutes-evacuate area immediately. Evacuate area.
Carbon Dioxide	Carbon Dioxide Meter	0-5,000 ppm 5,000-50,000 ppm >50,000 ppm	Monitor continuously and use initial PPE. TWA, if sustained for 5 minutes-evacuate area immediately. IDLH-evacuate area immediately

% = Percent
% LEL = Percent Lower Explosive Limits
TWA = Time Weighted Average
ppm = Parts per million

APPENDIX B

REVISED PROJECT SCHEDULE

PROJECT TIMELINE

PHASE II RATON BASIN SEEP INVESTIGATION
COLORADO OIL & GAS CONSERVATION COMMISSION

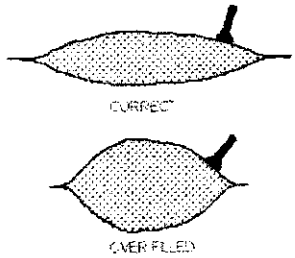
ID	Task Name	Start	Finish
1	**RATON BASIN RFP Water/Seep Quality Assessment**	**Mon 11/20/06**	**Wed 10/24/07**
2	Notice To Proceed	Mon 11/20/06	Mon 11/20/06
3	**TASK 1 Ground Survey to Locate Methane Seeps**	**Tue 3/6/07**	**Fri 5/18/07**
4	Interviews/Research	Tue 3/6/07	Fri 4/13/07
5	Roads and Trails Survey	Mon 4/23/07	Fri 5/4/07
6	Task 1 Summary Report	Fri 5/4/07	Fri 5/11/07
7	COGCC Review	Fri 5/11/07	Fri 5/18/07
8	**Task 2 Field Mapping of Identified Seep Areas**	**Mon 5/21/07**	**Tue 7/10/07**
9	Access Negotiations	Mon 5/21/07	Fri 6/15/07
10	Field Mapping of Methane Seeps	Mon 6/4/07	Fri 6/22/07
11	Task 2 Summary Report	Mon 6/25/07	Tue 7/10/07
12	**Task 3 Gas Seep Sampling**	**Mon 6/4/07**	**Mon 8/6/07**
13	Sample Collection	Mon 6/4/07	Fri 6/22/07
14	Laboratory Analysis	Tue 6/5/07	Mon 7/16/07
15	Task 3 Summary Report	Mon 7/16/07	Mon 8/6/07
16	**Task 4 Water Well Sampling**	**Mon 5/21/07**	**Fri 7/13/07**
17	Access Negotiations	Mon 5/21/07	Sat 6/9/07
18	Well Sampling/Interviews	Mon 6/4/07	Fri 6/8/07
19	Laboratory Analysis	Tue 6/5/07	Mon 6/25/07
20	Task 4 Summary Report	Mon 6/25/07	Fri 7/13/07
21	**Task 5 Reporting**	**Mon 11/20/06**	**Wed 10/24/07**
22	**Work Plan**	**Mon 3/19/07**	**Wed 4/11/07**
23	Draft Preparation	Mon 3/19/07	Thu 3/29/07
24	COGCC Review	Thu 3/29/07	Wed 4/11/07
25	**Final Report**	**Mon 8/6/07**	**Wed 10/24/07**
26	Draft Report Submittal	Mon 8/6/07	Fri 9/7/07
27	COGCC Review	Mon 9/10/07	Mon 9/24/07
28	Final Report Submittal	Mon 9/24/07	Wed 10/24/07
29	**Biweekly Reporting**	**Mon 11/20/06**	**Wed 10/24/07**

APPENDIX C

COLLECTION OF GAS SAMPLES USING A HAND PUMP AND GAS BAGS

APPENDIX C

COLLECTION OF GAS SAMPLES USING A HAND PUMP AND GAS BAGS



1 Attach the inlet tubing of the hand pump provided (black end) to the monitoring probe or sampling point and pump for a sufficient length of time to purge the system of air. The purge gas may be vented to the atmosphere.

2 Remove a gas bag from its shipping container and while pumping slowly, insert the male luer fitting on the outlet of the hand pump (clear end) into the luer-fit valve on the gas bag with a slight twisting motion. Inserting the male luer fitting depresses the valve stem and opens the valve. The tapered design of this fitting allows for a leak-tight friction fit.

The bag can be filled with about twenty squeezes of the bulb. To allow space for expansion during shipment, the bag should only be filled to about 2/3 of capacity. The bag is properly filled when it is about 1 1/2 inches thick, as shown in the

drawing.

5. Once the bag is filled, remove the fitting from the bag (be careful because if the fitting is pressed into the

valve too tightly,
the top of the valve can separate from the main valve body when attempting to remove the fitting). Although these bags are
durable, they can be damaged if not handled properly. Be careful not to crease or puncture the bags.

6. Record the pertinent information on the tag attached to the bag and on the chain of custody form provided and return the bag to the shipping container in which it was received. Samples should be shipped to the laboratory for analysis as soon as possible. If the samples are suspected to be flammable (>5% methane) they must be identified as hazardous and shipped according to the enclosed shipping instructions.

In preparing the sampling equipment described above we have tried to provide the user with the equipment and instructions necessary for the safe collection of gas samples under normal conditions. These have been prepared assuming that they will be used by someone who is familiar with the collection of natural gas samples and is fully aware of standard safety procedures and precautions. Isotech is not responsible for accidents resulting from improper use of this equipment or from use of unsafe practices.

APPENDIX C
Shipment of Flammable Gas Samples in Gas Bags

If the samples collected are known to contain less than 5% methane (or other hydrocarbons), they are not flammable and need not be considered hazardous for shipping purposes. The following instructions apply only to samples that are flammable.

Samples of flammable gas must be identified as hazardous materials. We have enclosed the various hazard labels that you will need and have listed below the information required by shipping companies such as Airborne and Federal Express (note: UPS will **only** accept Dangerous Goods from D.O.T. certified shippers who have a contract with them). Please don't hesitate to ask your shipper for assistance in attaching labels and filling out the required forms. Each shipper has it's own forms for Dangerous Goods.

1. Return the filled gas bags to the same UN approved metal can they were received in. Three 6"x8" bags will fit in a one-gallon can when properly filled. If necessary, add enough bubble wrap or foam peanuts to prevent the bags from rattling around in the can, but do not compress the bags. Place the top on the can and firmly seal it. Add the safety seal by pounding on the plastic ring provided with the can. Now place the can in the fibreboard box according to the general instructions included with the box.

2. Attach the following labels to the outside of the box all on the same side.

   FLAMMABLE GAS Label
   UN3167 Label
   DANGER DO NOT LOAD IN PASSENGER AIRCRAFT Label
   Note: Labels must <u>not</u> be folded or affixed in such a manner that parts of the same label appear on different faces of the package.

3. Complete a "SHIPPERS DECLARATION FOR DANGEROUS GOODS" which can be obtained from your shipping company. The information that may be needed on this form is given below. Although not generally required for shipping, an MSDS (Material Safety Data Sheet) is included on the back of this instruction sheet.

   Proper Shipping Name: Gas Samples, non-pressurized, flammable, n.o.s. (Natural Gas)
   Class or Division: 2.1
   UN or ID Number: UN3167
   Subsidiary Risk: None (leave blank)
   Packaging Group: None (leave blank)
   Quantity& Type of Packaging: # Fibreboard boxes box X 4L
   Packing Instructions: 206
   Shipment Type: Non-Radioactive
   Prepared per: ICAO/IATA
   Additional Information: your Company's emergency response telephone number
   Limitations: Cargo Aircraft Only

4. **As required by the Department of Transportation (49 CFR - Part 172, Subpart G, §172.604) a person who offers a hazardous material for transportation must provide an emergency response telephone number, including the area code or international access code, for use in the event of an emergency involving the hazardous material. You MUST use your company's emergency response telephone number. If one is not available to you please contact us and we can advise you on how to obtain one.**

These instructions have been prepared to simplify the task of shipping samples and are based on the "IATA

Dangerous goods Regulations 44th Edition, 2003,". However, it is you, the shipper, who is ultimately responsible for the safe and legal shipment of these samples in compliance with the most recent applicable local, state, and international shipping regulations. Isotech assumes no liability resulting from the improper packaging and shipment of samples and makes no guarantees regarding the validity of the information presented here.

Warning: Samples containing high concentrations of hydrogen sulfide (> ~ 1%) cannot be shipped by air. Samples containing hydrogen sulfide are Class 2.3, toxic gas, and have additional shipping restrictions. SI-3_1001.doc

APPENDIX D

PROCEDURES FOR SAMPLING WATER WELLS - WELL PURGING

APPENDIX D
PROCEDURES FOR SAMPLING WATER WELLS

Sampling should follow standard industry acceptable procedures and guidelines. A general overview of sampling procedures for domestic water wells is described below.

Well Purging

- Most standard water well sampling protocols require purging a minimum of 3 well bore volumes of water prior to collecting water samples. Because there are numerous low yield domestic water wells in Rocky Mountain basins, it is prudent to take a conservative approach. Residents should first be questioned about well yield prior to sampling a well. If yields are very low, then the well should be flowed at very low rates and monitored with field parameters prior to taking samples.
- The appropriate time to obtain a sample can be determined when field parameter measurements such as pH, specific electrical conductance (SC), temperature (T), and dissolved oxygen (DO) become stable. Stability is demonstrated when there is no significant change in measured parameters for duration of 3 consecutive measurements separated by 3-5 minute intervals. Measurements of pH should vary by less than 0.1 units, T should vary by less than 0.2°C, SC should vary by less than 5% for values < 100 µS/cm and by less than 3% for values > 100 µS/cm, DO should vary by less than 0.3 mg/L. Purging for this sampling effort will be considered complete with stability demonstrated by a minimum of three field readings.
- Purge rates should be slow enough to avoid turbulence in the well bore and pump tubing that may stir up sediments in the well casing. Laminar flow conditions should be maintained at all times while purging and sampling a well. Wells should be purged slowly at first, while water quality is observed. Flow rates are then gradually increased to a maximum flow rate of 3 to 5 gallons per minute as long as no increase in entrained sediment is observed. Using a white 5 gallon bucket is the simplest way to measure flow, and allows the observer to accurately monitor water color, odor, and entrained sediment as the well is purged. After field parameters become stable, the flow rate should be reduced to a flow rate between 0.1 and 1 gallon per minute to conduct sampling.
- Collecting samples at low flow rates insures more representative measurements of dissolved gas and other volatile constituent concentrations. Records of field parameters measured in the field should reflect the median value of the last 5 stable readings measured while sampling and the last value of pH recorded. **In some cases, well yields are too low to allow field measurement to stabilize without drawing down a well to the level of the pump intake. In such situations, wells should be sampled using low flow rates at the outset.** The final sampling data spreadsheet should reflect whether or not a well was adequately purged and the purging rates used. If a flow-through cell is used for monitoring water quality, it should be bypassed for sampling. Most laboratories will provide appropriate sample containers that are prepared in advance of actual sample collection. It is important to know which containers contain acids or preservatives so that these additives are not lost or spilled during sampling.

APPENDIX E

SAMPLING FOR CHROMATOGRAPHIC AND STABLE ISOTOPIC ANALYSIS OF FREE AND DISSOLVED GASES

APPENDIX E
SAMPLING FOR CHROMATOGRAPHIC AND STABLE ISOTOPIC ANALYSIS OF FREE AND DISSOLVED GASES

Relatively large water samples are needed to collect sufficient amounts of dissolved gases for both chromatographic and stable isotopic analysis. If dissolved gases are exsolving at a high rate and water effervesces, a sample of gas is collected by displacing well water from a sample bottle while creating a gas headspace. Otherwise samples are collected without displacing water in a headspace. Use a 1L bottle with a septum cap.

To collect a sample for isotopic and chromatographic analysis from water that is not effervescent use 1L bottles with a septum cap. Clear ½ inch polyvinyl hose is small enough to fit inside the bottle and it allows flow to be monitored. Make sure that the flow rates through the tubing are low. Remove the cap of the 1L bottle and fill it with water. Once the bottle is filled, immerse it in a 5 gallon bucket full of water, keeping the tubing at the bottom of the bottle. Place the bottle at the bottom of the bucket over a head of water, and keep water flowing at a low rate until another 2 volumes of water have been displaced from the bottle. Then slowly lift the tubing out of the bottle and immediately cap it under water. No air should be allowed into the 1L bottle. After the bottle is capped, remove it from the bucket, turn it upside down, and inspect it to insure that there are no bubbles present. If bubbles are visible, collect another sample. When finished, tape the cap to the bottle around the neck, pack the bottle upside down in ice, and ship it overnight to the analytical laboratory.

To collect a headspace gas sample from effervescent water, also use a 1L bottle equipped with a septum cap. Fill the sample bottle with well water. Submerge the sample bottle in a 5 gallon bucket filled with well water and invert it. Insert the ½ inch polyvinyl tubing into the bottle, increase the flow rate to 2-3 gpm, and allow the bubbling gases to displace water in a headspace until a ⅓ to ½ of the water in the bottle has been displaced. If the bottle opening is too narrow to accommodate the available tubing, a funnel can be used to direct the flow of bubbles into the bottle. Seal the container under water with the septum and screw cap and tighten it securely. Dry the bottle, tape the cap to the bottle, pack in it ice, and ship the container upside down overnight to the sample laboratory.

Pre-prepared sample bottles with septum caps containing bactericide capsules can be obtained from Isotech Laboratories, Inc. 1308 Parkland Court, Champaign, IL 61821-1826, (217-398-3490). The gelatin capsule delivers bactericide to water in the bottle as long as the bottle is shipped inverted, so that water is in contact with the capsule. Recent experiments have shown that the component and isotopic composition of hydrocarbons in water samples treated with bactericide will not change over a period of a month. However, a 14 day holding time is recommended. Samples must be shipped so that any water in the bottle remains in contact with the bactericide capsule glued to the cap.

If no bactericide is added to a water sample, instruct the analytical laboratory to process the samples and remove dissolved gases from the water matrix as soon as the samples are received. Even when refrigerated, natural bacteria will begin consuming the enclosed dissolved methane and alter its constituent and stable isotopic composition. It is best to notify the lab on the day of shipment.

overnight to the analytical laboratory. Two sample bottles are collected in the event that one breaks in transit. Samples should be kept on ice or refrigerated until analyzed, and analyses should routinely be completed within 24- to 48-hours of the time they are collected.

- To collect a sample for dissolved methane, use an appropriate length of clear ½-inch polyvinyl tubing to connect to the source tap. An adapter may be required to connect the tap to the clear hose. Such a hose is narrow enough to fit inside a VOA bottle, and it makes it easy to insure that laminar flow through the hose is maintained.
- Flow rates through the hose should be slow, generally less than 0.5 gpm.
- Keep the end of the hose submerged in water to minimize the free gas space in the hose. Lower the VOA bottle with cap intact and sealed into a 5 gallon bucket nearly filled with water.
- Uncap the vial under water using gloved hands. No air should be allowed into the VOA sample bottle.
- Invert the VOA bottle and insert the nozzle to flush the vial with the sample water. Allow enough water volume to flow through the vial to displace twice the volume of the VOA bottle.
- Slowly remove the nozzle from the vial under water, and replace the Teflon screw cap on the vial, under water and as far down to the bottom of the bucket as possible. The advantage of using this method is that dissolved methane is trapped under the pressure of a head of water and the sample is not easily degassed.
- After the vial is capped, take it out of the bucket, turn the VOA sample vial upside down and inspect it to insure that there are no bubbles in the vial. If bubbles are visible, collect another sample.
- If the water effervesces strongly, then it will be necessary to remove bubbles by tilting the vial under water. Keep fresh water flowing over the top of the VOA bottle opening when removing excess bubbles under water. In some instances when there is free gas in the aquifer, it may not be possible to obtain a sample that does not have bubbles. Any head space created by degassing water must be recorded in the field notes.

<u>Sampling If Water Does Not Effervesce (Recommended Holding Time Of 7 Days).</u>

If well water effervesces during sampling, this method should **not** be used and the contractor should use the procedure described for effervescence (above). Samples are collected in 40 ml VOA vials. Water from the well should fill the 5-gallon bucket. VOA bottles are uncapped at the bottom of the bucket and allowed to fill. No air should be allowed into the sample bottles. After VOA vial is filled, recap and remove from bucket. If bubbles are present, collect another sample.

Field Sample Handling, Packaging and Shipping

Pack samples upright in a cooler with at least 1 – 2 times as much ice as the total volume of samples. Glass containers should be separated with plastic containers or ice packs to minimize the potential for breakage during transport. Ideally, samples should be received and initially processed by the laboratory within 24 hours of shipment.

Water samples will be collected in pre-cleaned bottles. Samples requiring preservatives will be pre-preserved by the analytical laboratory. These samples will be packaged and shipped following laboratory specified procedures.

Quality Assurance/Quality Control

Equipment Blank

An equipment blank is a sample of analyte-free media (i.e., ionized water) poured into or over or pumped through the sampling device, collected in a sample container, and transported to the laboratory for analysis. Equipment blanks are used to assess the effectiveness of equipment decontamination procedures.

Equipment blanks shall be collected immediately after the equipment has been decontaminated. The blank shall be analyzed for all laboratory analyses requested for the environmental samples collected at the site. For this project one equipment blank will be collected every two days of sampling when equipment decontamination is conducted.

Field Duplicates/Replicates

A field replicate sample, also called a split, is a single sample divided into two equal parts for analysis. The sample containers are assigned an identification number in the field such that they cannot be identified as replicate samples by laboratory personnel performing the analysis. Specific locations are designated for collection of field duplicate/replicate samples prior to the beginning of sample collection. Replicate sample results are used to assess precision.

One field replicate sample shall be analyzed for every 20 samples.

Sampling for Dissolved Methane

Dissolved gas concentrations in well water can vary significantly from year to year and from minute to minute. Variability results from changes in static and dynamic water levels relative to pump levels well bore dilution of aquifer fluids containing methane, mixing between aquifer fluids containing different concentrations of methane from different sources, methane oxidation by bacteria, and sampling error. For these reasons, it is important to maintain consistent sampling protocols when collecting samples for dissolved methane analysis. Accordingly, there are two ways to collect samples for dissolved methane analysis.

If Water Effervesces During Sampling

- Samples collected to determine dissolved methane concentrations should be collected in two 40 ml VOA bottles, packed in a baggie filled with ice, and shipped

Field Observations

In conjunction with the collection of the water samples from water wells, the contractor shall make onsite measurements of temperature, dissolved oxygen (DO), pH, specific conductance, presence of methane in the well headspace or sample location (via explosimeter calibrated to methane or other similar instrument specific to methane), and depth to water (through knowledge of water well owner not through direct measurement). A labeled digital photograph will also be required at each sample location. In addition, the following field observations will be recorded:

- Water color
- Water clarity
- Odors (if any)
- Effervescence (if any)
- Produced sediment (if any)
- Evidence of bacterial fouling (bioslimes or biofilms)

Note: To avoid liability to both the contractor and the COGCC, the contractor will not access any water well to measure a static water level without written permission of the water well owner.

Documenting Water Well Conditions

The contractor will need to document conditions of the water well by recording the following:

- Type of pump used in the well (such as, suction, jet, submersible, etc.), if known.
- Casing material (such as, stainless steel, carbon steel, galvanized steel, PVC, etc.) and casing size, if known.
- Access point for the sample (cistern, pressure tank, pump, etc.).
- Typical daily water use.
- Depth of well and location of well screen(s). Most of this data is available from the State Engineers database; however, information from the well owner interview can also be used. The contractor must note the source(s) of information.
- It is recommend that this data be captured using a Field Sampling Checklist.

Decontamination Prior To Sampling

Any equipment, buckets, hoses, and probes that may come in contact with well water or surface sampling apparatus should be cleaned and disinfected not only to maintain sample integrity, but also to avoid contaminating water wells with bacteria. The following protocols can be modified, depending on the type of sampling conducted in the field.

- Clean equipment as needed with soft brush using a mild detergent solution and rinse thoroughly (3 times) with distilled water;

- Allow to air dry.

APPENDIX F

DATA SUBMISSION REQUIREMENTS

APPENDIX F
DATA SUBMISSION REQUIREMENTS

The COGCC requires the submission of analytical data in relational Access Database. **It is imperative that each sampling location**, referred to hereafter as a "Station", **must be assigned a unique identifier, and this identifier must be associated with every sample collected from that Station.** A Station may be a water well, oil & gas well, surface water feature, soil gas monitoring probe, or any other location from which a water or gas sample is collected. The electronic data submission must include a table giving pertinent information about each of the Stations sampled, including at a minimum the Unique Identifier, Station Name, Type of Station (Water Well), County, Section (¼, ¼) , Township, and Range. Additionally, in accordance with COGCC Rule 215, Latitude and longitude coordinates shall be provided in decimal degrees with an accuracy and precision of five (5) decimals of a degree using the North American Datum (NAD) of 1983 (e.g.; latitude 37.12345 N, longitude 104.45632 W).

Geographic Information System

All GIS data, shape files, lines, polygons, etc., will be assigned an identification number and will be managed in the Access Database.

APPENDIX B

LEAK DETECTION SYSTEM SPECIFICATIONS

Apogee Scientific, Inc.

Advanced Engineering and Environmental Technologies

Leak Detection System

Apogee provides services and system sales for detecting methane and total hydrocarbon leaks from pipelines, production and storage facilities, landfills, and coal seam seeps.

System Features:

- An advanced, innovative system that is sensitive, fast, and rugged
- Measures methane, total hydrocarbons, and carbon dioxide simultaneously at sub-ppm concentrations
- Monitoring rates of 50 samples/second
- Leak locations determined by GPS
- Advanced software allows for immediate processing of data
- Can be mounted on helicopters or ground vehicles

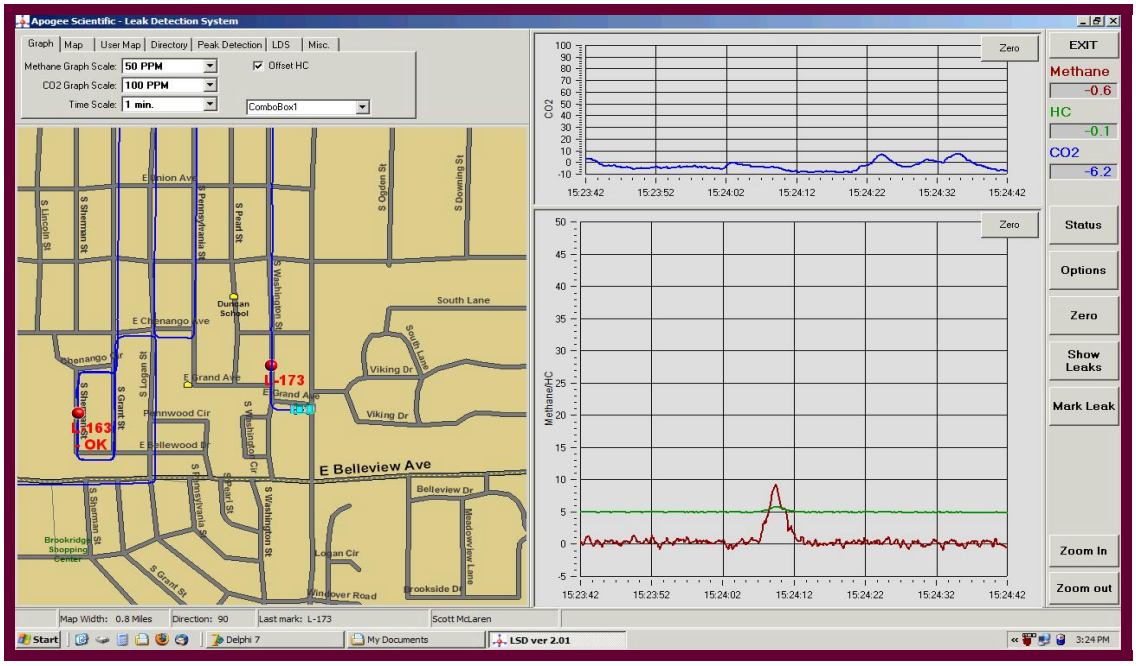
System Benefits

- Improved system safety and integrity
- Saves time with fast mobile detection
- Saves money
- Maximizes accuracy with no false positives
- Simplifies reporting
- Operates easily, anywhere

2895 West Oxford Avenue, Suite 1 Englewood, Colorado 80110-4397 Phone: 303-783-9599 Fax: 303-783-9607 apogee-sci.com

Apogee Scientific, Inc.

Advanced Engineering and Environmental Technologies



A snapshot of the Leak Detection System computer screen. The real-time map on the left shows the route the vehicle has taken (green line) and the methane leaks detected by the system (red circles). On the right the methane (red line), total hydrocarbons (green line), and CO_2 (blue line) concentrations are plotted in real time.

For more information, please contact:

John Wurster
Vice President
Sales & Marketing

Phone: 303-783-9599, x24
Cell: 303-518-3473
Fax: 303-783-9607

LDS is mounted on ATV and can be installed in truck, helicopter or other vehicle.

APPENDIX C

GLOBAL POSITIONING SYSTEM SPECIFICATIONS

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.

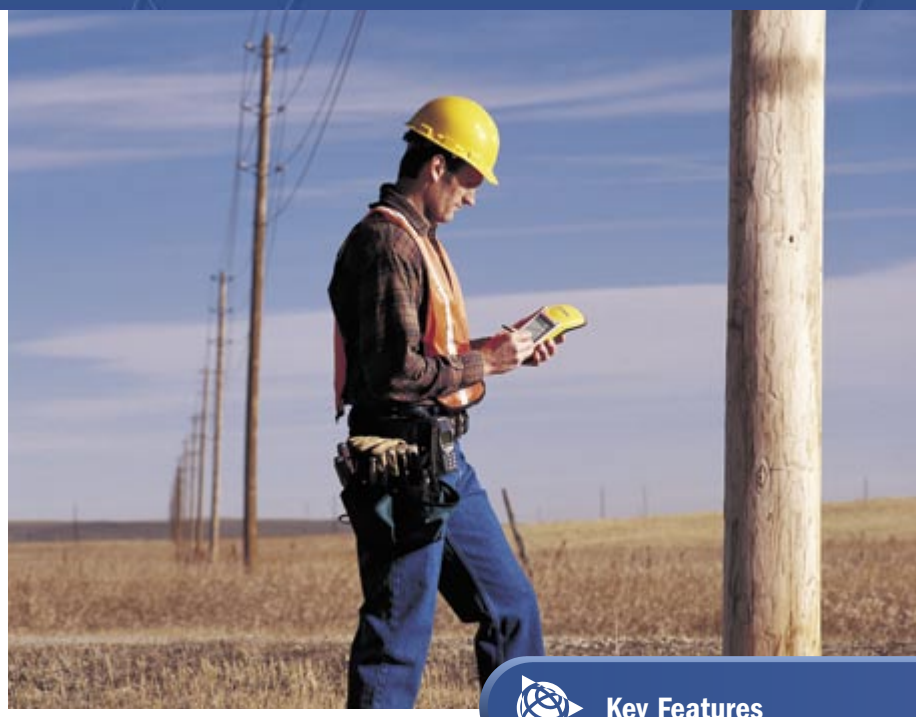
Windows Mobile includes familiar Microsoft productivity tools, including Pocket Word, Pocket Excel, and Pocket Outlook®. Pocket Outlook lets you synchronize e-mails, contacts, appointments, and data with your office computer, so whether you're in the office or in the field, you're always up to date.

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).*

YOUR LOCAL TRIMBLE OFFICE OR REPRESENTATIVE

www.trimble.com

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Westminster, CO 80021 • USA
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ASIA-PACIFIC
Trimble Navigation Australia Pty. Ltd
Level 1 • 123 Gotha St • Fortitude Valley
Queensland 4006 • AUSTRALIA
+61-7-3216-0044 Phone • +61-7-3216-0088 Fax

APPENDIX D

METHANE SURVEY EQUIPMENT SPECIFICATIONS

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).**

ID 08-04-27-MC / May 2000

Corporate Headquarters
P.O. Box 426
Pittsburgh, PA 15230 USA
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www.MSAnet.com

U.S. Customer Service Center
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MSA International
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FAX (412) 967-3451

Offices and representatives worldwide
For further information:

[Mighty Probe] [Mighty Probe Lite] [Slide Adapter] [Smart Stick] [Striking Head] [Hammer Probe] [Water Probe]

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800.521.6893
Fax: 800.521.3260

www.TandTtools.com

Catalog Download:
Catalog v5.pdf

The integrated slide hammer makes driving this probe into the hardest ground easy. More effective than striking a probe with a maul.

The sliding head has been specifically designed to minimize the number of pinch points, reducing the risk of injuries.

Comfortable 16" handles are made from 1" diameter steel tubing allowing ample room for the hands. The dual handles (spread 7 1/2" apart) provide greater control and improved ergonomics.

All internal pieces of the head assembly are manufactured from high strength impact resistant tool steel. This steel is designed for minimal distortion, ensuring a long lasting probe.

The tips are heat treated alloy steel and create a small clearance hole for the 1/2" shafts.

The Hammer is powder coated a bright blue for high visibility and a long lasting finish.

Part No.	Length	Cost
HMP36	36"	$120.00
HMP42	42"	$121.00
HMP48	48"	$122.00
HMP54	54"	$123.00
HMP60	60"	$124.00

FEATURES:

Highlights:

- 18" stroke
- 28" overall length
- 13 lbs. total weight
- 16" long handles on each side for easy lifting,

control, and safety
- High strength impact resistant tool steel for a long life
- Specially designed head minimizes pinch points

Shaft:

- 1/2" high quality steel alloy resists bending and bowing
- Head and shaft are threaded to ensure a secure connection and ease of replacement

Tip:

- Special alloy steel
- Heat treated for longer life
- Tapered edges make penetration and withdrawal easier
- Provides clearance for the 1/2" steel shaft
- Threaded for easy replacement

WARNING!

The **Slide Hammer Probe *DOES NOT*** provide protection from electrical shocks. For insulated capabilities, please refer to the **Mighty Probe™**.

APPENDIX E

GROUNDWATER SAMPLING EQUIPMENT SPECIFICATIONS

OAKTON®

waterproof and standard pH/conductivity/°C

pH/CON 10 Meters

Measure pH, conductivity and temperature with just one meter and probe. Choose between standard and waterproof models!

Select from standard or waterproof pH/CON 10 models
Waterproof model features an IP67-rated, dustproof and waterproof housing that floats!

Toggle between pH/°C and conductivity/°C readings with one button press
for the convenience of three meters in one!

Includes multi-sensor submersible probe with 10-ft submersible cable
there's no need to switch probes when you switch measurement modes!

Dual display shows measured parameter plus °C simultaneously
mode annunciators make readings easy to understand

Easy push-button pH and conductivity calibration
calibrate pH at up to three points and conductivity at up to four points for high accuracy over the entire measuring range

Auto-buffer recognition for pH calibration

Auto ranging for conductivity measurements
for fast response over a wide range

Automatic Temperature Compensation
keeps your measurements accurate even in solutions with varying temperatures

Hold function, Ready indicator, Automatic shutoff

Meter kits available
contains everything you need for calibration and measurement packaged in a hard carrying case

CE

ISO 9001 vendor CERTIFIED

3 year warranty
waterproof model meter only

2 year warranty
standard model meter only

Clockwise from left: Waterproof pH/CON 10 with probe.

Waterproof pH/CON 10 features an IP67-rated housing that floats!

pH/CON 10 probe comes with a 10-ft submersible cable— ideal for field use.

Standard pH/CON 10 with probe.

pH/CON 10 kit stores and organizes all the components you need for calibration and measurement.

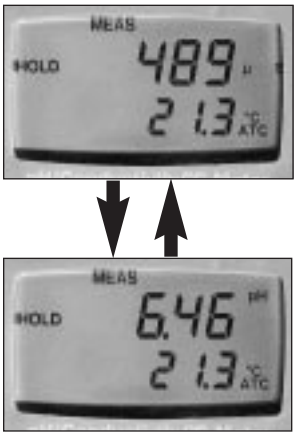
One meter does it all—measure pH, conductivity and temperature without switching meters or probes! Switch between conductivity and pH with a button press. Meters read pH from 0 to 14 pH, conductivity over four ranges up to 19.99 mS, and temperature in °C. Three-point pH calibration with auto-buffer recognition and four-point conductivity calibration provide high accuracy.

Choose from standard or waterproof models. The standard model features a built-in stand for tabletop use, a water-resistant keypad and optional AC power. The rugged dustproof, waterproof model has an IP67-rated housing that floats!

The pH/CON 10 meter is available in a kit which includes everything you need for fast, consistent calibration and measurement. See the back of this sheet for ordering information and complete specifications.

Large dual LCD shows measurement plus temperature, units and current function.

Toggle display from pH/temperature readings to conductivity/temperature readings with a button press.



Multi-sensor probe features three different sensors, so you can take pH, conductivity, and temperature measurements with just one probe.

Easy-access 6-pin connector for probe is located on meter's top. Standard pH/CON 10 model also has connection for optional AC adapter.

Standard pH/CON 10 model features a **sturdy built-in meter stand** for handy tabletop use.

pH/CON 10 Meters

• Applications •

Environmental / Agricultural Applications: Use these meters in ecology studies, aquaculture, and hydroponics.

Industrial Applications: Use these meters to check metal finishing, cooling tower water, printing fountain solutions, boiler water, brines, rinse tanks, ponds, pollution control, recirculating systems, and waste water.

Water Quality Testing: These meters are great for analyzing water hard water, drinking water, effluent water, and incoming process water. They are ideal for all types of quality assurance and water quality testing.

Educational Applications: These economical meters are ideal for quick pH and conductivity checks in labs and schools.

• Specifications •

Mode	pH	Temperature	Conductivity
Range	0.00 to 14.00 pH	0.0 to 100.0˚C	0 to 19.99 µS, 0 to 199.9 µS, 0 to 1999 µS, 0 to 19.99 mS
Resolution	0.01 pH	0.1˚C	0.01 µS, 0.1 µS, 1 µS, 0.01 mS
Accuracy	±0.01 pH	±0.5˚C	±1% full scale or ±1 digit
Calibration	Up to three points (pH 4.01, 7.00, 10.00)	Offset in 0.1°C increments	Up to four points (one point per range)

Temperature compensation:
Automatic Temperature Compensation (ATC) from 0 to 50°C

Operating temperature: 0 to 50°C

Conductivity cell constant (K): fixed at K = 1.0

Conductivity temperature coefficient: fixed at 2.00% per °C

Power:
Standard pH/CON 10: 4 x 1.5 V AAA batteries; >50 hours continuous use (included); 9V, 500 mA AC adapter (optional)
WP pH/CON 10: 4 x 1.5 V AAA batteries; >100 hours continuous use (included)

Dimensions:
Standard pH/CON 10: 7.5"L x 3.5"W x 1.75"H (19 x 9 x 4.5 cm)
WP pH/CON 10: 7.5"L x 3.75"W x 2.25"H (19 x 9.5 x 5.7 cm)
Boxed: 9.2"L x 9.2"W x 2.75"H (23 x 23 x 7 cm)
Probe: 6.8"L x 1.3" dia (173 mm L x 33 mm dia) with 10 ft (3 m) cable

Weight:
Meter: 1.0 lbs (0.45 kg)
Boxed: 1.4 lbs (0.64 kg)

• Ordering Information •

pH/CON 10 Meter

Include pH/conductivity/°C probe with 10-ft submersible cable, operating instructions, and batteries. Shipping weight 1.4 lbs (0.6 kg)

WD-35630-00 Standard pH/CON 10 meter
WD-35630-02 Waterproof pH/CON 10 meter

pH/CON 10 Meter Kit. Includes meter, pH/conductivity/°C probe with 10-ft submersible cable, calibration solution pouches (three each pH 4.01; 7.00; 10.00 and two each conductivity 447 µS; 1413 µS; 2764 µS, 15,000 µS), 3 rinse water pouches, sample bottle, instructions and hard carrying case. Shpg wt 2.0 lb (0.9 kg)

WD-35630-60 Standard pH/CON 10 meter kit
WD-35630-62 Waterproof pH/CON 10 meter kit
WD-35630-69 Kit without meter

"Singles" Calibration Solution Pouches

Each single-use pouch contains 20 ml of fresh calibration solution. pH "Singles": ±0.01 pH accuracy at 25°C. Conductivity "Singles": ±1% accuracy at 25°C; include NaCl, KCl and 442 TDS conversion factors. Certified to NIST traceable standards. Shpg wt 1 lb (0.5 kg). Box of 20.

WD-35653-01 pH "Singles", 4.01
WD-35653-02 pH "Singles", 7.00
WD-35653-03 pH "Singles", 10.00
WD-35653-00 pH "Singles", rinse water
WD-35653-04 pH "Singles", assortment pack, 5 each of pH 4.01; 7.00; 10.00 and rinse water
WD-35653-10 Conductivity "Singles", 447 µS
WD-35653-11 Conductivity "Singles", 1413 µS
WD-35653-13 Conductivity "Singles", 15,000 µS

Calibration Solution Bottles

1 pint of calibration solution each. pH solutions have ±0.01 pH accuracy at 25°C. Conductivity solutions have ±1% accuracy at 25°C and include NaCl, KCl and 442 TDS conversion factors. Certified to NIST traceable standards. Shpg wt 1.3 lbs (0.6 kg).

WD-00654-00 Calibration bottle, pH 4.01
WD-00654-04 Calibration bottle, pH 7.00
WD-00654-08 Calibration bottle, pH 10.00
WD-00653-16 Calibration bottle, 84 µS (40.38 ppm KCl, 38.04 ppm NaCl, 50.50 ppm 442)
WD-00653-47 Calibration bottle, 447 µS (225.6 ppm KCl, 215.5 ppm NaCl, 300.0 ppm 442)
WD-00653-18 Calibration bottle, 1413 µS (744.7 ppm KCl, 702.1 ppm NaCl, 1000 ppm 442)
WD-00653-89 Calibration bottle, 8974 µS (5101 ppm KCl, 4487 ppm NaCl, 7608 ppm 442)
WD-00653-50 Calibration bottle, 15,000 µS (8759 ppm KCl, 8532 ppm NaCl, 13,455 ppm 442)

Accessories

WD-35630-50 Replacement pH/conductivity/°C probe with 10-ft submersible cable

WD-35615-75 Belt loop portable meter carrying case. Soft case with clear plastic front panel protects your meter while allowing you to take measurements. Top and side openings let probe and probe connections remain accessible. Use with standard pH/CON 10 only. Shpg wt 1.0 lb (0.5 kg)

WD-35615-07 AC adapter, 9 VDC to 110 VAC. UL, CSA listed. Use with standard pH/CON 10 only

WD-35615-08 AC adapter, 9 VDC to 220 VAC. UL, CSA listed. Use with standard pH/CON 10 only

See OAKTON product Bulletin # DO B2 for information on our waterproof DO 300 and DO 310 Dissolved Oxygen meters..

• ORDER FROM •

APPENDIX F

METHANE DETECTION SYSTEM EQUIPMENT SPECIFICATIONS

Combustible Gas Detector

GD-1D

Dual-Level Combustible Gas Detector

FEATURES:

- Detects all heating gases inluding: Natural Gas, LP, Propane and Methane Gas.
- Ignition proof design.
- 12-24 VAC or VDC input
- High and Low level relays allow dual level alarm (Standard calibration is 10% and 25% of the LEL of Methane).
- Two N.O. sealed reed type dry contact relays.
- Easy Installation
- Little to no periodic maintenance required.
- Supervised / Fail-Safe system.

Special Calibrations Are Available
Contact Macurco for Availability

SPECIFICATIONS:

Size:	4½" x 4½" x 2"
Shipping Weight:	One Pound
Voltage Input:	9 to 30 VDC, 9 to 27 VAC
Current Draw:	120mA @ 12 Volts 60 mA @ 24 Volts
Color:	White
Relay Ratings:	0.5 Amps, 200 Volts
Temperature Range:	0 - 150° F
Coverage:	900 Square Feet

LOCATION NOTES:

- For ***lighter*** than air gases such as Natural Gas and Methane, mount one foot below the ceiling.
- For ***heavier*** than air gases such as Propane and LP, mount one foot above the floor.
- The GD-1D must not be mounted in corners, as this might be dead air space.
- Spacing for the Macurco GD-1D is the same as smoke detectors, 30 foot centers / one unit per 900 s.f.

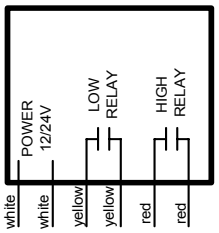
Manufactured By:

Macurco
3946 S. Mariposa Street
Englewood, CO 80110
303-781-4062 Fx: 303-781-7117
www.macurco.com

Distributed By:

Wiring Diagram and Specifications

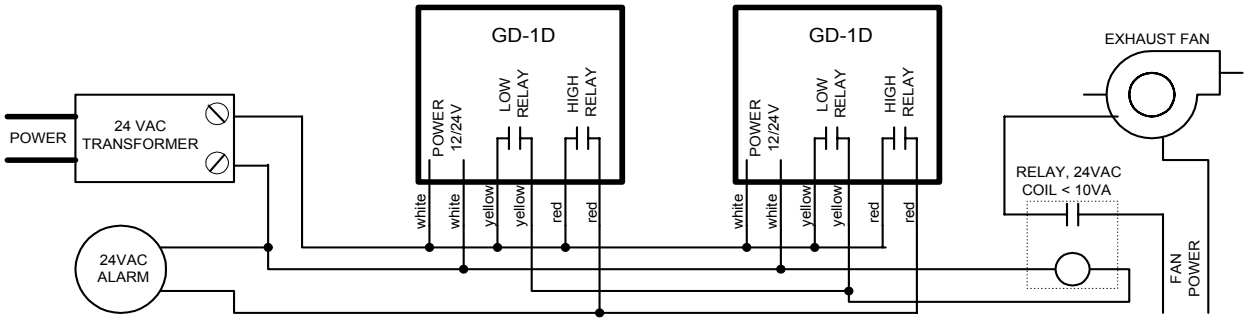
GD-1D COMBUSTIBLE GAS DETECTOR CONNECTIONS



LOW & HIGH
RELAY
N.O.
0.5 Amp
200 V
10 VA
No polarity
preferrence

POWER: 12 to 24
Vac or Vdc, 1.5 VA

MULTIPLE GD-1Ds CONTROLLING A LOW LEVEL EXHAUST FAN AND A HIGH LEVEL ALARM.



NOTES:

1. The fan relay contacts must be matched to the fan motor power. The GD-1D relay can only switch up 10 VA.
2. Consult Location Notes on front for mounting heights and recommended spacng
3. Match the transformer size, in VA to the total 24 VAC load.

Macurco 3946 S. Mariposa Street, Englewood, Colorado, USA 80110
303-781-4062, Fx: 303-781-7117 www.macurco.com

APPENDIX G

GROUND SURVEY OF THE RATON BASIN FOR METHANE SEEPS REPORT

APOGEE SCIENTIFIC, INC.

Ground Survey of the Raton Basin for Methane Seeps

May 19, 2007

Prepared by:

S. E. McLaren and M. G. McNeil
Apogee Scientific, Inc.
2895 W. Oxford Ave., Suite 1
Englewood, CO 80110-4397

Prepared for:

LT Environmental
4600 West 60th Avenue
Arvada, CO 80003

Agreement Number: 07-0319

Introduction

The Raton Basin is located in south central Colorado with an area of approximately 1,300 square miles. The Basin is underlain by two coal seams, the Raton and the Vermejo. These coals outcrop around the Basin and within the Basin. Raton and Vermejo coals have been mined for over one hundred years. Currently, the coals within the Basin are being drilled to produce methane. The coal bed methane development has been accompanied by concern from local government and the public about the impact to existing gas seeps. Production of methane may cause or enhance gas seepage. A project was undertaken by the Colorado Oil and Gas Conservation Commission (COGCC) to identify the existing conditions, and to the extent possible, identify and document conditions prior to coal bed methane development. In 2000, Apogee Scientific, Inc. (ASI) was contracted by COGCC to fulfill a part of phase one of this project, a ground survey to locate methane seeps within the Raton Basin[1]. Then in 2007 ASI was contracted by LT Environmental in a COGCC-funded effort to resurvey the Raton Basin to determine the current status of gas seepage. This document details ASI's ground survey and its findings.

This survey was conducted using 4-wheel drive vehicles equipped with infrared-based gas detectors developed by ASI. This type of gas detector was designed to find leaks in natural gas pipelines, and is referred to as the Apogee Leak Detection System (LDS). The LDS is a three-channel instrument capable of measuring methane (CH_4), total hydrocarbons (HC) and carbon dioxide (CO_2) at sub part per million (PPM) concentrations and at a speed of 10 samples per second. The survey vehicles are shown in Figure 1. Each vehicle was equipped with a Global Positioning System (GPS) based navigation system and a wind seep/direction sensor. In addition, a high accuracy (Trimble model GEOXH) GPS was also used in vehicle #1 to mark the locations of seeps.

Figure 1: LDS-equipped ground survey vehicles (#1 on left, #2 on right)

[1] A report on the phase 1 seep survey conducted in 2000 and 2001 is available from the Colorado Oil and Gas Conservation Commission (http://oil-gas.state.co.us/).

The survey took place between April 19, 2007 and May 4, 2007. A total of 166 hours was spent surveying the Basin. During this time, 3187 miles were driven within the Basin where a total of 59 seeps were located.

Procedures

Equipment

The LDS consists of a high-speed gas analyzer that can detect methane, total hydrocarbons, and carbon dioxide in gas plumes at sub part per million concentrations. The LDS is coupled to a Global Positioning System (GPS) receiver to determine vehicle location, and has a computer-based data acquisition system for data logging and display. A comparison of the relative concentrations of the three gases helps determine the probable source of the emission being detected. For example, a plume with above background concentrations of methane and carbon dioxide will be likely coming from biological sources, such as cows, rather than from a methane seep. In addition, the presence of elevated total hydrocarbons, carbon dioxide, and methane is an indication that exhaust from a combustion source, such as an automobile, is being sampled.

The LDS was mounted in the rear of the survey vehicles. Ambient air was collected at the front of each vehicle at a height of approximately 18 inches above the ground, passed through a filter to remove particles and other debris from the air stream, and was carried to the LDS through 2.375 inch diameter pipe. The delay time between gas entering the entrance of the collection system and being detected by the LDS was on the order of 1 second.

The navigation system consisted of a Garmin GPS 18 GPS receiver equipped with an external antenna. Output from the GPS receiver, in the form of NEMA 183B data sentences, was captured by the LDS data acquisition which displayed the current vehicle location in real time on a map containing the path the vehicle had previously taken and all previously discovered seeps overlaid on a very detailed street map.

The location of seeps discovered in vehicle #1 was also recorded using a Trimble model GEOXH high precision GPS. The data from this GPS was post processed using the Trimble Pathfinder program.

Wind speed and direction were measured using a Vaisala WMT50 ultrasonic wind sensor on vehicle #1 and a NRG Systems model 40 anemometer and model 200 wind vane on vehicle #2. The sensors were mounted at a height of 34 inches above the roofs of the survey vehicles. The wind vane on vehicle #2 was positioned such that wind directions were measured relative to the front of the vehicle (e.g. a wind from the front of the vehicle was recorded as 0 degrees and a wind from the rear of the vehicle was recorded as 180 degrees). The true wind direction was obtained by adding the apparent wind direction as measured by the wind vane to the direction the vehicle was facing, which was obtained from the GPS. Wind speed and direction data was recorded manually with the vehicle stationary.

Data Collection

The survey vehicles were driven on those roads, lease roads, and jeep trails providing representative coverage of the Raton Basin, as shown in Figure 2. The areas of lighter

coverage were due to mountains, private property that ASI did not have permission to enter, and snow blocked or otherwise inaccessible roads.

The typical procedure followed while performing this survey was to drive the survey vehicle along the road/lease road/jeep trail being surveyed. The LDS display and audio output would be continually checked for indications of an elevated methane concentration. When a methane plume was detected, the vehicle was driven upwind into the plume, if possible, looking for the source of the methane plume. Plumes that could be identified as coming from gas production equipment or other expected methane sources were not recorded. The location of the leak was recorded in a logbook and marked on the navigation program. The wind speed and direction were also recorded along with any comments and photographs of the leak site.

The survey vehicle was stopped at approximately 30-minute intervals to allow collection of wind speed, direction, and temperature data. These measurements were made in flat, open areas where possible.

Results

Between April 19, 2007 and May 4, 2007, a total of 3187 miles was surveyed within the Raton Basin, taking 166 hours. During this period a total of 59 separate seeps were found. A summary of these seeps is presented in Appendix A, and a map showing the locations of the seeps is shown in Figure 2. Also plotted in Figure 2 are the paths taken by the survey vehicles within the Raton Basin and the seep locations found during the 2000/2001 survey. A companion compact disk (CD) to this report has been prepared which contains all of the data collected during this project. The content of this CD is documented in Appendix B.

Interpretation of Results

The presence of methane seeps in the Raton Basin is not surprising due to the large methane-containing coal beds present only a few hundred feet below the ground. Any activity that penetrates the overburden above the coal beds or removes water from the coal beds, either naturally occurring or due to the activities of man, has the potential to cause the release of methane.

The focus of this study was to discover the location of methane gas seeps. The survey vehicles were constrained to stay on the roads and jeep trails being surveyed, thus the precise locations of seeps that apparently came from inaccessible areas off the roads were not determined. With the recorded position where a plume intercepted the road as well as the recorded wind direction at that time, it should be relatively easy to find the leak source using hand-held leak survey equipment. The peak methane concentration measured at each seep was recorded and is presented in Appendix A. These peak concentrations are dependent on wind speed, measurement location, and other factors in addition to the methane emission rate, but can be used to infer relative seep rates.

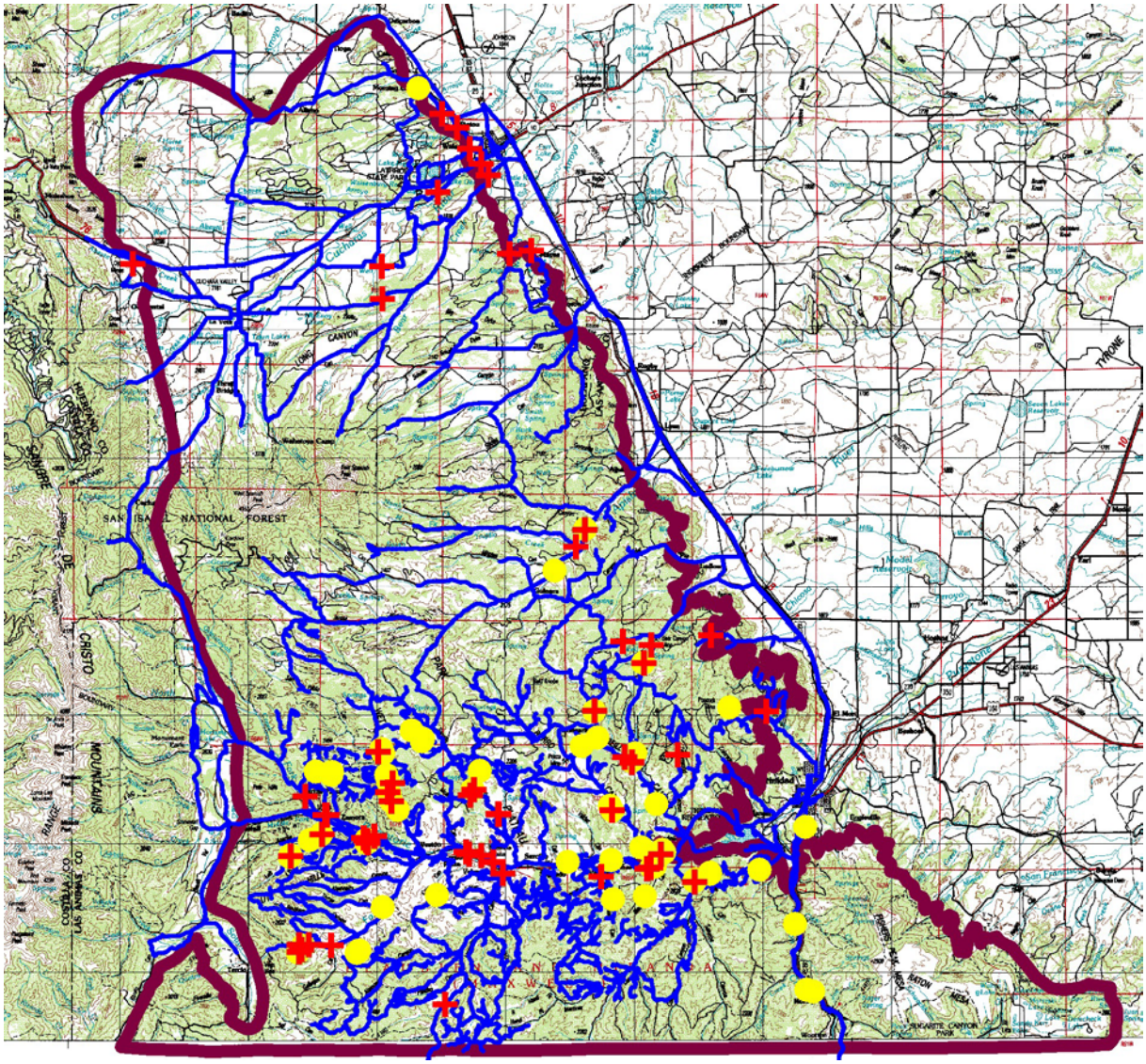


Figure 2. Map showing seeps detected during the 2007 survey (red crosses), seeps detected during the 2000/2001 survey (yellow circles) and vehicle track (blue line).

The most obvious pattern to the methane seeps discovered in the Raton Basin is that they are clustered in the southern end of the Basin along the Purgatorie River valley through which Route 12 passes (Figure 2). This was also observed during the 2000/12001 survey. During the survey in 2000/2001, very few seeps were observed in the northern end of the Raton Basin (north of the Spanish Peaks); however during this survey several seeps were detected in the northern half of the Basin. The cause of this change is unknown at this point in time.

Many of the seeps detected in 2000/2001 were still existing and detectable in 2007. The peak methane concentration observed in 2007 was much lower compared to the 2000/2001 survey as shown in Figure 3 which compares the peak methane concentration observed during the 2000/2001 to that measured in 2007 for the same seeps. The lower

methane concentrations are most likely caused by a decrease in methane emission rates, but the cause of the decreased methane emission rates is unknown.

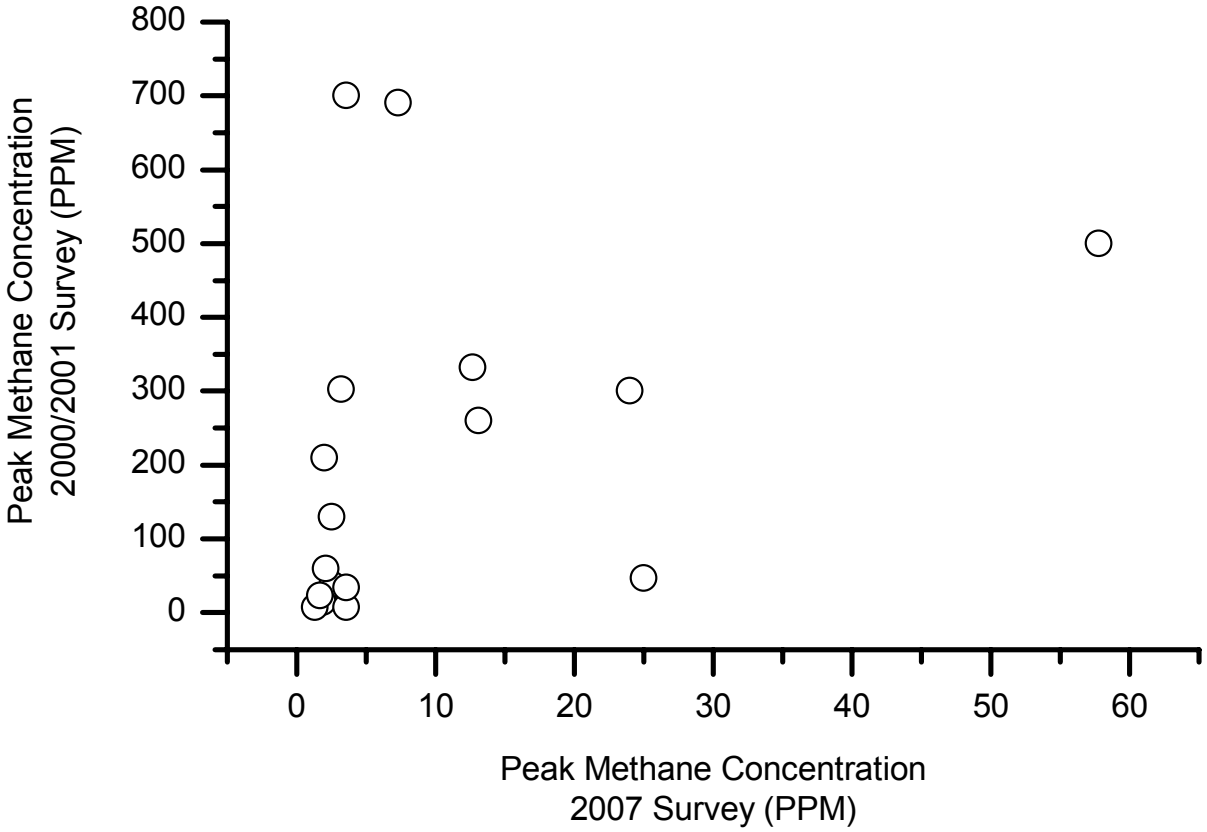


Figure 3. Comparison of the peak methane concentration measured in 2007 to that measured in 2000/2001 for the same seeps.

Conclusions and Recommendations

There are many methane seeps in the Raton Basin, most of which are located in the southern portion of the Basin along the Purgatorie River valley. The cause of these seeps cannot be determined from this data set alone. However, when geological data, mine locations, gas well locations, and other data sets are combined with this data set, a much better understanding of the cause of methane seeps should be possible.

It is recommended that a representative number of seeps be selected for further emission rate monitoring, to determine the relationship, if any, between coal bed methane development and methane seeps. The precise location of each of these seeps, if not already determined, should then be determined. Following that, the surface area of the seeps should be measured and documented and emission rates calculated for each of the selected seeps. Then, at periodic intervals, these seeps should again be studied to determine any changes in their surface extent, emission rates, and other characteristics.

Appendix A

Summary of Methane Seeps

Table A-1. Summary of seeps discovered in Raton Basin.

Seep ID	Date	Time	Previous ID*	Peak Methane Concentration (PPM)	Wind Speed (MPH)	Wind Direction (degrees)	Comments
041907-01	04/19/07	14:31		12.5	6	127	N/A
042007-01	04/20/07	11:55		2.0	9	62	The seep could not detect when backtracked through plume (wind was swirling). There was a gas pipeline marker several hundred meters over a hill upwind.
042007-02	04/20/07	17:57		4.2	19	257	The seep could not detect when backtracked through plume (wind was swirling).
042007-03	04/20/07	18:28		1.9	10	235	Pipeline markers directly upwind (pipeline leak?).
042107-01	04/21/07	11:25		2.2	25	244	Private property in area (La Veta Oil CO).
042207-01	04/22/07	11:19	110900-05	12.7	5	358	Several peaks along lower road were detected. The methane might have been coming from the compressor at the top of the hill, but this is the same location as seep 110900-05 from the first survey.
042207-02	04/22/07	12:02		4.8	6	85	Down hill in gully past "Reclamation Area" sign.
042207-03	04/22/07	12:10	110900-06	3.2	3	133	Leak down in gully from mark location.
042207-04	04/22/07	12:12	110900-07	57.8	5	21	Near big pipe/valve coming out of ground. Seems to be coming from valley to north of mark location. Near seep 110900-07 from first survey.
042207-05	04/22/07	15:59		5.0	3	297	Coal mining property adjacent, abandoned building upwind.
042207-06	04/22/07	16:32		99.4	3	298	Private property in area.

Table A-1. Summary of seeps discovered in Raton Basin.

Seep ID	Date	Time	Previous ID*	Peak Methane Concentration (PPM)	Wind Speed (MPH)	Wind Direction (degrees)	Comments
042207-07	04/22/07	17:23		11.0	7	11	Private property in area
042207-08	04/22/07	18:27	111700-04	2.5	6	0	Same as 111700-04 last time.
042207-09	04/22/07	18:36	111700-05	2.0	6	141	Same as 111700-05 last time.
042207-10	04/22/07	19:09		21.2	1	155	Seep is at stream crossing.
042307-01	04/23/07	9:07		22.6	5	245	Private property in area (down wind of exploded house).
042307-02	04/23/07	9:43		41.5	3	66	Private property in area, difficult to decipher wind direction w/ the calm conditions.
042307-03	04/23/07	10:37	110900-01	2.6	3	233	Near seep 110900-01 from first survey.
042307-04	04/23/07	11:12	110900-03	1.9	2	217	Near seep 110900-03 from first survey. Possibly from mine vent a few hundred yards upwind.
042307-05	04/23/07	12:17	121300-05	3.6	5	263	Gas activity down wind.
042307-06	04/23/07	12:26		7.6	6	158	N/A
042307-07	04/23/07	14:14		5.2	17	173	Private property in area, but downwind.
042307-08	04/23/07	14:18		28.5	5	344	Seep appears to be very close to the road, possibly on north side.
042307-09	04/23/07	14:22		13.7	5	3	Private property in area.
042307-10	04/23/07	14:26		8.4	15	156	Several methane peaks picked up as driving up hill. Operator could not stop safely to mark the other plumes due to the narrow road and truck traffic.
042307-11	04/23/07	14:40	111000-01	1.3	0		Near seep 111000-01 from first survey. Slight wind blowing up gully.

Table A-1. Summary of seeps discovered in Raton Basin.

Seep ID	Date	Time	Previous ID*	Peak Methane Concentration (PPM)	Wind Speed (MPH)	Wind Direction (degrees)	Comments
042307-12	04/23/07	14:45		41.4	9	218	Private property in area, but not directly upwind
042307-13	04/23/07	14:49		11.4	1	75	Seep appears to be near road. Winds are very variable.
042307-14	04/23/07	15:07		1.4	2	263	Plume sitting down in a saddle.
042307-15	04/23/07	15:35		4.7	7	132	Seep south of road near stream. Three distinct peaks detected when driving slowly through plume.
042607-01	04/26/07	12:48		3.7	5	136	N/A
042607-02	04/26/07	17:57		3.2	5	109	Noticed mining point of interest in mapping software nearby.
042707-01	04/27/07	10:11		45.3	11	39	Gas activity in area.
042707-02	04/27/07	10:39		10	5	130	Near knocked down house.
042707-03	04/27/07	10:53		2.7	5	180	Near a well head and house.
042707-04	04/27/07	11:57		8.9	1.7	95	Near a well head and house.
042707-05	04/27/07	12:09		23.6	10	162	Near a house.
042707-06	04/27/07	15:38		5.5	7	8	N/A
042907-01	04/29/07	16:54	011601-01	2.1	7	154	Same as 011601-01 last time.
043007-01	04/30/07	10:40		20.0	6	76	Private property upwind, however over hill from property was a compressor station (although lower concentrations were witnessed at the compressor station).
043007-02	04/30/07	13:45	121500-01	3.6	3	346	Near 121500-02 and 121500-01 last time.

Table A-1. Summary of seeps discovered in Raton Basin.

Seep ID	Date	Time	Previous ID*	Peak Methane Concentration (PPM)	Wind Speed (MPH)	Wind Direction (degrees)	Comments
043007-03	04/30/07	13:50	121500-01/02	7.3	0	0	Plume could not be pick up when backtracked (wind swirling) near 121500-01 and 121500-02 last time. Continued shortly there after to pick up <5 PPM for next 1/4 mile.
043007-04	04/30/07	14:07	010701-01/02/03	24.0	3	53	Near 010701-01/02/03 last time.
050107-01	05/01/07	14:18	121400-02/03	25.0	5	120	Gas well upwind, near 121400-02/03 last time.
050107-02	05/01/07	16:40		49.0	0	0	Concentrations varied greatly, but nearly calm conditions.
050207-01	05/02/07	10:42		7.0	0	0	N/A
050207-02	05/02/07	12:59		25.0	0	0	Private property in area.
050207-03	05/02/07	14:44		1.7	3.4	220	Several seeps coming from river near bridge.
050207-04	05/02/07	18:20	121300-01	1.7	6.8	35	Seep appears to be near stream east of road.
050307-01	05/03/07	17:20		10	10	329	Methane measured coming from both sides of road from this mark west for about 1/2 mile.
050307-02	05/03/07	17:27		5.7	7	240	Seep appears to be south of Rt. 12 in creek.
050307-03	05/03/07	18:29		1.6	12	260	Seep appears to be south of Rt. 12 in stream.
050407-01	05/04/07	10:28		1.9	7	45	Seep coming from area of stream east of road.
050407-02	05/04/07	10:40		1.7	2	45	Seep in area of stream.
050407-03	05/04/07	10:56	121500-06	3.6	3.4	320	

Table A-1. Summary of seeps discovered in Raton Basin.

Seep ID	Date	Time	Previous ID*	Peak Methane Concentration (PPM)	Wind Speed (MPH)	Wind Direction (degrees)	Comments
050407-04	05/04/07	11:37		5.5	4	184	N/A
050407-05	05/04/07	13:31		1.9	5.1	43	Gas found throughout canyon west of mark. Wind is blowing up canyon from east. Gas appears to be coming from stream to South of road and 100 feet down.
050407-06	05/04/07	14:15	040901-02	13.1	0	0	Same as 040901-02 last time.
050407-07	05/04/07	14:17		0.3	3	232	Slightly elevated methane through canyon near mine entrance.

Appendix B
Contents of Supplemental Data CD

Directory	Filename	Description
/Seeps	Seeps.XLS	An EXCEL spread sheet containing information about each seep. The information contained in this spread sheet includes: the seep ID, latitude, longitude, date and time discovered, maximum methane reading, wind speed, wind direction, comments, and links to pictures of the leak site.
/Seeps/Pictures	All .JPG files	These are pictures of the leak site in JPEG format that are referenced in Seeps.xls
/Seeps	Seeps.shp, Seeps.dbf, Seeps.shx	The shape file of the seep data.
/Seeps	Seeps.kml	The seep data in Google Earth format.
/Wind	Wind.XLS	An EXCEL spreadsheet containing all wind speed and direction data. The information contained in this spread sheet includes: date and time measurement made, latitude and longitude, vehicle number, wind speed and wind direction.
/Wind	Wind.shp, Wind.dbf, Wind.shx	The shape file of the wind data.
/Track	Track.shp, Track.dbf, Track.shx	The shape file of the path taken by the survey vehicle.
/Track	Track.kml	The vehicle track in Google Earth format.
/Base map	Raton Basin Outline.*	The shape file of the Raton Basin outline
/Base map	250K Base Map	Topographical map of the Raton Basin in TIFF format.
/Report	ASI7054 Raton Basin Survey 2007.doc/pdf	Final report detailing ground survey and its findings

Notes:

1. All GPS data is in the Geodetic Latitude/Longitude, degrees coordinate system and uses the WGS84.

APPENDIX H

SITE-SPECIFIC DETAILED MAPPING RESULTS

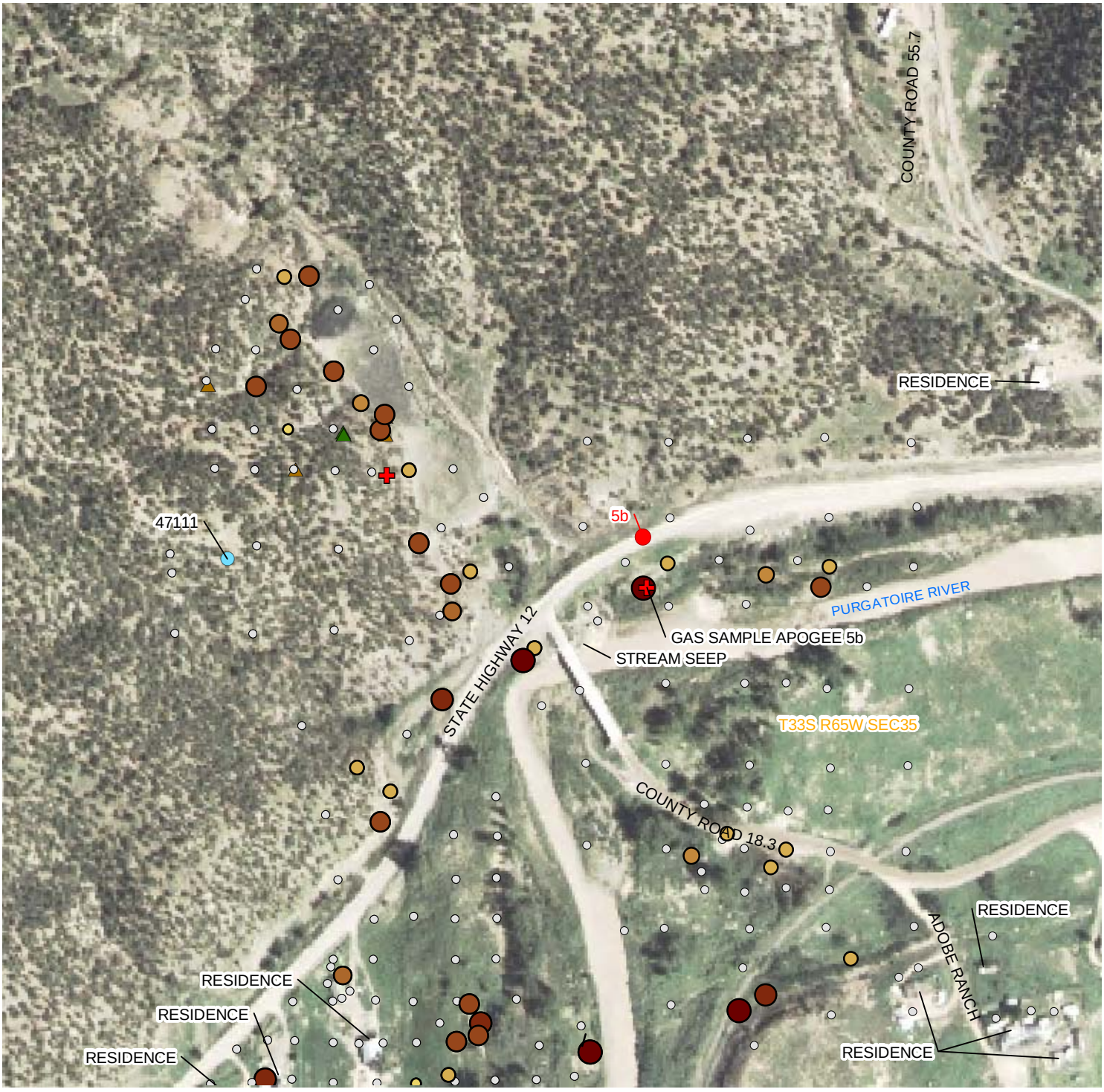


IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/19/07

0 350 700
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 5b
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- DRY AND ABANDONED
- INJECTING
- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/16/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 11
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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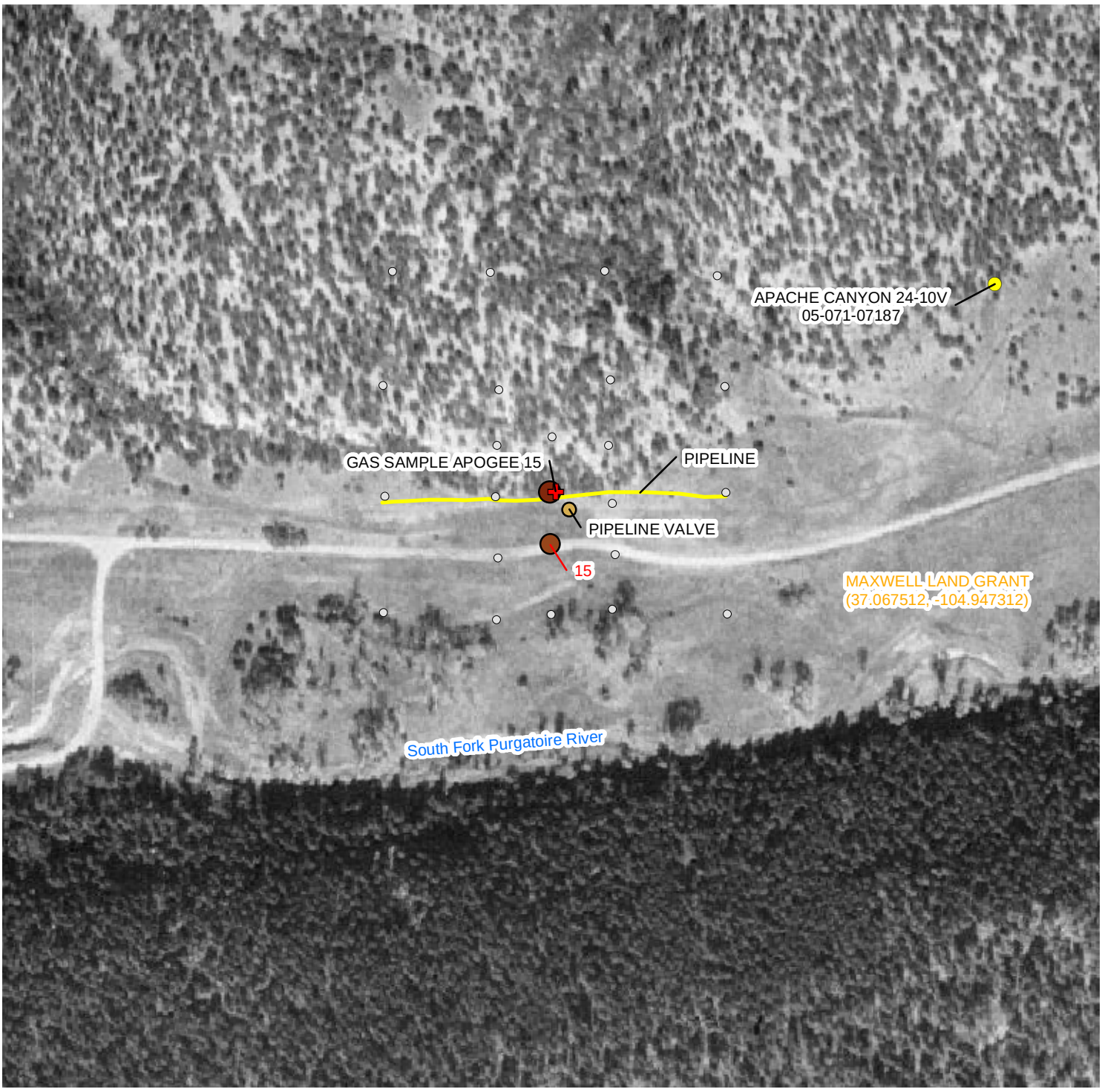

IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/15/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 15
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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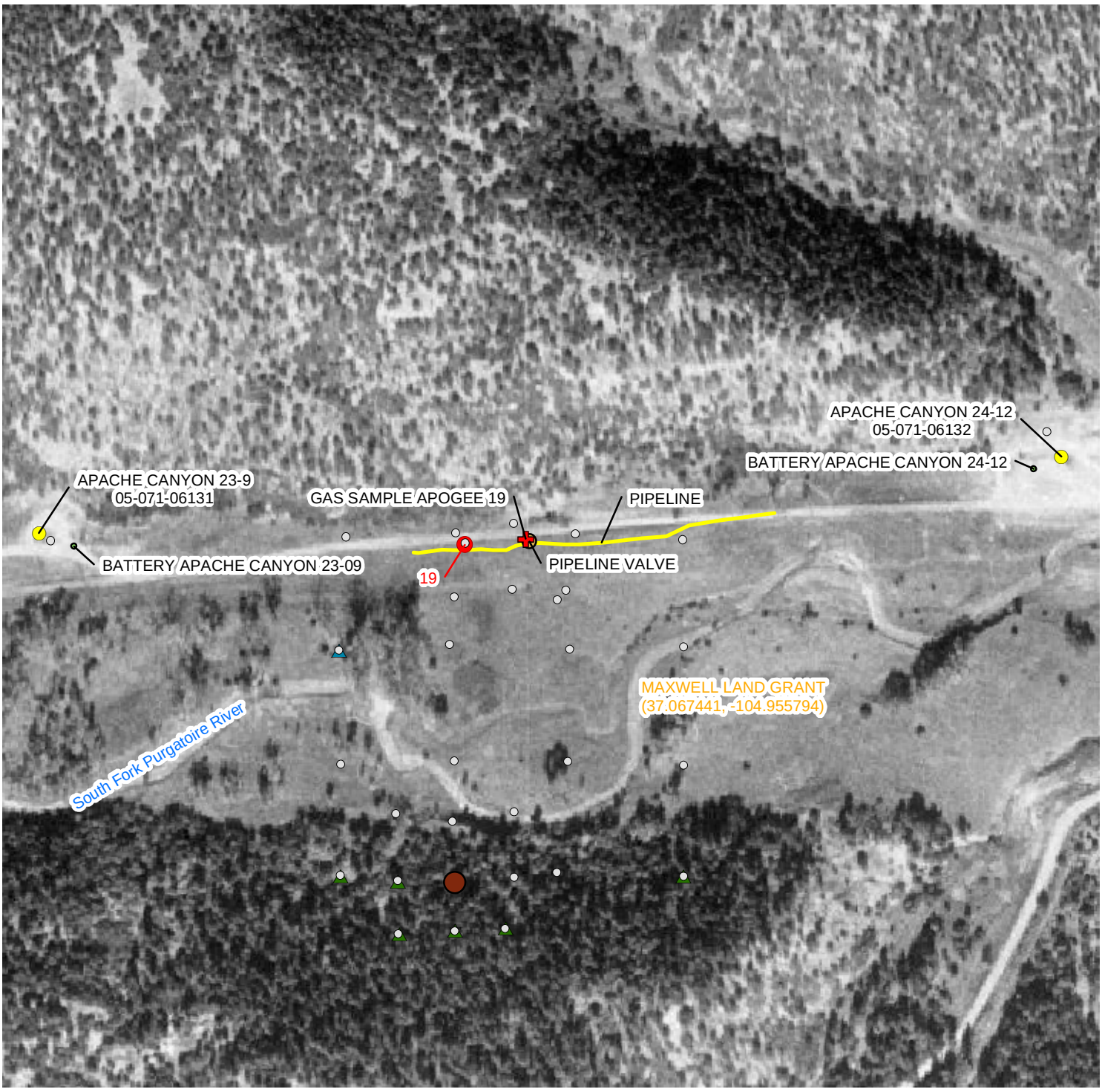

IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- DEAD WILLOW
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/15/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 19
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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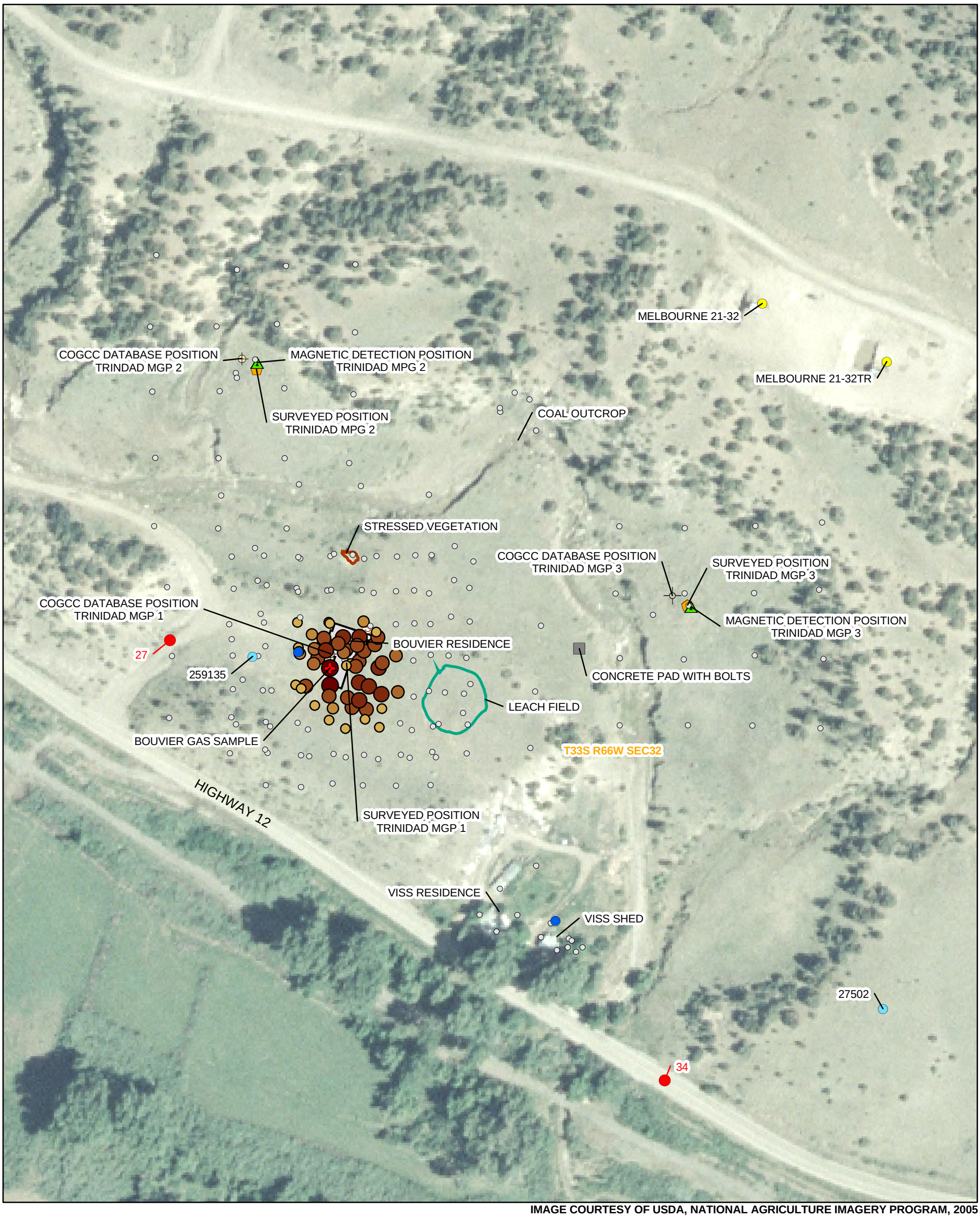

IMAGE COURTESY OF USDA, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2005

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP

COGCC OIL & GAS WELL (API NO.)

- DRY AND ABANDONED
- PLUGGED AND ABANDONED
- PRODUCING
- SEPTIC TANK
- WATER WELL (DWR RECORDS)
- WATER WELL (SURVEYED BY GPS)

- GAS SAMPLE
- SURVEYED WELL LOCATION
- METAL DETECTED WELL LOCATION
- APPROXIMATE BOUVIER RESIDENCE

0 150 300
Feet

N

GAS SAMPLE COLLECTED ON 04/23/07
SOIL GAS SURVEY PERFORMED ON 04/24/07 & 05/24/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 27 & 34
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USDA, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2005

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP

COGCC OIL & GAS WELL (API NO.)

- DRY AND ABANDONED
- PLUGGED AND ABANDONED
- PRODUCING
- SEPTIC TANK
- WATER WELL (DWR RECORDS)
- WATER WELL (SURVEYED BY GPS)

- GAS SAMPLE
- SURVEYED WELL LOCATION
- METAL DETECTED WELL LOCATION
- APPROXIMATE BOUVIER RESIDENCE

0 150 300
Feet

N

GAS SAMPLE COLLECTED ON 04/23/07
SOIL GAS SURVEY PERFORMED ON 08/29/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 27 & 34
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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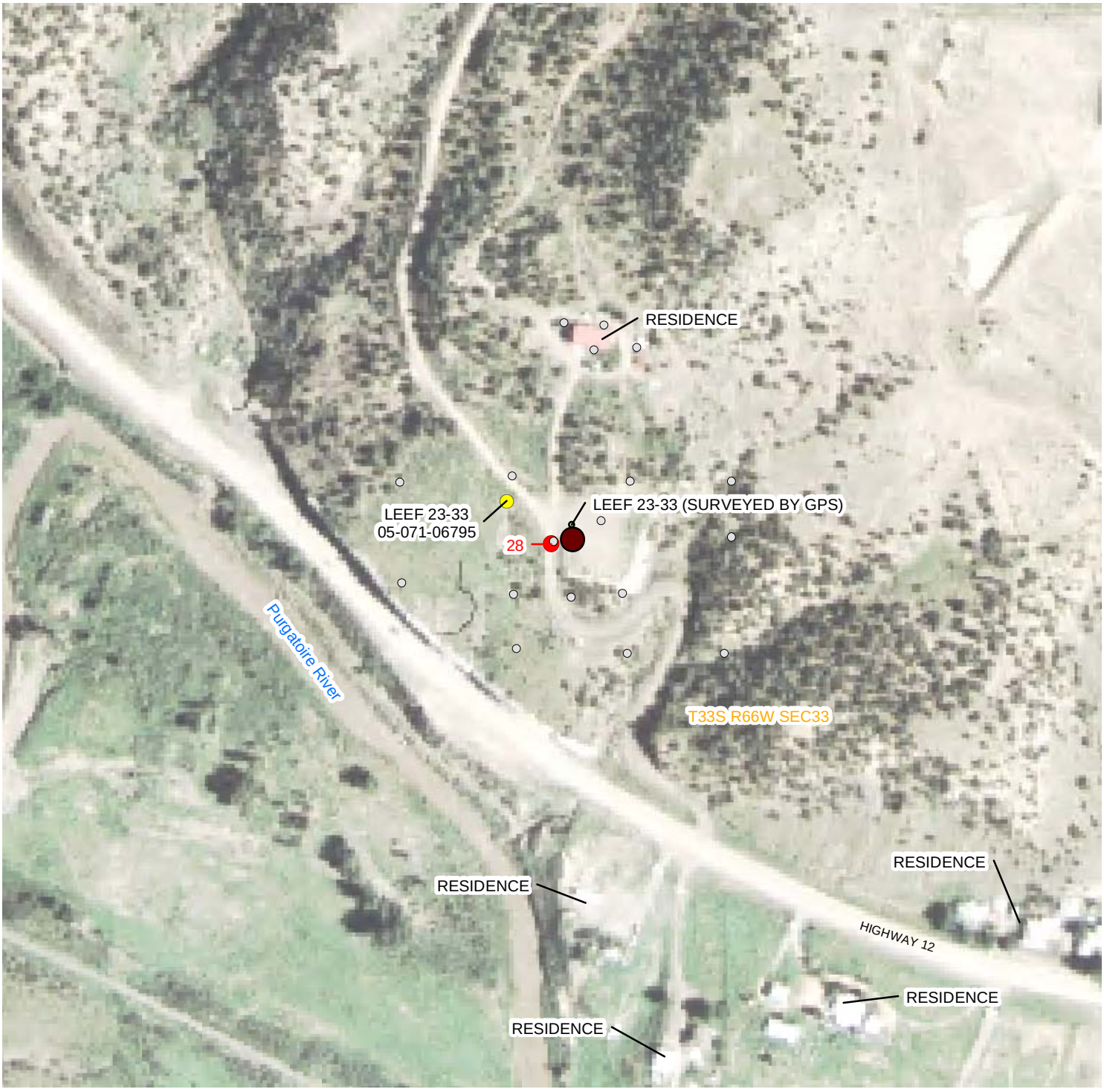

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP

COGCC OIL & GAS WELL (API NO.)

- PRODUCING
- RAILROAD

SOIL GAS SURVEY PERFORMED ON 07/16/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 28
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/04/07
SOIL GAS SURVEY PERFORMED ON 07/31/07

0 550 1,100
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 605
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/04/07
SOIL GAS SURVEY PERFORMED ON 10/31/07

0 550 1,100
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 605
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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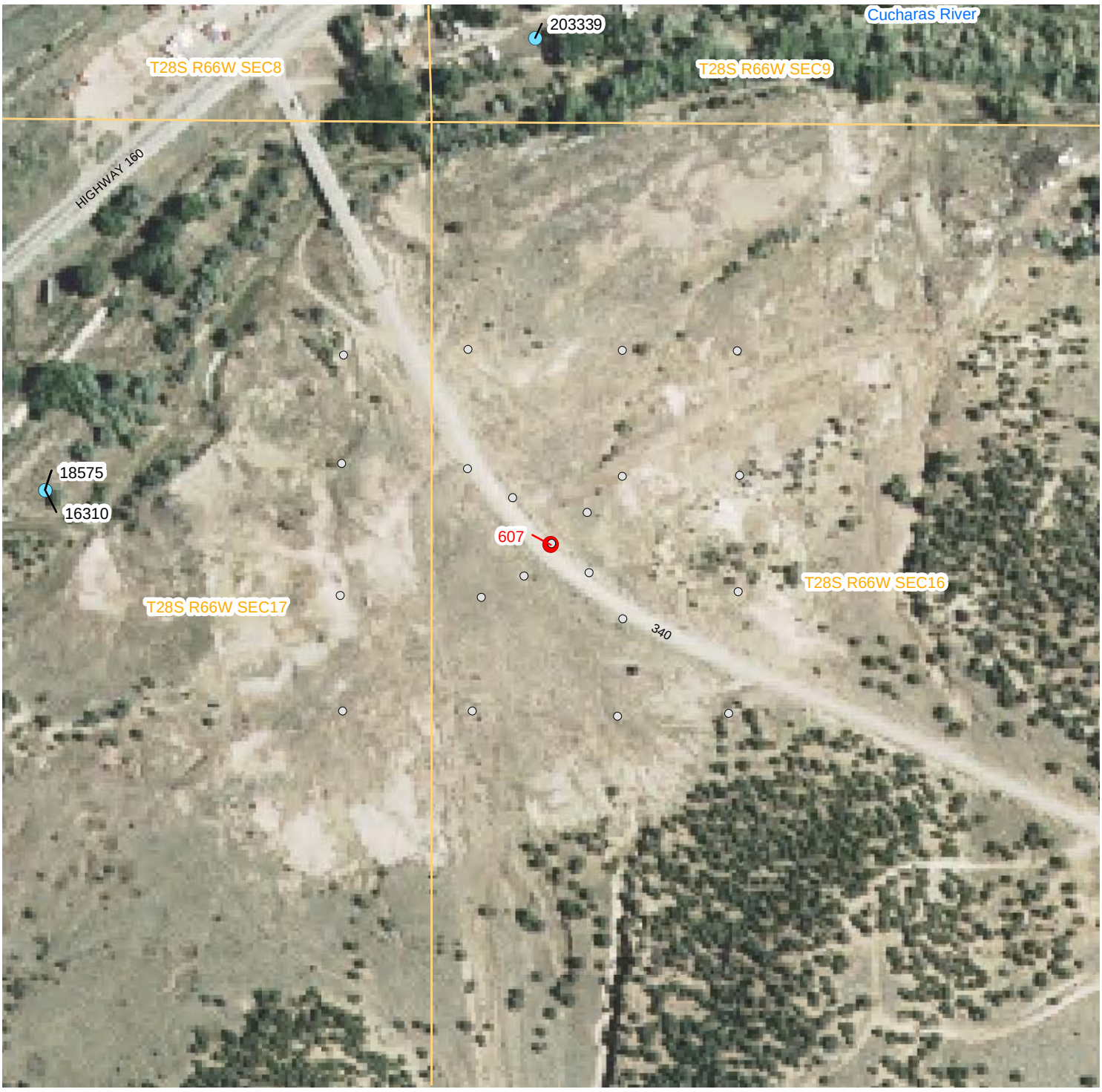

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- DEAD PINE
- SECTION

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 07/17/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 607
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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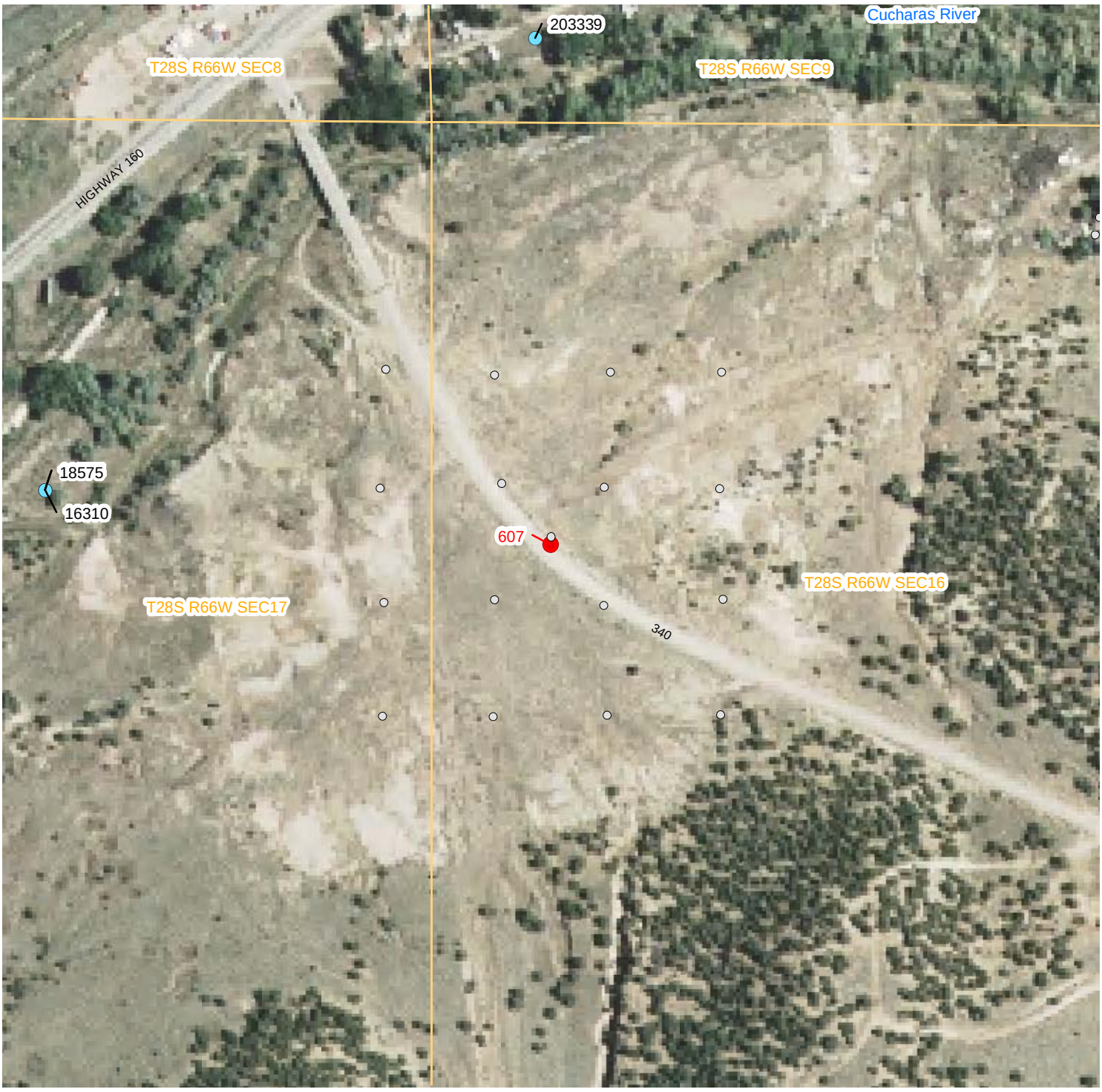

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- DEAD PINE
- SECTION

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 08/11/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 607
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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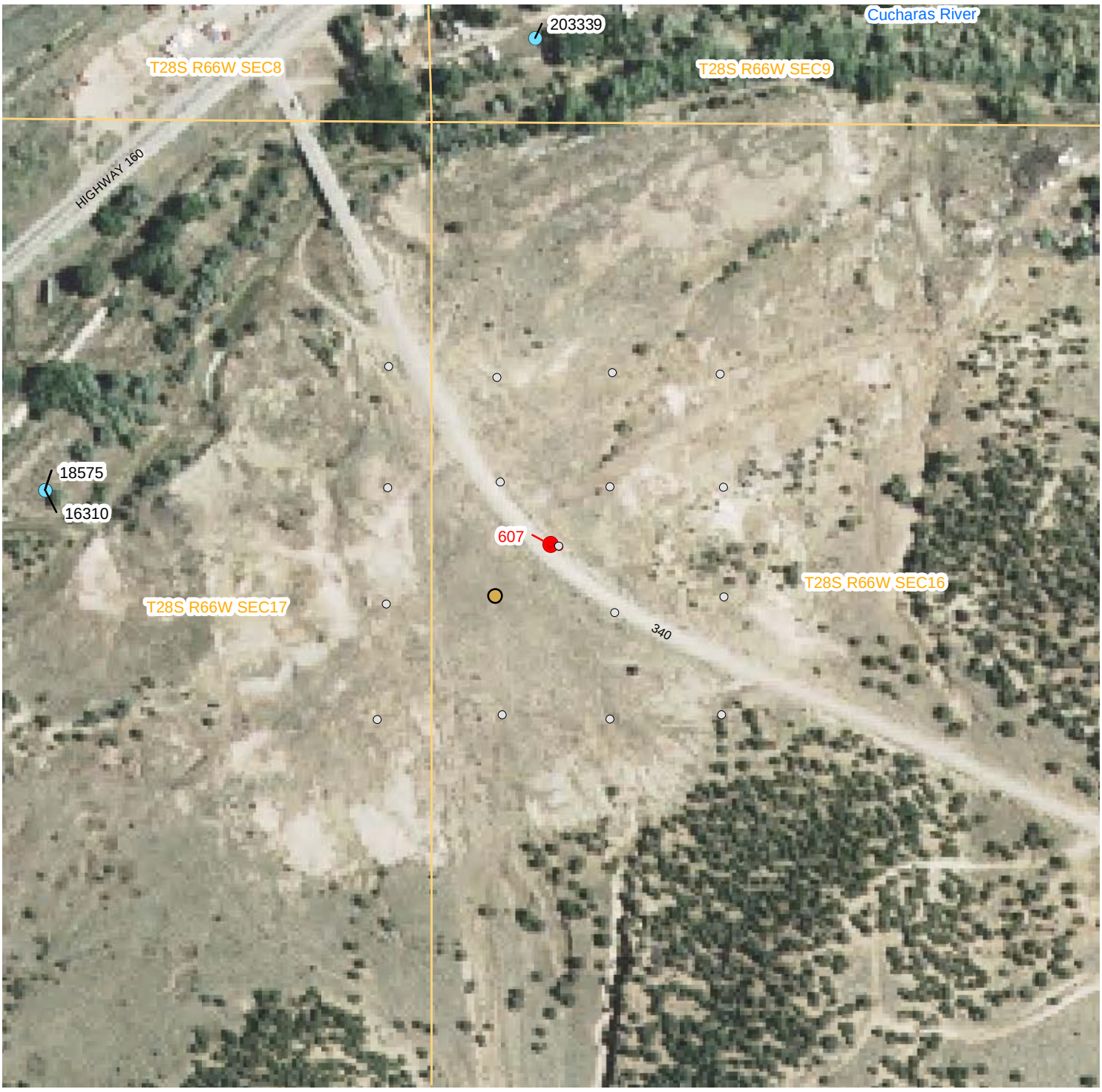

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- DEAD PINE
- SECTION

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 10/31/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 607
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/01/07
SOIL GAS SURVEY PERFORMED ON 07/18/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 612
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/01/07
SOIL GAS SURVEY PERFORMED ON 08/11/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 612
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/01/07
SOIL GAS SURVEY PERFORMED ON 11/02/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 612
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD JUNIPER
- DEAD PINE
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/03/07
SOIL GAS SURVEY PERFORMED ON 07/10/07

- SECTION

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 613
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD JUNIPER
- DEAD PINE
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/03/07
SOIL GAS SURVEY PERFORMED ON 08/03/07

- SECTION

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 613
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- SURFACE METHANE MEASUREMENT
- DEAD JUNIPER
- DEAD PINE

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/03/07
SOIL GAS SURVEY PERFORMED ON 11/02/07

- GAS SAMPLE LOCATION
- SECTION

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 613
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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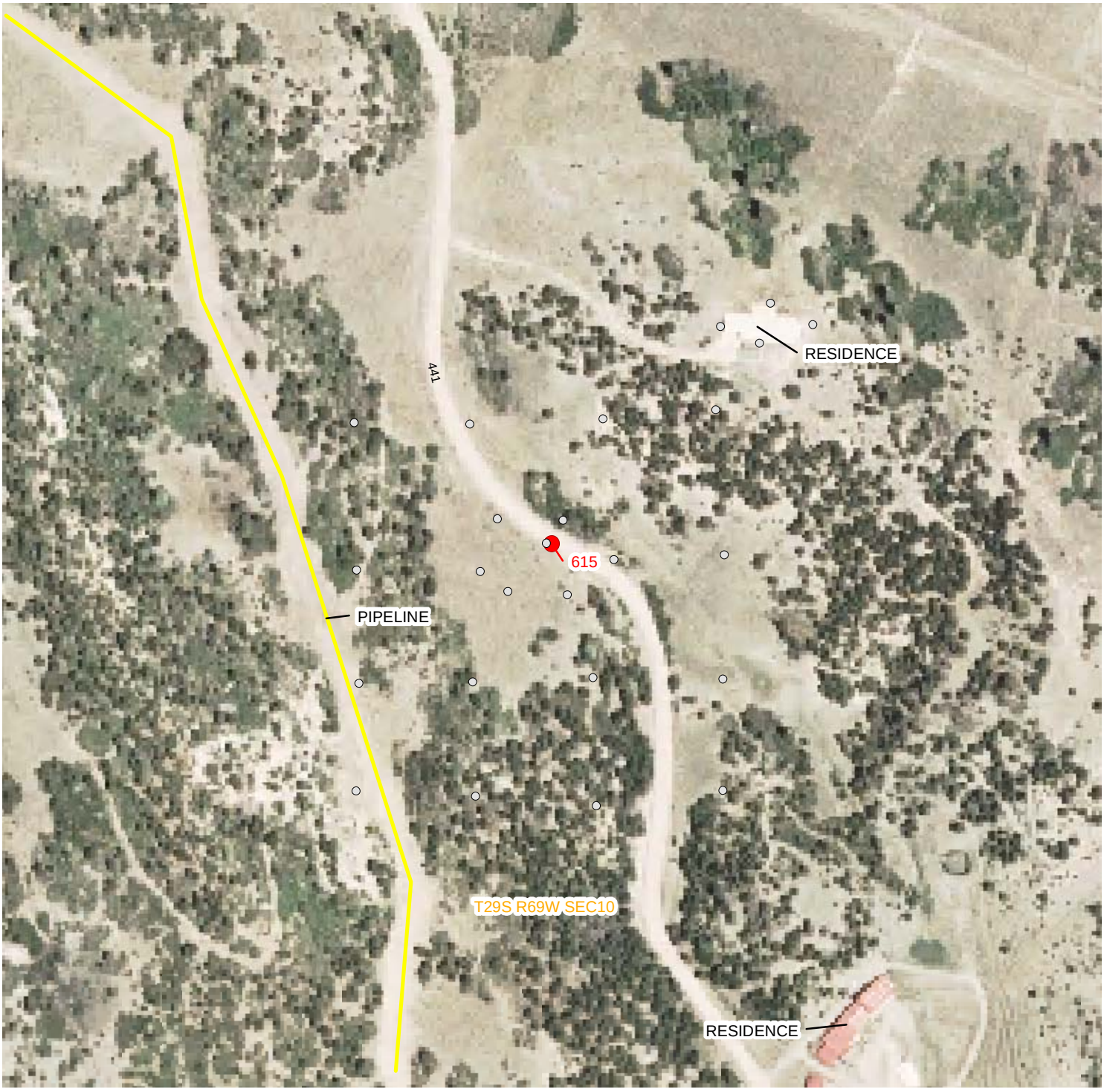

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

APOGEE SEEP

SOIL GAS SURVEY PERFORMED ON 07/17/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 615
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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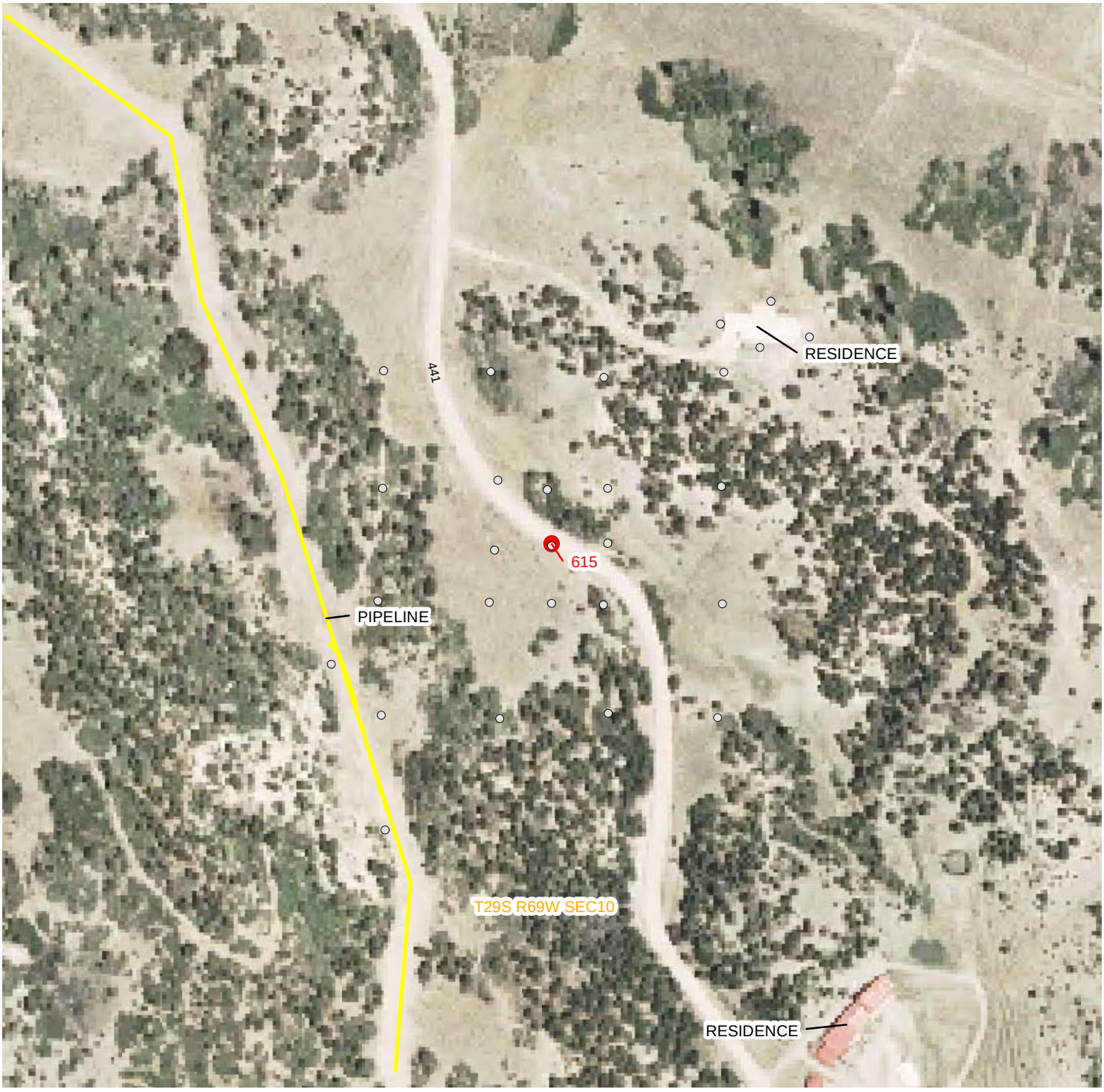

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

APOGEE SEEP

SOIL GAS SURVEY PERFORMED ON 08/02/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 615
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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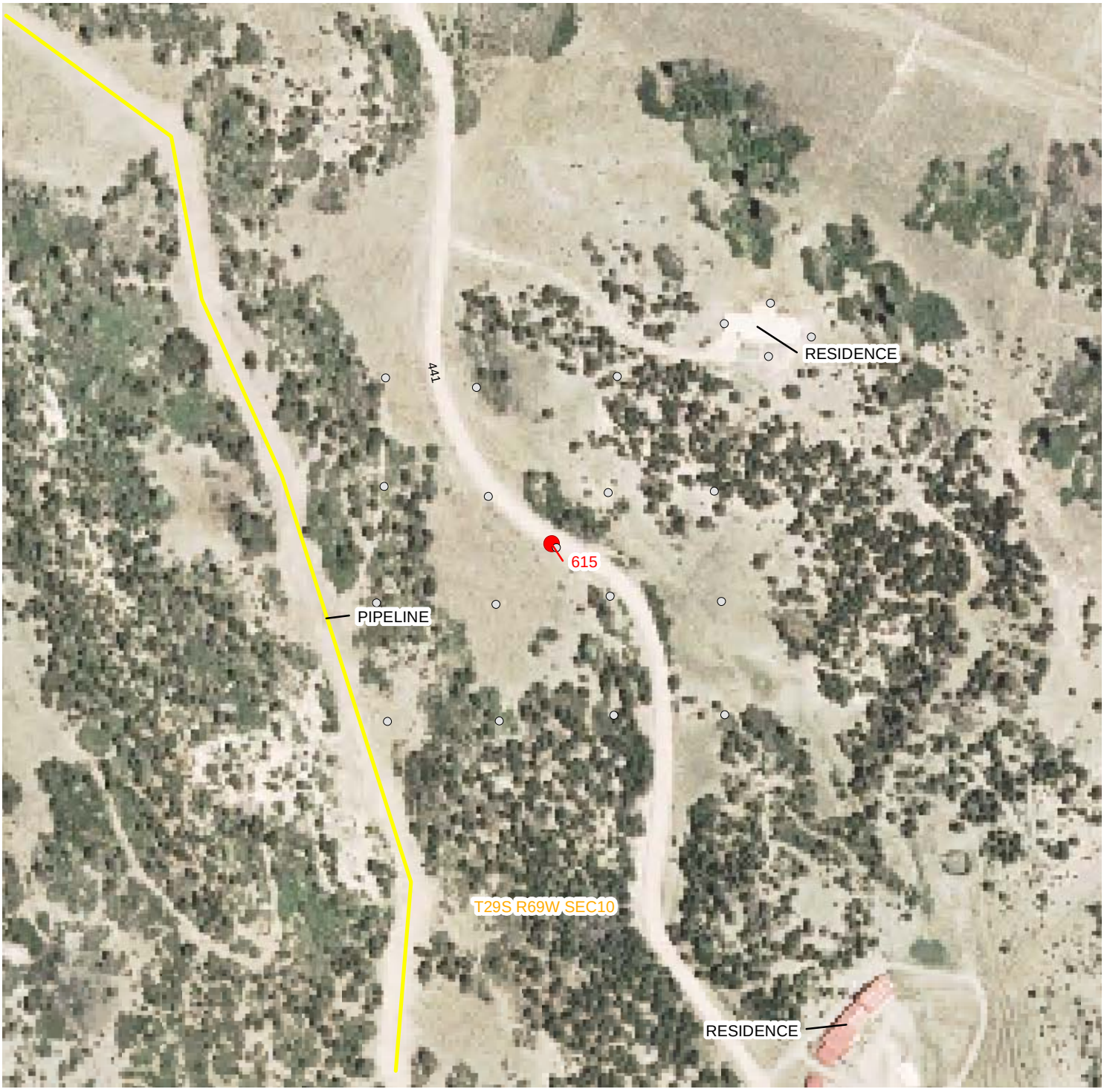

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

APOGEE SEEP

SOIL GAS SURVEY PERFORMED ON 11/01/07

0 250 500

Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 615
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 623
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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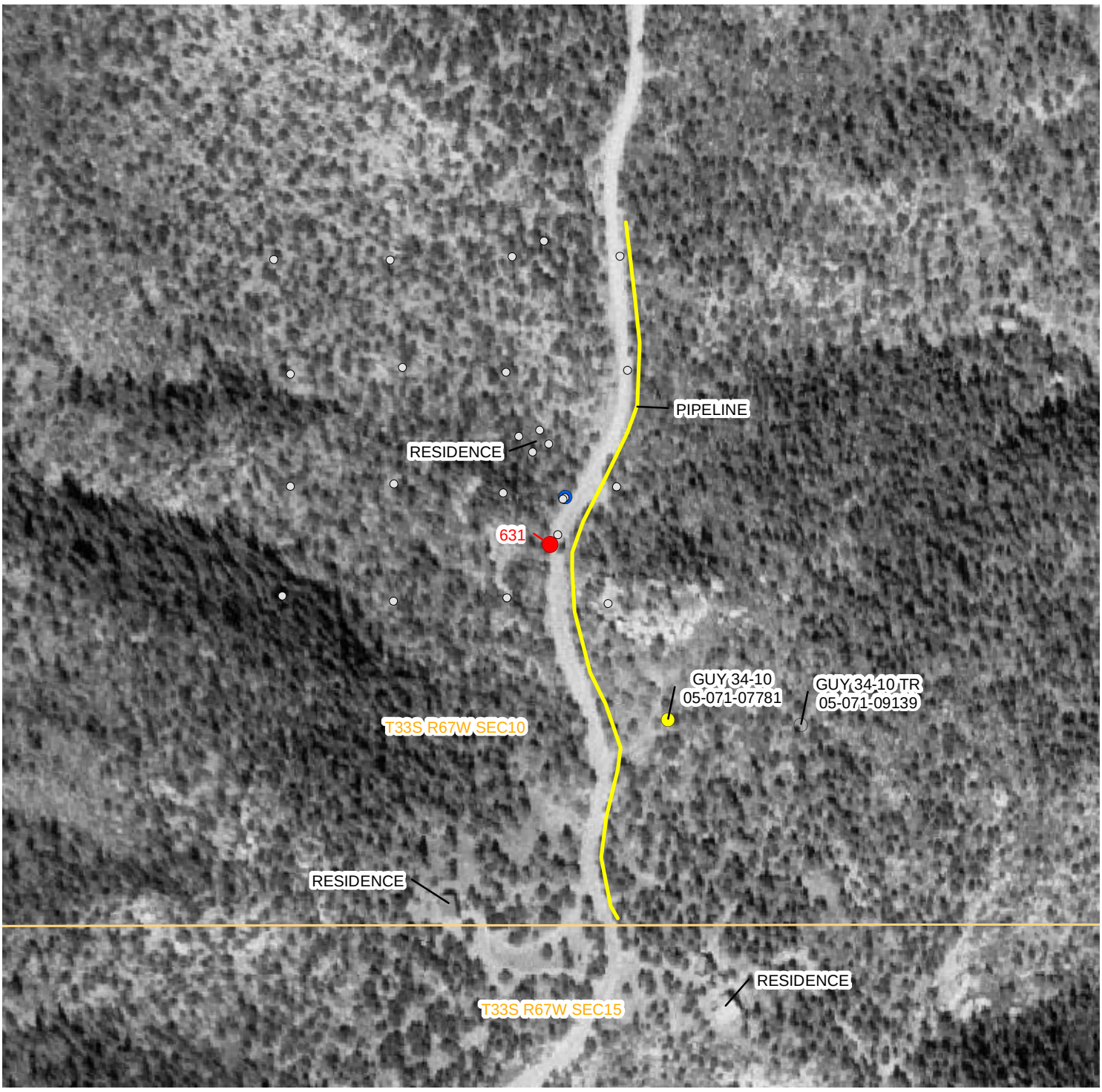

IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (SURVEYED BY GPS)

COGCC OIL & GAS WELL (API NO.)

- PRODUCING
- LOCATION
- SECTION

SOIL GAS SURVEY PERFORMED ON 07/14/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 631
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 07/13/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 633
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/16/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 636
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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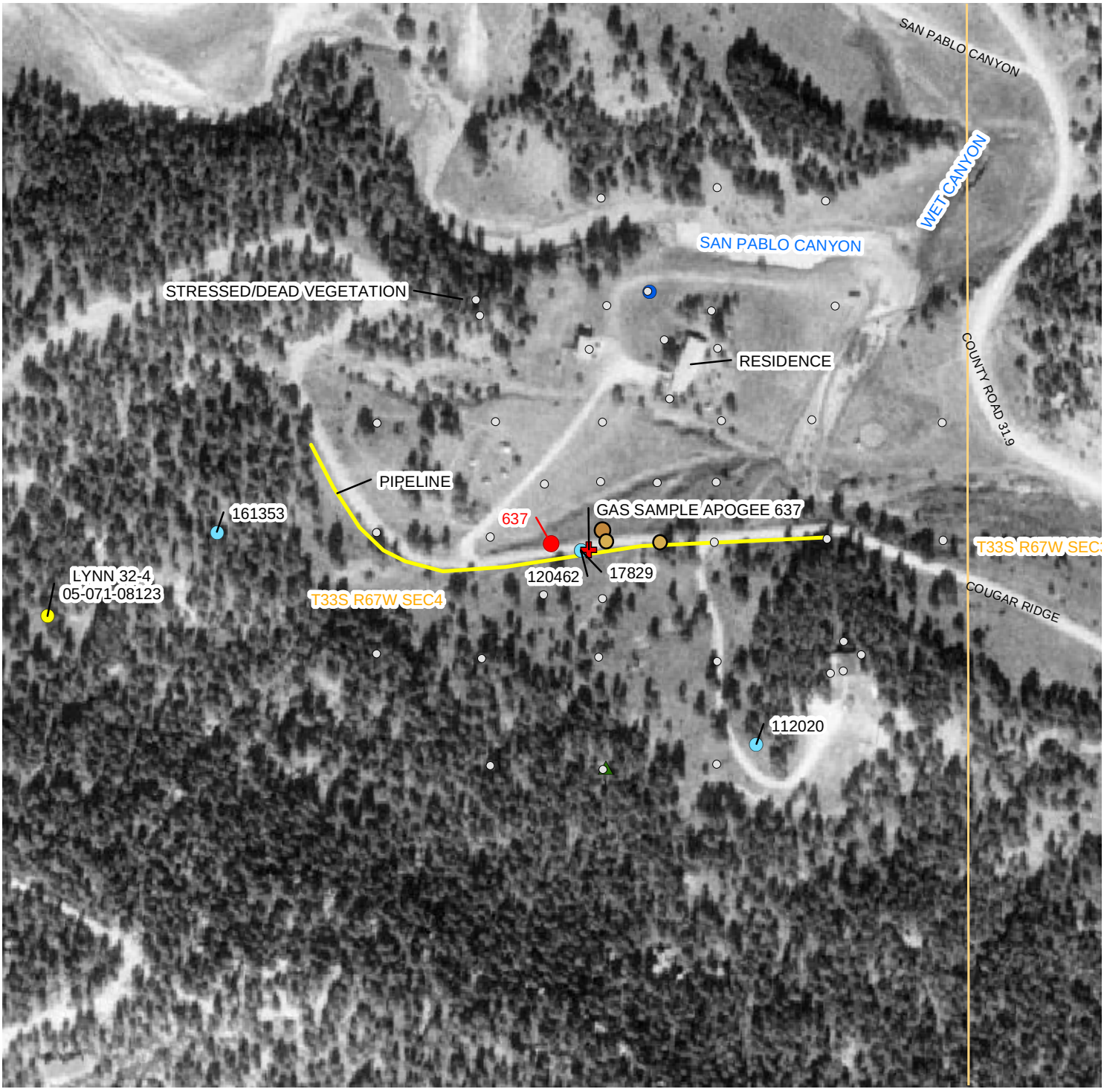

IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD PINE
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/01/07

- SECTION

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 637
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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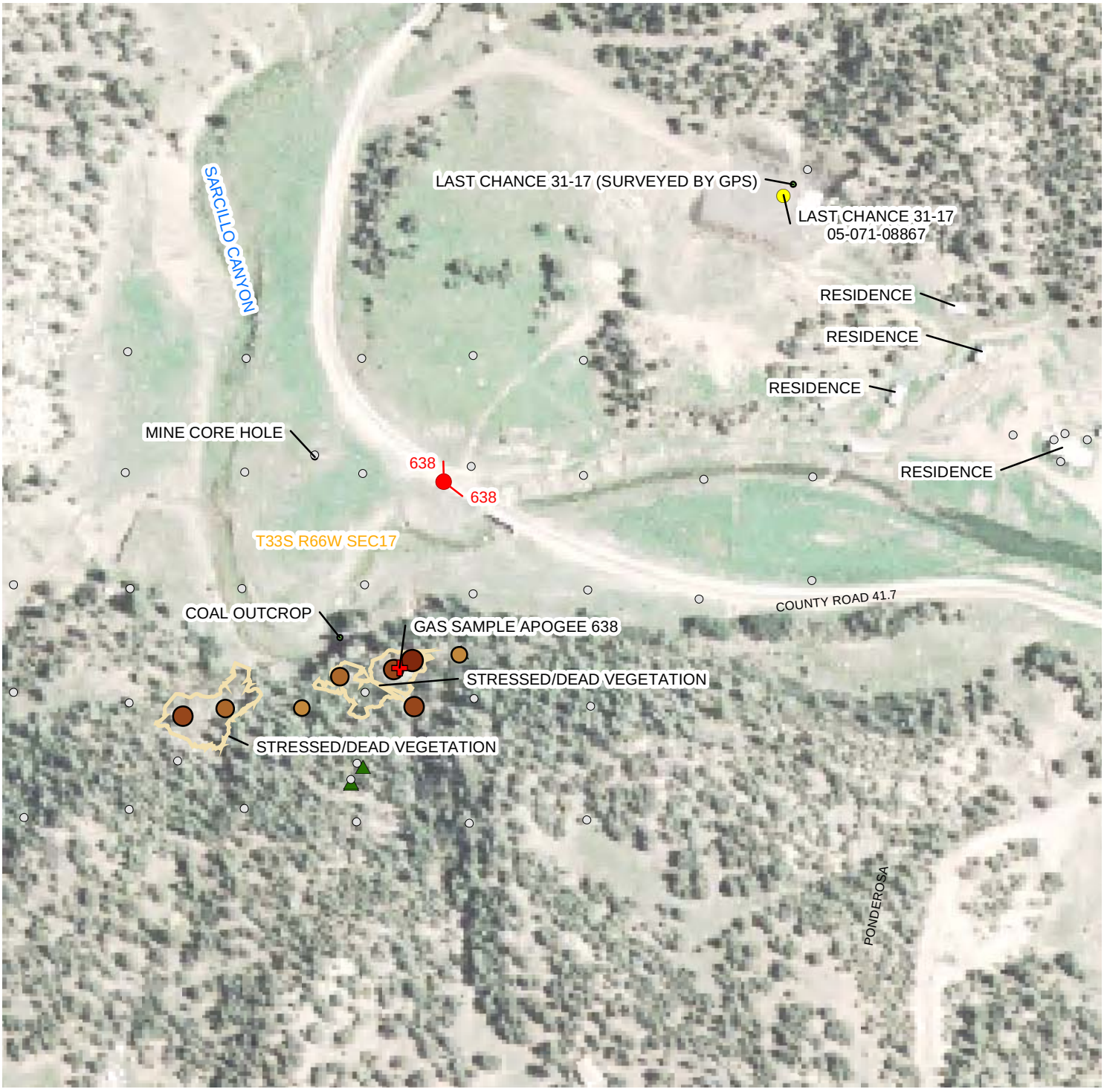

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/29/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 638
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD PINE
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/06/07
SOIL GAS SURVEY PERFORMED ON 07/14/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 640 (SINKHOLE)
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD PINE
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/06/07
SOIL GAS SURVEY PERFORMED ON 08/06/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 640 (SINKHOLE)
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- SURFACE METHANE MEASUREMENT
- DEAD PINE
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/06/07
SOIL GAS SURVEY PERFORMED ON 10/30/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 640 (SINKHOLE)
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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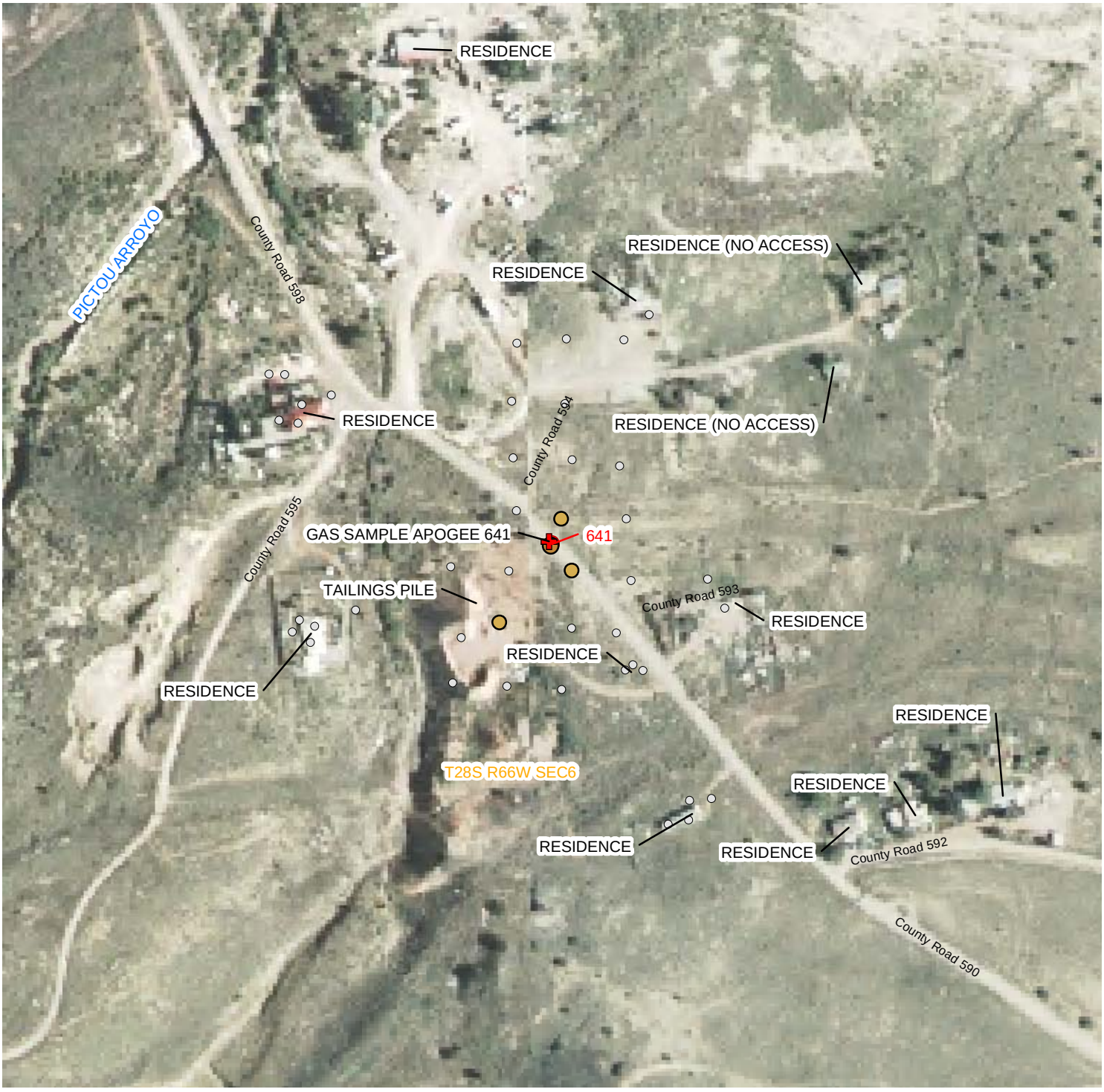

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/06/07
SOIL GAS SURVEY PERFORMED ON 07/12/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 641
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/06/07
SOIL GAS SURVEY PERFORMED ON 08/06/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 641
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/06/07
SOIL GAS SURVEY PERFORMED ON 10/30/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 641
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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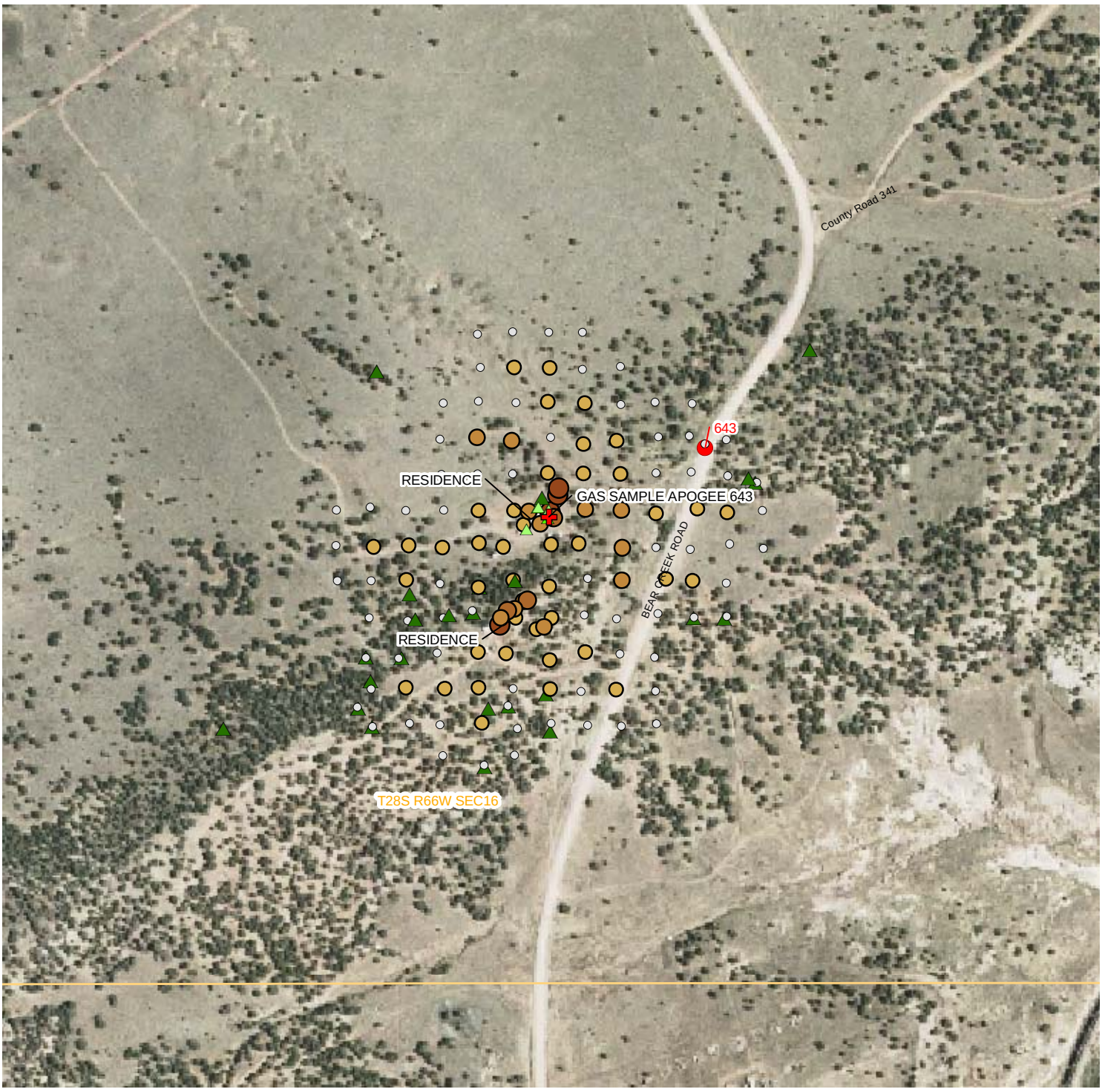

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- STRESSED PINE
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/04/07
SOIL GAS SURVEY PERFORMED ON 07/12/07

0 400 800
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 643
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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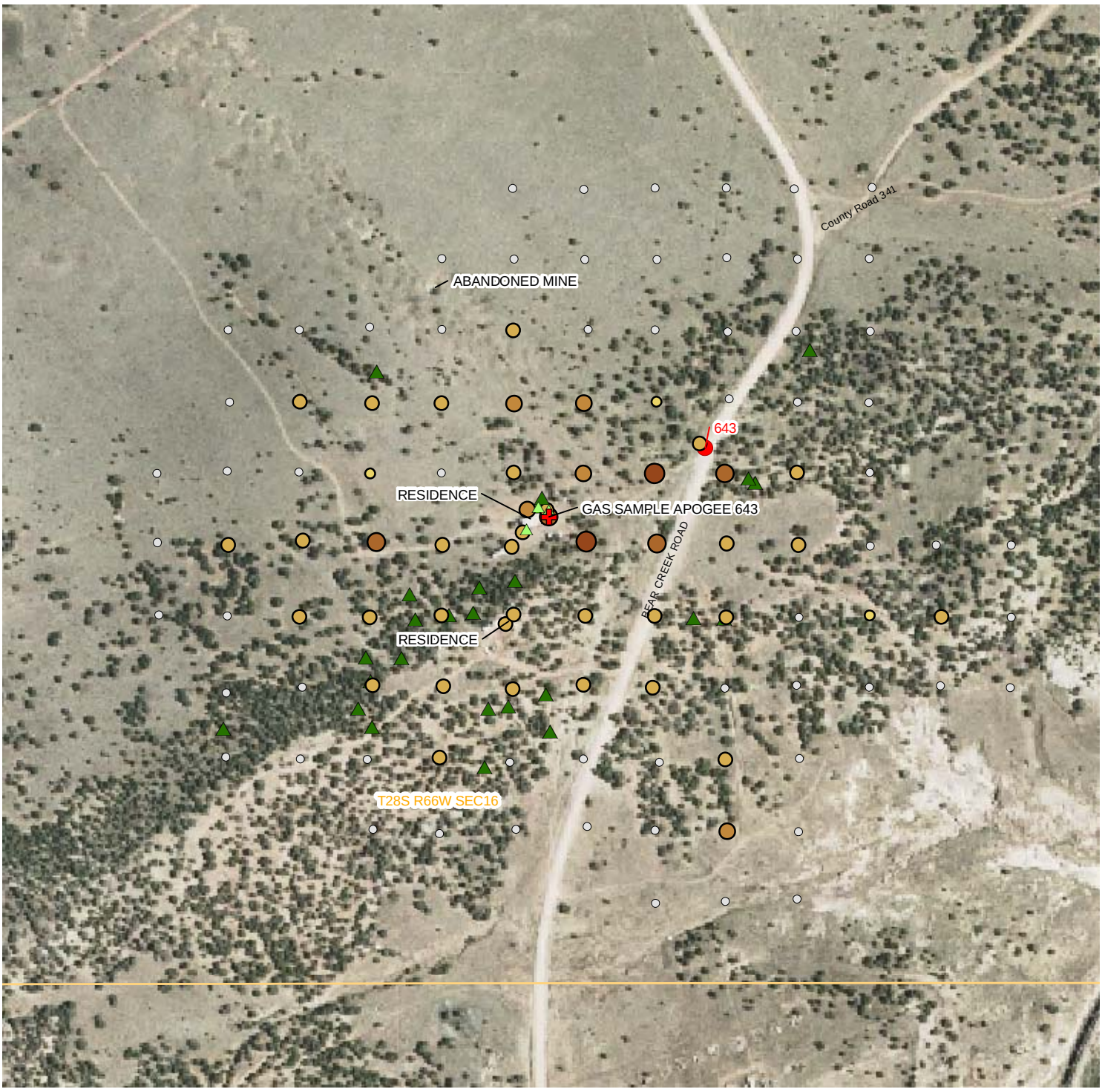

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- STRESSED PINE
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/04/07
SOIL GAS SURVEY PERFORMED ON 08/04/07

0 400 800
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 643
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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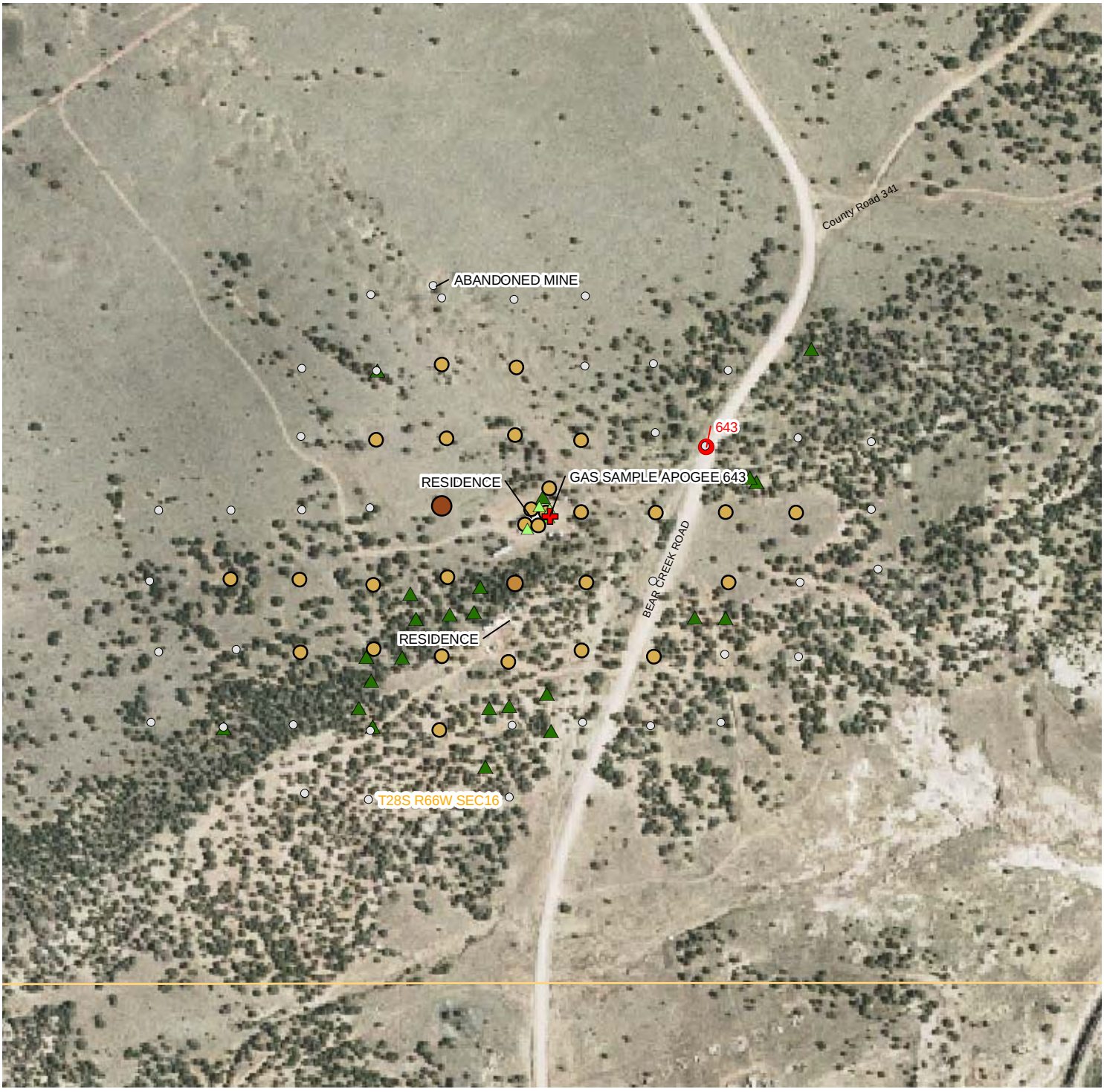

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- STRESSED PINE
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/04/07
SOIL GAS SURVEY PERFORMED ON 10/31/07

0 400 800
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 643
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (SURVEYED BY GPS)
- DEAD PINE
- STRESSED PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/02/07
SOIL GAS SURVEY PERFORMED ON 07/11/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 644
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (SURVEYED BY GPS)
- DEAD PINE
- STRESSED PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/02/07
SOIL GAS SURVEY PERFORMED ON 08/02/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 644
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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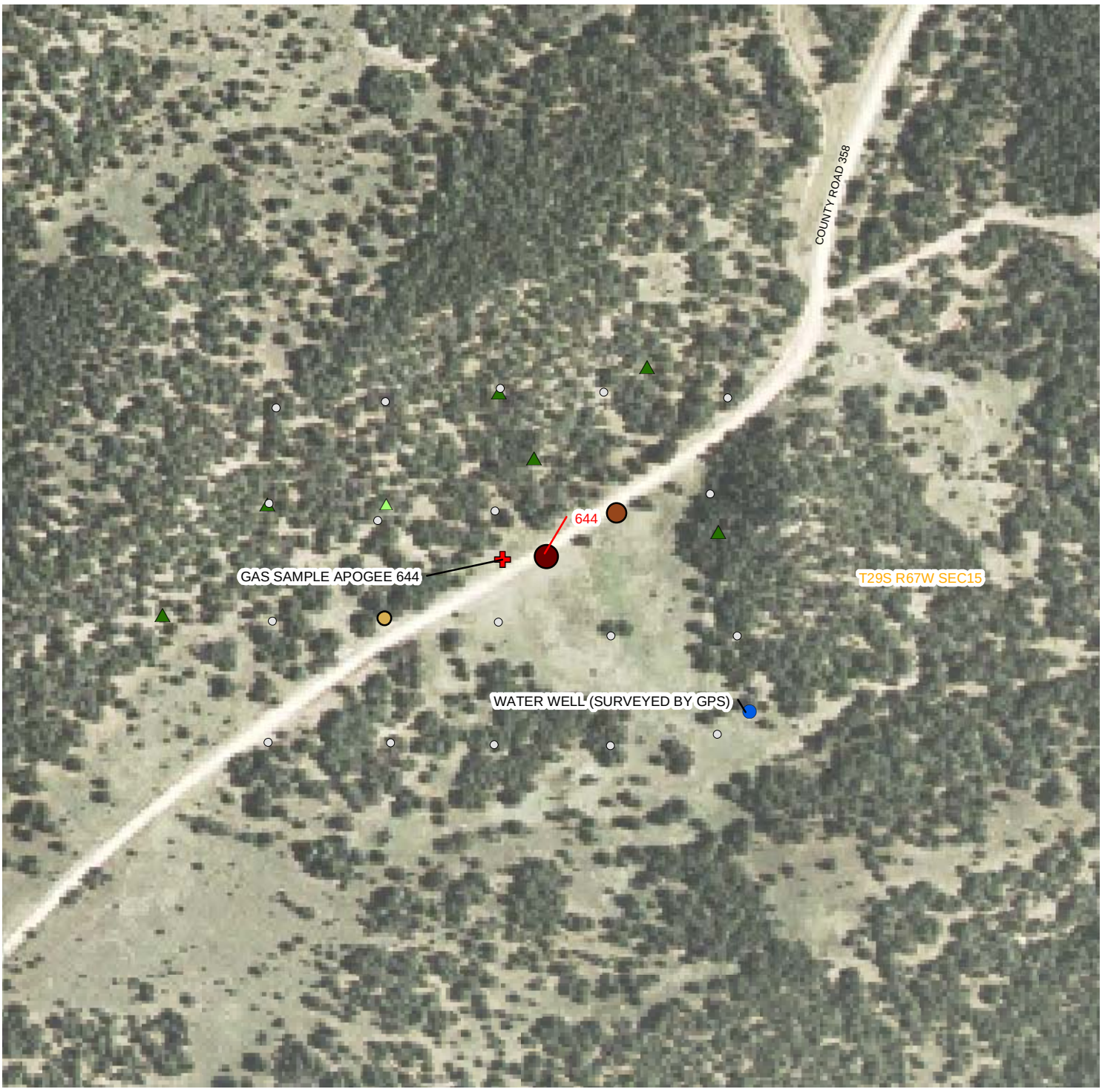

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (SURVEYED BY GPS)
- DEAD PINE
- STRESSED PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/02/07
SOIL GAS SURVEY PERFORMED ON 11/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 644
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD JUNIPER
- DEAD PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/03/07
SOIL GAS SURVEY PERFORMED ON 07/17/07

0 350 700
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 646
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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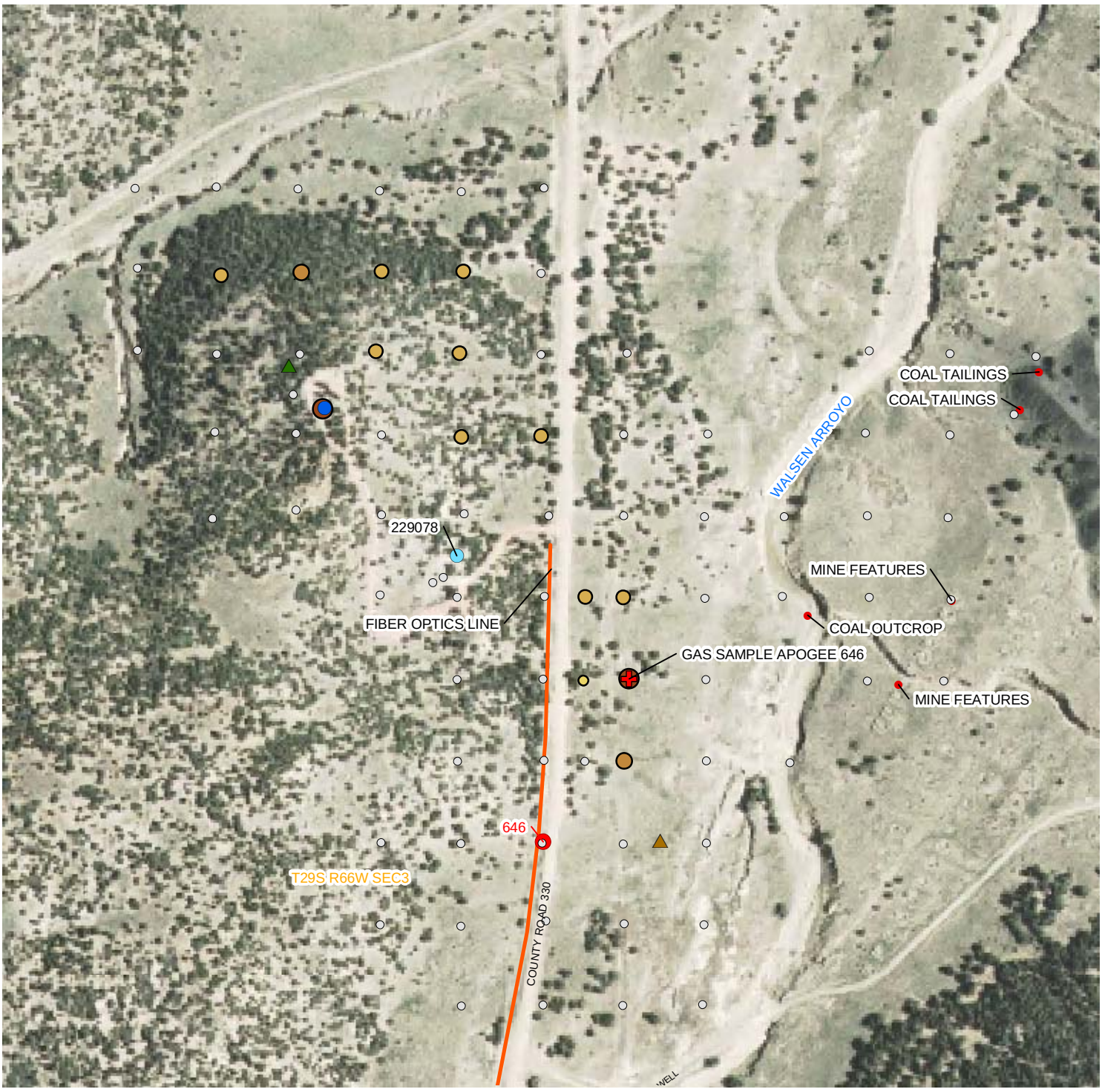

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD JUNIPER
- DEAD PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/03/07
SOIL GAS SURVEY PERFORMED ON 08/03/07

0 350 700
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 646
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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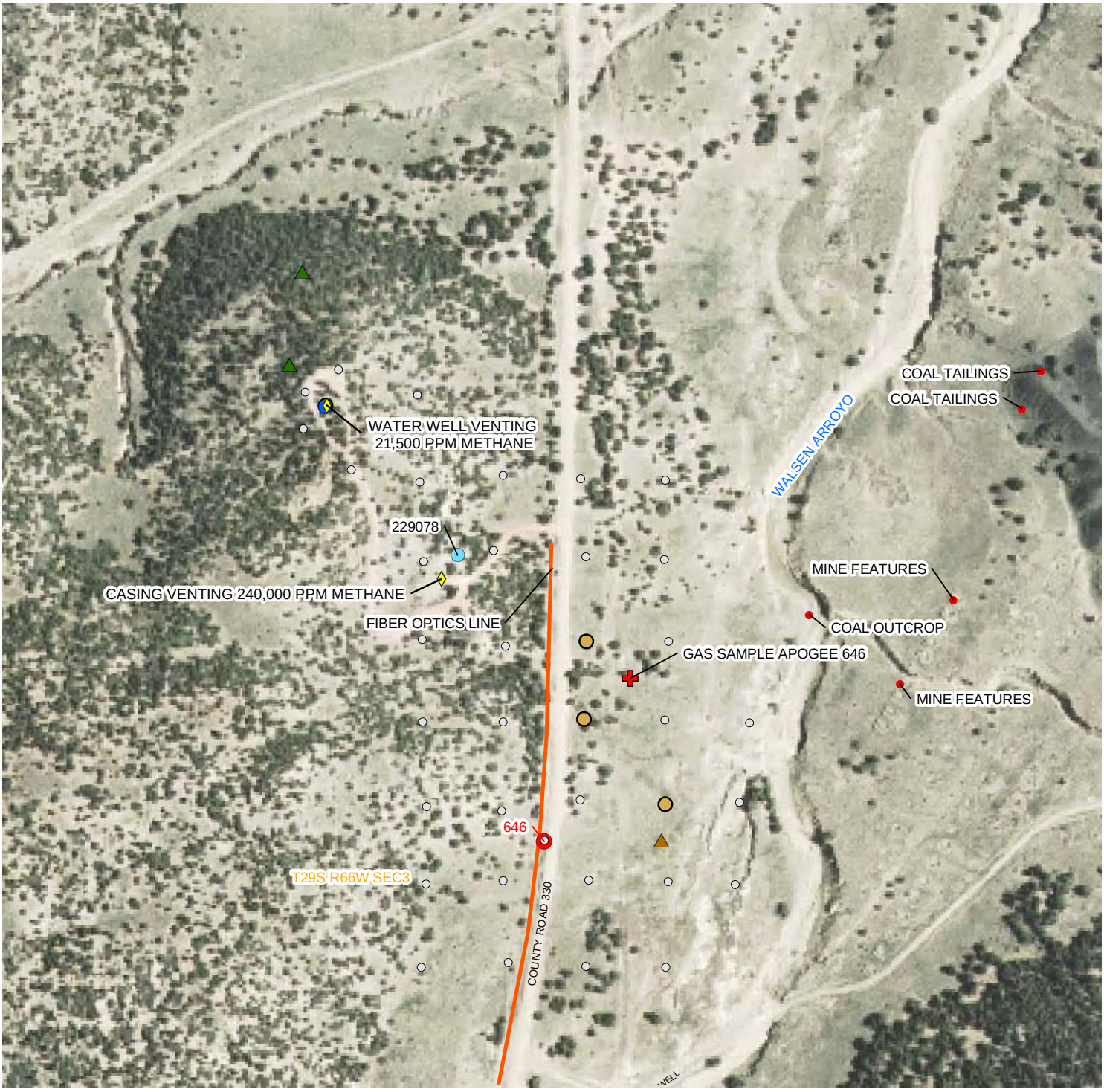

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- SURFACE METHANE MEASUREMENT
- DEAD JUNIPER
- DEAD PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/03/07
SOIL GAS SURVEY PERFORMED ON 11/02/07

0 350 700
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 646
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- DEAD PINE
- GAS SAMPLE LOCATION

0 250 500
Feet

N

GAS SAMPLE COLLECTED ON 08/01/07
SOIL GAS SURVEY PERFORMED ON 07/17/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 647
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- DEAD PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/01/07
SOIL GAS SURVEY PERFORMED ON 08/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 647
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- DEAD PINE
- GAS SAMPLE LOCATION

0 250 500
Feet

N

GAS SAMPLE COLLECTED ON 08/01/07
SOIL GAS SURVEY PERFORMED ON 11/02/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 647
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/16/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 649
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/30/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 652
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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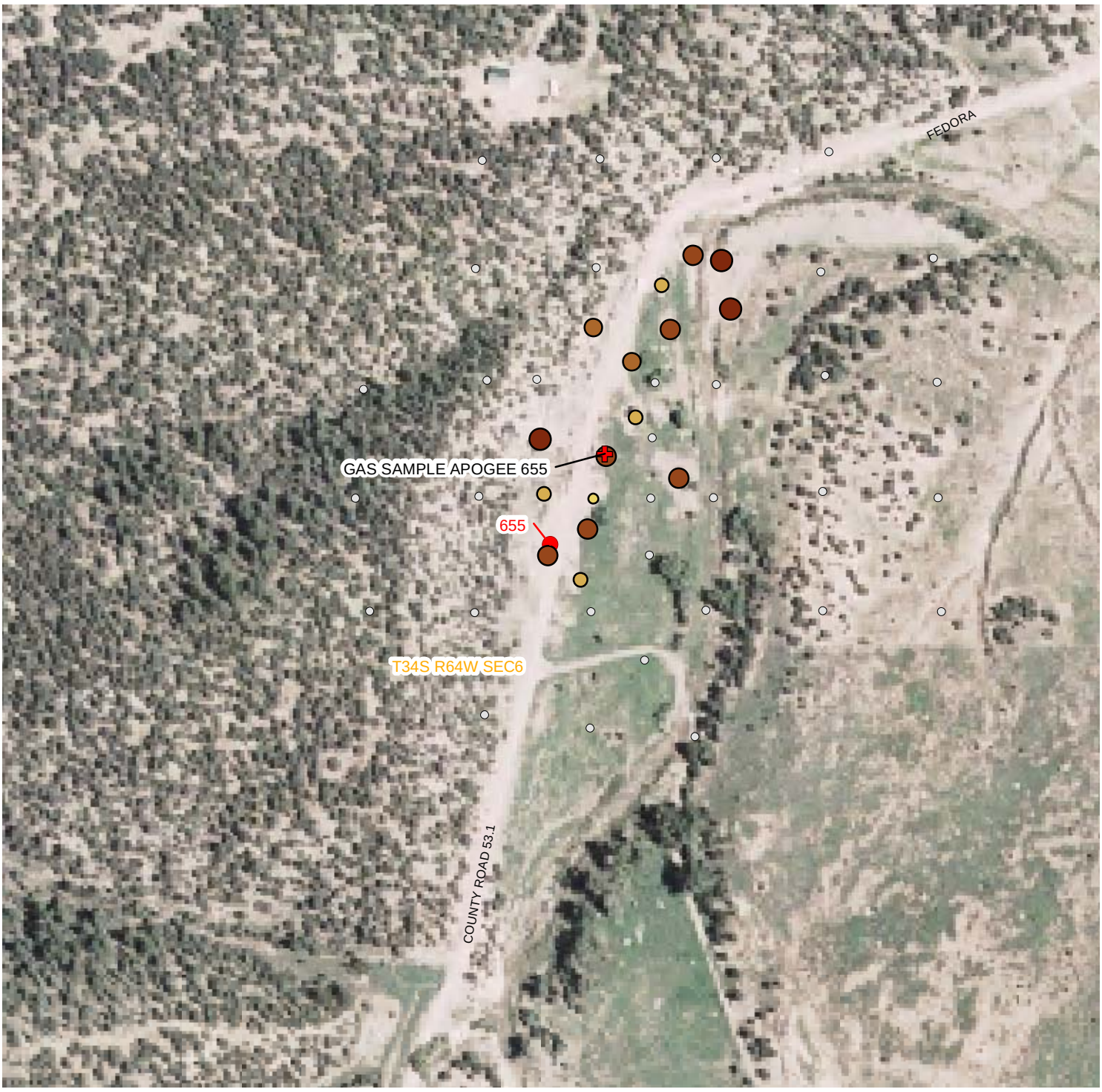

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/20/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 655
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/28/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 656
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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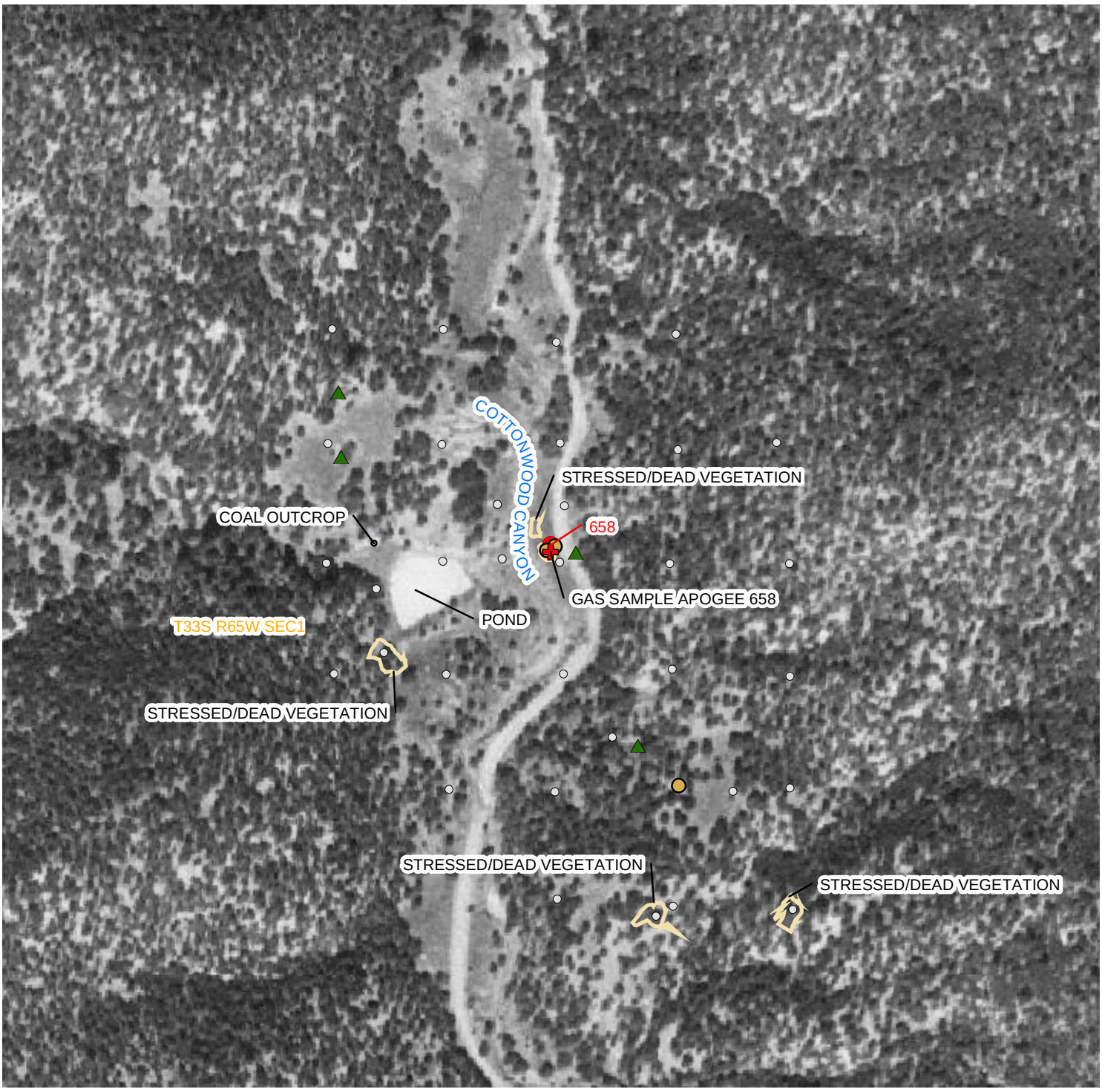

IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/30/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 658
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- DEAD COTTONWOOD
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/28/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
APOGEE SEEP ID 660
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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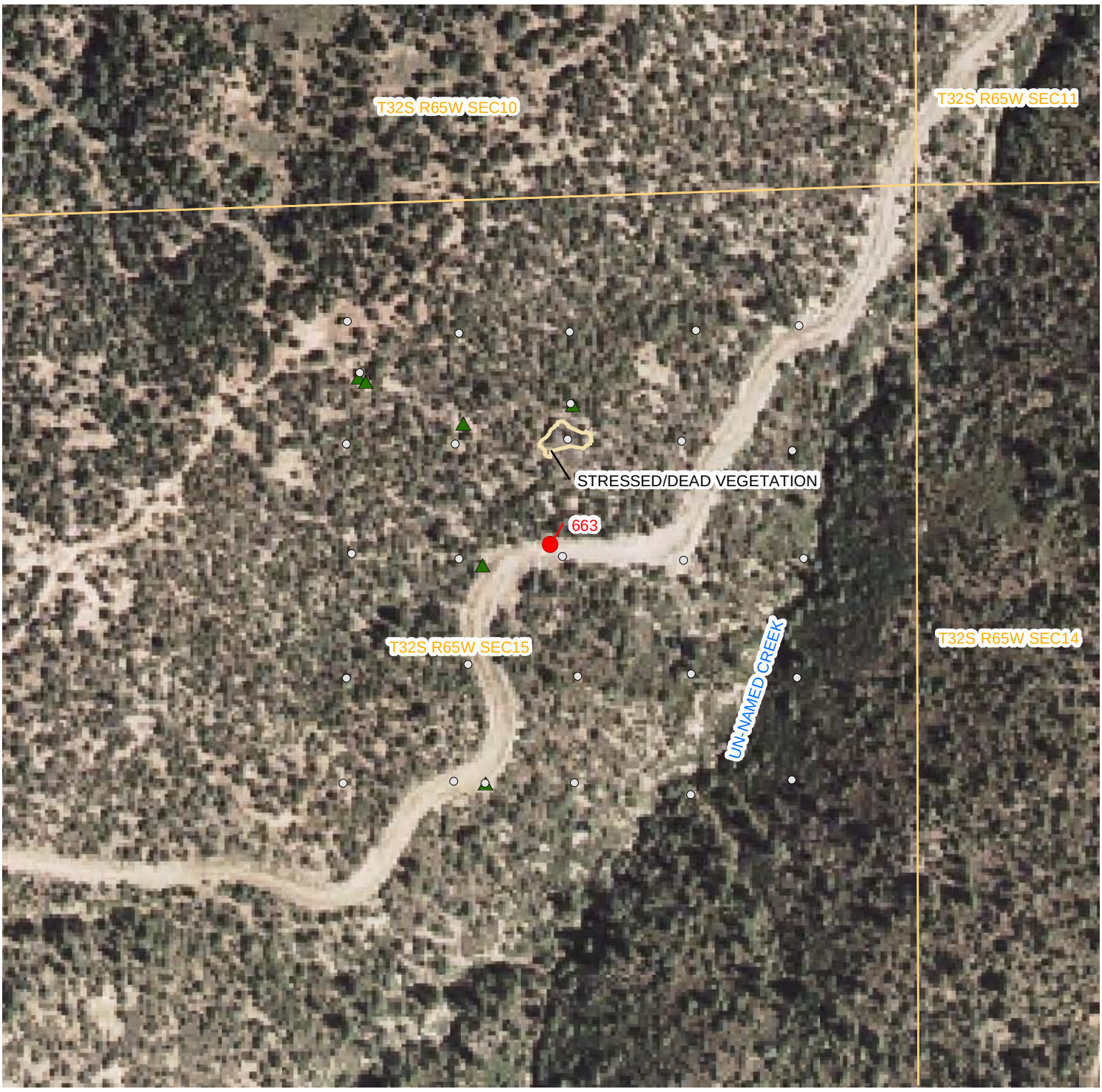

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- DEAD PINE
- SECTION

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 06/28/07

DETAILED MAPPING RESULTS
APOGEE SEEP ID 663
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

PLUGGED AND ABANDONED

0 250 500

Feet

N

SOIL GAS SURVEY PERFORMED ON 08/08/07

DETAILED MAPPING RESULTS
ANDREATTA 14-10
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/08/07
SOIL GAS SURVEY PERFORMED ON 07/02/07

0 200 400
Feet

N

DETAILED MAPPING RESULTS
ANGELEY
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/08/07
SOIL GAS SURVEY PERFORMED ON 08/08/07

0 200 400
Feet

N

DETAILED MAPPING RESULTS
ANGELEY
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- SURFACE METHANE MEASUREMENT
- GAS SAMPLE LOCATION

0 200 400
Feet

N

GAS SAMPLE COLLECTED ON 08/08/07
SOIL GAS SURVEY PERFORMED ON 11/01/07

DETAILED MAPPING RESULTS
ANGELEY
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/08/07
SOIL GAS SURVEY PERFORMED ON 07/11/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
BOUNDS
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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- 26% - 50%
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- 76% - 100%

- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/08/07
SOIL GAS SURVEY PERFORMED ON 08/08/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
BOUNDS
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

- 0 ppm
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- 76% - 100%

- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- SURFACE METHANE MEASUREMENT
- GAS SAMPLE LOCATION

GAS SAMPLE COLLECTED ON 08/08/07
SOIL GAS SURVEY PERFORMED ON 11/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
BOUNDS
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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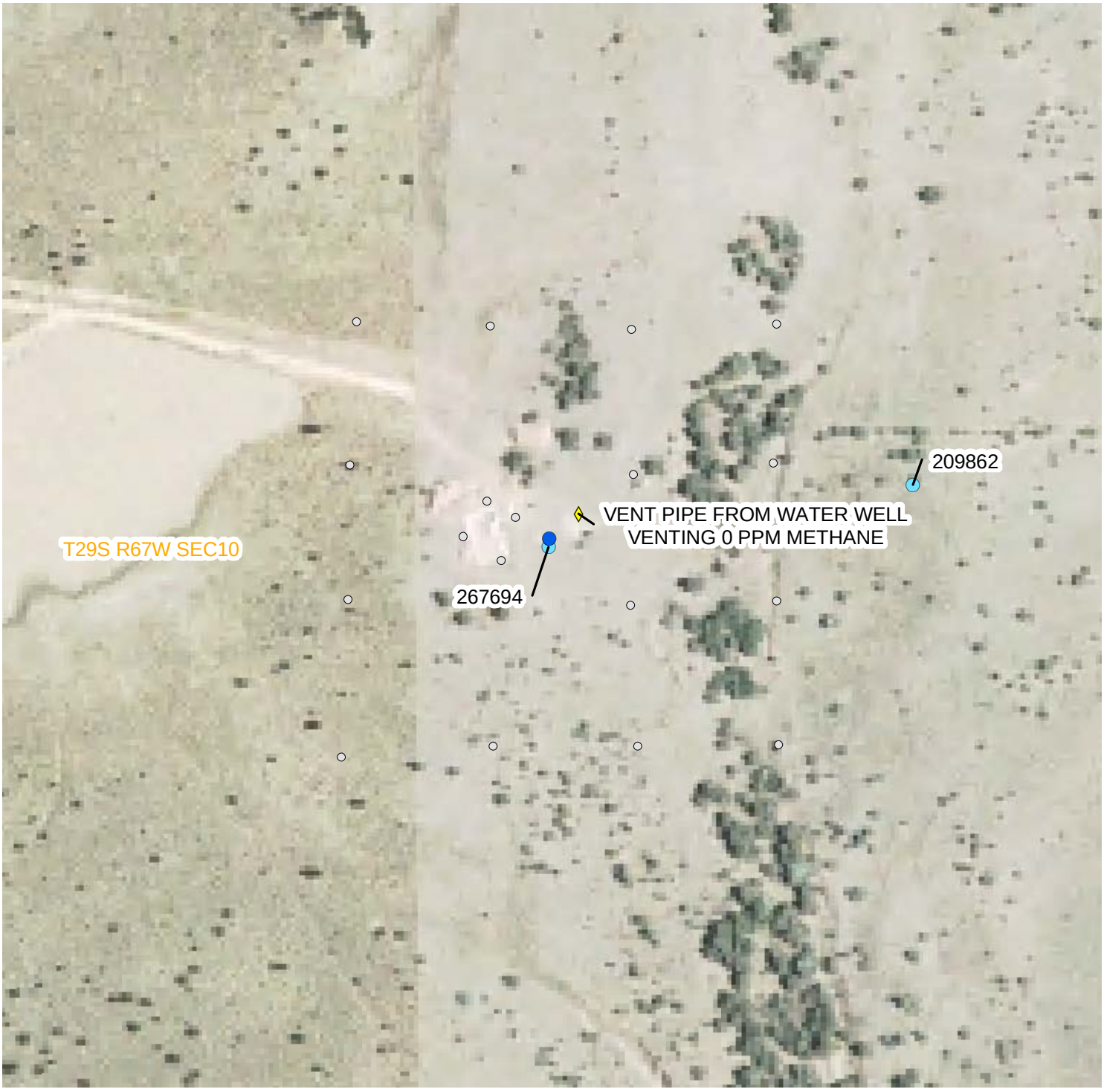

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- SURFACE METHANE MEASUREMENT

0 200 400

Feet

N

SOIL GAS SURVEY PERFORMED ON 11/02/07

DETAILED MAPPING RESULTS
COLEMAN
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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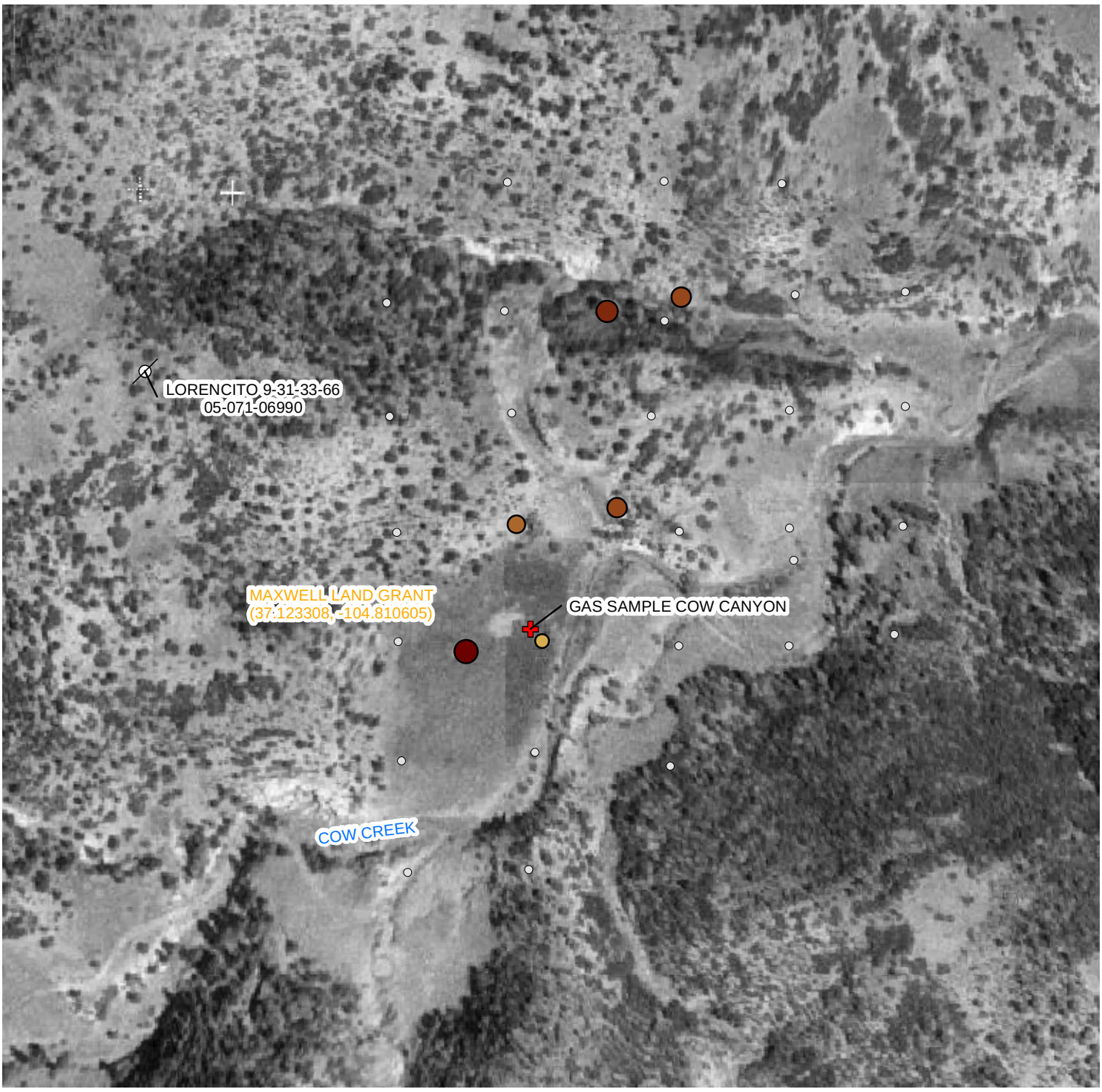

IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

ABANDONED LOCATION

0 250 500

Feet

N

GAS SAMPLE COLLECTED ON 08/29/07
SOIL GAS SURVEY PERFORMED ON 06/20/07

DETAILED MAPPING RESULTS
COW CANYON
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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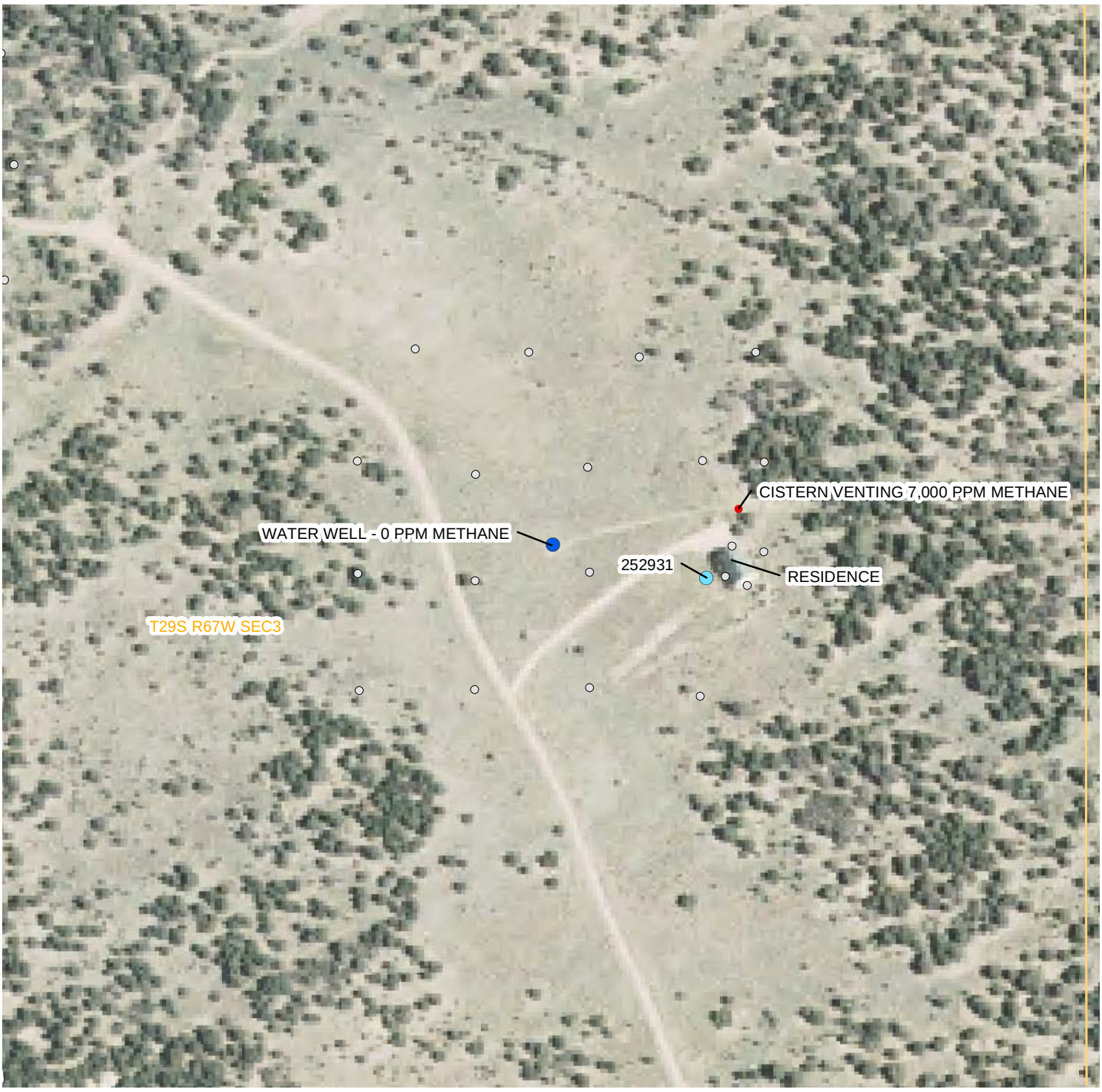

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- SECTION

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 11/01/07

DETAILED MAPPING RESULTS
DEROWITSCH
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

COGCC OIL & GAS WELL (API NO.)

- DRY AND ABANDONED
- SECTION

SOIL GAS SURVEY PERFORMED ON 08/09/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
DICK REALTY & INV CO 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 08/07/07

0 250 500

Feet

N

DETAILED MAPPING RESULTS
FERDINAND B ROHR 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 11/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
FERDINAND B ROHR 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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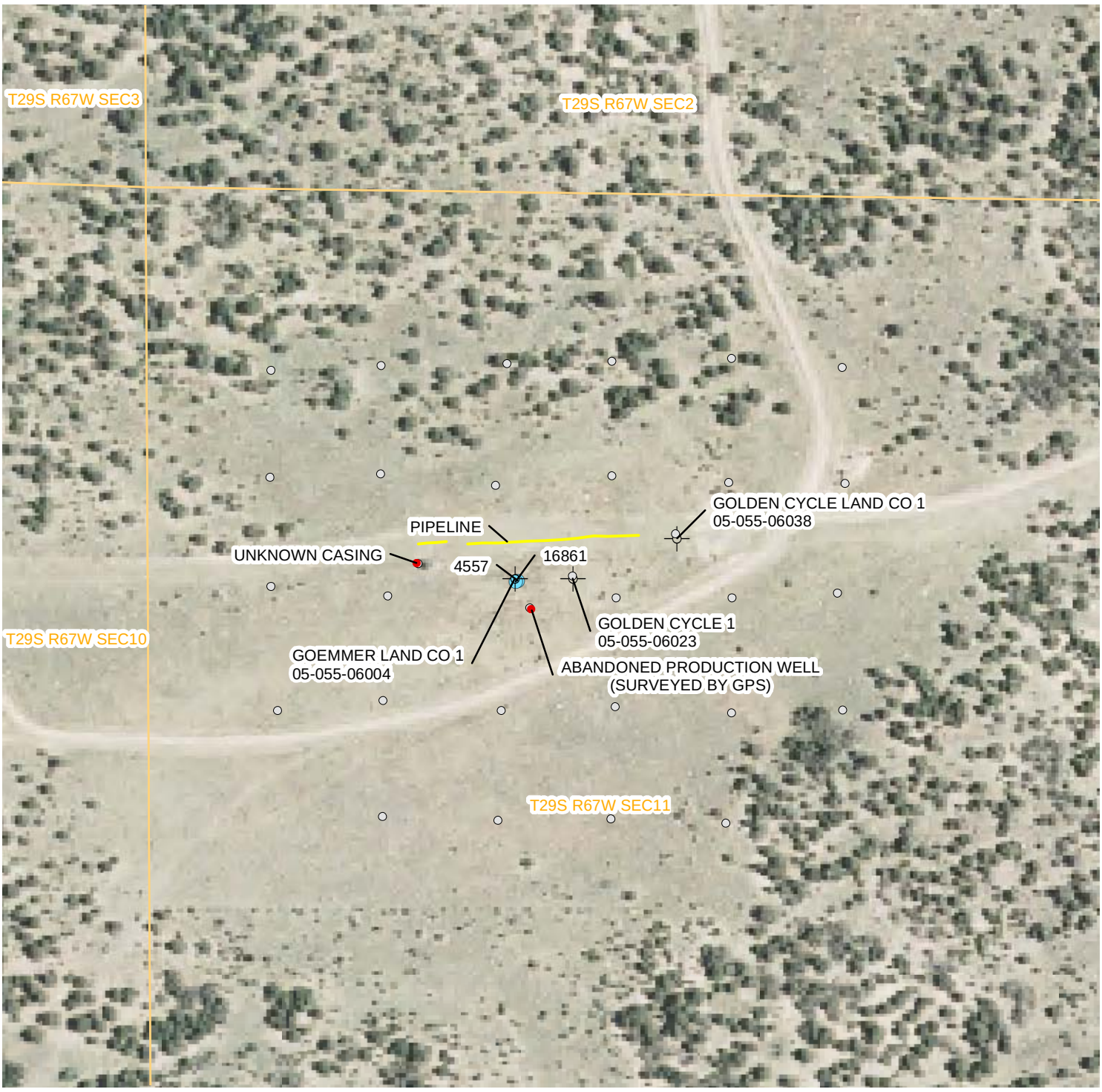

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 08/07/07

0 250 500

Feet

N

DETAILED MAPPING RESULTS
GOEMMER LAND CO 1, GOLDEN CYCLE 1, & GOLDEN CYCLE LAND CO 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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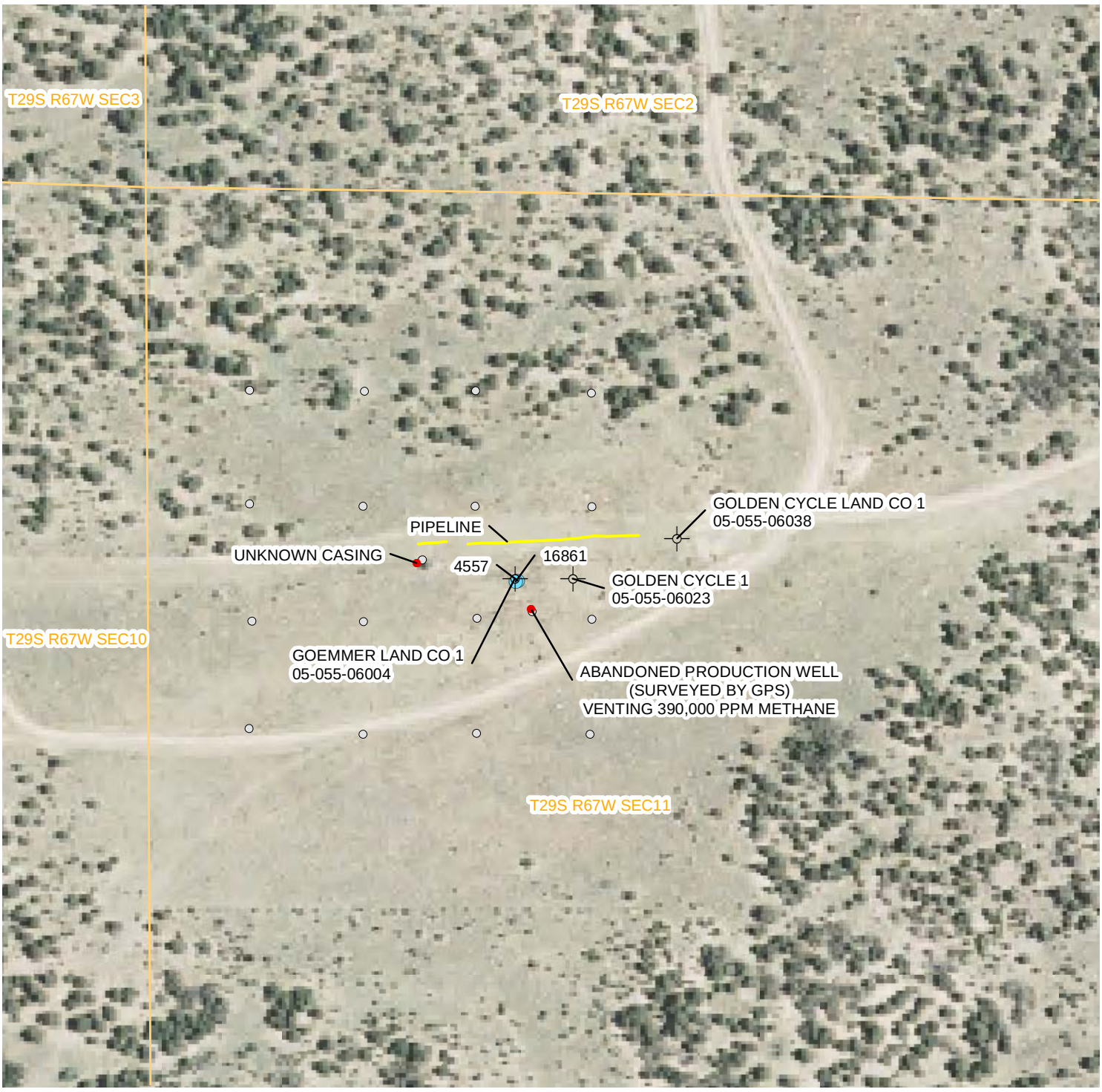

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 08/29/07

0 250 500

Feet

N

DETAILED MAPPING RESULTS
GOEMMER LAND CO 1, GOLDEN CYCLE 1, & GOLDEN CYCLE LAND CO 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

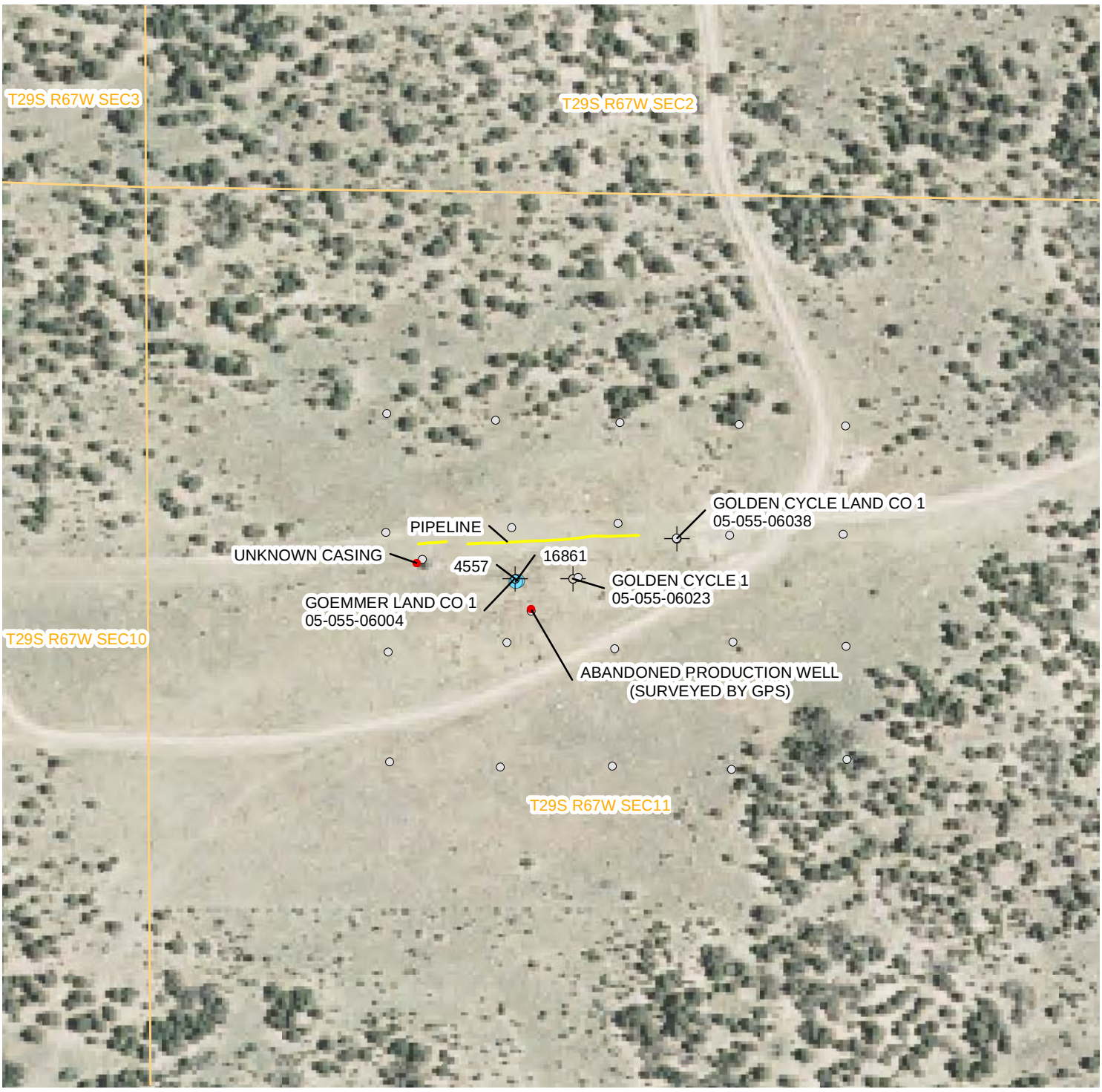

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

SOIL GAS SURVEY PERFORMED ON 11/01/07

- WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

- DRY AND ABANDONED
- SECTION

0 250 500
Feet

N

DETAILED MAPPING RESULTS
GOEMMER LAND CO 1, GOLDEN CYCLE 1, & GOLDEN CYCLE LAND CO 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

ABANDONED LOCATION

DRY AND ABANDONED

0 250 500

Feet

N

SOIL GAS SURVEY PERFORMED ON 07/10/07

DETAILED MAPPING RESULTS
GOLDEN CYCLE 2 & 2-A
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

ABANDONED LOCATION

DRY AND ABANDONED

SOIL GAS SURVEY PERFORMED ON 08/08/07

0 250 500

Feet

N

DETAILED MAPPING RESULTS
GOLDEN CYCLE 2 & 2-A
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF TERRASERVER, 1999

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- GAS SAMPLE LOCATION
- **COGCC OIL & GAS WELL (API NO.)**
- PLUGGED AND ABANDONED
- PRODUCING
- SHUT IN
- LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/29/07
SOIL GAS SURVEY PERFORMED ON 06/18/07

0 500 1,000
Feet

N

DETAILED MAPPING RESULTS
GOLDEN EAGLE MINE
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

COGCC OIL & GAS WELL (API NO.)

- PLUGGED AND ABANDONED
- SECTION

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 08/08/07

DETAILED MAPPING RESULTS
HURTADO 13-04
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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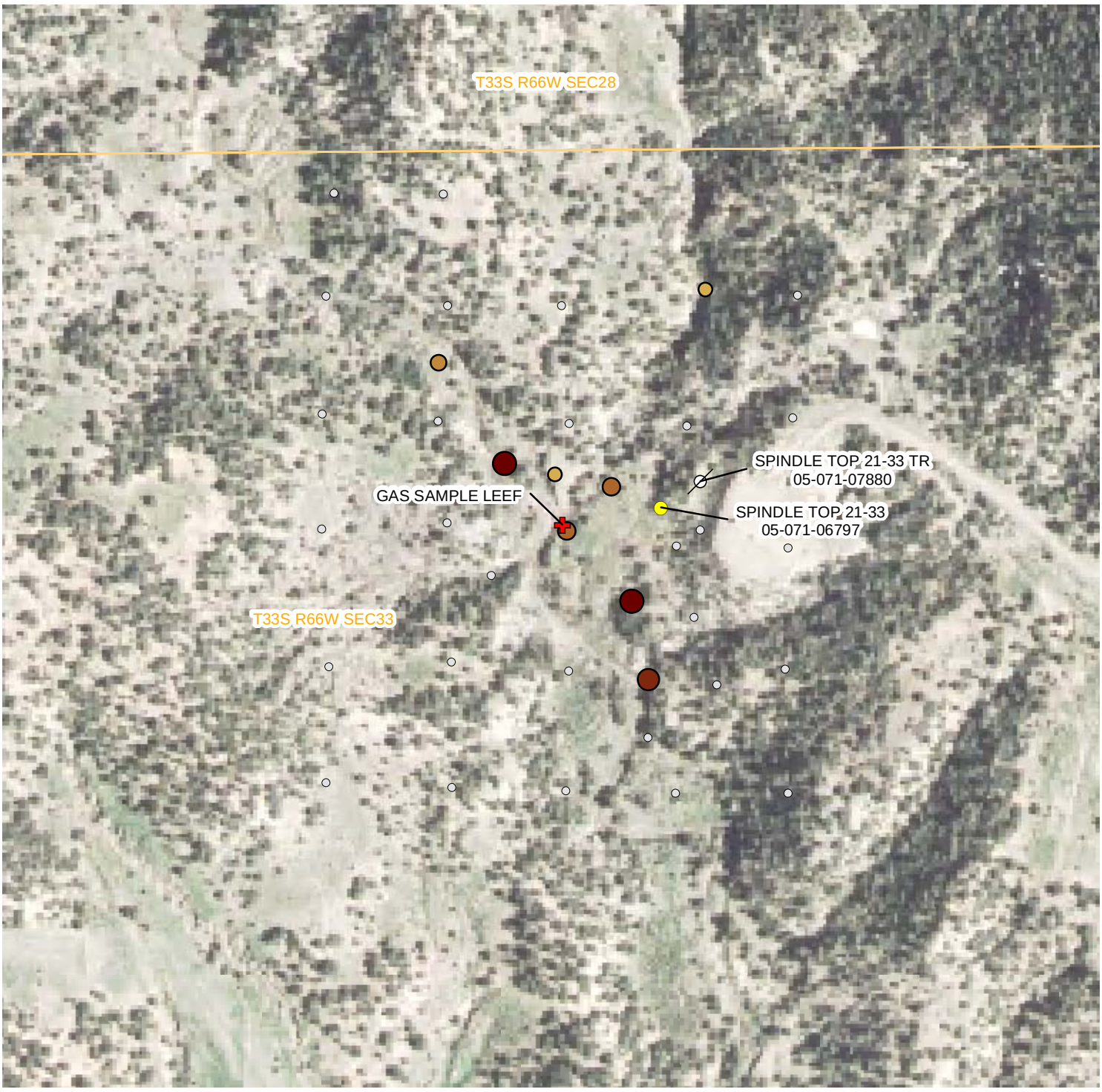

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- GAS SAMPLE LOCATION

COGCC OIL & GAS WELL (API NO.)

- ABANDONED LOCATION
- PRODUCING
- SECTION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 07/02/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
LEEF
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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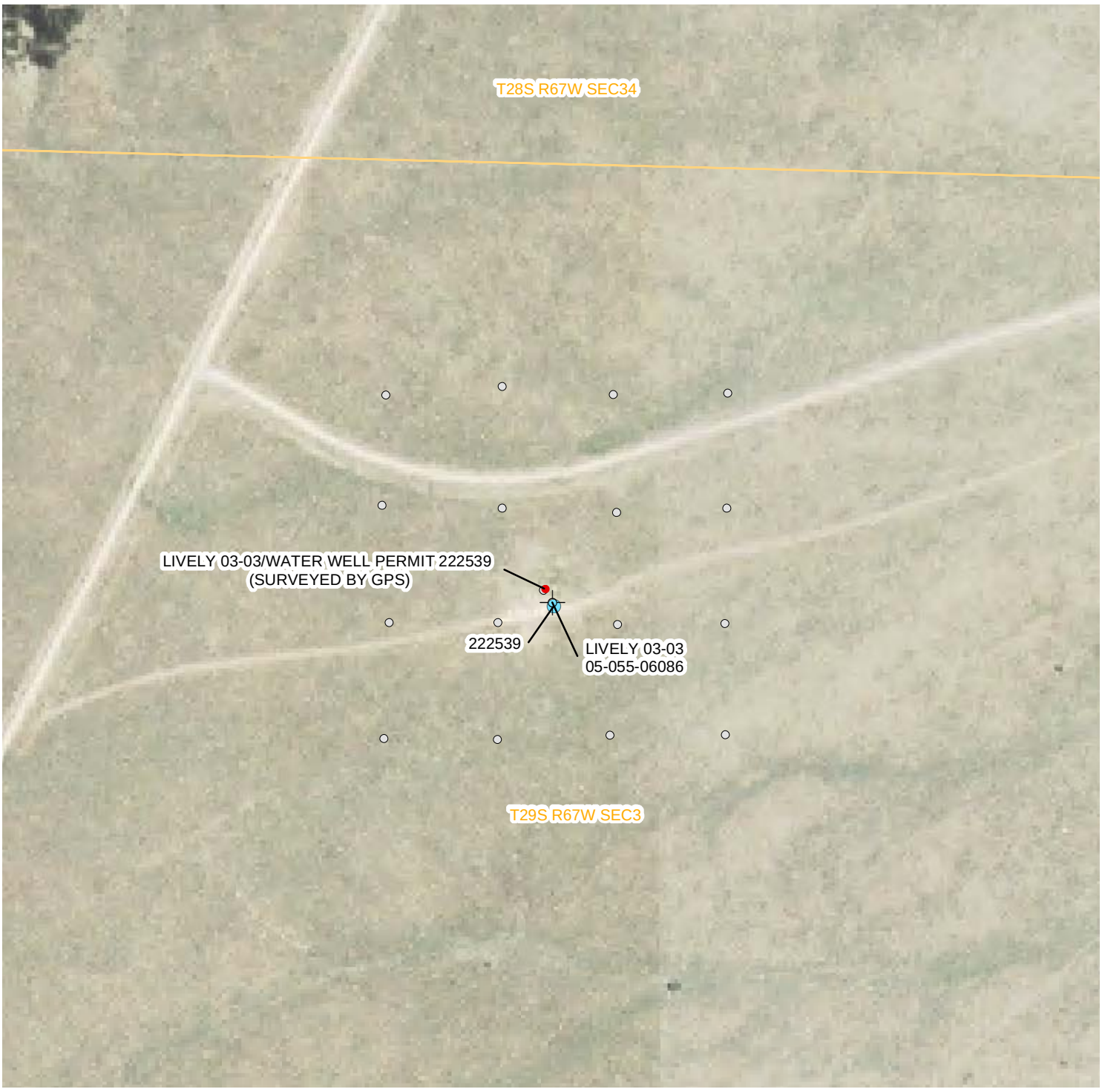

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 08/07/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
LIVELY 03-03
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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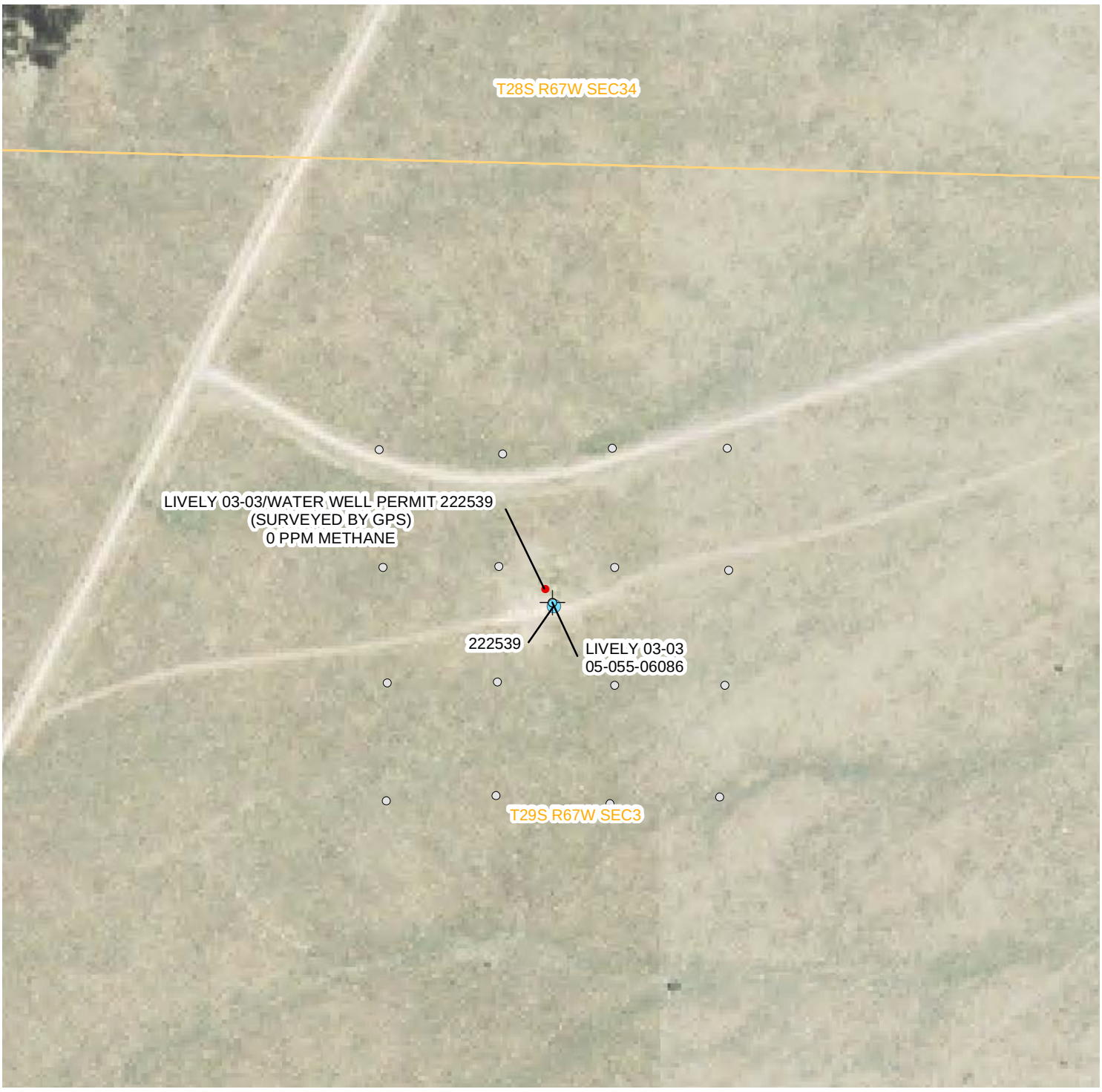

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 11/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
LIVELY 03-03
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (DWR PERMIT NO.)
- DEAD PINE

COGCC OIL & GAS WELL (API NO.)

- PRODUCING

SOIL GAS SURVEY PERFORMED ON 11/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
LIVELY 3-10
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

DEAD JUNIPER

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 07/10/07

0 250 500

Feet

N

DETAILED MAPPING RESULTS
LIVELY 10-02
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

DEAD JUNIPER

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 08/07/07

0 250 500

Feet

N

DETAILED MAPPING RESULTS
LIVELY 10-02
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

COGCC OIL & GAS WELL (API NO.)

- DRY AND ABANDONED
- PRODUCING

0 250 500
Feet

N

SOIL GAS SURVEY PERFORMED ON 08/07/07

DETAILED MAPPING RESULTS
LIVELY 35-11 & LIVELY 35-11 B
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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5b

47111

MADRID BRIDGE

T33S R65W SEC35

Adobe Ranch Road

CO State Highway 12

MONDRAGON RESIDENCE

SAINT RESIDENCE

47112

Purgatoire River

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- APOGEE SEEP
- WATER WELL (DWR PERMIT NO.)
- WATER WELL (SURVEYED BY GPS)
- DEAD COTTONWOOD
- DEAD JUNIPER
- DEAD PINE
- DEAD SCRUB OAK
- DEAD WILLOW

- RAILROAD
- STRESSED/DEAD VEGETATION

SOIL GAS SURVEY PERFORMED ON 05/23/07, 05/24/07, & 06/19/07

IMAGE COURTESY OF USGS/NRCS, 2006

0 250 500

Feet

N

DETAILED MAPPING RESULTS
MONDRAGON/SAINT
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\Mondragon_Seep5b_MadridBridge.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- GAS SAMPLE LOCATION
- SECTION

GAS SAMPLE COLLECTED ON 08/30/07
SOIL GAS SURVEY PERFORMED ON 06/20/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
PLOSKI
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USDA, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2005

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE
- SECTION

0 150 300
Feet

N

GAS SAMPLE COLLECTED ON 04/23/07
SOIL GAS SURVEY PERFORMED ON 04/18/07 & 04/24/07

DETAILED MAPPING RESULTS
PRIMERO
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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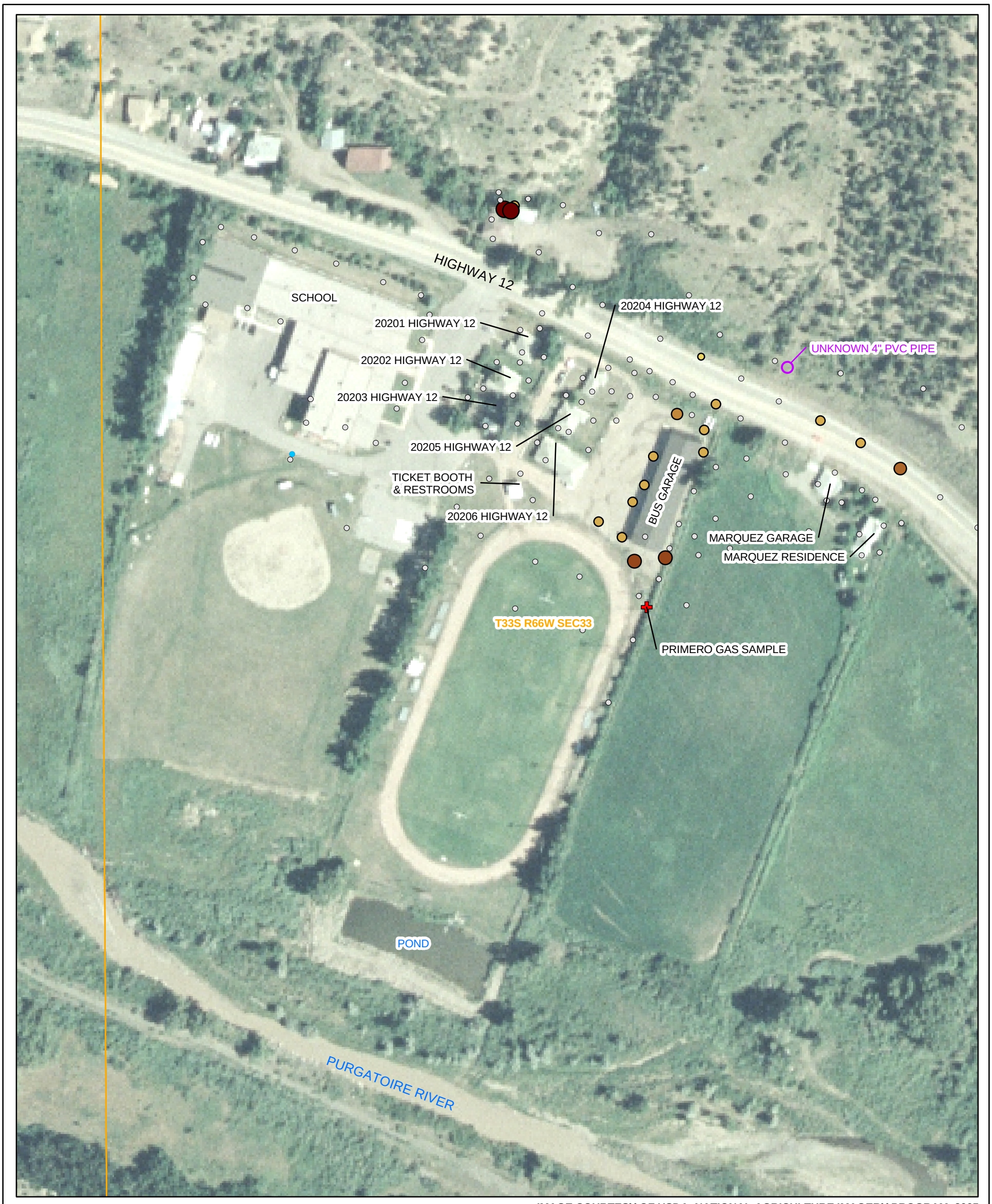

IMAGE COURTESY OF USDA, NATIONAL AGRICULTURE IMAGERY PROGRAM, 2005

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (SURVEYED BY GPS)
- GAS SAMPLE
- SECTION

0 150 300

Feet

N

GAS SAMPLE COLLECTED ON 04/23/07
SOIL GAS SURVEY PERFORMED ON 05/22/07

DETAILED MAPPING RESULTS
PRIMERO
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\11x17_Primero.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

WATER WELL (DWR PERMIT NO.)

COGCC OIL & GAS WELL (API NO.)

DRY AND ABANDONED

SECTION

SOIL GAS SURVEY PERFORMED ON 08/07/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
STAN SEARLE 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

P:\COGCC - Raton Basin\GIS\MXD\8x11_Raton_seeps.mxd

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- WATER WELL (DWR PERMIT NO.)
- SURFACE METHANE MEASUREMENT

COGCC OIL & GAS WELL (API NO.)

- DRY AND ABANDONED
- SECTION

SOIL GAS SURVEY PERFORMED ON 11/01/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
STAN SEARLE 1
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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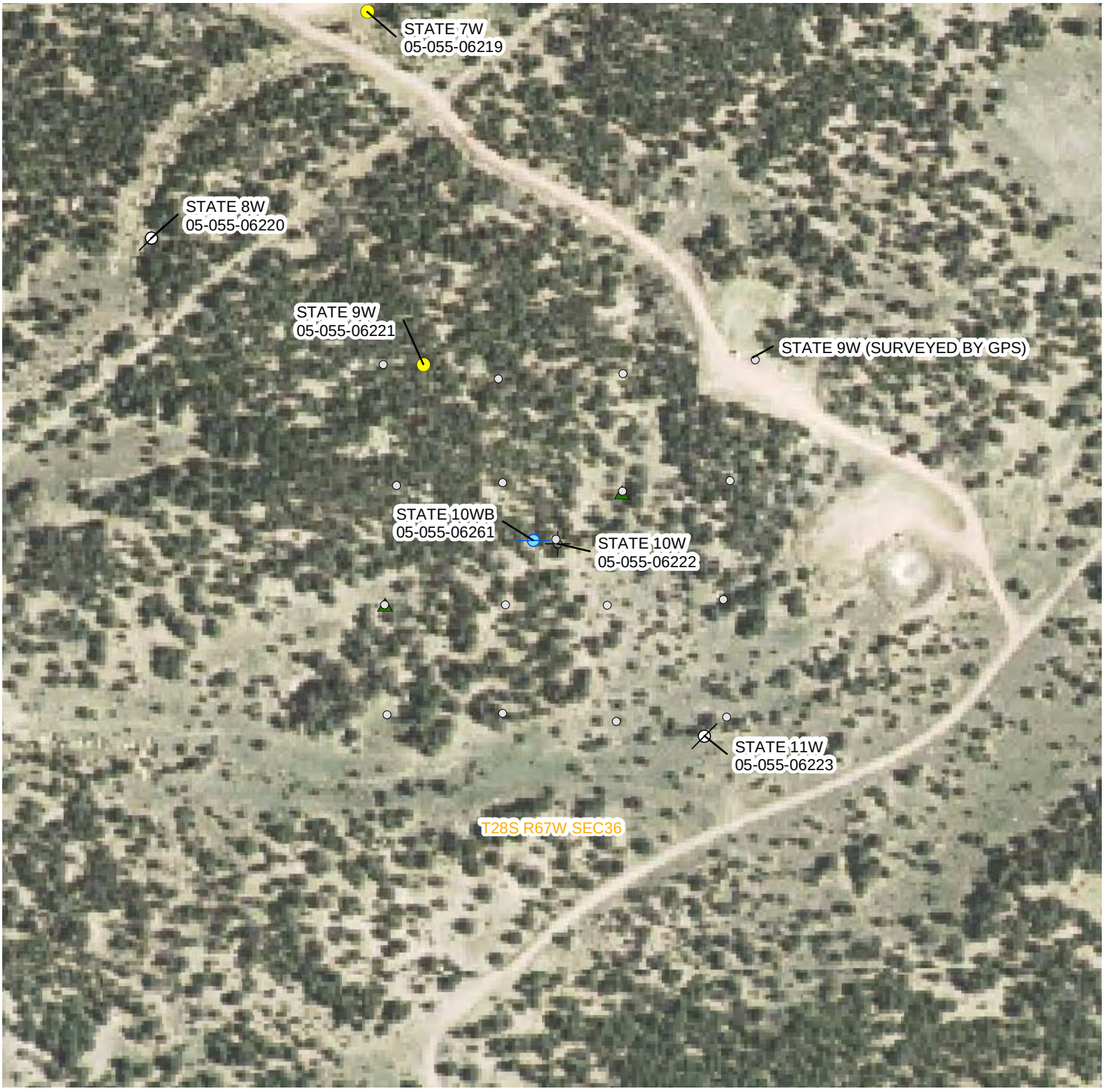

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

SUBSURFACE METHANE MEASUREMENTS

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

- DEAD PINE

COGCC OIL & GAS WELL (API NO.)

- ABANDONED LOCATION
- DRY AND ABANDONED
- PRODUCING
- SHUT IN

SOIL GAS SURVEY PERFORMED ON 08/08/07

0 250 500
Feet

N

DETAILED MAPPING RESULTS
STATE 10W & STATE 10WB
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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APPENDIX I

METHANE FLUX ESTIMATE DOCUMENTATION

Procedures for Methane Flux Estimates

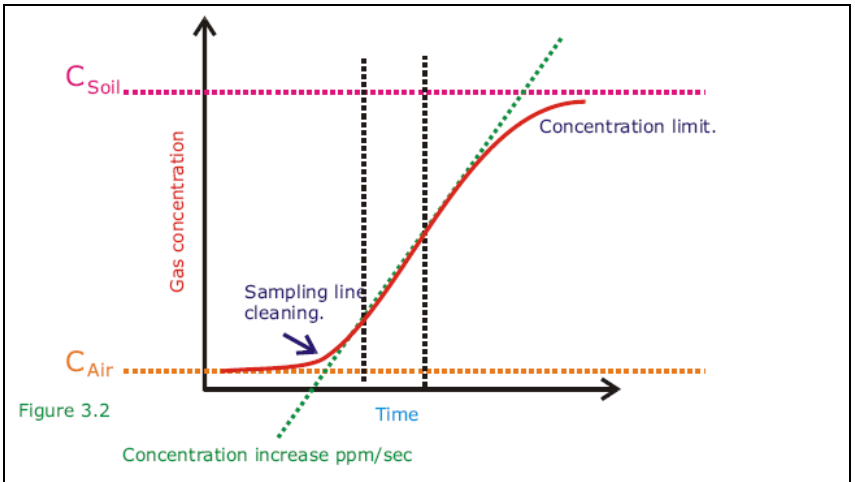
LT Environmental, Inc. (LTE) utilized a West Systems portable flux meter to measure the methane flux from two seep areas in the Raton Basin. The two seep areas include the seep at Apogee 643 at the Houpt residence and at Apogee 644 near the Bounds residence. Both seeps appear to be natural seeps from coal outcrops.

Data Collection

On November 5, 2007, LTE was on site to collect flux data using the portable flux meter. At the Apogee 643 site, LTE collected 50 measurements from a sample grid using a 175-foot grid spacing. At the Apogee 644 site, LTE collected 21 measurements from a sample grid using a 200-foot grid spacing. The data collected are reported in an attached print-out.

How the Meter Works

The flux meter measures the concentration accumulation rate in a chamber of known volume over a known area. As the concentration builds over time, the meter measures the slope of the line representing the accumulation rate of methane gas, hydrogen sulfide gas, and carbon dioxide gas. Temperature and pressure are also measured by sensors in the unit. Lines are fit to the curves of the data collected, the slope of the line is then proportional to the flux once temperature and pressure are considered. The following diagram and associated text explains this concept.



C_{Air} is the target gas air concentration, 350 ppm in the case of carbon dioxide , few ppm in the case of other gases. C_{Soil} is the target gas concentration in the soil. A very long recording period is necessary to reach the limit C_{Soil} concentration.
In the first part of the flux curve a "sampling line cleaning" area is highlighted : in this area the gas pumped from the accumulation chamber is replacing the gas into the pump, the tubes and the cell detector cell(Dead volumes). The cleaning efficiency depends on the dead volumes and on the pumping flow. The effect of the pumping flow on the flux measurement accuracy is discussed in chapter 4.
When the target gas concentration become close to the soil concentration the flux curve slope decreases. Normally the flux curve recording time in not enough to highlight this effect. The carbon dioxide concentration in the anomalous soils is normally more than 5%.
The two vertical lines delimit the good flux curve interval where to compute the flux.

Portable diffuse flux meter LI820 Carbon Dioxide & DX6100-Methane Release 5.39 January 2006 Handbook, West Systems

Processing the Data

Once the data were collected, the West Systems datafiles for each data point were processed. For each measurement point, the data files reported the temperature, pressure, and slope (measured in parts per million per second [ppm/sec]) of the flux curve. The Accumulation Chamber Factor (A.c.K.) is also required to perform the flux estimate. The A.c.K. is calculated using the formula:

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

Where

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

The dimensions of the A.c.K. are

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

Portable diffuse flux meter LI820 Carbon Dioxide & DX6100-Methane Release 5.39 January 2006 Handbook, West Systems

The flux, measured in moles per square meter per day (mol/m^2/day) was then calculated at each measurement point by multiplying the slope of the flux curve by the A.c.K.

Estimating the Total Flux

These flux data were then gridded, interpolated, and contoured using Surfer®. The volume under the interpolated surface was calculated using the Kriging algorithm in Surfer®. The maps of the flux values at each measurement point and the maps showing the contoured values at both the Apogee 643 and Apogee 644 sites are attached.

The estimated emissions for the two seep areas reported in moles per day (mol/day) are shown in the following table:

Site ID	CH_4 (mol/day)	CO_2 (mol/day)	H_2S (mol/day)
Apogee 643	155,554	43,108	175
Apogee 644	14,649	8,482	25

For a better perspective of the methane flux rates, LTE converted the methane values into units of cubic feet per day (CFD). The unit conversion is based on the molecular weight of methane and the density of methane at approximately 7,000 feet above mean sea level as follows:

$$\frac{\text{mol } CH_4}{\text{day}} \times \frac{16.04276 \text{ g } CH_4}{\text{mol } CH_4} \times \frac{0.0698 \text{ ft}^3 CH_4}{\text{g } CH_4} = \frac{\text{ft}^3 CH_4}{\text{day}}$$

Therefore,

The estimated methane flux at Apogee 643 is 174,186 CFD or 174 MCFD. The estimated flux at Apogee 644 is 16,403 CFD or 16 MCFD.

Estimating the total emissions over each of these seep areas carries a very high degree of uncertainty. This uncertainty is largely due to the fact the majority of the estimated flux is associated with only one or two points in the sample grid. A more detailed survey with a smaller grid spacing would help in reducing this uncertainty. Additional uncertainty in the estimate lies with not fully understanding the subsurface flow regime (i.e. homogeneous flow or fracture flow), seasonal or possibly daily changes in flow rate, and/or changes in barometric pressure.

Statistical Evaluation Method

LTE explored a more complex statistical procedure used by the manufacturer of the portable flux meter. However, this procedure was developed for use at landfills measuring biogas seepage. Landfills typically have a more uniform flow regime as compared to coal bed methane seeps. The procedure involves a statistical method developed by A.J. Sinclair in 1974 to select threshold values in geochemical data using probability graphs.

Essentially, the method is looking at the variance among the data and establishes uncertainty control. It calculates one flux rate to be applied over the entire seep area based on the statistical distribution of all the flux rate values collected. While the method is useful in quantifying uncertainty in the variance of the data, it does not account for all of the other factors of uncertainty in the estimate such as the significant spatial variability of the data collected in an area where methane seepage likely occurs through preferential pathways.

LTE found that this statistical method under-predicted the methane flux in another project area in Colorado where a large flux chamber has been installed to measure methane flux over an area of approximately 850 square feet. Therefore, LTE opted to utilize the data collected, grid and interpolate the data to account for spatial variability, and estimate the flux from the seep area using Surfer®.

Conclusions

The estimation of methane flux over a large area has a high degree of uncertainty and is strongly influenced by only a few measurements. Additional measurement locations can help reduce uncertainty by reducing the effect of data variability.

Apogee 643 Flux Data
(flux meter)

SitePt	LocList.Easting	LocList.Northing	CH4flux (mol/m^2 day)	H2Sflux (mol/m^2 day)	CO2flux (mol/m^2 day)	GPS_Height (feet)	Chamber	Temp_DegC (Deg C)	Pressure (mb)	CH4slope (ppm/sec)	H2Sslope (ppm/sec)	CO2slope (ppm/sec)	AcK (mol/m^2 day)/(ppm/sec)
apogee643-01	3205635.849	1342722.215	0.08748701	0.000253586	0.09509458	6327.443	A	27.3213	814.66	0.345	0.001	0.375	0.253585553
apogee643-02	3205420.589	1342709.28	0.2147645	0.00025326	0.06660739	6304.485	A	27.7075	814.66	0.848	0.001	0.263	0.253260034
apogee643-03	3205239.247	1342716.392	1.546577	0.000252667	0.2754074	6299.11	A	27.9616	813.44	6.121	0.001	1.09	0.252667364
apogee643-04	3205034.841	1342715.188	0.2944815	0.000256517	0.04258182	6297.881	A	28.0004	825.94	1.148	0.001	0.166	0.256517008
apogee643-05	3204836.294	1342712.056	0.104955	0	0.06492325	6290.315	A	28	826.25	0.409	0	0.253	0.256613627
apogee643-06	3204822.41	1342912.648	0	0	0.02200696	6282.319	A	27.8723	814.12	0	0	0.087	0.2529536
apogee643-07	3205025.576	1342914.151	0	0	0.04356997	6285.165	A	27.7434	814.93	0	0	0.172	0.253313745
apogee643-08	3205218.71	1342915.298	0	0.000506355	0.02886225	6294.763	A	27.8387	814.75	0	0.002	0.114	0.253177606
apogee643-09	3205428.389	1342912.048	0	0.000252874	0.02048278	6302.483	A	28.0671	814.39	0	0.001	0.081	0.25287385
apogee643-10	3205625.739	1342913.273	0.2462254	0.000505078	0.05656871	6306.293	A	28.2	813.67	0.975	0.002	0.224	0.252538862
apogee643-11	3205823.369	1342918.603	0.5418195	0	0.1319849	6313.794	A	28.364	813.54	2.147	0	0.523	0.252361174
apogee643-12	3206020.357	1342916.656	30.23339	0.000504352	5.334533	6323.083	A	28.5	813.31	119.89	0.002	21.154	0.252176082
apogee643-13	3206021.932	1343107.016	0	0.000251996	0.02267968	6315.865	A	28.6	813	0	0.001	0.09	0.251996424
apogee643-14	3205829.722	1343113.217	0.180873	0	0.6094687	6304.585	A	28.5808	813.81	0.717	0	2.416	0.252263542
apogee643-15	3205624.293	1343110.478	0.2413853	0	0.4512088	6294.52	A	28.3522	813.94	0.956	0	1.787	0.252495136
apogee643-16	3205423.155	1343115.184	0	0.000253349	0.09601913	6296.45	A	27.8349	815.29	0	0.001	0.379	0.253348605
apogee643-17	3205226.907	1343100.765	0	0.000253585	0.02865512	6286.25	A	27.2701	814.52	0	0.001	0.113	0.253585185
apogee643-18	3205013.149	1343104.056	0	0.000254158	0.02795734	6278.217	A	26.5935	814.52	0	0.001	0.11	0.254157593
apogee643-19	3205625.701	1343311.215	0	0.000254762	0.05986897	6288.402	A	25.982	814.79	0	0.001	0.235	0.254761576
apogee643-20	3206225.014	1342909.538	1.067847	0.000256079	0.3042212	6321.496	A	23.7534	812.9	4.17	0.001	1.188	0.256078468
apogee643-21	3206219.964	1343113.113	0	0.00025532	0.02987247	6315.088	A	24.6351	812.9	0	0.001	0.117	0.255320256
apogee643-22	3206166.255	1342998.167	0.09077024	0	0.06756773	6324.911	A	25.3383	813.71	0.356	0	0.265	0.254972564
apogee643-23	3206425.389	1342916.935	0.144086	0.00025412	0.03354383	6312.991	A	25.9938	812.77	0.567	0.001	0.132	0.254119955
apogee643-24	3206422.888	1342720.071	0.06913349	0	0.03609175	6298.433	A	26.2215	813.54	0.272	0	0.142	0.254167237
apogee643-25	3206429.721	1342510.619	0.0410924	0	0.02485836	6298.358	A	26.7244	813.27	0.162	0	0.098	0.253656778
apogee643-26	3206628.863	1342511.136	0.04151366	0.000253132	0.0622705	6275.026	A	27.5455	813.81	0.164	0.001	0.246	0.25313209
apogee643-27	3206826.194	1342515.394	0.08053841	0.001262357	0.05832092	6278.584	A	28.4323	814.08	0.319	0.005	0.231	0.252471492
apogee643-28	3206228.269	1342509.213	0.2461847	0.00025198	0.1000361	6302.635	A	29.0203	814.08	0.977	0.001	0.397	0.251980202
apogee643-29	3206230.421	1342715.502	0.1963556	0.000251416	0.1060974	6304.874	A	29.3975	813.27	0.781	0.001	0.422	0.251415642
apogee643-30	3206025.401	1342508.394	0.1684084	0.000501962	0.07981202	6322.129	A	29.8355	813.04	0.671	0.002	0.318	0.250981192
apogee643-31	3205832.166	1342519.605	0.1134028	0.001003565	0.0795325	6310.13	A	30.1455	813.58	0.452	0.004	0.317	0.250891188
apogee643-32	3205627.22	1342517.467	0.1028343	0.00050041	0.03202625	6333.231	A	30.3716	811.96	0.411	0.002	0.128	0.250205091
apogee643-33	3205422.997	1342518.635	0.1454863	0.00074993	0.0287473	6332.103	A	30.7352	812.19	0.582	0.003	0.115	0.249976509
apogee643-34	3205227.362	1342520.388	0.3438037	0	0.09144778	6304.387	A	30.9962	812.5	1.376	0	0.366	0.249857325
apogee643-35	3205031.27	1342514.597	0.2290632	0.000249796	0.05545476	6302.224	A	31.1567	812.73	0.917	0.001	0.222	0.249796234
apogee643-36	3204825.249	1342517.091	0	0.000249713	0.01223594	6303.594	A	31.3105	812.87	0	0.001	0.049	0.249713056
apogee643-37	3205233.179	1342323.002	0	0.000249287	0.02767085	6340.084	A	31.8947	813.04	0	0.001	0.111	0.249286947
apogee643-38	3205432.638	1342315.301	0.03829907	0.000248695	0.2061684	6327.411	A	32.2143	811.96	0.154	0.001	0.829	0.248695246
apogee643-39	3205632.75	1342313	0.205809	0.000248262	0.1055112	6328.487	A	32.6948	811.82	0.829	0.001	0.425	0.248261718
apogee643-40	3205441.312	1342123.893	0.1706344	0.00049531	0.04953103	6329.905	A	33.3948	811.69	0.689	0.002	0.2	0.247655144
apogee643-41	3205827.371	1342311.951	0.1954698	0.002474301	0.07200217	6323.956	A	34.1839	813.04	0.79	0.01	0.291	0.247430115
apogee643-42	3206024.513	1342316.171	0	0	0.02228721	6312.415	A	36.6724	811.29	0	0	0.091	0.244914456
apogee643-43	3206227.515	1342107.058	0.08794571	0.000489948	0.03356146	6284.762	A	36.7	811.56	0.359	0.002	0.137	0.244974141
apogee643-44	3206233.798	1341913.138	0.3982692	0.001718794	0.3597191	6271.083	A	36.6995	813.44	1.622	0.007	1.465	0.245542026
apogee643-45	3206426.345	1341910.134	0	0.001227333	0.06529411	6260.545	A	36.7452	813.31	0	0.005	0.266	0.245466581
apogee643-46	3206126.641	1341713.992	0	0.000736133	0.05054777	6266.129	A	36.8043	813.17	0	0.003	0.206	0.245377531
apogee643-47	3205827.418	1342108.033	0	0.003234208	0.03060058	6308.157	A	36.7656	824.36	0	0.013	0.123	0.248785225
apogee643-48	3205827.676	1342723.868	4.626858	0.000985696	0.6813625	6321.741	A	34.3	810.04	18.776	0.004	2.765	0.246424043
apogee643-49	3206023.421	1342714.103	1.192884	0	0.5772178	6319.436	A	34.3	810.17	4.84	0	2.342	0.24646359
apogee643-50	3205715.771	1342798.048	1.498049	0.001233165	1.215161	6311.755	A	34.1912	810.44	6.074	0.005	4.927	0.246633006

Grid Volume Computations

Wed Nov 28 13:24:21 2007

Upper Surface

Grid File Name:	C:\DatabaseBackup\SUtes\RatonFlux2007\HouptChamberCH4.grd
Grid Size:	80 rows x 100 columns
X Minimum:	3204822.41
X Maximum:	3206826.194
X Spacing:	20.240242424242
Y Minimum:	1341713.992
Y Maximum:	1343311.215
Y Spacing:	20.218012658228
Z Minimum:	-2.1410138911948
Z Maximum:	28.340501487579

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	1

Total Volumes by:

Trapezoidal Rule:	1253977.589148
Simpson's Rule:	1254308.3331392
Simpson's 3/8 Rule:	1254190.2535083

Cut & Fill Volumes

Positive Volume [Cut]:	1674375.1136811
Negative Volume [Fill]:	420352.56114641
Net Volume [Cut-Fill]:	1254022.5525347

Areas

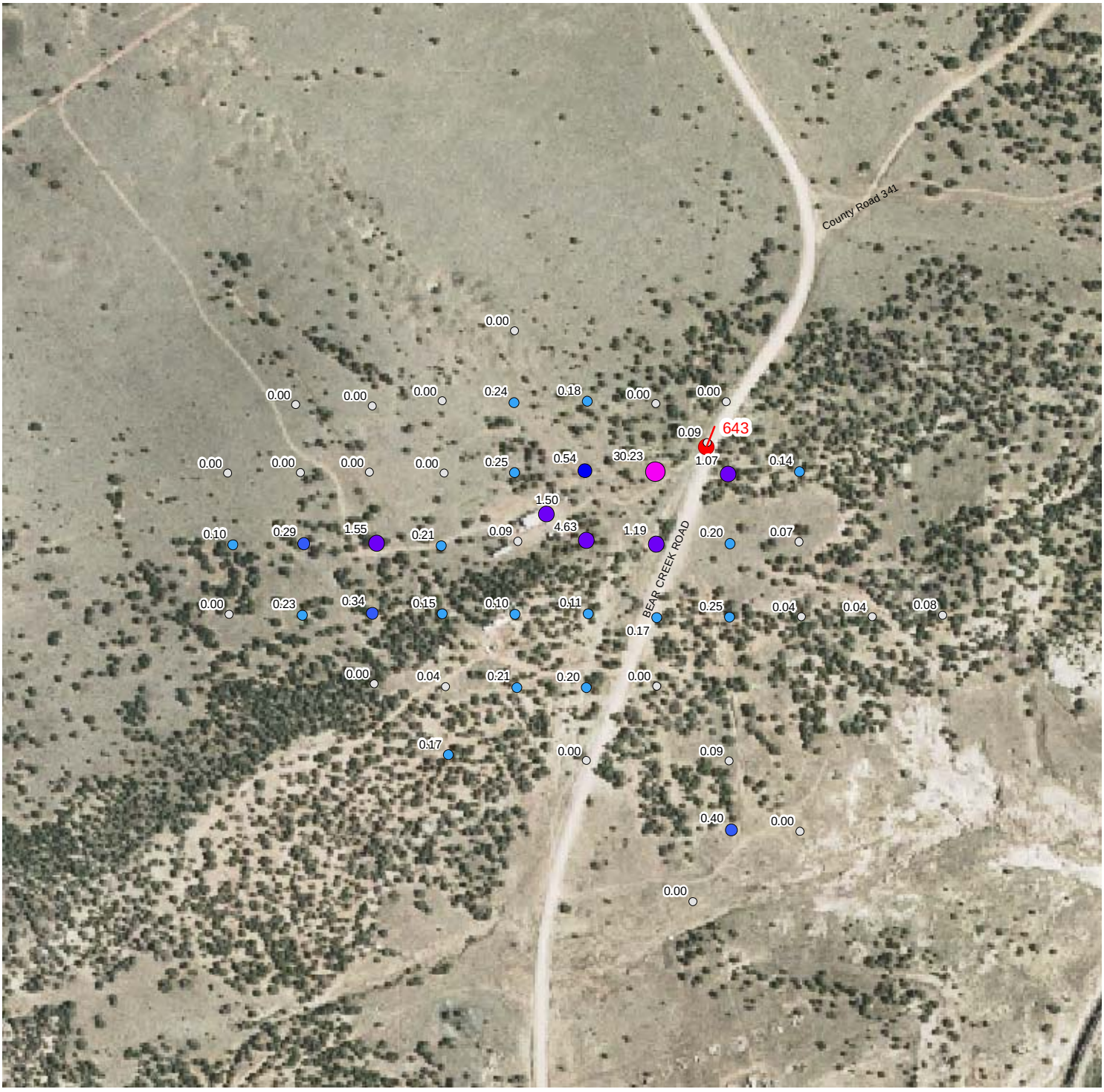
Planar Areas

Positive Planar Area [Cut]:	2144563.4691139
Negative Planar Area [Fill]:	1055926.4227181

Blanked Planar Area:	0
Total Planar Area:	3200489.891832

Surface Areas

Positive Surface Area [Cut]:	2145572.2477967
Negative Surface Area [Fill]:	1055937.7076245



LEGEND

IMAGE COURTESY OF USGS/NRCS, 2006

METHANE FLUX MEASUREMENTS (mol/m^2 day)

- 0.000 - 0.100
- 0.101 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01- 5.00
- 5.01 - 10.00
- 10.01 - 30.24

APOGEE SEEP

METHANE FLUX MEASUREMENTS ARE LABELED IN MOLES PER SQUARE METER PER DAY (mol/m^2 day)

0 400 800

Feet

N

FLUX SURVEY PERFORMED ON 11/05/07 & 11/06/07

METHANE FLUX MEASUREMENT MAP
APOGEE SEEP ID 643 (HOUPT)
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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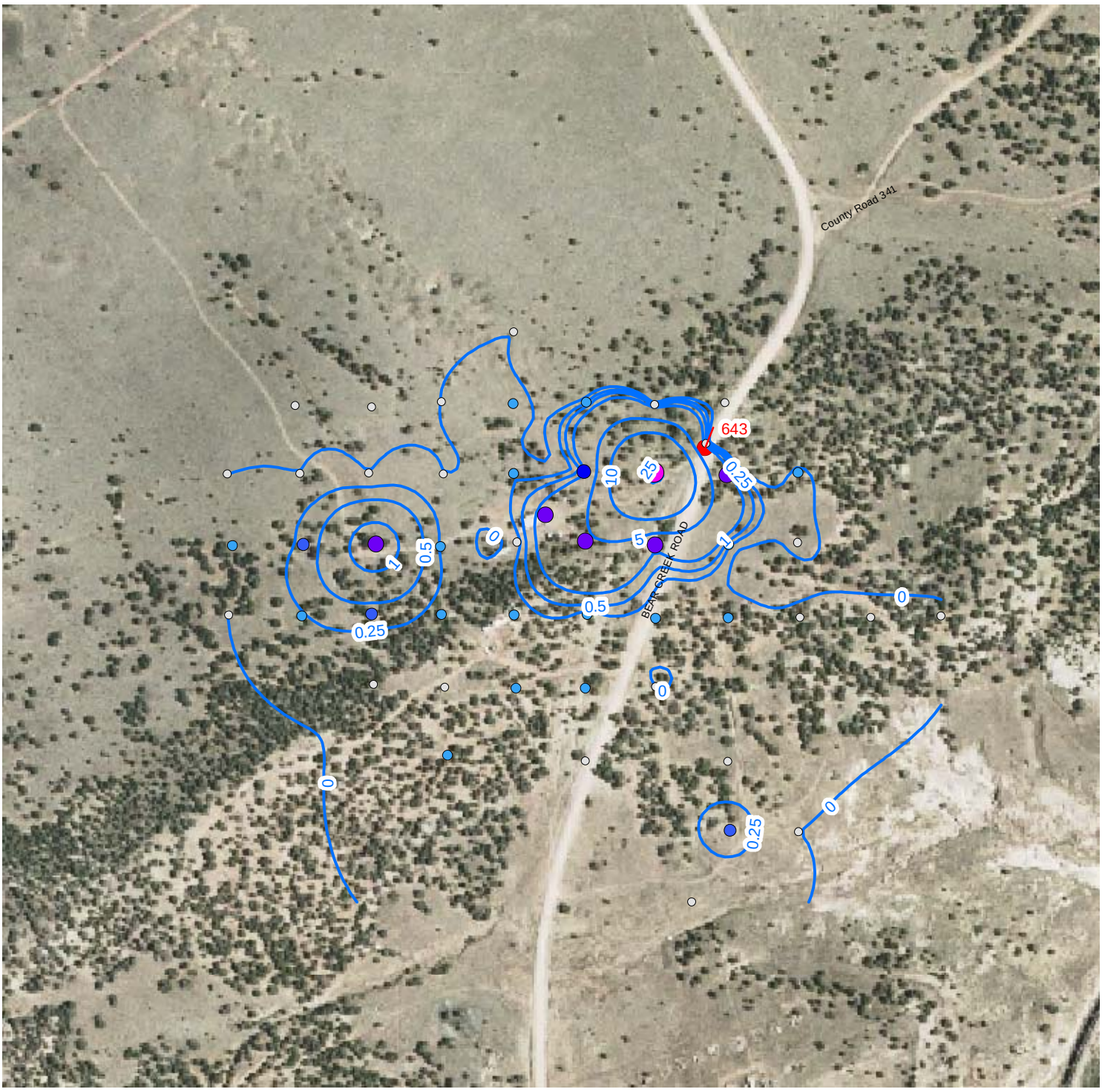

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

METHANE FLUX MEASUREMENTS (mol/m^2 day)

- 0.000 - 0.100
- 0.101 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01- 5.00
- 5.01 - 10.00
- 10.01 - 30.24

APOGEE SEEP

METHANE FLUX CONTOUR (mol/m^2 day)

mol/m^2 day - MOLES PER SQUARE METER PER DAY

0 400 800

Feet

N

FLUX SURVEY PERFORMED ON 11/05/07 & 11/06/07

METHANE FLUX CONTOUR MAP
APOGEE SEEP ID 643 (HOUPT)
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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Apogee 644 Flux Data
(flux meter)

SitePt	LocList.Easting	LocList.Northing	CH4flux (mol/m^2 day)	H2Sflux (mol/m^2 day)	CO2flux (mol/m^2 day)	GPS_Height (feet)	Chamber	Temp_DegC (Deg C)	Pressure (mb)	CH4slope (ppm/sec)	H2Sslope (ppm/sec)	CO2slope (ppm/sec)	AcK (mol/m^2 day)/(ppm/sec)
bounds01	3179201.355	1311254.358	0.2634039	0.000726298	0.7183083	7083.521	A	31.1076	787.56	1.088	0.003	2.967	0.242099184
bounds02	3179315.596	1311337.502	1.046413	0.000725836	1.290536	7087.794	A	31.5099	788.1	4.325	0.003	5.334	0.241945274
bounds03	3179303.964	1311161.189	0	0.000734902	0.03968471	7084.463	A	31.6	798.18	0	0.003	0.162	0.244967369
bounds04	3179101.836	1310946.04	0.03462177	0.000484221	0.1394555	7093.266	A	31.5611	788.77	0.143	0.002	0.576	0.242110275
bounds05	3179300.251	1310750.705	0.2095364	0.000967836	0.03895538	7060.302	A	31.2724	787.53	0.866	0.004	0.161	0.241958906
bounds06	3179306.119	1310950.645	0	0.000484582	0.03270925	7065.495	A	31.0099	787.93	0	0.002	0.135	0.242290726
bounds07	3179206.02	1311148.145	0.2725834	0.000485456	0.2614179	7078.185	A	30.7357	788.64	1.123	0.002	1.077	0.242727872
bounds08	3179102.473	1311156.831	0	0.000242809	0.07114315	7086.645	A	30.5682	788.47	0	0.001	0.293	0.242809384
bounds09	3179103.653	1311250.356	10.36007	0.00024259	0.7656154	7087.619	A	30.4375	787.42	42.706	0.001	3.156	0.242590431
bounds10	3179103.759	1311343.891	0	0.000242682	0.09537406	7104.647	A	30.3113	787.39	0	0.001	0.393	0.242682071
bounds11	3178911.341	1311357.934	0	0.000989382	0.2080175	7124.782	A	24.8055	787.96	0	0.004	0.841	0.247345422
bounds12	3178908.923	1311157.863	0.1806972	0.000245847	0.2999328	7112.563	A	26.0476	786.45	0.735	0.001	1.22	0.245846552
bounds13	3178906.01	1310959.809	0	0.000245383	0.02134834	7113.583	A	26.8183	786.99	0	0.001	0.087	0.245383278
bounds14	3179498.653	1311161.073	0	0	0.02806946	7064.947	A	27.2315	797.77	0	0	0.113	0.24840231
bounds15	3179513.769	1311351.325	0	0.000245543	0.01915238	7093.709	A	27.3008	788.77	0	0.001	0.078	0.245543324
bounds16	3179502.645	1311546.857	0.03455577	0.000245076	0.03406562	7111.143	A	27.4	787.53	0.141	0.001	0.139	0.245076396
bounds17	3179312.226	1311548.274	0	0.001727812	0.07627057	7106.014	A	24.8172	786.35	0	0.007	0.309	0.24683034
bounds18	3179111.692	1311549.456	0	0.000985212	0.04014738	7133.807	A	25.6983	786.99	0	0.004	0.163	0.246302906
bounds19	3179003.198	1311261.614	0	0.000491778	0.09933925	7106.578	A	26.0071	786.48	0	0.002	0.404	0.245889214
bounds20	3179002.712	1311156.584	0.1583497	0.000498739	0.3528579	7101.523	A	26.0664	797.77	0.635	0.002	1.415	0.249369548
bounds21	3179398.051	1311429.142	0.4470896	0.000246466	0.1301341	7099.864	A	25.766	787.69	1.814	0.001	0.528	0.24646615

Grid Volume Computations

Wed Nov 28 13:25:54 2007

Upper Surface

Grid File Name:	C:\DatabaseBackup\SUtes\RatonFlux2007\BoundsChamberCH4.grd
Grid Size:	100 rows x 76 columns
X Minimum:	3178906.01
X Maximum:	3179513.769
X Spacing:	8.1034533333344
Y Minimum:	1310750.705
Y Maximum:	1311549.456
Y Spacing:	8.0681919191912
Z Minimum:	-0.38593460863155
Z Maximum:	9.9211107898206

Lower Surface

Level Surface defined by Z = 0

Volumes

Z Scale Factor:	1

Total Volumes by:

Trapezoidal Rule:	135359.42310172
Simpson's Rule:	135360.79567047
Simpson's 3/8 Rule:	135373.67111235

Cut & Fill Volumes

Positive Volume [Cut]:	157678.44578337
Negative Volume [Fill]:	22320.317301337
Net Volume [Cut-Fill]:	135358.12848203

Areas

Planar Areas

Positive Planar Area [Cut]:	301210.10768984
Negative Planar Area [Fill]:	184238.00131918
Blanked Planar Area:	0
Total Planar Area:	485448.10900902

Surface Areas

Positive Surface Area [Cut]:	301329.2633531
Negative Surface Area [Fill]:	184238.98779007

IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

METHANE FLUX MEASUREMENTS (mol/m^2 day)

- 0.000 - 0.100
- 0.101 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01- 5.00
- 5.01 - 10.00
- 10.01 - 30.24

APOGEE SEEP

METHANE FLUX CONTOUR (mol/m^2 day)

mol/m^2 day - MOLES PER SQUARE METER PER DAY

0 250 500

Feet

N

FLUX SURVEY PERFORMED ON 11/06/07

METHANE FLUX CONTOUR MAP
APOGEE SEEP ID 644 (BOUNDS)
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

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IMAGE COURTESY OF USGS/NRCS, 2006

LEGEND

METHANE FLUX MEASUREMENTS (mol/m^2 day)

- 0.000 - 0.100
- 0.101 - 0.25
- 0.26 - 0.50
- 0.51 - 1.00
- 1.01- 5.00
- 5.01 - 10.00
- 10.01 - 30.24

APOGEE SEEP

METHANE FLUX MEASUREMENTS ARE LABELED IN MOLES PER SQUARE METER PER DAY (mol/m^2 day)

0 250 500

Feet

N

METHANE FLUX MEASUREMENT MAP
APOGEE SEEP ID 644 (BOUNDS)
PHASE II SEEP INVESTIGATION
RATON BASIN, COLORADO

COLORADO OIL AND GAS CONSERVATION COMMISSION

FLUX SURVEY PERFORMED ON 11/06/07

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APPENDIX J

LABORATORY ANALYTICAL REPORTS – SOIL GAS SAMPLES

ISOTECH®
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Isotech Laboratories, Inc. 1308 Parkland Court, Champaign IL 61821-1826 Telephone (217) 398-3490 Fax (217) 398-3493

Lab #:	122829	Job #:	8809
Sample Name/Number:	Apogee 11		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	0.0041	0.011			
Hydrogen	nd	nd			
Argon	0.62	0.099			
Oxygen	13.07				
Nitrogen	50.16	3.81			
Carbon Dioxide	0.39	1.04			
Methane	35.75	95.03	-49.55	-224.2	
Ethane	0.0039	0.010			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 362
Specific gravity, calculated: 0.842

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

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Lab #:	122830	Job #:	8809
Sample Name/Number:	Apogee 636		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.96	1.19			
Oxygen	18.84				
Nitrogen	76.20	59.14			
Carbon Dioxide	2.08	20.63			
Methane	1.92	19.04	-27.08	-137.2	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 19
Specific gravity, calculated: 1.001

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

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Lab #:	122831	Job #:	8809
Sample Name/Number:	Apogee 15		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	0.0020	0.0065			
Argon	0.71	0.20			
Oxygen	14.55				
Nitrogen	57.48	10.59			
Carbon Dioxide	0.86	2.81			
Methane	26.40	86.38	-44.92	-216.7	
Ethane	0.0030	0.0098			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 267
Specific gravity, calculated: 0.886

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

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Lab #: 122832 Job #: 8809
Sample Name/Number: Apogee 658
Company: LT Environmental
Date Sampled: 8/30/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase II
Location: Raton Basin CO
Formation/Depth:
Sampling Point:
Date Received: 9/05/2007 Date Reported: 9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.98	1.25			
Oxygen	17.92				
Nitrogen	76.42	66.42			
Carbon Dioxide	2.04	14.09			
Methane	2.64	18.24	-38.82	-187.8	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 27
Specific gravity, calculated: 0.996

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

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Lab #: 122833 Job #: 8809
Sample Name/Number: Ploski
Company: LT Environmental
Date Sampled: 8/30/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase II
Location: Raton Basin CO
Formation/Depth:
Sampling Point:
Date Received: 9/05/2007 Date Reported: 9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.98	0.82			
Oxygen	21.61				
Nitrogen	75.46	nd			
Carbon Dioxide	0.17	8.65			
Methane	1.78	90.53	-47.15	-233.1	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 18
Specific gravity, calculated: 0.995

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

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Lab #:	122834	Job #:	8809
Sample Name/Number:	Apogee 655		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.88	0.76			
Oxygen	14.32				
Nitrogen	75.43	69.64			
Carbon Dioxide	3.29	10.39			
Methane	6.08	19.21	-35.65	-189.5	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 62
Specific gravity, calculated: 0.984

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

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Lab #:	122835	Job #:	8809
Sample Name/Number:	Apogee 5b		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.35	0.13			
Oxygen	5.82				
Nitrogen	31.66	13.79			
Carbon Dioxide	1.73	2.40			
Methane	60.43	83.67	-44.00	-218.3	
Ethane	0.0093	0.013			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 612
Specific gravity, calculated: 0.736

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

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Lab #:	122836	Job #:	8809
Sample Name/Number:	Apogee 652		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.74	0.095			
Oxygen	16.04				
Nitrogen	57.35	nd			
Carbon Dioxide	0.31	1.20			
Methane	25.56	98.69	-40.84	-205.3	
Ethane	0.0038	0.015			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 259
Specific gravity, calculated: 0.888

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

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Lab #:	122837	Job #:	8809
Sample Name/Number:	Apogee 656		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.99	4.84			
Oxygen	21.82				
Nitrogen	76.86	nd			
Carbon Dioxide	0.21	60.55			
Methane	0.12	34.61			
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 1
Specific gravity, calculated: 1.002

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

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Lab #:	122838	Job #:	8809
Sample Name/Number:	Apogee 623		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.91	0.46			
Oxygen	19.06				
Nitrogen	67.05	nd			
Carbon Dioxide	4.37	33.51			
Methane	8.61	66.03	-36.03	-350.4	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 87
Specific gravity, calculated: 0.986

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

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Lab #:	122839	Job #:	8809
Sample Name/Number:	Apogee 637		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.91	0.71			
Oxygen	18.70				
Nitrogen	76.74	65.34			
Carbon Dioxide	1.02	9.49			
Methane	2.63	24.46	-39.02	-212.9	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 27
Specific gravity, calculated: 0.991

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

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Lab #:	122840	Job #:	8809
Sample Name/Number:	Apogee 19		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.93	0.46			
Oxygen	19.90				
Nitrogen	70.02	nd			
Carbon Dioxide	0.39	4.24			
Methane	8.76	95.30	-48.93	-221.4	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 89
Specific gravity, calculated: 0.964

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

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Lab #:	122841	Job #:	8809
Sample Name/Number:	Apogee 660		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.91	0.51			
Oxygen	19.74				
Nitrogen	78.46	84.18			
Carbon Dioxide	0.81	14.00			
Methane	0.076	1.31			
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 1
Specific gravity, calculated: 1.002

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

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Lab #:	122842	Job #:	8809
Sample Name/Number:	Apogee 638		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	0.0035	0.0071			
Argon	0.49	0.037			
Oxygen	10.58				
Nitrogen	39.89	0.90			
Carbon Dioxide	0.35	0.71			
Methane	48.68	98.34	-47.95	-229.3	
Ethane	0.0030	0.0061			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 493
Specific gravity, calculated: 0.785

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

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Lab #:	122843	Job #:	8809
Sample Name/Number:	Golden Eagle Mine		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	0.0023	0.0071			
Argon	0.72	0.28			
Oxygen	14.14				
Nitrogen	57.03	13.28			
Carbon Dioxide	1.35	4.15			
Methane	26.75	82.27	-56.56	-251.1	
Ethane	0.0049	0.015			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 271
Specific gravity, calculated: 0.887

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

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Lab #:	122844	Job #:	8809
Sample Name/Number:	Apogee 649		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	0.0034	0.0096			
Hydrogen	nd	nd			
Argon	0.63	0.023			
Oxygen	13.94				
Nitrogen	49.93	nd			
Carbon Dioxide	0.16	0.45			
Methane	35.33	99.51	-50.83	-239.0	
Ethane	0.0043	0.012			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 358
Specific gravity, calculated: 0.844

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

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Lab #:	122845	Job #:	8809
Sample Name/Number:	Leef		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.28	0.045			
Oxygen	5.53				
Nitrogen	24.45	5.21			
Carbon Dioxide	0.56	0.76			
Methane	69.18	93.98	-48.96	-236.2	
Ethane	0.0034	0.0046			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 701
Specific gravity, calculated: 0.693

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

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Lab #:	122846	Job #:	8809
Sample Name/Number:	Cow Canyon		
Company:	LT Environmental		
Date Sampled:	8/30/2007		
Container:	Cali-5-Bond Bag		
Field/Site Name:	Raton Basin Phase II		
Location:	Raton Basin CO		
Formation/Depth:			
Sampling Point:			
Date Received:	9/05/2007	Date Reported:	9/28/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.77	0.15			
Oxygen	16.56				
Nitrogen	64.05	11.04			
Carbon Dioxide	0.41	1.96			
Methane	18.21	86.85	-38.24	-223.2	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 184
Specific gravity, calculated: 0.920

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

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Lab #: 122024 Job #: 8744
Sample Name/Number: Apogee 646
Company: LT Environmental
Date Sampled: 8/03/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton - OGCC0604
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/16/2007 Date Reported: 8/31/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	0.0040	0.031			
Argon	0.92	0.82			
Oxygen	18.28				
Nitrogen	75.52	57.77			
Carbon Dioxide	0.93	7.29			
Methane	4.35	34.09	-52.89	-220.2	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 44
Specific gravity, calculated: 0.983

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

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Lab #: 122025 Job #: 8744
Sample Name/Number: 640 - Sinkhole
Company: LT Environmental
Date Sampled: 8/06/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton - OGCC0604
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/16/2007 Date Reported: 8/31/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	0.0015	0.0017			
Hydrogen	nd	nd			
Argon	0.71	0.68			
Oxygen	2.27				
Nitrogen	59.05	56.73			
Carbon Dioxide	14.29	16.03			
Methane	23.67	26.55	-52.44	-232.5	
Ethane	0.0037	0.0041			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 240
Specific gravity, calculated: 0.954

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

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Lab #: 122026 Job #: 8744
Sample Name/Number: 641
Company: LT Environmental
Date Sampled: 8/06/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton - OGCC0604
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/16/2007 Date Reported: 8/31/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	0.0013	0.0099			
Argon	0.95	1.05			
Oxygen	18.20				
Nitrogen	77.77	75.50			
Carbon Dioxide	2.02	15.37			
Methane	1.06	8.07	-32.34	-109.8	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 11
Specific gravity, calculated: 1.003

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

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Lab #: 122027 Job #: 8744
Sample Name/Number: 640
Company: LT Environmental
Date Sampled: 8/06/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton - OGCC0604
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/16/2007 Date Reported: 8/31/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.95	1.36			
Oxygen	20.18				
Nitrogen	77.72	67.46			
Carbon Dioxide	0.45	12.20			
Methane	0.70	18.98	-35.48	-169.0	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 7
Specific gravity, calculated: 0.999

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

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Lab #: 122028 Job #: 8744
Sample Name/Number: Angeley
Company: LT Environmental
Date Sampled: 8/08/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton - OGCC0604
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/16/2007 Date Reported: 8/31/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.93	0.89			
Oxygen	18.87				
Nitrogen	75.21	48.91			
Carbon Dioxide	0.83	8.35			
Methane	4.16	41.85	-46.24	-215.3	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 42
Specific gravity, calculated: 0.984

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

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Lab #: 122029 Job #: 8744
Sample Name/Number: Bounds
Company: LT Environmental
Date Sampled: 8/08/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton - OGCC0604
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/16/2007 Date Reported: 8/31/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	0.0035	0.0038			
Hydrogen	nd	nd			
Argon	0.099	0.036			
Oxygen	1.47				
Nitrogen	8.71	3.47			
Carbon Dioxide	0.21	0.23			
Methane	89.49	96.24	-50.00	-237.1	
Ethane	0.019	0.020			
Ethylene	nd	nd			
Propane	0.0018	0.0019			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 908
Specific gravity, calculated: 0.601

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

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Lab #: 121733 Job #: 8721
Sample Name/Number: Apogee 612
Company: LT Environmental
Date Sampled: 8/01/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase 2 Investigation
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/09/2007 Date Reported: 8/24/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	0.0012	0.0061			
Argon	0.95	1.01			
Oxygen	16.81				
Nitrogen	78.29	79.00			
Carbon Dioxide	2.59	13.10			
Methane	1.36	6.88	-10.44	-68.1	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 14
Specific gravity, calculated: 1.003

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

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Lab #: 121734 Job #: 8721
Sample Name/Number: Apogee 647
Company: LT Environmental
Date Sampled: 8/01/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase 2 Investigation
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/09/2007 Date Reported: 8/24/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.94	1.10			
Oxygen	20.27				
Nitrogen	77.66	64.23			
Carbon Dioxide	0.59	18.10			
Methane	0.54	16.57	-38.78	-202.8	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 5
Specific gravity, calculated: 1.000

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

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Lab #: 121735 Job #: 8721
Sample Name/Number: Apogee 644
Company: LT Environmental
Date Sampled: 8/02/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase 2 Investigation
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/09/2007 Date Reported: 8/24/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	0.0013	0.0019			
Hydrogen	0.0021	0.0031			
Argon	0.49	0.28			
Oxygen	6.76				
Nitrogen	42.19	25.08			
Carbon Dioxide	6.35	9.37			
Methane	44.20	65.25	-44.32	-227.8	
Ethane	0.0085	0.013			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 448
Specific gravity, calculated: 0.831

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

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Lab #: 121736 Job #: 8721
Sample Name/Number: Apogee 613
Company: LT Environmental
Date Sampled: 8/03/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase 2 Investigation
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/09/2007 Date Reported: 8/24/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	1.01	2.02			
Oxygen	21.75				
Nitrogen	75.30	nd			
Carbon Dioxide	0.82	41.41			
Methane	1.12	56.57	-33.21	-199.3	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 11
Specific gravity, calculated: 1.001

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

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Lab #: 121737 Job #: 8721
Sample Name/Number: Apogee 605
Company: LT Environmental
Date Sampled: 8/04/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase 2 Investigation
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/09/2007 Date Reported: 8/24/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.94	0.97			
Oxygen	17.81				
Nitrogen	75.46	60.43			
Carbon Dioxide	1.60	10.67			
Methane	4.19	27.93	-42.59	-201.2	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 42
Specific gravity, calculated: 0.987

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

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Lab #: 121738 Job #: 8721
Sample Name/Number: Apogee 643
Company: LT Environmental
Date Sampled: 8/04/2007
Container: Cali-5-Bond Bag
Field/Site Name: Raton Basin Phase 2 Investigation
Location:
Formation/Depth:
Sampling Point:
Date Received: 8/09/2007 Date Reported: 8/24/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.95	1.09			
Oxygen	20.85				
Nitrogen	76.38	nd			
Carbon Dioxide	0.16	8.70			
Methane	1.66	90.21	-57.26	-244.1	
Ethane	nd	nd			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

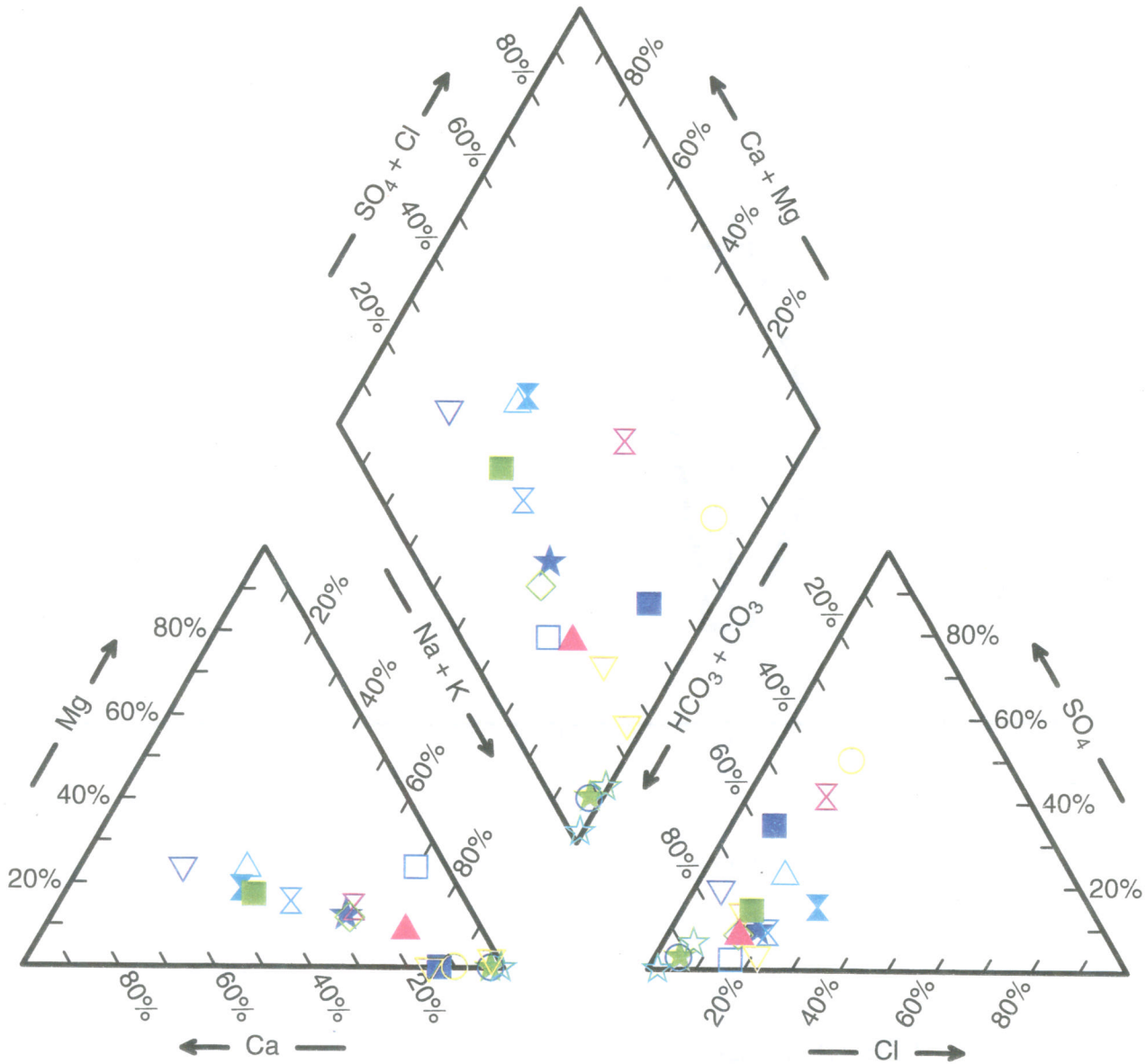
Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 17
Specific gravity, calculated: 0.994

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

APPENDIX K

STIFF DIAGRAMS AND PIPER PLOTS FOR GROUNDWATER ANALYTICAL DATA

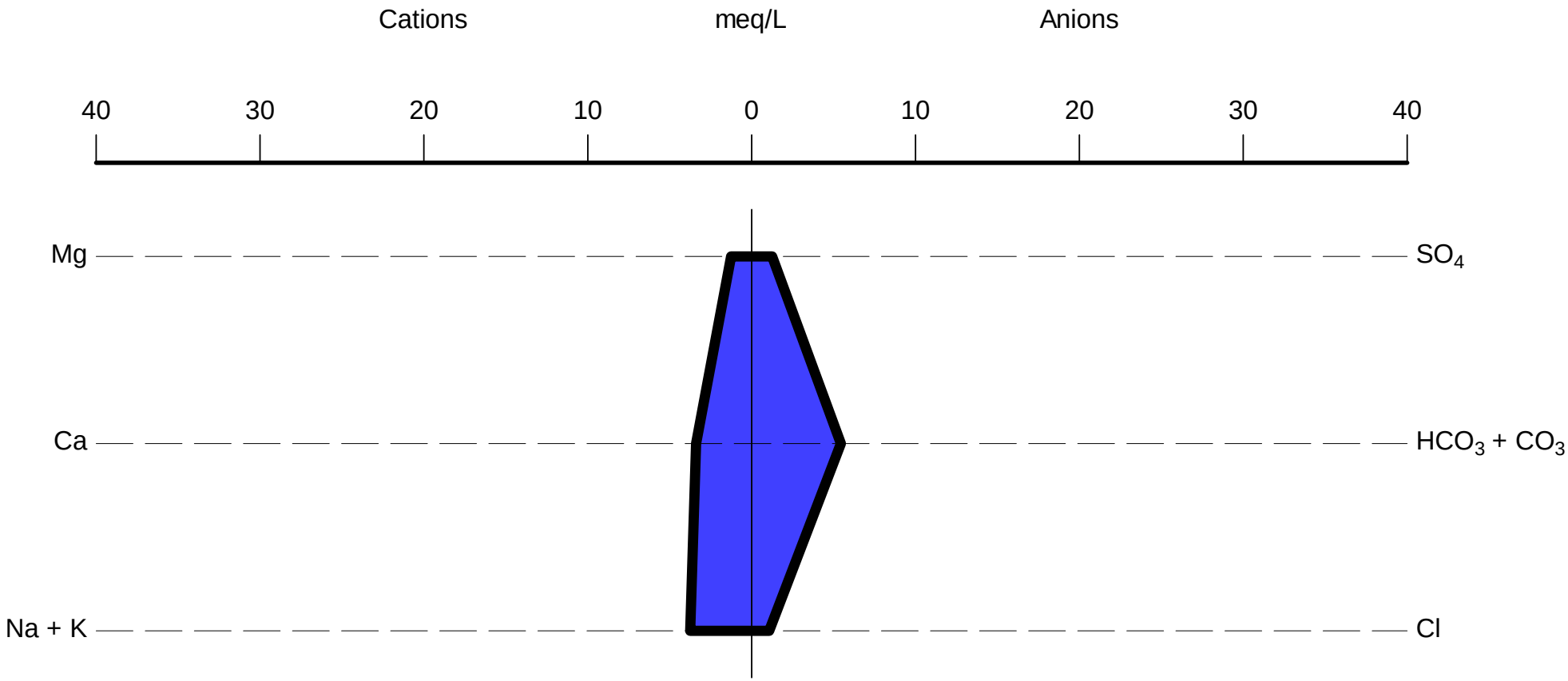
Piper Diagram



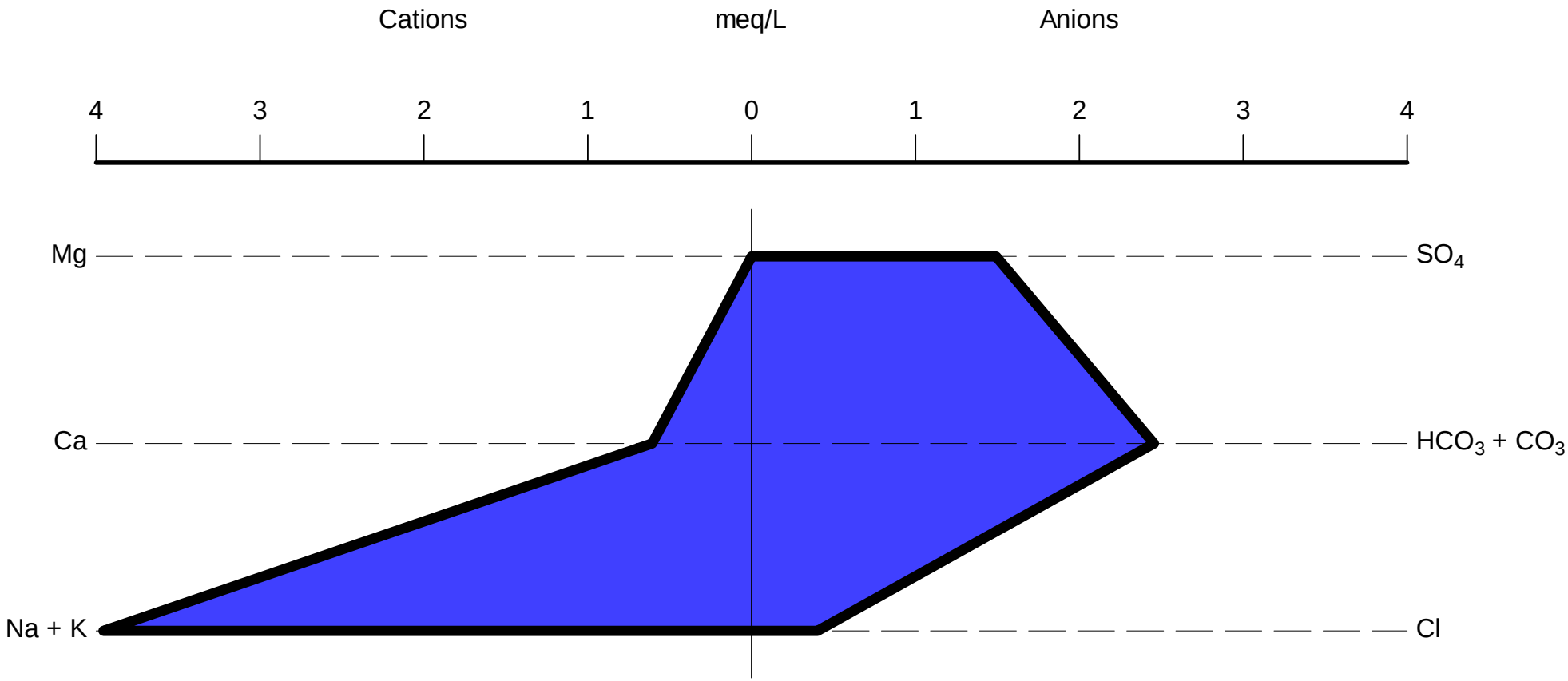
Legend

- Barth
- Bounds
- Dubis
- Gabe
- Hopke
- Manning
- Robinson A
- Robinson G
- Robinson J
- Robinson S
- Robinson...
- Robinson...
- Skowron
- Skowron...
- Slevec-1
- Slevec-2
- Tokar
- Van Artsdalen

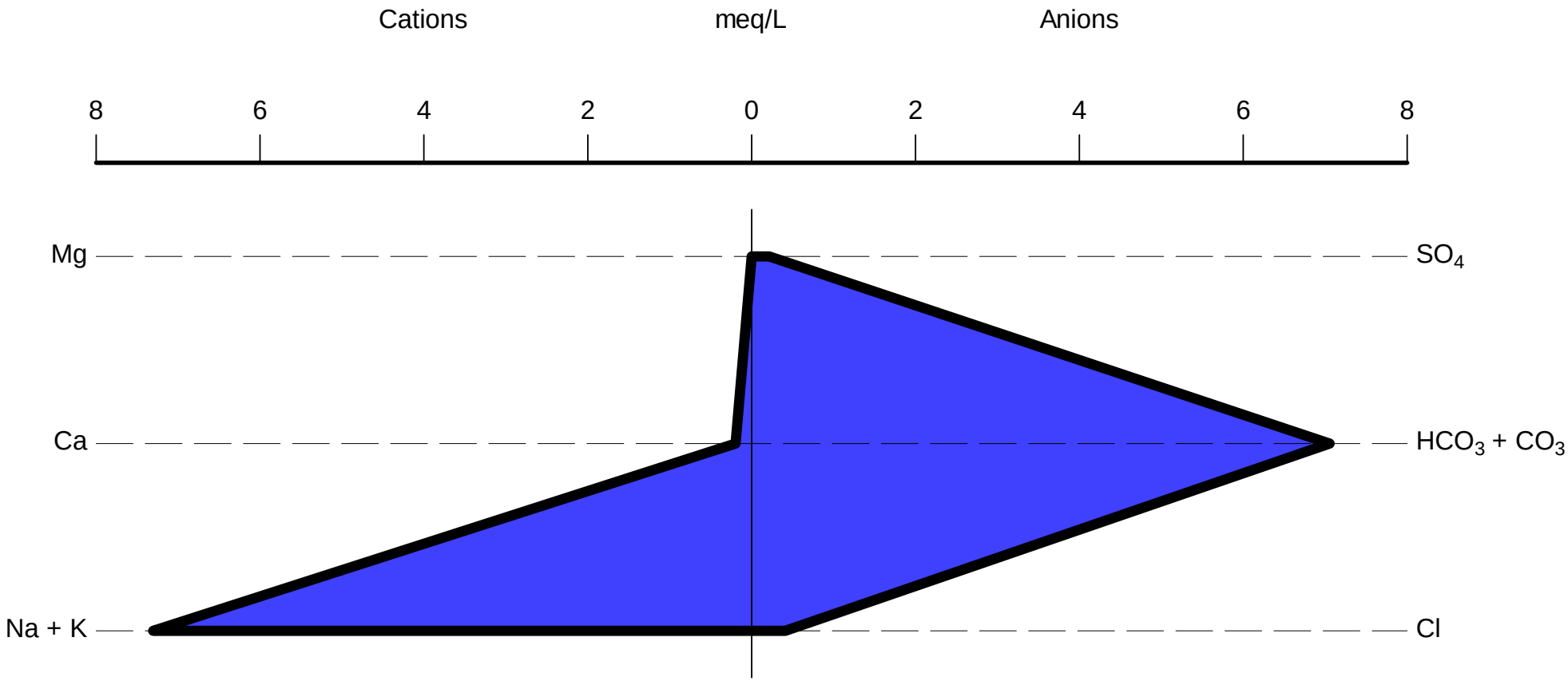
Barth - Stiff Diagram



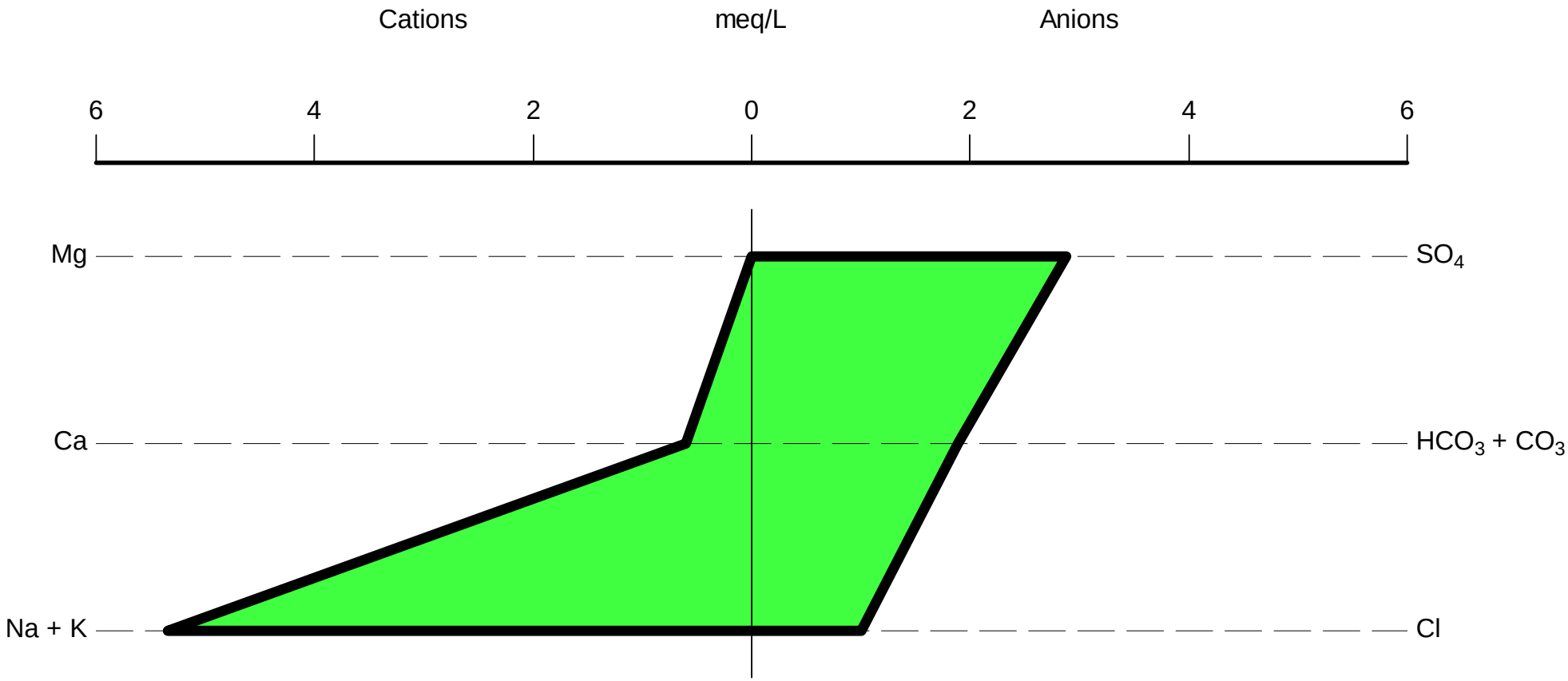
Bounds - Stiff Diagram



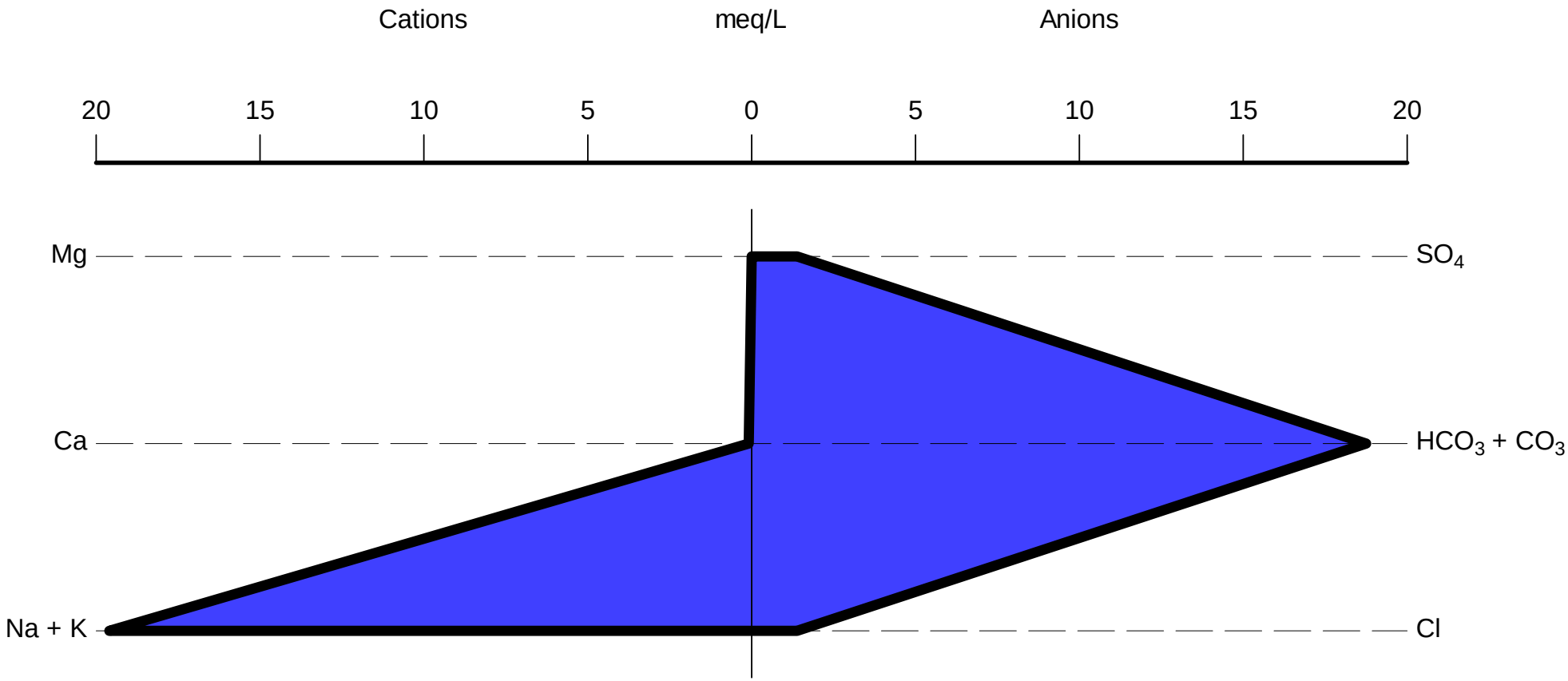
Dubis - Stiff Diagram



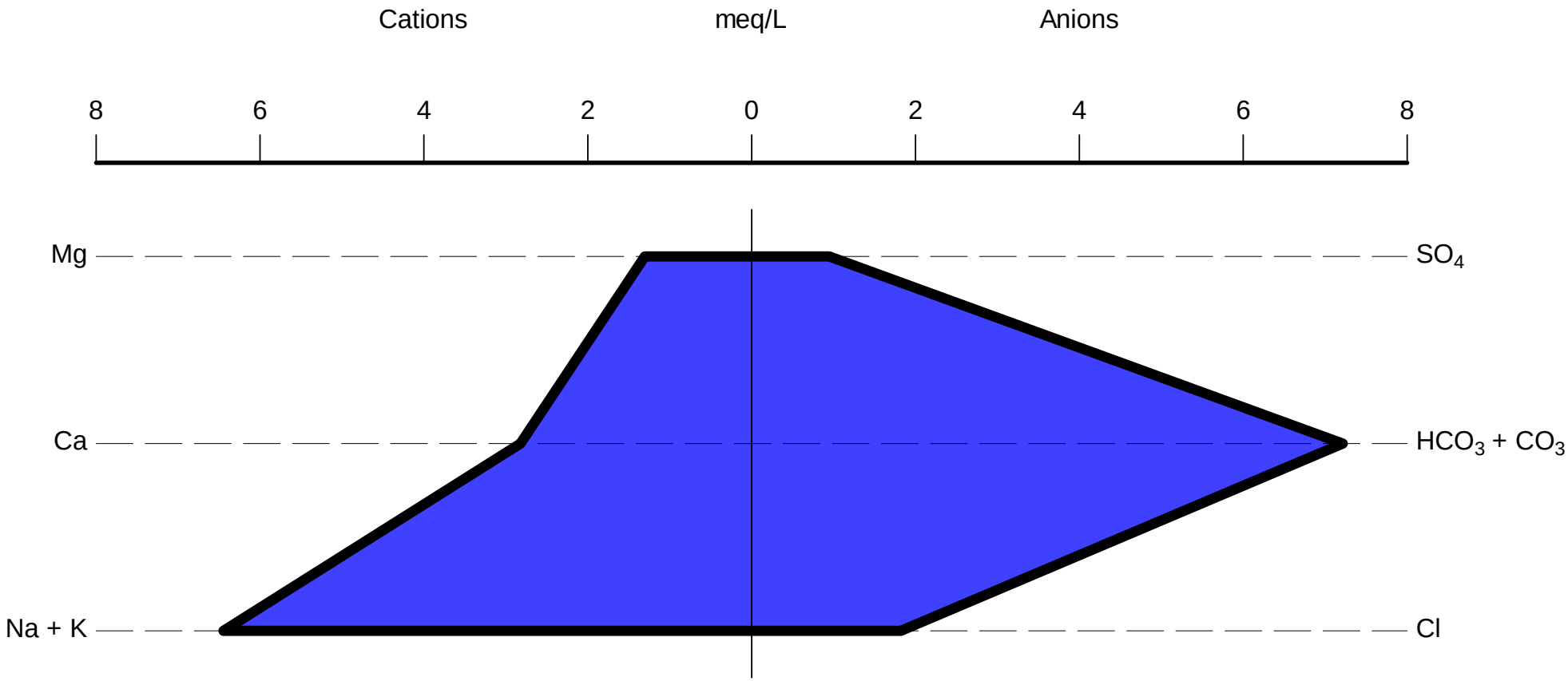
Hopke - Stiff Diagram



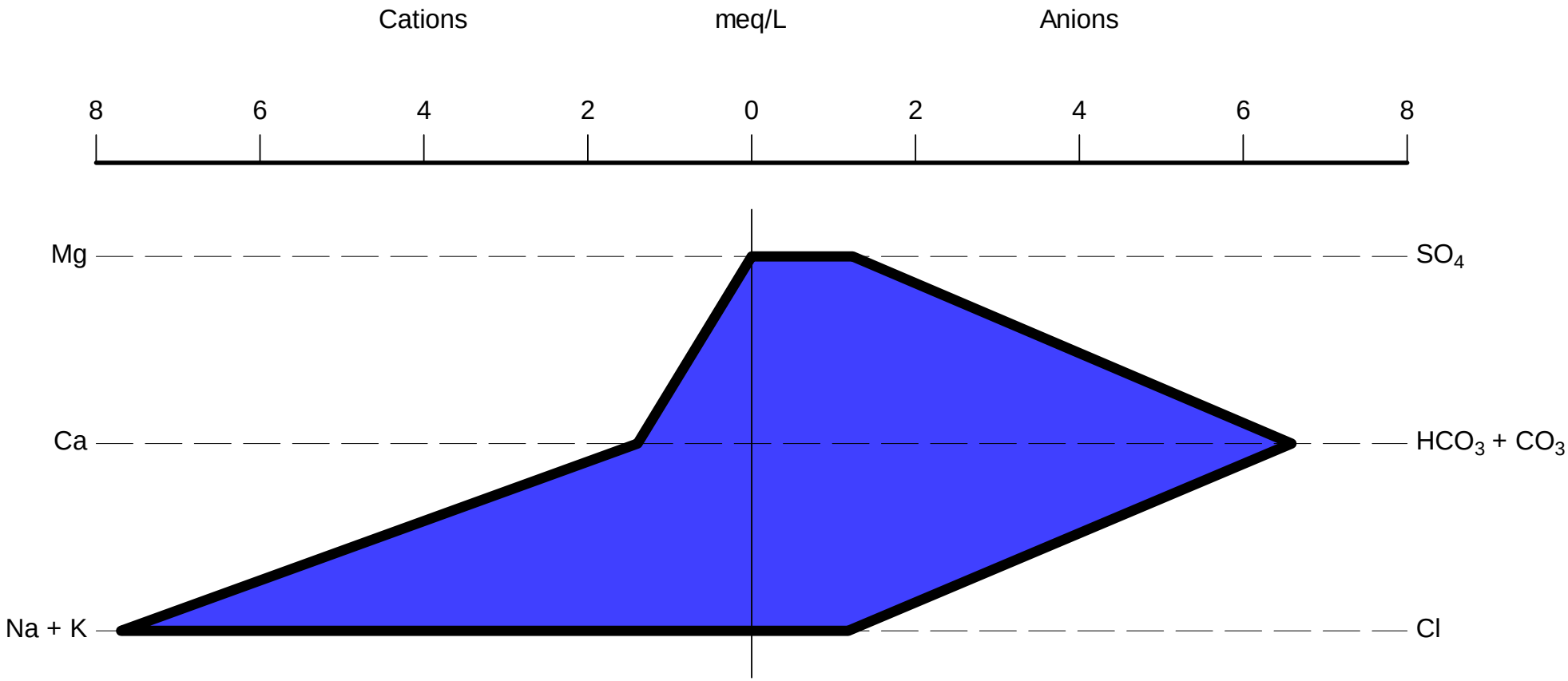
Manning - Stiff Diagram



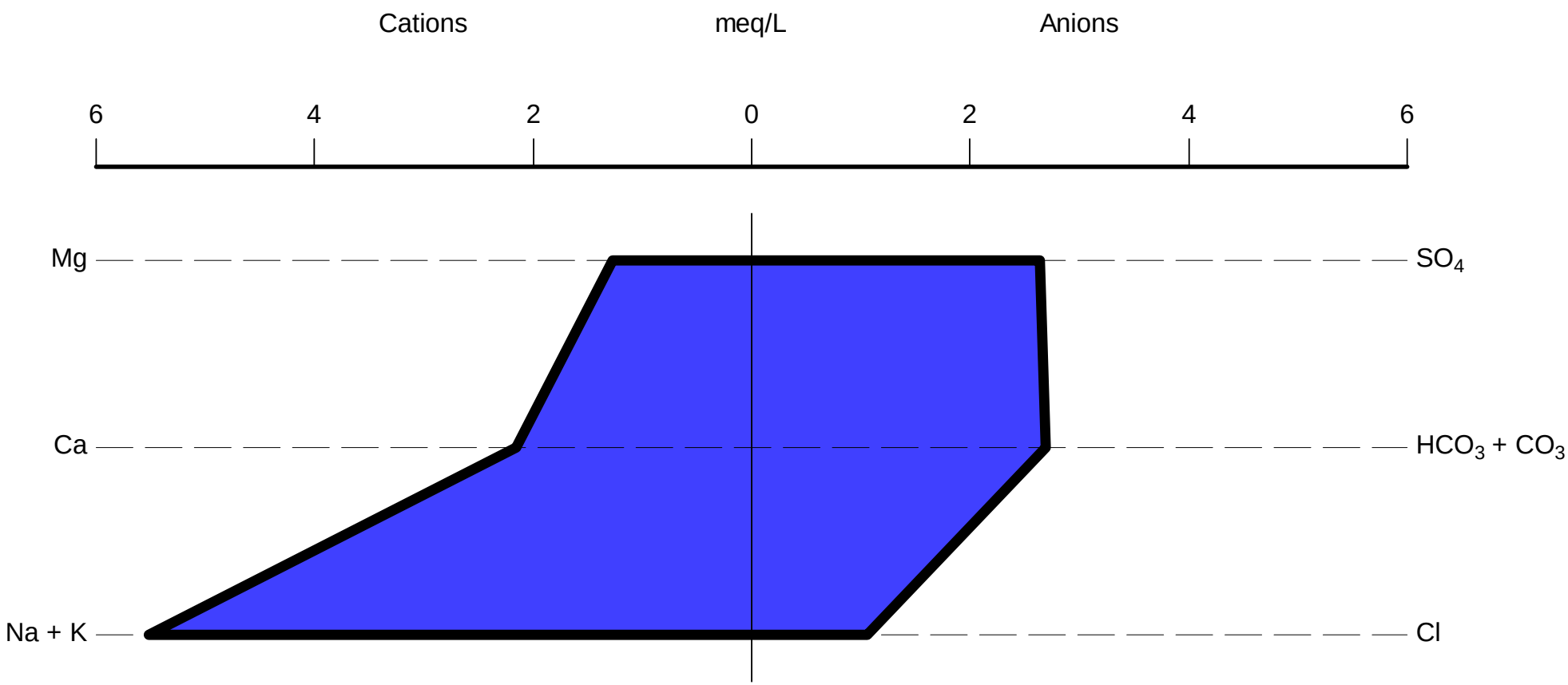
Robinson A - Stiff Diagram



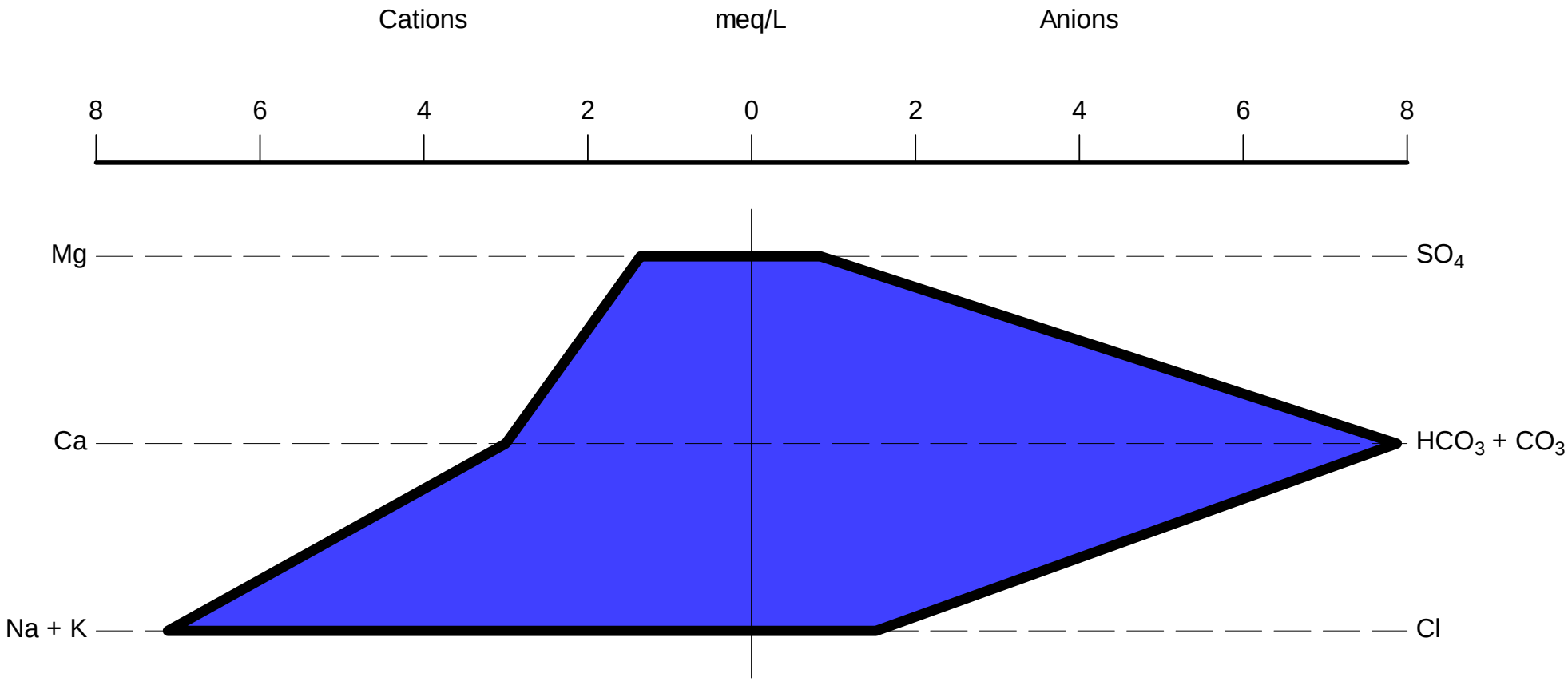
Robinson G - Stiff Diagram



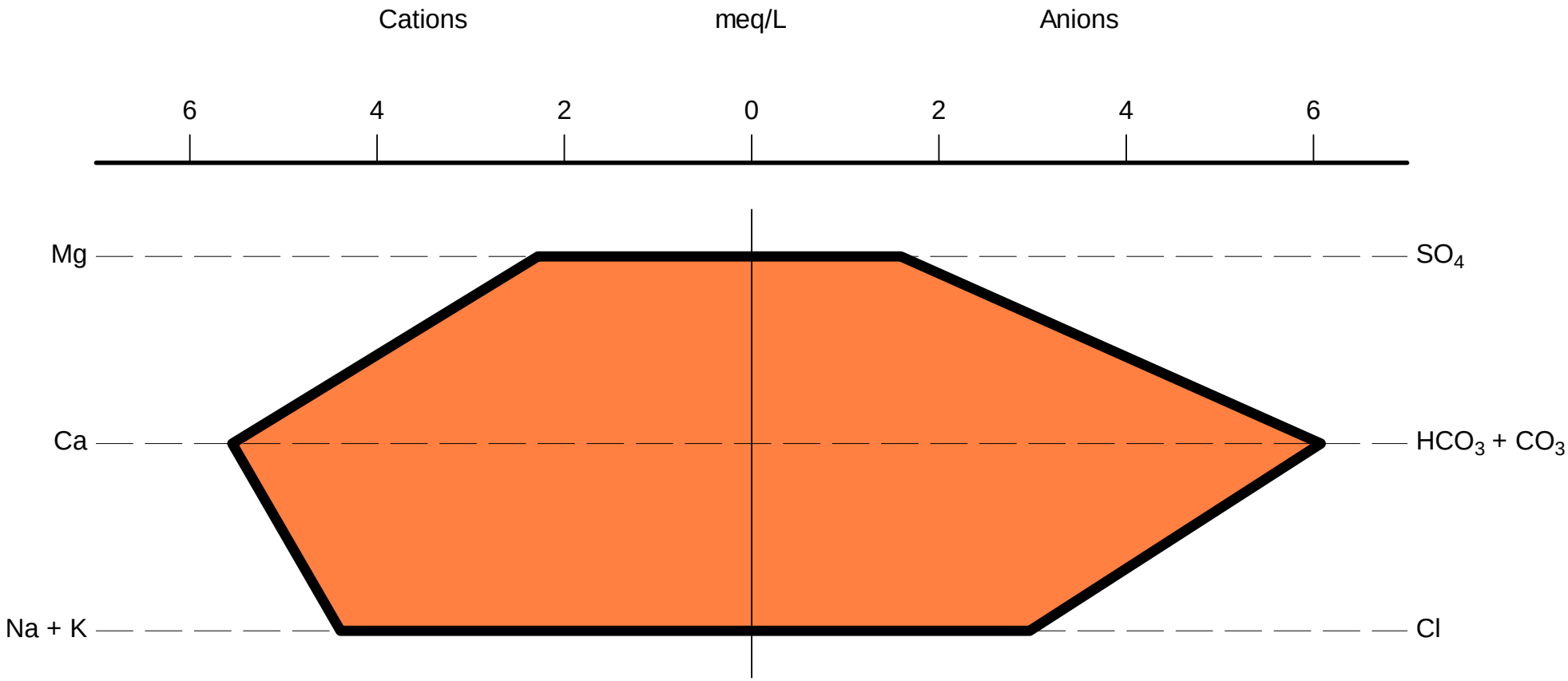
Robinson J - Stiff Diagram



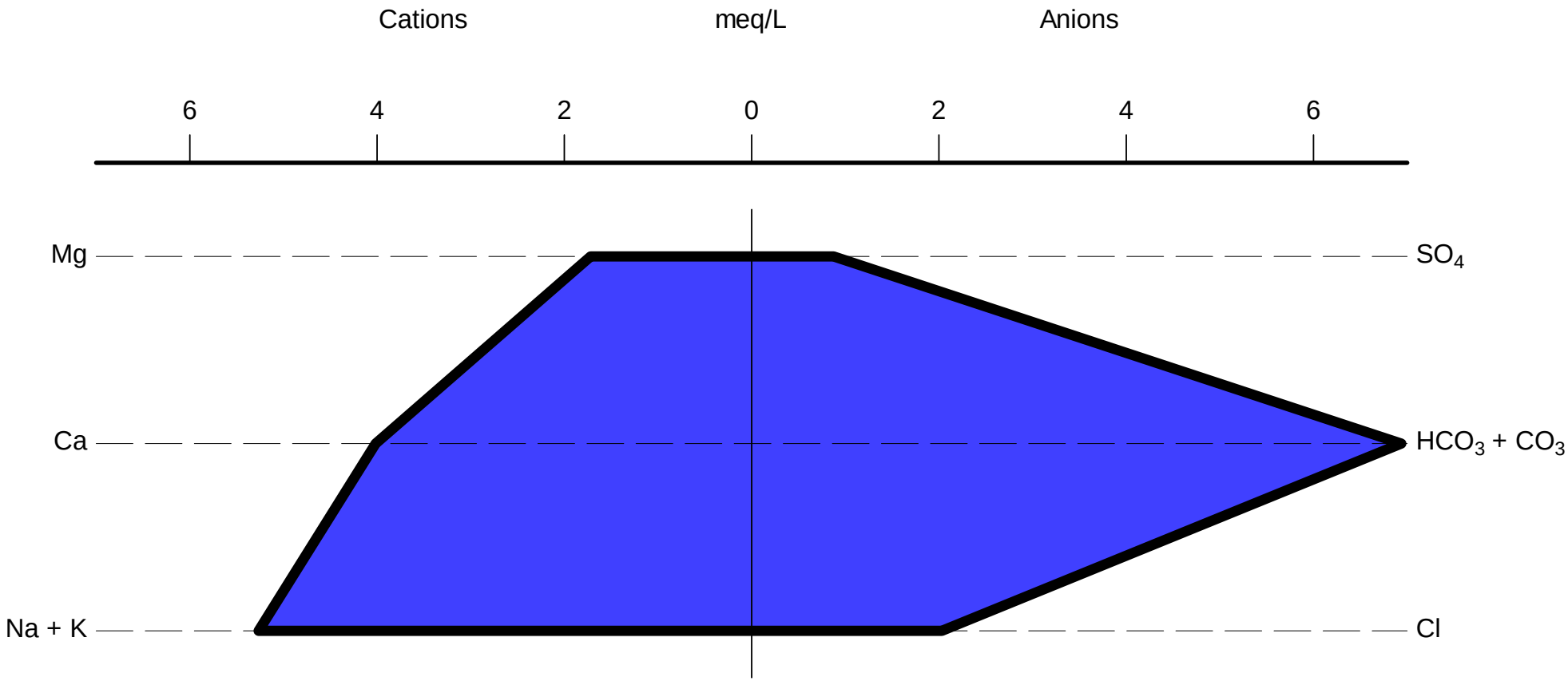
Robinson S - Stiff Diagram



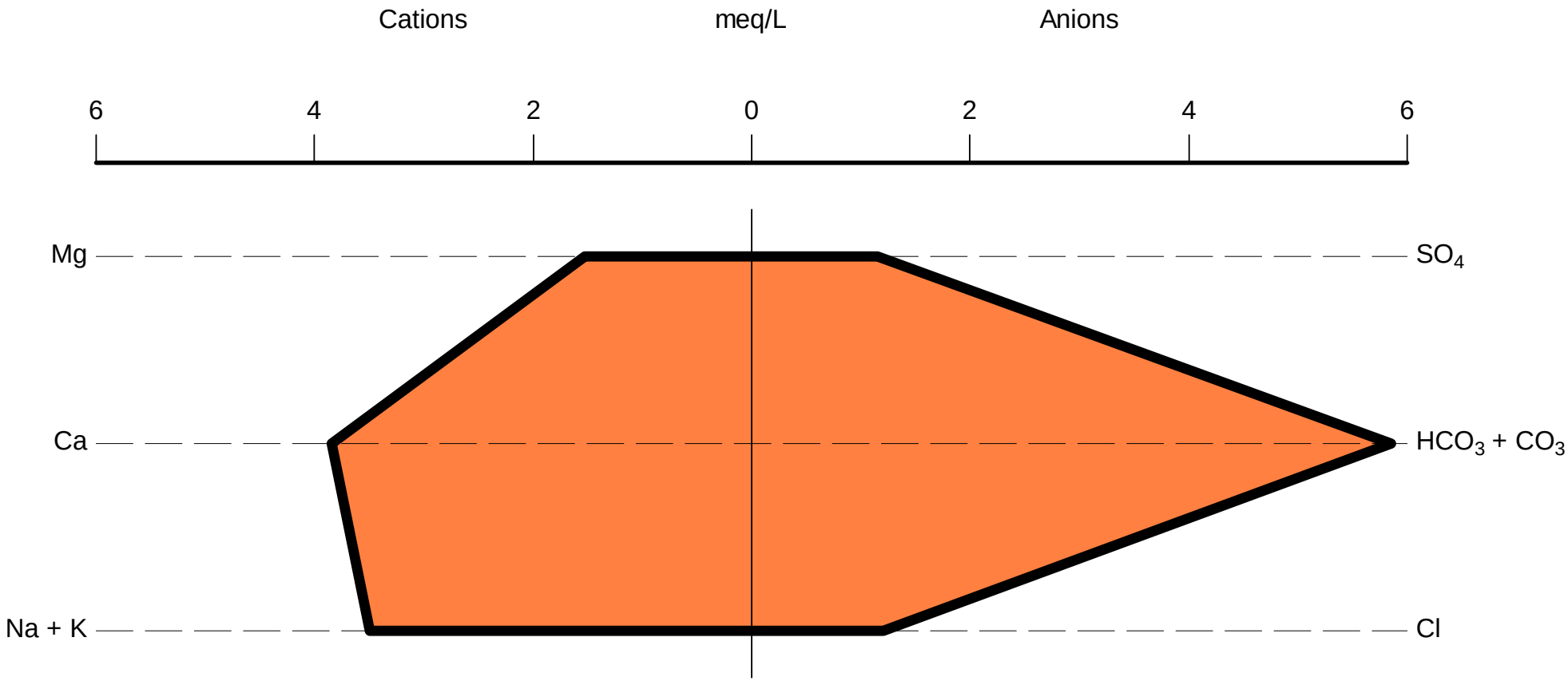
Robinson Sawmill 1 - Stiff Diagram



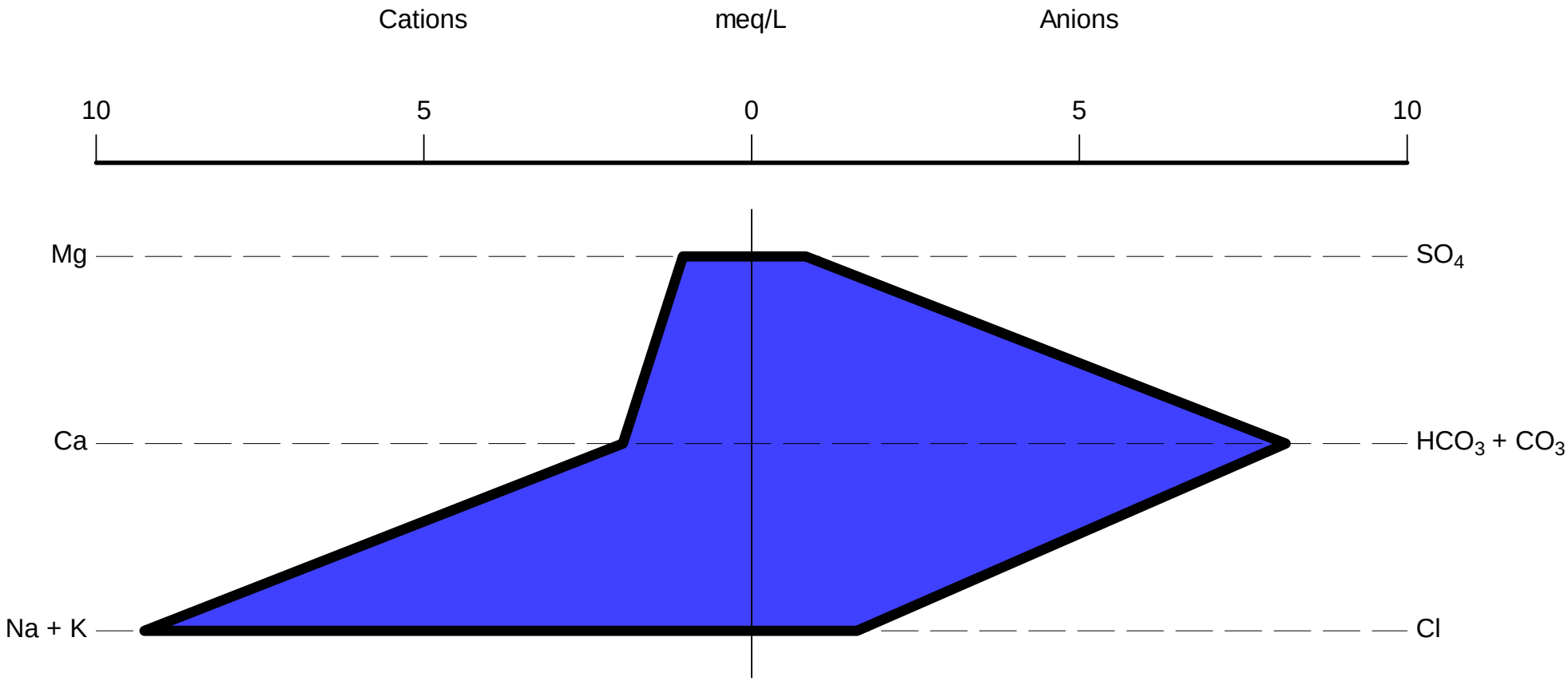
Robinson Sawmill 2 - Stiff Diagram



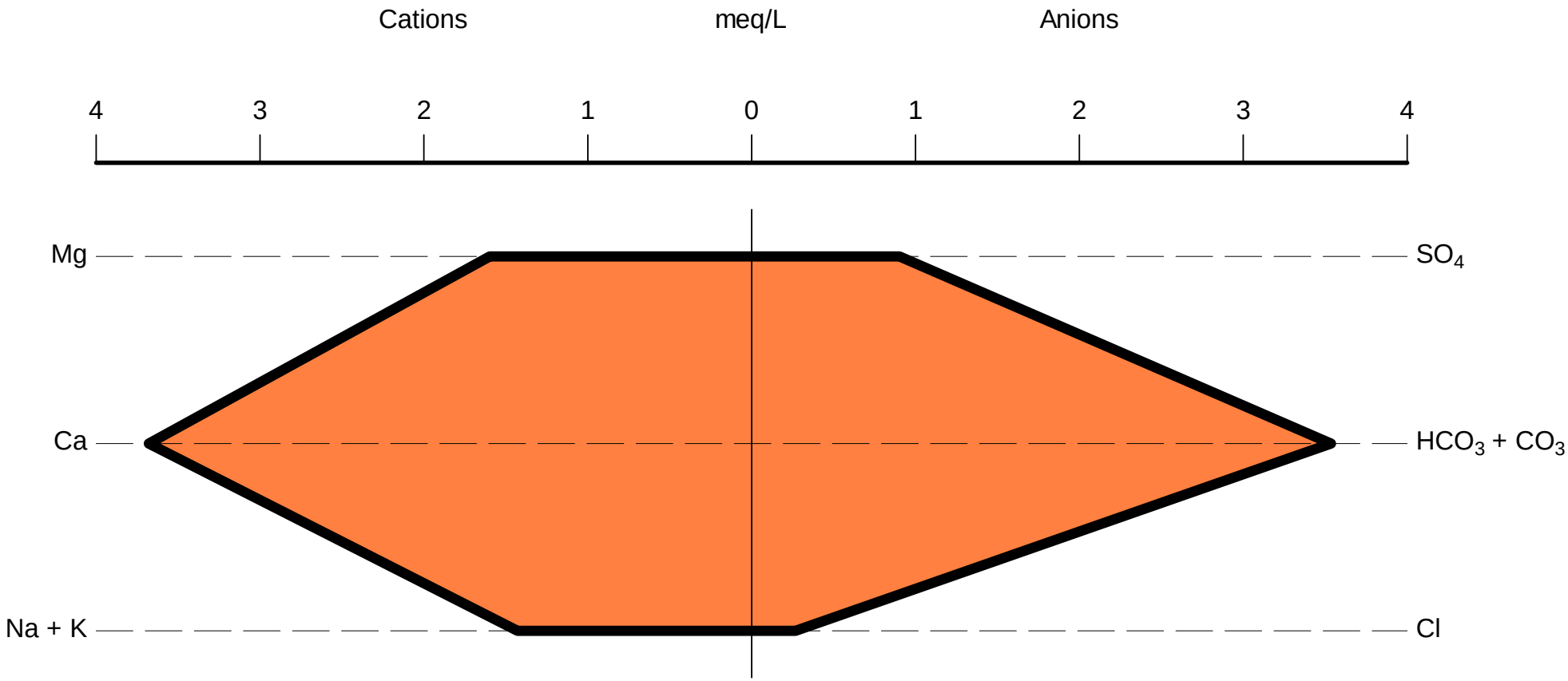
Skowron - Stiff Diagram



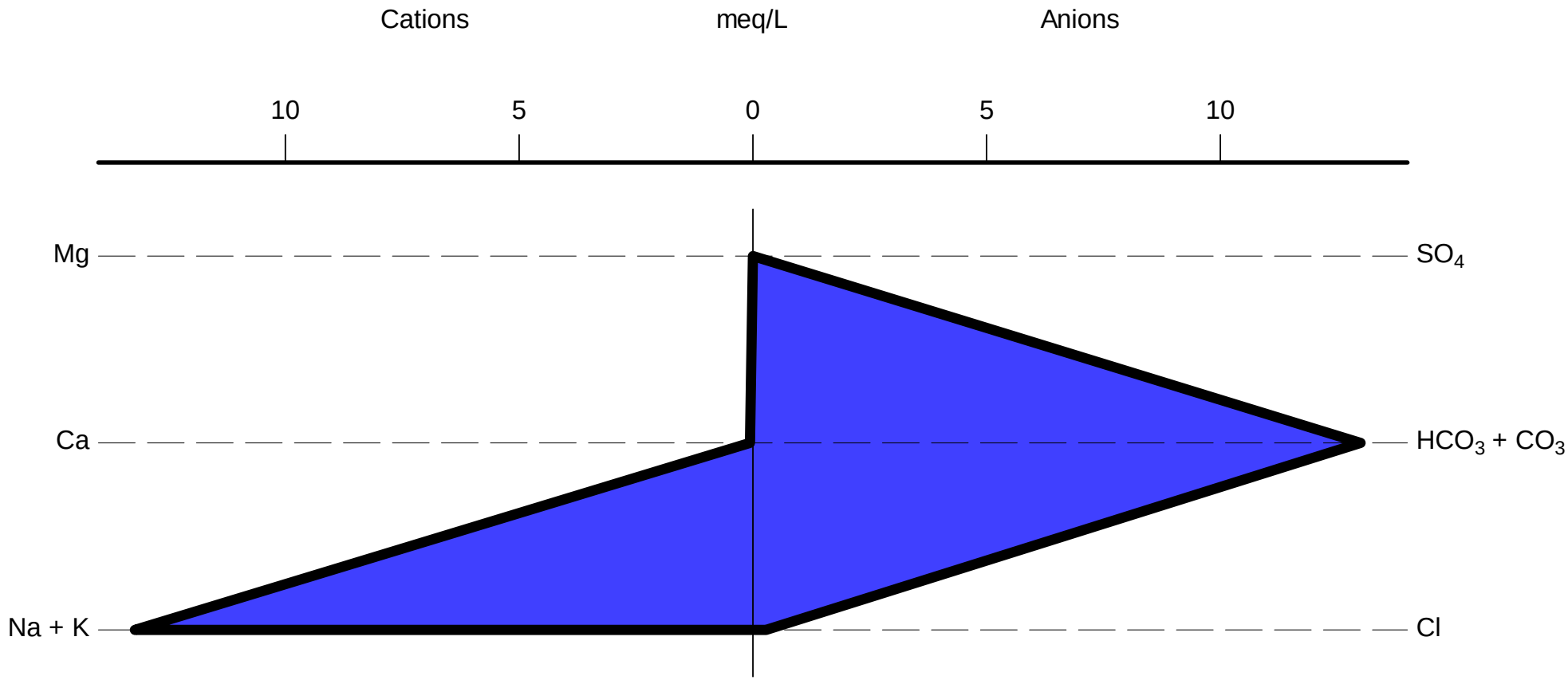
Skowron Creek - Stiff Diagram



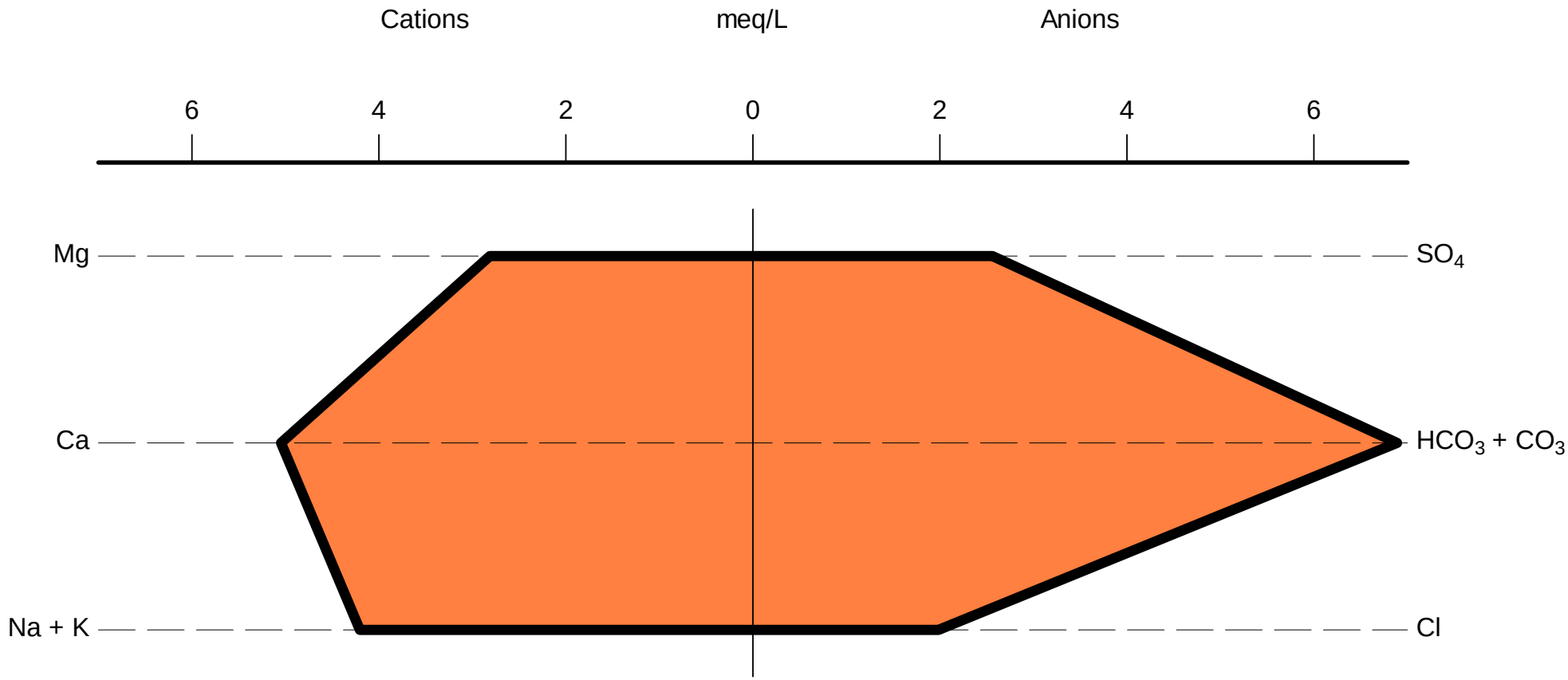
Slevec 1 - Stiff Diagram



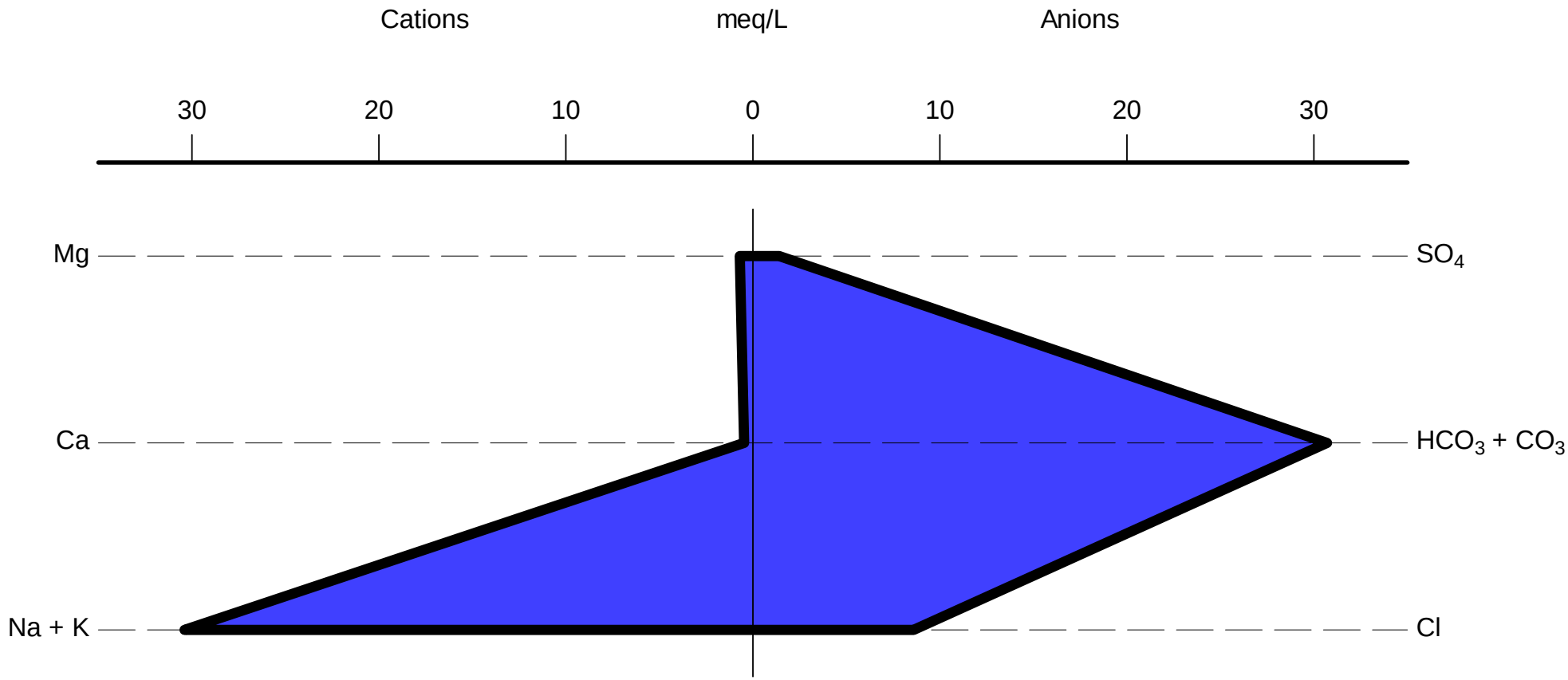
Slevec 2 - Stiff Diagram



Tokar - Stiff Diagram



Van Artsdalen - Stiff Diagram



Barth

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	757.82 mg/kg	756 mg/L	Measured
Density	0.9976 g/cm^3		Calculated
Conductivity	808 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	236.01 mg/kg	235.45 mg/L	Calculated
Carbonate	236.01	235.45	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	7.79	
Cations	8.47	
% Difference	4.163	Not within ± 2%
Measured TDS = Calculated TDS		
Measured	757.817	
Calculated	631.033	
Ratio	1.201	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	808.000	
Calculated	713.380	
Ratio	1.133	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions	0.964723	Within preferred range (0.9-1.1)
Cations	1.048538	Within preferred range (0.9-1.1)
Calculated TDS to EC ratio (0.55-0.7)	0.781	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	0.938	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Bounds

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	658.63 mg/kg	657 mg/L	Measured
Density	0.99753 g/cm^3		Calculated
Conductivity	519 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	30.539 mg/kg	30.463 mg/L	Calculated
Carbonate	30.539	30.463	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	4.42	
Cations	4.56	
% Difference	1.550	OK
Measured TDS = Calculated TDS		
Measured	658.628	
Calculated	374.756	
Ratio	1.757	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	519.000	
Calculated	424.380	
Ratio	1.223	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions (0.9-1.1)	0.852327	Not within preferred range
Cations (0.9-1.1)	0.879161	Not within preferred range
Calculated TDS to EC ratio (0.55-0.7)	0.722	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	1.269	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Dubis

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	758.82 mg/kg	757 mg/L	Measured
Density	0.9976 g/cm^3		Calculated
Conductivity	802 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	9.8868 mg/kg	9.8631 mg/L	Calculated
Carbonate	9.8868	9.8631	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	7.78	
Cations	7.5	
% Difference	1.823	OK
Measured TDS = Calculated TDS		
Measured	758.818	
Calculated	637.578	
Ratio	1.190	OK
Measured EC = Calculated EC		
Measured	802.000	
Calculated	621.295	
Ratio	1.291	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions	0.970507	Within preferred range (0.9-1.1)
Cations	0.935750	Within preferred range (0.9-1.1)
Calculated TDS to EC ratio (0.55-0.7)	0.795	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	0.946	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Gabe

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	399.06 mg/kg	398 mg/L	Measured
Density	0.99733 g/cm^3		Calculated
Conductivity	803 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	10.04 mg/kg	10.013 mg/L	Calculated
Carbonate	10.04	10.013	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	8.1	
Cations	7.51	
% Difference	3.783	Not within ± 2%
Measured TDS = Calculated TDS		
Measured	399.065	
Calculated	649.844	
Ratio	0.614	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	803.000	
Calculated	633.806	
Ratio	1.267	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions	1.008482	Within preferred range (0.9-1.1)
Cations	0.934957	Within preferred range (0.9-1.1)
Calculated TDS to EC ratio (0.55-0.7)	0.809	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	0.497	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Hopke

Water Type	$Na\text{-}SO_4$		
Dissolved Solids	446.17 mg/kg	445 mg/L	Measured
Density	0.99737 g/cm^3		Calculated
Conductivity	707 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	30.293 mg/kg	30.214 mg/L	Calculated
Carbonate	30.293	30.214	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	5.98	
Cations	5.95	
% Difference	0.227	OK
Measured TDS = Calculated TDS		
Measured	446.175	
Calculated	469.686	
Ratio	0.950	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	707.000	
Calculated	587.278	
Ratio	1.204	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions (0.9-1.1)	0.846015	Not within preferred range
Cations (0.9-1.1)	0.842177	Not within preferred range
Calculated TDS to EC ratio	0.664	OK
Measured TDS to EC ratio	0.631	OK

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Manning

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	1862.9 mg/kg	1860 mg/L	Measured
Density	0.99844 g/cm^3		Calculated
Conductivity	1548.4 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	5.0769 mg/kg	5.0689 mg/L	Calculated
Carbonate	5.0769	5.0689	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance

Anions	21.8	
Cations	19.7	
% Difference	5.012	Not within ± 5%

Measured TDS = Calculated TDS

Measured	1862.915	
Calculated	1718.038	
Ratio	1.084	OK

Measured EC = Calculated EC

Measured	N/A	
Calculated	1548.393	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:

Measured EC not available

Calculated TDS to EC ratio

Measured EC not available

Measured TDS to EC ratio

Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Robinson A

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	713.73 mg/kg	712 mg/L	Measured
Density	0.99757 g/cm^3		Calculated
Conductivity	871.71 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	206.4 mg/kg	205.9 mg/L	Calculated
Carbonate	206.4	205.9	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	10	
Cations	10.6	
% Difference	2.483	OK
Measured TDS = Calculated TDS		
Measured	713.735	
Calculated	833.265	
Ratio	0.857	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	N/A	
Calculated	871.707	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:
Measured EC not available

Calculated TDS to EC ratio
Measured EC not available

Measured TDS to EC ratio
Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics
DOC unavailable

Robinson G

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	363.98 mg/kg	363 mg/L	Measured
Density	0.99731 g/cm^3		Calculated
Conductivity	976 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	70.105 mg/kg	69.916 mg/L	Calculated
Carbonate	70.105	69.916	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	9.03	
Cations	9.1	
% Difference	0.343	OK
Measured TDS = Calculated TDS		
Measured	363.981	
Calculated	732.012	
Ratio	0.497	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	976.000	
Calculated	772.067	
Ratio	1.264	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions	0.925624	Within preferred range (0.9-1.1)
Cations	0.932005	Within preferred range (0.9-1.1)
Calculated TDS to EC ratio (0.55-0.7)	0.750	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	0.373	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Robinson J

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	790.88 mg/kg	789 mg/L	Measured
Density	0.99763 g/cm^3		Calculated
Conductivity	946 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	171.69 mg/kg	171.29 mg/L	Calculated
Carbonate	171.69	171.29	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	6.44	
Cations	8.95	
% Difference	16.330	Not within ± 2%
Measured TDS = Calculated TDS		
Measured	790.876	
Calculated	696.823	
Ratio	1.135	OK
Measured EC = Calculated EC		
Measured	946.000	
Calculated	716.132	
Ratio	1.321	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions (0.9-1.1)	0.680305	Not within preferred range
Cations	0.945852	Within preferred range (0.9-1.1)
Calculated TDS to EC ratio (0.55-0.7)	0.737	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	0.836	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Robinson S

Water Type	Na-HCO_3		
Dissolved Solids	635.58 mg/kg	634 mg/L	Measured
Density	0.99751 g/cm^3		Calculated
Conductivity	905.02 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	218.15 mg/kg	217.6 mg/L	Calculated
Carbonate	218.15	217.6	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance

Anions	10.3	
Cations	11.5	
% Difference	5.336	Not within ± 5%

Measured TDS = Calculated TDS

Measured	635.582	
Calculated	859.971	
Ratio	0.739	Not within range 1.0 to 1.2

Measured EC = Calculated EC

Measured	N/A	
Calculated	905.019	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:

Measured EC not available

Calculated TDS to EC ratio

Measured EC not available

Measured TDS to EC ratio

Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Robinson Sawmill-1

Water Type	$Ca\text{-}HCO_3$		
Dissolved Solids	819.93 mg/kg	818 mg/L	Measured
Density	0.99765 g/cm^3		Calculated
Conductivity	1005.1 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	392.16 mg/kg	391.24 mg/L	Calculated
Carbonate	392.16	391.24	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	10.7	
Cations	12.2	
% Difference	6.701	Not within ± 5%
Measured TDS = Calculated TDS		
Measured	819.927	
Calculated	858.227	
Ratio	0.955	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	N/A	
Calculated	1005.104	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:
Measured EC not available

Calculated TDS to EC ratio
Measured EC not available

Measured TDS to EC ratio
Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics
DOC unavailable

Robinson Sawmill-2

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	704.72 mg/kg	703 mg/L	Measured
Density	0.99756 g/cm^3		Calculated
Conductivity	890.49 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	287.11 mg/kg	286.41 mg/L	Calculated
Carbonate	287.11	286.41	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	9.89	
Cations	11	
% Difference	5.250	Not within ± 2%
Measured TDS = Calculated TDS		
Measured	704.718	
Calculated	834.965	
Ratio	0.844	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	N/A	
Calculated	890.492	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:
Measured EC not available

Calculated TDS to EC ratio
Measured EC not available

Measured TDS to EC ratio
Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics
DOC unavailable

Skowron

Water Type	$Ca\text{-}HCO_3$		
Dissolved Solids	275.76 mg/kg	275 mg/L	Measured
Density	0.99724 g/cm^3		Calculated
Conductivity	859 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	269.86 mg/kg	269.11 mg/L	Calculated
Carbonate	269.86	269.11	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	8.25	
Cations	8.88	
% Difference	3.666	Not within ± 2%
Measured TDS = Calculated TDS		
Measured	275.761	
Calculated	672.708	
Ratio	0.410	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	859.000	
Calculated	746.444	
Ratio	1.151	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions	0.960615	Within preferred range (0.9-1.1)
Cations	1.033720	Within preferred range (0.9-1.1)
Calculated TDS to EC ratio (0.55-0.7)	0.783	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	0.321	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Skowron Creek

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	689.69 mg/kg	688 mg/L	Measured
Density	0.99755 g/cm^3		Calculated
Conductivity	945.83 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	151.21 mg/kg	150.84 mg/L	Calculated
Carbonate	151.21	150.84	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	10.7	
Cations	12.3	
% Difference	6.703	Not within ± 5%
Measured TDS = Calculated TDS		
Measured	689.689	
Calculated	950.056	
Ratio	0.726	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	N/A	
Calculated	945.826	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:
Measured EC not available

Calculated TDS to EC ratio
Measured EC not available

Measured TDS to EC ratio
Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics
DOC unavailable

Slevec-1

Water Type	$Ca\text{-}HCO_3$		
Dissolved Solids	316.87 mg/kg	316 mg/L	Measured
Density	0.99727 g/cm^3		Calculated
Conductivity	629 µmho/cm		Measured
Hardness (as $CaCO_3$)			
Total	264.89 mg/kg	264.17 mg/L	Calculated
Carbonate	264.89	264.17	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	4.73	
Cations	6.71	
% Difference	17.342	Not within ± 2%
Measured TDS = Calculated TDS		
Measured	316.865	
Calculated	490.900	
Ratio	0.645	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	629.000	
Calculated	515.614	
Ratio	1.220	Not within range 0.9 to 1.1

Secondary Tests

Measured EC and Ion Sums:		
Anions (0.9-1.1)	0.751513	Not within preferred range
Cations (0.9-1.1)	1.066850	Within preferred range
Calculated TDS to EC ratio (0.55-0.7)	0.780	Not within preferred range
Measured TDS to EC ratio (0.55-0.7)	0.504	Not within preferred range

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Slevec-2

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	700.71 mg/kg	699 mg/L	Measured
Density	0.99756 g/cm^3		Calculated
Conductivity	1013.9 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	3.8548 mg/kg	3.8454 mg/L	Calculated
Carbonate	3.8548	3.8454	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance

Anions	13.5	
Cations	13.3	
% Difference	0.609	OK

Measured TDS = Calculated TDS

Measured	700.710	
Calculated	1117.066	
Ratio	0.627	Not within range 1.0 to 1.2

Measured EC = Calculated EC

Measured	N/A	
Calculated	1013.881	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:

Measured EC not available

Calculated TDS to EC ratio

Measured EC not available

Measured TDS to EC ratio

Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

Tokar

Water Type	$Ca\text{-}HCO_3$		
Dissolved Solids	815.92 mg/kg	814 mg/L	Measured
Density	0.99765 g/cm^3		Calculated
Conductivity	1021.4 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	393.55 mg/kg	392.62 mg/L	Calculated
Carbonate	393.55	392.62	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance		
Anions	11.5	
Cations	12	
% Difference	2.409	OK
Measured TDS = Calculated TDS		
Measured	815.920	
Calculated	884.161	
Ratio	0.923	Not within range 1.0 to 1.2
Measured EC = Calculated EC		
Measured	N/A	
Calculated	1021.433	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:
Measured EC not available

Calculated TDS to EC ratio
Measured EC not available

Measured TDS to EC ratio
Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics
DOC unavailable

Van Artsdalen

Water Type	$Na\text{-}HCO_3$		
Dissolved Solids	1902.9 mg/kg	1900 mg/L	Measured
Density	0.99847 g/cm^3		Calculated
Conductivity	2601.7 µmho/cm		Calculated
Hardness (as $CaCO_3$)			
Total	55.212 mg/kg	55.127 mg/L	Calculated
Carbonate	55.212	55.127	
Non-Carbonate	0.0	0.0	

Primary Tests

Anion-Cation Balance

Anions	40.9	
Cations	31.5	
% Difference	13.025	Not within ± 5%

Measured TDS = Calculated TDS

Measured	1902.920	
Calculated	3006.534	
Ratio	0.633	Not within range 1.0 to 1.2

Measured EC = Calculated EC

Measured	N/A	
Calculated	2601.727	
Ratio	N/A	

Secondary Tests

Measured EC and Ion Sums:

Measured EC not available

Calculated TDS to EC ratio

Measured EC not available

Measured TDS to EC ratio

Measured EC unavailable

Organic Mass Balance

DOC ≥Sum of Organics

DOC unavailable

APPENDIX L

LABORATORY ANALYTICAL REPORTS – GROUNDWATER SAMPLES

Technical Report for

LT Environmental

Raton Basin

OGCC0604

Accutest Job Number: F52626

Sampling Date: 09/17/07

Report to:

Demo Account (SB)

sueb@accutest.com

ATTN: Sue Bell

Total number of pages in report: **56**

ACCREDITED IN ACCORDANCE WITH nelac

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

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Laboratory Director

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ACCUTEST LABORATORIES 50 YEARS 1956-2006

Certifications: FL (DOH E83510), NC (573), NJ (FL002), MA (FL946), IA (366), LA (03051), KS (E-10327), SC, AK

Test results relate only to samples analyzed.

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Sample Summary

LT Environmental

Job No: F52626

Raton Basin
Project No: OGCC0604

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
F52626-1	09/17/07	08:26	KEM	09/19/07	AQ	Ground Water	HOPKE
F52626-1A	09/17/07	08:26	KEM	09/19/07	AQ	Groundwater Filtered	HOPKE
F52626-2	09/17/07	09:55	KEM	09/19/07	AQ	Ground Water	BOUNDS
F52626-2A	09/17/07	09:55	KEM	09/19/07	AQ	Groundwater Filtered	BOUNDS
F52626-3	09/17/07	13:35	KEM	09/19/07	AQ	Ground Water	ROBINSON J
F52626-3A	09/17/07	13:35	KEM	09/19/07	AQ	Groundwater Filtered	ROBINSON J
F52626-4	09/17/07	11:15	KEM	09/19/07	AQ	Ground Water	SLEVEC-1
F52626-4A	09/17/07	11:15	KEM	09/19/07	AQ	Groundwater Filtered	SLEVEC-1
F52626-5	09/17/07	11:45	KEM	09/19/07	AQ	Ground Water	SLEVEC-2
F52626-5A	09/17/07	11:45	KEM	09/19/07	AQ	Groundwater Filtered	SLEVEC-2

SAMPLE DELIVERY GROUP CASE NARRATIVE

Client: LT Environmental **Job No:** F52626

Site: Raton Basin **Report Date** 11/9/2007 9:44:21 AM

5 Samples were collected on 09/17/2007 and were received at Accutest on 09/19/2007 properly preserved, at 3.6 Deg. C and intact. These Samples received an Accutest job number of F52626. A listing of the Laboratory Sample ID, Client Sample ID and dates of collection are presented in the Results Summary Section of this report.

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

Wet Chemistry By Method EPA 300/SW846 9056

Matrix: AQ **Batch ID:** GP9918

All method blanks for this batch meet method specific criteria.

Sample(s) F52624-2DUP, F52624-2MS were used as the QC samples for Bromide, Chloride, Fluoride, Nitrogen, Nitrate, Nitrogen, Nitrite, Sulfate.

Matrix Spike Recovery(s) for Nitrogen, Nitrite, Sulfate are outside control limits. Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

Matrix Spike Recovery(s) for Chloride are outside control limits. Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

Sampling time is recorded as Mountain Time; therefore samples F52626-1 and 2 were received within hold but analyzed outside of holding time. Since there was no Nitrate or Nitrite detected in the samples, hold time exceedance did not negatively impact data integrity.

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

Narrative prepared by:

Date: November 09, 2007

Svetlana Izosimova, QAO (signature on file)

Sample Results

Report of Analysis

Report of Analysis

Client Sample ID:	HOPKE		
Lab Sample ID:	F52626-1	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028093.D	5	10/01/07	JM	n/a	n/a	GXY1128
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	3420	2.5	0.80	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	HOPKE		
Lab Sample ID:	F52626-1	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	155	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	155	5.0	mg/l	1	09/29/07	LR	EPA 310.1
Bromide	0.65	0.50	mg/l	1	09/19/07 21:28	KG	EPA 300/SW846 9056
Chloride	35.7	2.0	mg/l	1	09/19/07 21:28	KG	EPA 300/SW846 9056
Fluoride	4.0	0.20	mg/l	1	09/19/07 21:28	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/19/07 21:28	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 21:28	KG	EPA 300/SW846 9056
Solids, Total Dissolved	445	100	mg/l	1	09/19/07 14:25	LE	EPA 160.1
Specific Conductivity	707	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	138	2.0	mg/l	1	09/19/07 21:28	KG	EPA 300/SW846 9056
pH	6.8		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	HOPKE		
Lab Sample ID:	F52626-1A	**Date Sampled:**	09/17/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	12100	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	49.6	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	< 5000	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	123000	50000	ug/l	5	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BOUNDS		
Lab Sample ID:	F52626-2	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028094.D	10	10/01/07	JM	n/a	n/a	GXY1128
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	5240	5.0	1.6	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID: BOUNDS
Lab Sample ID: F52626-2
Matrix: AQ - Ground Water
Project: Raton Basin

Date Sampled: 09/17/07
Date Received: 09/19/07
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	183	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	183	5.0	mg/l	1	09/29/07	LR	EPA 310.1
Bromide	0.53	0.50	mg/l	1	09/19/07 21:43	KG	EPA 300/SW846 9056
Chloride	14.1	2.0	mg/l	1	09/19/07 21:43	KG	EPA 300/SW846 9056
Fluoride	1.4	0.20	mg/l	1	09/19/07 21:43	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/19/07 21:43	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 21:43	KG	EPA 300/SW846 9056
Solids, Total Dissolved	657	100	mg/l	1	09/19/07 14:25	LE	EPA 160.1
Specific Conductivity	519	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	71.7	2.0	mg/l	1	09/19/07 21:43	KG	EPA 300/SW846 9056
pH	7.0		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Report of Analysis

Client Sample ID:	BOUNDS		
Lab Sample ID:	F52626-2A	**Date Sampled:**	09/17/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	12200	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	< 5000	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	90900	40000	ug/l	4	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	ROBINSON J		
Lab Sample ID:	F52626-3	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028063.D	1	09/27/07	JM	n/a	n/a	GXY1126
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	3.45	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	ROBINSON J		
Lab Sample ID:	F52626-3	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	344	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	344	5.0	mg/l	1	09/29/07	LR	EPA 310.1
Bromide	0.53	0.50	mg/l	1	09/19/07 21:57	KG	EPA 300/SW846 9056
Chloride	37.4	2.0	mg/l	1	09/19/07 21:57	KG	EPA 300/SW846 9056
Fluoride	0.64	0.20	mg/l	1	09/19/07 21:57	KG	EPA 300/SW846 9056
Nitrogen, Nitrate [a]	< 0.10	0.10	mg/l	1	09/19/07 21:57	KG	EPA 300/SW846 9056
Nitrogen, Nitrite [a]	< 0.10	0.10	mg/l	1	09/19/07 21:57	KG	EPA 300/SW846 9056
Solids, Total Dissolved	789	100	mg/l	1	09/19/07 14:25	LE	EPA 160.1
Specific Conductivity	946	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	127	2.0	mg/l	1	09/19/07 21:57	KG	EPA 300/SW846 9056
pH	6.3		su	1	09/20/07 10:40	LE	EPA 150.1

(a) Sample was prepped within 48 hours of collection, but analyzed beyond hold time.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	ROBINSON J		
Lab Sample ID:	F52626-3A	**Date Sampled:**	09/17/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	43200	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	15400	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	47.6	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	127000	50000	ug/l	5	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	SLEVEC-1		
Lab Sample ID:	F52626-4	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028061.D	1	09/27/07	JM	n/a	n/a	GXY1126
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	4.24	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	SLEVEC-1		
Lab Sample ID:	F52626-4	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	310	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	310	5.0	mg/l	1	09/29/07	LR	EPA 310.1
Bromide	< 0.50	0.50	mg/l	1	09/19/07 22:12	KG	EPA 300/SW846 9056
Chloride	9.5	2.0	mg/l	1	09/19/07 22:12	KG	EPA 300/SW846 9056
Fluoride	0.33	0.20	mg/l	1	09/19/07 22:12	KG	EPA 300/SW846 9056
Nitrogen, Nitrate [a]	0.13	0.10	mg/l	1	09/19/07 22:12	KG	EPA 300/SW846 9056
Nitrogen, Nitrite [a]	< 0.10	0.10	mg/l	1	09/19/07 22:12	KG	EPA 300/SW846 9056
Solids, Total Dissolved	316	100	mg/l	1	09/19/07 14:25	LE	EPA 160.1
Specific Conductivity	629	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	43.5	2.0	mg/l	1	09/19/07 22:12	KG	EPA 300/SW846 9056
pH	6.7		su	1	09/20/07 10:40	LE	EPA 150.1

(a) Sample was prepped within 48 hours of collection, but analyzed beyond hold time.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	SLEVEC-1		
Lab Sample ID:	F52626-4A	**Date Sampled:**	09/17/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [2]	SW846 3010A [4]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Calcium	73800	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Magnesium	19400	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Selenium [c]	< 20	20	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]
Sodium	32900	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: T:MA3128
(3) Prep QC Batch: MP13049
(4) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.
(c) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	SLEVEC-2		
Lab Sample ID:	F52626-5	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028095.D	50	10/01/07	JM	n/a	n/a	GXY1128
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	21200	25	8.0	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Report of Analysis

Client Sample ID:	SLEVEC-2		
Lab Sample ID:	F52626-5	**Date Sampled:**	09/17/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	783	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	12.2	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	795	5.0	mg/l	1	09/29/07	LR	EPA 310.1
Bromide	< 0.50	0.50	mg/l	1	09/19/07 22:26	KG	EPA 300/SW846 9056
Chloride	9.9	2.0	mg/l	1	09/19/07 22:26	KG	EPA 300/SW846 9056
Fluoride	3.7	0.20	mg/l	1	09/19/07 22:26	KG	EPA 300/SW846 9056
Nitrogen, Nitrate [a]	< 0.10	0.10	mg/l	1	09/19/07 22:26	KG	EPA 300/SW846 9056
Nitrogen, Nitrite [a]	< 0.10	0.10	mg/l	1	09/19/07 22:26	KG	EPA 300/SW846 9056
Solids, Total Dissolved	699	100	mg/l	1	09/19/07 14:25	LE	EPA 160.1
Specific Conductivity	1320	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	< 2.0	2.0	mg/l	1	09/19/07 22:26	KG	EPA 300/SW846 9056
pH	8.2		su	1	09/20/07 10:40	LE	EPA 150.1

(a) Sample was prepped within 48 hours of collection, but analyzed beyond hold time.

RL = Reporting Limit

Report of Analysis

Client Sample ID:	SLEVEC-2		
Lab Sample ID:	F52626-5A	**Date Sampled:**	09/17/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	1540	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	< 5000	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	304000	200000	ug/l	20	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

CHAIN OF CUSTODY

F52626

ACCUTEST.
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:

Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Analytical Information

Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: VOC	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bkcarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
Hopke	9/7/07	826	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note: Short hold times for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		9/7/07 1428	UPS	UPS	9/9/07 10:30	9/09/07 10:30
2						
3						
4						
5				Seal #	Preserved where applicable	On Ice: 3.6

F52626

ACCUTEST

CHAIN OF CUSTODY

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:

Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, CO 80003 State: Zip:
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Analytical Information

Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: MeOH	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
2) Bounds	91707	955	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note: Short hold time for N. Frotal Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1		91707 1426	1 UPS	2 UPS	9/19/07 10:00	2 9/19/07 10:00
3			3	4		4
5			5	Seal #	Preserved where applicable: ☑	On Ice: ☑ 3.6

F52626

CHAIN OF CUSTODY

ACCUTEST

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:

Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Analytical Information

Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: HCl	Preservation: None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
5) Robinson, J	9/7/07	1335	KEM	GW	6	6		X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
N&K Short hold time for Nitrate/Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	9/7/07 1426	1 UPS	2 UPS	9/10/07 10:00	2
3		3	4		4
5		5	Seal #	Preserved where applicable: ☑	On Ice: ☑ 3.6

4.1 4

F52626

CHAIN OF CUSTODY

ACCUTEST

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:

Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

	Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: Vac	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
1	Slevec-1	9/7/07	1115	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X
2	Slevec-2	9/7/07	1145	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Analytical Information

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note: Short hold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	K Madigan	9/7/07 1426	UPS	UPS	9/8/07 10:00	9/8/07 10:00
2						
3						
4						
5				Seal #	Preserved where applicable: ☑	On Ice: ☐ 3.6

F52626: Chain of Custody
Page 4 of 5

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F52626 CLIENT: CT. Env. PROJECT: Raton Basin

DATE/TIME RECEIVED: 9/19/07 1070 # OF COOLERS RECEIVED: 1 COOLER TEMPS: 3.6

METHOD OF DELIVERY: FEDEX (UPS) ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS: 1 204 787 329 2

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [X] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [X] TRIP BLANK NOT PROVIDED
- [X] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? Ø

NUMBER OF 5035 FIELD KITS ? Ø

NUMBER OR LAB FILTERED METALS ? Ø

SUMMARY OF COMMENTS: all vials have no labels, Edge information is on top of the caps.

TECHNICIAN SIGNATURE/DATE [signature] 9/19/07 TECHNICIAN SIGNATURE/DATE [signature] 9-19-07 ASBD 10/03/06

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F52626: Chain of Custody
Page 5 of 5

GC Volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1126-MB	XY028046.D	1	09/27/07	JM	n/a	n/a	GXY1126

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-3, F52626-4, F52626-5

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

Method Blank Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1128-MB	XY028090.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-5

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

Blank Spike Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1126-BS	XY028047.D	1	09/27/07	JM	n/a	n/a	GXY1126

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-3, F52626-4, F52626-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
74-82-8	Methane	108	105	97	54-149

Blank Spike Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1128-BS	XY028091.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-5

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
74-82-8	Methane	108	85.9	80	54-149

Matrix Spike Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52626-3MS	XY028065.D	1	09/27/07	JM	n/a	n/a	GXY1126
F52626-3 [a]	XY028063.D	1	09/27/07	JM	n/a	n/a	GXY1126

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-3, F52626-4, F52626-5

CAS No.	Compound	F52626-3 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	3.45		108	129	116	54-149

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

Matrix Spike Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52753-4MS	XY028104.D	1	10/01/07	JM	n/a	n/a	GXY1128
F52753-4	XY028102.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-5

CAS No.	Compound	F52753-4 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	ND		108	119	110	54-149

Duplicate Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52626-3DUP	XY028064.D	1	09/27/07	JM	n/a	n/a	GXY1126
F52626-3 [a]	XY028063.D	1	09/27/07	JM	n/a	n/a	GXY1126

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-3, F52626-4, F52626-5

CAS No.	Compound	F52626-3 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	3.45		2.93		16	24

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

Duplicate Summary

Job Number: F52626
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52753-4DUP	XY028103.D	1	10/01/07	JM	n/a	n/a	GXY1128
F52753-4	XY028102.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52626-1, F52626-2, F52626-5

CAS No.	Compound	F52753-4 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	ND		ND		nc	24

Metals Analysis

QC Data Summaries

Includes the following where applicable:

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:				10/01/07		10/01/07
Metal	RL	IDL	MB raw	final	MB raw	final
Aluminum	200	48				
Antimony	6.0	3.3				
Arsenic	10	3.7	-1.5	<10	-1.3	<10
Barium	200	5	0.18	<200	0.17	<200
Beryllium	16	1	anr			
Cadmium	5.0	1	-0.030	<5.0	-0.10	<5.0
Calcium	1000	100	14.4	<1000	93.3	<1000
Chromium	10	.92	-0.34	<10	0.11	<10
Cobalt	50	1				
Copper	25	1.2	2.1	<25	1.7	<25
Iron	300	14	7.6	<300	11.4	<300
Lead	10	2.1	4.6	<10	5.2	<10 (a)
Magnesium	5000	100	12.8	<5000	25.6	<5000
Manganese	15	1	0.0	<15	0.18	<15
Molybdenum	50	1.2				
Nickel	40	1				
Potassium	10000	100	1700	<10000	1720	<10000
Selenium	10	4	3.1	<10	1.7	<10
Silver	10	.77	-0.42	<10	-0.12	<10
Sodium	10000	500	3880	<10000	3580	<10000
Thallium	10	5.6				
Tin	50	2.4				
Vanadium	50	1	anr			
Zinc	20	5				

Associated samples MP13049: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:			10/01/07					10/01/07	
Metal	F52626-1A Original	DUP	RPD	QC Limits	F52626-1A Original	MS	Spikelot MPFLICP1	% Rec	QC Limits
Aluminum									
Antimony									
Arsenic	0.0	0.0	NC	0-20	0.0	1920	2000	96.0	80-120
Barium	24.4	23.7	2.9	0-20	24.4	2010	2000	99.3	80-120
Beryllium	anr								
Cadmium	0.0	0.0	NC	0-20	0.0	51.5	50	103.0	80-120
Calcium	12100	11800	2.5	0-20	12100	37800	25000	102.8	80-120
Chromium	0.0	0.0	NC	0-20	0.0	196	200	98.0	80-120
Cobalt									
Copper	49.6	47.8	3.7	0-20	49.6	303	250	101.4	80-120
Iron	48.1	33.2	36.7 (a)	0-20	48.1	26600	26000	102.1	80-120
Lead	0.0	3.0	200.0(a)	0-20	0.0	498	500	99.6	80-120
Magnesium	499	480	3.9	0-20	499	26000	25000	102.0	80-120
Manganese	6.2	6.0	3.3	0-20	6.2	507	500	100.2	80-120
Molybdenum									
Nickel									
Potassium	3620	3540	2.2	0-20	3620	33800	25000	120.7N(c	80-120
Selenium	0.0	0.0	NC	0-20	0.0	1910	2000	95.5	80-120
Silver	0.0	0.0	NC	0-20	0.0	44.9	50	89.8	80-120
Sodium	133000	129000(b	3.1	0-20	133000	175000(b	25000	168.0(d)	80-120
Thallium									
Tin									
Vanadium	anr								
Zinc									

Associated samples MP13049: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) RPD acceptable due to low duplicate and sample concentrations.
(b) Above linear range.
(c) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
(d) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 10/01/07

Metal	F52626-1A Original	MSD	Spikelot MPFLICP1	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	0.0	1940	2000	97.0	1.0	20
Barium	24.4	2020	2000	99.8	0.5	20
Beryllium	anr					
Cadmium	0.0	51.4	50	102.8	0.2	20
Calcium	12100	39700	25000	110.4	4.9	20
Chromium	0.0	198	200	99.0	1.0	20
Cobalt						
Copper	49.6	304	250	101.8	0.3	20
Iron	48.1	27700	26000	106.4	4.1	20
Lead	0.0	496	500	99.2	0.4	20
Magnesium	499	26900	25000	105.6	3.4	20
Manganese	6.2	512	500	101.2	1.0	20
Molybdenum						
Nickel						
Potassium	3620	35400	25000	127.1N(a	4.6	20
Selenium	0.0	1910	2000	95.5	0.0	20
Silver	0.0	45.3	50	90.6	0.9	20
Sodium	133000	184000(b	25000	204.0(c)	5.0	20
Thallium						
Tin						
Vanadium	anr					
Zinc						

Associated samples MP13049: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
(b) Above linear range.
(c) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	BSP Result	Spikelot MPFLICP1	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	1950	2000	97.5	80-120
Barium	1910	2000	95.5	80-120
Beryllium	anr			
Cadmium	50.5	50	101.0	80-120
Calcium	26400	25000	105.6	80-120
Chromium	196	200	98.0	80-120
Cobalt				
Copper	234	250	93.6	80-120
Iron	26900	26000	103.5	80-120
Lead	484	500	96.8	80-120
Magnesium	24900	25000	99.6	80-120
Manganese	497	500	99.4	80-120
Molybdenum				
Nickel				
Potassium	24900	25000	99.6	80-120
Selenium	1900	2000	95.0	80-120
Silver	43.1	50	86.2	80-120
Sodium	25900	25000	103.6	80-120
Thallium				
Tin				
Vanadium	anr			
Zinc				

Associated samples MP13049: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	F52626-1A Original	SDL 1:5	RPD	QC Limits
Aluminum				
Antimony				
Arsenic	0.00	0.00	NC	0-10
Barium	24.4	25.5	4.4	0-10
Beryllium	anr			
Cadmium	0.00	0.00	NC	0-10
Calcium	12100	12200	0.9	0-10
Chromium	0.00	0.00	NC	0-10
Cobalt				
Copper	49.6	52.6	6.0	0-10
Iron	48.1	0.00	100.0(a)	0-10
Lead	0.00	15.2		0-10
Magnesium	499	547	9.8	0-10
Manganese	6.20	5.61	9.5	0-10
Molybdenum				
Nickel				
Potassium	3620	10000	175.7(a)	0-10
Selenium	0.00	0.00	NC	0-10
Silver	0.00	0.00	NC	0-10
Sodium	133000	123000	7.6	0-10
Thallium				
Tin				
Vanadium	anr			
Zinc				

Associated samples MP13049: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

General Chemistry

QC Data Summaries

Includes the following where applicable:

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

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Alkalinity, Total as CaCO3	GN27588	5.0	<5.0	mg/l	250	263	105.0	90-113%
Bromide	GP9918/GN27446	0.50	<0.50	mg/l	12.5	12.9	103.2	90-110%
Chloride	GP9918/GN27446	2.0	<2.0	mg/l	50	50.4	100.8	90-110%
Fluoride	GP9918/GN27446	0.20	<0.20	mg/l	2.5	2.63	105.2	90-110%
Nitrogen, Nitrate	GP9918/GN27446	0.10	<0.10	mg/l	2.5	2.49	99.6	90-110%
Nitrogen, Nitrite	GP9918/GN27446	0.10	<0.10	mg/l	2.5	2.60	104.0	90-110%
Solids, Total Dissolved	GN27406	100	<100	mg/l				
Sulfate	GP9918/GN27446	2.0	<2.0	mg/l	50	48.4	96.8	90-110%

Associated Samples:
Batch GN27406: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
Batch GN27588: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
Batch GP9918: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Alkalinity, Total as CaCO3	GN27588	F52624-2	mg/l	321	321	0.0	0-20%
Bromide	GP9918/GN27446	F52624-2	mg/l	1.8	1.5	18.2	0-20%
Bromide	GP9918/GN27446	F52624-2	mg/l	4.7	1.5	18.2	0-20%
Chloride	GP9918/GN27492	F52624-2	mg/l	391	385	0.3	0-20%
Chloride	GP9918/GN27492	F52624-2	mg/l	386	385	0.3	0-20%
Fluoride	GP9918/GN27446	F52624-2	mg/l	0.91	0.91	0.0	0-20%
Fluoride	GP9918/GN27446	F52624-2	mg/l	1.2	0.91	0.0	0-20%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.050 U	<0.10	0.0	0-20%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.50 U	<0.10	0.0	0-20%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.050 U	<0.10	0.0	0-20%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.50 U	<0.10	0.0	0-20%
Solids, Total Dissolved	GN27406	F52628-1	mg/l	292	363	21.7	0-30%
Sulfate	GP9918/GN27446	F52624-2	mg/l	10.3	10.3	0.0	0-20%
Sulfate	GP9918/GN27446	F52624-2	mg/l	86.1	10.3	0.0	0-20%

Associated Samples:
Batch GN27406: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
Batch GN27588: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
Batch GP9918: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52626
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Alkalinity, Total as CaCO3	GN27588	F52624-2	mg/l	321	250	471	60.0*(a)	90-113%
Bromide	GP9918/GN27446	F52624-2	mg/l	1.8	12.5	14.3	100.0	90-110%
Bromide	GP9918/GN27446	F52624-2	mg/l	4.7	12.5	14.3	100.0	90-110%
Chloride	GP9918/GN27492	F52624-2	mg/l	391	50	383	0.0(b)	90-110%
Chloride	GP9918/GN27492	F52624-2	mg/l	386	50	383	0.0(b)	90-110%
Fluoride	GP9918/GN27446	F52624-2	mg/l	0.91	2.5	3.4	99.6	90-110%
Fluoride	GP9918/GN27446	F52624-2	mg/l	1.2	2.5	3.4	99.6	90-110%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.050 U	2.5	2.5	100.0	90-110%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.50 U	2.5	2.5	100.0	90-110%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.050 U	2.5	3.5	140.0N(a)	90-110%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.50 U	2.5	3.5	140.0N(a)	90-110%
Sulfate	GP9918/GN27446	F52624-2	mg/l	10.3	50	49.2	77.8N(a)	90-110%
Sulfate	GP9918/GN27446	F52624-2	mg/l	86.1	50	49.2	77.8N(a)	90-110%

Associated Samples:
Batch GN27588: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
Batch GP9918: F52626-1, F52626-2, F52626-3, F52626-4, F52626-5
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
(b) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

Misc. Forms

Custody Documents and Other Forms

(Accutest Laboratories Gulf Coast, Inc.)

Includes the following where applicable:

- Chain of Custody

Accutest Laboratories Southeast
Chain of Custody

ACCUTEST

4405 Vineland Road, Suite C-15 Orlando, Fl 32811
TEL. 407-425-6700 • FAX: 407-425-0707
www.accutest.com

Accutest JOB # PAGE_____OF_____

Accutest Quote # SKIFF#

Client / Reporting Information

Company Name: Accutest Southeast
Address:
City: State: Zip:
Project Contact: E-mail:
Phone#:
Sampler(s) Name(s) (Printed):

Project Information

Project Name: F52626
Street:
City: State:
Project #:
Fax #:
Client Purchase Order #:

Analytical Information

Dissolved Boron

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

Accutest Sample #	Field ID / Point of Collection	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	CONTAINER INFORMATION TOTAL # OF BOTTLES	OTHER	ACONE	HCl	NaOH	HNO3	H2SO4	NaOH+ZnAc	DI WATER	MEOH	Dissolved Boron	LAB USE ONLY
	F52626-1A				GW	1					X					X	
	-2A					1											
	-3A					1											
	-4A					1											
	-5A					1											

TURNAROUND TIME (Business Days)

Approved By: / Rush Code

- [X] 10 Days Standard
- [ ] 7 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] OTHER

Emergency or Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [X] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULT1 (EPA LEVEL 4)
- [ ] EDD'S

Comments / Remarks

A16C
ASRD

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished by :	Date Time:	Received By:
1	9/9/07 17:00	2	3		4
Relinquished by:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:
5		6	7	9/26/07 10:20	8 Cassie Escotto

Lab Use Only: Custody Seal in Place: Y N Temp Blank Provided: Y N Preserved where Applicable: Y N Total # of Coolers: Cooler Temperature (s) Celsius: 8.2

8.1

8

F52626: Chain of Custody
Page 1 of 4
Accutest Laboratories Gulf Coast, Inc.

ACCUTEST.

VARIANCE MEMO
SAMPLE LOG-IN

SAMPLE(S) All
PROJECT N/a
FILED BY CNE

DATE 9/24/14
LAB NO. F52624

VARIANCE - Check applicable items(s):

- ____ Insufficient sample sent for proper analysis; received approx. ____
- ____ Sample bottle received broken and/or cap not intact.
- ____ Samples received without paperwork; paperwork received without samples.
- ✓ Samples received without proper refrigeration, when it has been deemed necessary. Temperature at receipt: 8.2°C
- ____ Illegible sample number or label missing from bottle.
- ____ Numbers on sample not the same as numbers on paper work.
- ____ Incomplete instructions received with sample(s) ie.,no request for analysis, no chain of custody, incomplete billing instructions, no due date, etc. Temperature at reciept: ____
- ____ Samples received in improper container or lacking proper preservation.
- ____ Physical characteristics different than those on sampling sheets; Describe: ____
- ____ Rush samples on hold because of incomplete paperwork.
- ✓ Other (specify) Samples Received out of temp Range w/ melted ice in plastic trash bags + not directly on samples.

CORRECTIVE ACTION TAKEN

- ____ Person Contacted
- ____ Client informed verbally.
- ____ Client informed by memo/letter.
- ____ Samples processed as is.
- ____ Samples preserved by lab.
- ____ Client will resample and resubmit.
- ____ By phone.
- ____ Samples processed for information only and noted on report.
- ____ Samples processed with higher detection limits accepted.
- ____ Samples rejected.

Notes: ____

ROUTING

TITLE	DATE	INITIALS	CORRECTED?
Sample Manager:			
Login:			
Project Manager:			

Comments:

Form: SM006

F52626: Chain of Custody
Page 2 of 4

ACCUTEST.

SAMPLE RECEIPT LOG

JOB #: F52626 DATE/TIME RECEIVED: 9/24/07 10:10

CLIENT: ALSE INITIALS: CNE

Condition/Variance (Circle "Y" for yes and "N" for no or NA. If "N" is circled, see variance for explanation):

1. (Y) N Sample received in undamaged condition.
2. Y (N) Samples received within temp. range.
3. (Y) N Sample received with proper pH.
4. (Y) N Sample received in proper containers.
5. (Y) N Sample volume sufficient for analysis.
6. (Y) N Sample received with chain of custody.
7. (Y) N Chain of Custody matches **sample IDs and analysis** on containers.
8. Y (N) Samples Headspace acceptable
9. Y N (NA) Custody seal received intact and tamper not evident on cooler.
10. Y N (NA) Custody seal received intact and tamper not evident on bottles.

SAMPLE or FIELD ID	BOTTLE #	DATE SAMPLED	MATRIX	VOLUME	LOCATION	PRESERV.	PH
1-5	1		AQ	P1000	10	1,2,3,4,5,6	U (<2) >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
				CNE 9/24/07		1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA

LOCATION: WI: Walk-in VR: Volatile Refrig. SUB: Subcontract EF: Encore Freezer

PRESERVATIVES: 1: None 2: HCL 3: HNO3 4: H2SO4 5: NAOH 6: Other

Comments:

pH of waters checked excluding volatiles

pH of soils N/A

Delivery method: Courier: FedEx

COOLER TEMP: 8.2 COOLER TEMP:

COOLER TEMP: COOLER TEMP:

Form: SM012, Rev.07/28/06, QAO

F52626: Chain of Custody

Page 3 of 4

F52626

From: Origin ID: TIXA (407)425-6700
Aaron Ben David
ACCUTEST LABORATORIES
4405 VINELAND ROAD SUITE C-15

ORLANDO, FL 32811

Ship Date: 25SEP07
ActWgt: 35 LB
System#: 8227259/INET7091
Account#: S **********

Delivery Address Bar Code

Ref #
Invoice #
PO #
Dept #

SHIP TO: (713)271-4700 BILL RECIPIENT

Sample Management
Accutest Laboratories Gulf Coast
10165 Harwin Drive

Houston, TX 77036

TRK# 0201 7924 2615 6110

WED - 26SEP **A2**
PRIORITY OVERNIGHT

XH-JGQA

IAH
TX-US
77036

Shipping Label: Your shipment is complete

1. Use the 'Print' feature from your browser to send this page to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

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F52626: Chain of Custody
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Metals Analysis

QC Data Summaries

(Accutest Laboratories Gulf Coast, Inc.)

Includes the following where applicable:

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F52626
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	RL	IDL	MB raw	final
Aluminum	200	51		
Antimony	5.0	1.8		
Arsenic	5.0	1.4		
Barium	200	.1		
Beryllium	5.0	.06		
Boron	100	1.4	1.6	<100
Cadmium	4.0	.5		
Calcium	5000	8		
Chromium	10	.9		
Cobalt	50	.99		
Copper	25	1.4		
Iron	100	16		
Lead	3.0	.7		
Lithium	300		anr	
Magnesium	5000	8		
Manganese	15	.2		
Molybdenum	10	.45		
Nickel	40	1		
Potassium	5000	80		
Selenium	5.0	1.7		
Silver	10	.5		
Sodium	5000	160		
Strontium	20	.5		
Thallium	10	1.5		
Tin	20	1.5		
Titanium	20	.5		
Vanadium	50	.4		
Zinc	20	.8		

Associated samples MP6640: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52626
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:			09/28/07					09/28/07	
Metal	F52666-1 Original	DUP	RPD	QC Limits	F52666-1 Original	MS	Spikelot MPTW3	% Rec	QC Limits
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Boron	50.1	43.9	13.2	0-20	50.1	1040	800	123.7	75-125
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Lithium	anr								
Magnesium									
Manganese									
Molybdenum									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Strontium									
Thallium									
Tin									
Titanium									
Vanadium									
Zinc									

Associated samples MP6640: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52626
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	F52666-1 Original	MSD	Spikelot MPTW3	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron	50.1	1010	800	120.0	2.9	
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium	anr					
Magnesium						
Manganese						
Molybdenum						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP6640: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F52626
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	BSP Result	Spikelot MPTW3	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron	918	800	114.8	80-120
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium	anr			
Magnesium				
Manganese				
Molybdenum				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP6640: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: F52626
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	F52666-1 Original	SDL 1:5	RPD	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron	50.1	56.3	12.5 (a)	0-10
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium	anr			
Magnesium				
Manganese				
Molybdenum				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP6640: F52626-1A, F52626-2A, F52626-3A, F52626-4A, F52626-5A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Technical Report for

LT Environmental

Raton Basin

OGCC0604

Accutest Job Number: F52627

Sampling Date: 09/18/07

Report to:

jpeterson@ltenv.com

Total number of pages in report: **64**

ACCREDITED IN ACCORDANCE WITH nelac

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

Harry Behzadi, Ph.D.
Laboratory Director

Client Service contact: Sue Bell 407-425-6700

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Certifications: FL (DOH E83510), NC (573), NJ (FL002), MA (FL946), IA (366), LA (03051), KS (E-10327), SC, AK

Test results relate only to samples analyzed.

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Sample Summary

LT Environmental

Job No: F52627

Raton Basin
Project No: OGCC0604

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
F52627-1	09/18/07	06:35	KEM	09/19/07	AQ	Ground Water	MANNING
F52627-1A	09/18/07	06:35	KEM	09/19/07	AQ	Groundwater Filtered	MANNING
F52627-2	09/18/07	08:30	KEM	09/19/07	AQ	Ground Water	TOKAR
F52627-2A	09/18/07	08:30	KEM	09/19/07	AQ	Groundwater Filtered	TOKAR
F52627-3	09/18/07	09:45	KEM	09/19/07	AQ	Ground Water	BARTH
F52627-3A	09/18/07	09:45	KEM	09/19/07	AQ	Groundwater Filtered	BARTH
F52627-4	09/18/07	10:35	KEM	09/19/07	AQ	Ground Water	SKOWRON
F52627-4A	09/18/07	10:35	KEM	09/19/07	AQ	Groundwater Filtered	SKOWRON
F52627-5	09/18/07	11:25	KEM	09/19/07	AQ	Ground Water	ROBINSON SAWMILL-1
F52627-5A	09/18/07	11:25	KEM	09/19/07	AQ	Groundwater Filtered	ROBINSON SAWMILL-1
F52627-6	09/18/07	11:55	KEM	09/19/07	AQ	Ground Water	ROBINSON SAWMILL-2
F52627-6A	09/18/07	11:55	KEM	09/19/07	AQ	Groundwater Filtered	ROBINSON SAWMILL-2
F52627-7	09/18/07	12:35	KEM	09/19/07	AQ	Ground Water	ROBINSON A

Sample Summary
(continued)

LT Environmental

Job No: F52627

Raton Basin
Project No: OGCC0604

Sample Number	Collected Date	Time	By	Received	Matrix Code	Matrix Type	Client Sample ID
F52627-7A	09/18/07	12:35	KEM	09/19/07	AQ	Groundwater Filtered	ROBINSON A

Sample Results

Report of Analysis

Accutest Laboratories

Report of Analysis

Client Sample ID:	MANNING		
Lab Sample ID:	F52627-1	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028096.D	10	10/01/07	JM	n/a	n/a	GXY1128
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	4140	5.0	1.6	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	MANNING		
Lab Sample ID:	F52627-1	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	1130	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	11.7	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	1140	5.0	mg/l	1	10/01/07	LR	EPA 310.1
Bromide	0.82	0.50	mg/l	1	09/19/07 20:01	KG	EPA 300/SW846 9056
Chloride	49.1	2.0	mg/l	1	09/19/07 20:01	KG	EPA 300/SW846 9056
Fluoride [a]	5.2	0.20	mg/l	1	09/19/07 20:01	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/19/07 20:01	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 20:01	KG	EPA 300/SW846 9056
Solids, Total Dissolved	1860	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	2150	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	65.5	2.0	mg/l	1	09/19/07 20:01	KG	EPA 300/SW846 9056
pH	8.3		su	1	09/20/07 10:40	LE	EPA 150.1

(a) Estimated value, above calibration range.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	MANNING		
Lab Sample ID:	F52627-1A	**Date Sampled:**	09/18/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	316	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	2030	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	< 5000	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	451000	200000	ug/l	20	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	TOKAR		
Lab Sample ID:	F52627-2	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028076.D	1	09/28/07	JM	n/a	n/a	GXY1127
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	0.69	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values. Confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID: TOKAR
Lab Sample ID: F52627-2
Matrix: AQ - Ground Water
Project: Raton Basin

Date Sampled: 09/18/07
Date Received: 09/19/07
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	455	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	455	5.0	mg/l	1	10/01/07	LR	EPA 310.1
Bromide	0.90	0.50	mg/l	1	09/19/07 20:16	KG	EPA 300/SW846 9056
Chloride	70.5	2.0	mg/l	1	09/19/07 20:16	KG	EPA 300/SW846 9056
Fluoride	0.50	0.20	mg/l	1	09/19/07 20:16	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	0.48	0.10	mg/l	1	09/19/07 20:16	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 20:16	KG	EPA 300/SW846 9056
Solids, Total Dissolved	814	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	1130	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	123	2.0	mg/l	1	09/19/07 20:16	KG	EPA 300/SW846 9056
pH	7.4		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	TOKAR		
Lab Sample ID:	F52627-2A	**Date Sampled:**	09/18/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	101000	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	34100	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium [c]	< 20	20	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	96600	40000	ug/l	4	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.
(c) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BARTH		
Lab Sample ID:	F52627-3	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028077.D	1	09/28/07	JM	n/a	n/a	GXY1127
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID: BARTH
Lab Sample ID: F52627-3
Matrix: AQ - Ground Water
Project: Raton Basin

Date Sampled: 09/18/07
Date Received: 09/19/07
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	360	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	360	25	mg/l	1	10/01/07	LR	EPA 310.1
Bromide	0.61	0.50	mg/l	1	09/19/07 19:04	KG	EPA 300/SW846 9056
Chloride	38.4	2.0	mg/l	1	09/19/07 19:04	KG	EPA 300/SW846 9056
Fluoride	0.66	0.20	mg/l	1	09/19/07 19:04	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	0.25	0.10	mg/l	1	09/19/07 19:04	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 19:04	KG	EPA 300/SW846 9056
Solids, Total Dissolved	756	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	808	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	58.9	2.0	mg/l	1	09/19/07 19:04	KG	EPA 300/SW846 9056
pH	7.4		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BARTH		
Lab Sample ID:	F52627-3A	**Date Sampled:**	09/18/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	68400	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	15700	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	86600	20000	ug/l	2	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SKOWRON		
Lab Sample ID:	F52627-4	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028078.D	1	09/28/07	JM	n/a	n/a	GXY1127
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values. Confirmed by dual column analysis.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	SKOWRON		
Lab Sample ID:	F52627-4	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	395	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	395	25	mg/l	1	10/01/07	LR	EPA 310.1
Bromide	0.61	0.50	mg/l	1	09/19/07 19:18	KG	EPA 300/SW846 9056
Chloride	42.6	2.0	mg/l	1	09/19/07 19:18	KG	EPA 300/SW846 9056
Fluoride	0.66	0.20	mg/l	1	09/19/07 19:18	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	0.18	0.10	mg/l	1	09/19/07 19:18	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 19:18	KG	EPA 300/SW846 9056
Solids, Total Dissolved	275	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	859	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	55.6	2.0	mg/l	1	09/19/07 19:18	KG	EPA 300/SW846 9056
pH	7.3		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SKOWRON		
Lab Sample ID:	F52627-4A	**Date Sampled:**	09/18/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	77100	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	18600	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium [c]	< 20	20	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	80500	20000	ug/l	2	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.
(c) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON SAWMILL-1		
Lab Sample ID:	F52627-5	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028079.D	1	09/28/07	JM	n/a	n/a	GXY1127
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	14.2	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON SAWMILL-1		
Lab Sample ID:	F52627-5	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	443	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	443	25	mg/l	1	10/01/07	LR	EPA 310.1
Bromide	1.2	0.50	mg/l	1	09/19/07 19:32	KG	EPA 300/SW846 9056
Chloride	105	2.0	mg/l	1	09/19/07 19:32	KG	EPA 300/SW846 9056
Fluoride	0.59	0.20	mg/l	1	09/19/07 19:32	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	0.12	0.10	mg/l	1	09/19/07 19:32	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 19:32	KG	EPA 300/SW846 9056
Solids, Total Dissolved	818	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	1190	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	76.6	2.0	mg/l	1	09/19/07 19:32	KG	EPA 300/SW846 9056
pH	7.1		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON SAWMILL-1		
Lab Sample ID:	F52627-5A	**Date Sampled:**	09/18/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	111000	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	27700	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	25.8	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium [c]	< 20	20	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	101000	20000	ug/l	2	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.
(c) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON SAWMILL-2		
Lab Sample ID:	F52627-6	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028082.D	1	09/28/07	JM	n/a	n/a	GXY1127
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	17.2	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON SAWMILL-2		
Lab Sample ID:	F52627-6	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	495	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	495	25	mg/l	1	10/01/07	LR	EPA 310.1
Bromide	0.92	0.50	mg/l	1	09/19/07 20:30	KG	EPA 300/SW846 9056
Chloride	72.0	2.0	mg/l	1	09/19/07 20:30	KG	EPA 300/SW846 9056
Fluoride	0.71	0.20	mg/l	1	09/19/07 20:30	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/19/07 20:30	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 20:30	KG	EPA 300/SW846 9056
Solids, Total Dissolved	703	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	1040	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	42.1	2.0	mg/l	1	09/19/07 20:30	KG	EPA 300/SW846 9056
pH	7.1		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON SAWMILL-2		
Lab Sample ID:	F52627-6A	**Date Sampled:**	09/18/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	80400	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	20800	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	1510	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium [c]	< 20	20	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	121000	50000	ug/l	5	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.
(c) Elevated reporting limit(s) due to matrix interference.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON A		
Lab Sample ID:	F52627-7	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028083.D	1	09/28/07	JM	n/a	n/a	GXY1127
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	17.6	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON A		
Lab Sample ID:	F52627-7	**Date Sampled:**	09/18/07
Matrix:	AQ - Ground Water	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	499	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	500	25	mg/l	1	10/01/07	LR	EPA 310.1
Bromide	0.85	0.50	mg/l	1	09/19/07 21:14	KG	EPA 300/SW846 9056
Chloride	64.4	2.0	mg/l	1	09/19/07 21:14	KG	EPA 300/SW846 9056
Fluoride	1.1	0.20	mg/l	1	09/19/07 21:14	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	0.19	0.10	mg/l	1	09/19/07 21:14	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/19/07 21:14	KG	EPA 300/SW846 9056
Solids, Total Dissolved	712	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	1100	0.50	umhos/cm	1	09/20/07 10:40	LE	EPA 120.1
Sulfate	45.5	2.0	mg/l	1	09/19/07 21:14	KG	EPA 300/SW846 9056
pH	7.2		su	1	09/20/07 10:40	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON A		
Lab Sample ID:	F52627-7A	**Date Sampled:**	09/18/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/19/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	09/28/07	09/28/07	ATX	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Calcium	56400	1000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Lead [b]	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Magnesium	15800	5000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/01/07	10/02/07	RS	SW846 6010B [1]	SW846 3010A [4]
Sodium	148000	50000	ug/l	5	10/01/07	10/03/07	RS	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6017
(2) Instrument QC Batch: MA6020
(3) Instrument QC Batch: T:MA3128
(4) Prep QC Batch: MP13049
(5) Prep QC Batch: T:MP6640

(a) Analysis performed at Accutest Laboratories, Houston, TX.
(b) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

CHAIN OF CUSTODY

ACCUTEST
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52627
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection: Date	Collection: Time	Sampled By	Matrix	# of bottles	Preservation: VOC	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
1 Manning	9/18/07	635	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 Manning	91807 1400	1 FX	2 FX		2 E. Torres 09:00
3		3	4		4 9.19.07
5		5	Seal #	Preserved where applicable ☐	On Ice: ☐

2.4 2.8

F52627: Chain of Custody
Page 1 of 7

ACCUTEST

CHAIN OF CUSTODY

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52627
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

	Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: Vac	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bkcarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
2	Tokar	9/18/07	0830	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Analytical Information

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold times for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	KMadigan	9/19/07 1400	FX	FX		E. Jones 9.19.07 09:00
2						
3						
4						
5						

Seal # | Preserved where applicable ☐ | On Ice: ☐

2.4.2.8

CHAIN OF CUSTODY

ACCUTEST
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:
Accutest Control #: F52627

Client Information	Facility Information	Analytical Information
Name: LT Environmental	Project Name: Raton Basin	
Address: 4600 W. 60th Avenue	Location: Raton Basin	
City: Arvada, CO 80003 State: Zip:	Project No.: OGCC0604	
Report to: Phone #: 303-433-9788	Email: kmadigan@ltenv.com	

Field ID / Point of Collection	Collection: Date	Time	Sampled By	Matrix	# of bottles	Preservation: HCl	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
3 Barth	9/8/07	945	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Nitrate & Nitrite Note 5br hold time for

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 Khalil Zia	9/8/07 1400	1 FX	2 FX		2 E. Times 9/19/07 09:00
3		3	4		4
5		5	Seal #	Preserved where applicable: ☐	On Ice: ☐

2.4 2.8

F52627: Chain of Custody
Page 3 of 7

CHAIN OF CUSTODY

ACCUTEST
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:
Accutest Control #: F52627

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, CO 80003 State: Zip:
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection: Date	Time	Sampled By	Matrix	# of bottles	Preservation: HCl	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
4 Skowron	91807	1035	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED, PLEASE FILTER IN LAB!!
Note Short hold times for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	9/18/07 1400	1 FX	2 FX		2 F. Torres 9/19/07
3		3	4		4 09:00
5		5	Seal #	Preserved where applicable ☐	On Ice: ☐

2.4 2.8

CHAIN OF CUSTODY

ACCUTEST

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52627
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: HCl	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
5 Robinson Sawmill-1	91807	1125	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X
6 Robinson Sawmill-2	91807	1155	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold times for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	91807 1400	1 FX	2 FX		2 E. Torres 9/9/07
3		3	4		4 09:00
5		5	Seal #	Preserved where applicable ☐	On Ice: ☐

2.4 2.8

F52627: Chain of Custody
Page 5 of 7

CHAIN OF CUSTODY

ACCUTEST
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:
Accutest Control #: F52627

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Analytical Information

Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: HCl	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
7 Robinson, A	91807	1235	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold times for Nitrate Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	91607 1400	1 FX	2 FX		2 E. Torres 9/19/07
3		3	4		4 09:10
5		5	Seal #	Preserved where applicable ☐	On Ice: ☐

2.4 2.8

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F52627 CLIENT: LT Envir. PROJECT: Raton Basin

DATE/TIME RECEIVED: 9.19.07 09:20 # OF COOLERS RECEIVED: 2 COOLER TEMPS: 2.4 2.8

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS: 8619 1477 1338

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [ ] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [X] TRIP BLANK NOT PROVIDED
- [X] TRIP BLANK NOT ON COC
- [ ] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [ ] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [X] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? Ø

NUMBER OF 5035 FIELD KITS ? Ø

NUMBER OR LAB FILTERED METALS ? 7

SUMMARY OF COMMENTS: All vials have no labels bottle information is written on cap.

Sample 1 - manning 91807 635 Sample 2 - Tokar 91807 830 Sample 3 - Barth 91807 945

Sample 4 - Skoumal 91807 1035 Sample 5 - Robinson Sawmill -1 91807 1125

Sample 6 - Robinson Sawmill-2 91807 1155 Sample 7 - Robinson, A 91807 1215

TECHNICIAN SIGNATURE/DATE E.T. 9.19.07 TECHNICIAN SIGNATURE/DATE JC 9-19-07 ASBD 10/03/06

F52627: Chain of Custody
Page 7 of 64

GC Volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1127-MB	XY028071.D	1	09/28/07	JM	n/a	n/a	GXY1127

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

Method Blank Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1128-MB	XY028090.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

Blank Spike Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1127-BS	XY028072.D	1	09/28/07	JM	n/a	n/a	GXY1127

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
74-82-8	Methane	108	106	98	54-149

Blank Spike Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1128-BS	XY028091.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
74-82-8	Methane	108	85.9	80	54-149

Matrix Spike Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52627-5MS	XY028085.D	1	09/28/07	JM	n/a	n/a	GXY1127
F52627-5 [a]	XY028079.D	1	09/28/07	JM	n/a	n/a	GXY1127

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7

CAS No.	Compound	F52627-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	14.2		108	154	129	54-149

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

Matrix Spike Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52753-4MS	XY028104.D	1	10/01/07	JM	n/a	n/a	GXY1128
F52753-4	XY028102.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1

CAS No.	Compound	F52753-4 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	ND		108	119	110	54-149

Duplicate Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52627-5DUP	XY028084.D	1	09/28/07	JM	n/a	n/a	GXY1127
F52627-5 [a]	XY028079.D	1	09/28/07	JM	n/a	n/a	GXY1127

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7

CAS No.	Compound	F52627-5 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	14.2		13.7		4	24

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

Duplicate Summary

Job Number: F52627
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52753-4DUP	XY028103.D	1	10/01/07	JM	n/a	n/a	GXY1128
F52753-4	XY028102.D	1	10/01/07	JM	n/a	n/a	GXY1128

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52627-1

CAS No.	Compound	F52753-4 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	ND		ND		nc	24

Metals Analysis

QC Data Summaries

Includes the following where applicable:

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:				10/01/07		10/01/07
Metal	RL	IDL	MB raw	final	MB raw	final
Aluminum	200	48				
Antimony	6.0	3.3				
Arsenic	10	3.7	-1.5	<10	-1.3	<10
Barium	200	5	0.18	<200	0.17	<200
Beryllium	16	1	anr			
Cadmium	5.0	1	-0.030	<5.0	-0.10	<5.0
Calcium	1000	100	14.4	<1000	93.3	<1000
Chromium	10	.92	-0.34	<10	0.11	<10
Cobalt	50	1				
Copper	25	1.2	2.1	<25	1.7	<25
Iron	300	14	7.6	<300	11.4	<300
Lead	10	2.1	4.6	<10	5.2	<10 (a)
Magnesium	5000	100	12.8	<5000	25.6	<5000
Manganese	15	1	0.0	<15	0.18	<15
Molybdenum	50	1.2				
Nickel	40	1				
Potassium	10000	100	1700	<10000	1720	<10000
Selenium	10	4	3.1	<10	1.7	<10
Silver	10	.77	-0.42	<10	-0.12	<10
Sodium	10000	500	3880	<10000	3580	<10000
Thallium	10	5.6				
Tin	50	2.4				
Vanadium	50	1	anr			
Zinc	20	5				

Associated samples MP13049: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Elevated RL/MDL due to CRIA exceeding acceptance criteria.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07 10/01/07

Metal	F52626-1A Original	DUP	RPD	QC Limits	F52626-1A Original	MS	Spikelot MPFLICP1	% Rec	QC Limits
Aluminum									
Antimony									
Arsenic	0.0	0.0	NC	0-20	0.0	1920	2000	96.0	80-120
Barium	24.4	23.7	2.9	0-20	24.4	2010	2000	99.3	80-120
Beryllium	anr								
Cadmium	0.0	0.0	NC	0-20	0.0	51.5	50	103.0	80-120
Calcium	12100	11800	2.5	0-20	12100	37800	25000	102.8	80-120
Chromium	0.0	0.0	NC	0-20	0.0	196	200	98.0	80-120
Cobalt									
Copper	49.6	47.8	3.7	0-20	49.6	303	250	101.4	80-120
Iron	48.1	33.2	36.7 (a)	0-20	48.1	26600	26000	102.1	80-120
Lead	0.0	3.0	200.0(a)	0-20	0.0	498	500	99.6	80-120
Magnesium	499	480	3.9	0-20	499	26000	25000	102.0	80-120
Manganese	6.2	6.0	3.3	0-20	6.2	507	500	100.2	80-120
Molybdenum									
Nickel									
Potassium	3620	3540	2.2	0-20	3620	33800	25000	120.7N(c	80-120
Selenium	0.0	0.0	NC	0-20	0.0	1910	2000	95.5	80-120
Silver	0.0	0.0	NC	0-20	0.0	44.9	50	89.8	80-120
Sodium	133000	129000(b	3.1	0-20	133000	175000(b	25000	168.0(d)	80-120
Thallium									
Tin									
Vanadium	anr								
Zinc									

Associated samples MP13049: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) RPD acceptable due to low duplicate and sample concentrations.
(b) Above linear range.
(c) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
(d) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049 Methods: SW846 6010B
Matrix Type: AQUEOUS Units: ug/l

Prep Date: 10/01/07

Metal	F52626-1A Original	MSD	Spikelot MPFLICP1	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	0.0	1940	2000	97.0	1.0	20
Barium	24.4	2020	2000	99.8	0.5	20
Beryllium	anr					
Cadmium	0.0	51.4	50	102.8	0.2	20
Calcium	12100	39700	25000	110.4	4.9	20
Chromium	0.0	198	200	99.0	1.0	20
Cobalt						
Copper	49.6	304	250	101.8	0.3	20
Iron	48.1	27700	26000	106.4	4.1	20
Lead	0.0	496	500	99.2	0.4	20
Magnesium	499	26900	25000	105.6	3.4	20
Manganese	6.2	512	500	101.2	1.0	20
Molybdenum						
Nickel						
Potassium	3620	35400	25000	127.1N(a	4.6	20
Selenium	0.0	1910	2000	95.5	0.0	20
Silver	0.0	45.3	50	90.6	0.9	20
Sodium	133000	184000(b	25000	204.0(c)	5.0	20
Thallium						
Tin						
Vanadium	anr					
Zinc						

Associated samples MP13049: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
(b) Above linear range.
(c) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	BSP Result	Spikelot MPFLICP1	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	1950	2000	97.5	80-120
Barium	1910	2000	95.5	80-120
Beryllium	anr			
Cadmium	50.5	50	101.0	80-120
Calcium	26400	25000	105.6	80-120
Chromium	196	200	98.0	80-120
Cobalt				
Copper	234	250	93.6	80-120
Iron	26900	26000	103.5	80-120
Lead	484	500	96.8	80-120
Magnesium	24900	25000	99.6	80-120
Manganese	497	500	99.4	80-120
Molybdenum				
Nickel				
Potassium	24900	25000	99.6	80-120
Selenium	1900	2000	95.0	80-120
Silver	43.1	50	86.2	80-120
Sodium	25900	25000	103.6	80-120
Thallium				
Tin				
Vanadium	anr			
Zinc				

Associated samples MP13049: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13049
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	F52626-1A Original	SDL 1:5	RPD	QC Limits
Aluminum				
Antimony				
Arsenic	0.00	0.00	NC	0-10
Barium	24.4	25.5	4.4	0-10
Beryllium	anr			
Cadmium	0.00	0.00	NC	0-10
Calcium	12100	12200	0.9	0-10
Chromium	0.00	0.00	NC	0-10
Cobalt				
Copper	49.6	52.6	6.0	0-10
Iron	48.1	0.00	100.0(a)	0-10
Lead	0.00	15.2		0-10
Magnesium	499	547	9.8	0-10
Manganese	6.20	5.61	9.5	0-10
Molybdenum				
Nickel				
Potassium	3620	10000	175.7(a)	0-10
Selenium	0.00	0.00	NC	0-10
Silver	0.00	0.00	NC	0-10
Sodium	133000	123000	7.6	0-10
Thallium				
Tin				
Vanadium	anr			
Zinc				

Associated samples MP13049: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

General Chemistry

QC Data Summaries

Includes the following where applicable:

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

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Alkalinity, Total as CaCO3	GN27598	25	<25	mg/l	250	264	106.0	90-113%
Bromide	GP9918/GN27446	0.50	<0.50	mg/l	12.5	12.9	103.2	90-110%
Chloride	GP9918/GN27446	2.0	<2.0	mg/l	50	50.4	100.8	90-110%
Fluoride	GP9918/GN27446	0.20	<0.20	mg/l	2.5	2.63	105.2	90-110%
Nitrogen, Nitrate	GP9918/GN27446	0.10	<0.10	mg/l	2.5	2.49	99.6	90-110%
Nitrogen, Nitrite	GP9918/GN27446	0.10	<0.10	mg/l	2.5	2.60	104.0	90-110%
Solids, Total Dissolved	GN27432	100	<100	mg/l				
Sulfate	GP9918/GN27446	2.0	<2.0	mg/l	50	48.4	96.8	90-110%

Associated Samples:
Batch GN27432: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
Batch GN27598: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
Batch GP9918: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Alkalinity, Total as CaCO3	GN27598	F52627-2	mg/l	455	463	1.7	0-20%
Bromide	GP9918/GN27446	F52624-2	mg/l	1.8	1.5	18.2	0-20%
Bromide	GP9918/GN27446	F52624-2	mg/l	4.7	1.5	18.2	0-20%
Chloride	GP9918/GN27492	F52624-2	mg/l	391	385	0.3	0-20%
Chloride	GP9918/GN27492	F52624-2	mg/l	386	385	0.3	0-20%
Fluoride	GP9918/GN27446	F52624-2	mg/l	0.91	0.91	0.0	0-20%
Fluoride	GP9918/GN27446	F52624-2	mg/l	1.2	0.91	0.0	0-20%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.050 U	<0.10	0.0	0-20%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.50 U	<0.10	0.0	0-20%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.050 U	<0.10	0.0	0-20%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.50 U	<0.10	0.0	0-20%
Solids, Total Dissolved	GN27432	F52627-1	mg/l	1860	1560	18.1	0-30%
Sulfate	GP9918/GN27446	F52624-2	mg/l	10.3	10.3	0.0	0-20%
Sulfate	GP9918/GN27446	F52624-2	mg/l	86.1	10.3	0.0	0-20%

Associated Samples:
Batch GN27432: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
Batch GN27598: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
Batch GP9918: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52627
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Alkalinity, Total as CaCO3	GN27598	F52627-2	mg/l	455	250	663	98.8	90-113%
Bromide	GP9918/GN27446	F52624-2	mg/l	1.8	12.5	14.3	100.0	90-110%
Bromide	GP9918/GN27446	F52624-2	mg/l	4.7	12.5	14.3	100.0	90-110%
Chloride	GP9918/GN27492	F52624-2	mg/l	391	50	383	0.0(a)	90-110%
Chloride	GP9918/GN27492	F52624-2	mg/l	386	50	383	0.0(a)	90-110%
Fluoride	GP9918/GN27446	F52624-2	mg/l	0.91	2.5	3.4	99.6	90-110%
Fluoride	GP9918/GN27446	F52624-2	mg/l	1.2	2.5	3.4	99.6	90-110%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.050 U	2.5	2.5	100.0	90-110%
Nitrogen, Nitrate	GP9918/GN27446	F52624-2	mg/l	0.50 U	2.5	2.5	100.0	90-110%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.050 U	2.5	3.5	140.0N(b)	90-110%
Nitrogen, Nitrite	GP9918/GN27446	F52624-2	mg/l	0.50 U	2.5	3.5	140.0N(b)	90-110%
Sulfate	GP9918/GN27446	F52624-2	mg/l	10.3	50	49.2	77.8N(b)	90-110%
Sulfate	GP9918/GN27446	F52624-2	mg/l	86.1	50	49.2	77.8N(b)	90-110%

Associated Samples:
Batch GN27598: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
Batch GP9918: F52627-1, F52627-2, F52627-3, F52627-4, F52627-5, F52627-6, F52627-7
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(a) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.
(b) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

Misc. Forms

Custody Documents and Other Forms

(Accutest Laboratories Gulf Coast, Inc.)

Includes the following where applicable:

- Chain of Custody

Accutest Laboratories Southeast
Chain of Custody

ACCUTEST

4405 Vineland Road, Suite C-15 Orlando, Fl 32811
TEL. 407-425-6700 • FAX: 407-425-0707
www.accutest.com

Accutest JOB # PAGE_____OF_____

Accutest Quote # SKIFF#

Client / Reporting Information

Company Name: Accutest Southeast
Address:
City State Zip
Project Contact E-mail
Phone#
Sampler(s) Name(s) (Printed)

Project Information

Project Name: F52627
Street
City State
Project #
Fax #
Client Purchase Order #

Analytical Information

Dissolved Boron

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

Accutest Sample #	Field ID / Point of Collection	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	CONTAINER INFORMATION OTHER	NONE	HCl	HONO3	H2SO4	NAOH+ZNAC	DI WATER	MEOH
	F52627 -1A				GW	1				X				X
	-2A				↓	1				↓				↓
	-3A					1								
	-4A					1								
	-5A					1								
	-6A					1								
	-7A				↓	1				↓				↓

LAB USE ONLY

TURNAROUND TIME (Business Days)

Approved By: / Rush Code

- [X] 10 Days Standard
- [ ] 7 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] OTHER

Emergency or Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [X] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULT1 (EPA LEVEL 4)
- [ ] EDD'S

Comments / Remarks

AWSB AIGC
ASD

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished by :	Date Time:	Received By:
1	9-19-07 17:00	2	3		4
Relinquished by:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:
5		6	7	9/26/07 10:12	8 Cassie Scott

Lab Use Only: Custody Seal in Place: Y N Temp Blank Provided: Y N Preserved where Applicable: Y N Total # of Coolers: Cooler Temperature (s) Celsius: 8.2

7.1
7

F52627: Chain of Custody
Page 1 of 4
Accutest Laboratories Gulf Coast, Inc.

ACCUTEST.

VARIANCE MEMO
SAMPLE LOG-IN

SAMPLE(S) All
PROJECT N/A
FILED BY CNE

DATE 9/26/14

LAB NO. F52627

VARIANCE - Check applicable items(s):

- ____ Insufficient sample sent for proper analysis; received approx. ____
- ____ Sample bottle received broken and/or cap not intact.
- ____ Samples received without paperwork; paperwork received without samples.
- ✓ Samples received without proper refrigeration, when it has been deemed necessary. Temperature at receipt: 8.2°C
- ____ Illegible sample number or label missing from bottle.
- ____ Numbers on sample not the same as numbers on paper work.
- ____ Incomplete instructions received with sample(s) ie.,no request for analysis, no chain of custody, incomplete billing instructions, no due date, etc. Temperature at reciept: ____
- ____ Samples received in improper container or lacking proper preservation.
- ____ Physical characteristics different than those on sampling sheets; Describe: ____
- ____ Rush samples on hold because of incomplete paperwork.
- ✓ Other (specify) Samples Recieved out of temp range w/ melted ice in plastic trash bags + not directly on samples.

CORRECTIVE ACTION TAKEN

- ____ Person Contacted
- ____ Client informed verbally.
- ____ Client informed by memo/letter.
- ____ Samples processed as is.
- ____ Samples preserved by lab.
- ____ Client will resample and resubmit.
- ____ By phone.
- ____ Samples processed for information only and noted on report.
- ____ Samples processed with higher detection limits accepted.
- ____ Samples rejected.

Notes: ____

ROUTING

TITLE	DATE	INITIALS	CORRECTED?
Sample Manager:			
Login:			
Project Manager:			
Comments:			

Form: SM006

F52627: Chain of Custody
Page 2 of 4

ACCUTEST.

SAMPLE RECEIPT LOG

JOB #: F52627 DATE/TIME RECEIVED: 9/26/07 10:10

CLIENT: ALSE INITIALS: CNE

Condition/Variance (Circle "Y" for yes and "N" for no or NA. If "N" is circled, see variance for explanation):

1. (Y) N Sample received in undamaged condition.
2. Y (N) Samples received within temp. range.
3. (Y) N Sample received with proper pH.
4. (Y) N Sample received in proper containers.
5. (Y) N Sample volume sufficient for analysis.
6. (Y) N Sample received with chain of custody.
7. (Y) N Chain of Custody matches **sample IDs and analysis** on containers.
8. Y (NA) Samples Headspace acceptable
9. Y N (NA) Custody seal received intact and tamper not evident on cooler.
10. Y N (NA) Custody seal received intact and tamper not evident on bottles.

SAMPLE or FIELD ID	BOTTLE #	DATE SAMPLED	MATRIX	VOLUME	LOCATION	PRESERV.	PH
1-7	1		AQ	P1000	10	1,2,(3),4,5,6	U,(<2),>12,NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
				CNE 9/26/07		1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA
						1,2,3,4,5,6	U, <2, >12, NA

LOCATION: WI: Walk-In VR: Volatile Refrig. SUB: Subcontract EF: Encore Freezer

PRESERVATIVES: 1: None 2: HCL 3: HNO3 4: H2SO4 5: NAOH 6: Other

Comments:

pH of waters checked excluding volatiles

pH of soils N/A

Delivery method: Courier: FedEx

COOLER TEMP: 8.2 COOLER TEMP:

COOLER TEMP: COOLER TEMP:

Form: SM012, Rev.07/28/06, QAO

7.1 7

F52627: Chain of Custody
Page 3 of 4

F52627

From: Origin ID: TIXA (407)425-6700
Aaron Ben David
ACCUTEST LABORATORIES
4405 VINELAND ROAD SUITE C-15

ORLANDO, FL 32811

FedEx Express

Ship Date: 25SEP07
ActWgt: 35 LB
System#: 8227259/INET7091
Account#: S *********

Delivery Address Bar Code

Ref #
Invoice #
PO #
Dept #

SHIP TO: (713)271-4700 BILL RECIPIENT

Sample Management
Accutest Laboratories Gulf Coast
10165 Harwin Drive

Houston, TX 77036

TRK# 0201 7924 2615 6110

WED - 26SEP **A2**
PRIORITY OVERNIGHT

XH-JGQA

IAH
TX-US
77036

Shipping Label: Your shipment is complete

1. Use the 'Print' feature from your browser to send this page to your laser or inkjet printer.
2. Fold the printed page along the horizontal line.
3. Place label in shipping pouch and affix it to your shipment so that the barcode portion of the label can be read and scanned.

Warning: Use only the printed original label for shipping. Using a photocopy of this label for shipping purposes is fraudulent and could result in additional billing charges, along with the cancellation of your FedEx account number.

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F52627: Chain of Custody
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Metals Analysis

QC Data Summaries

(Accutest Laboratories Gulf Coast, Inc.)

Includes the following where applicable:

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F52627
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	RL	IDL	MB raw	final
Aluminum	200	51		
Antimony	5.0	1.8		
Arsenic	5.0	1.4		
Barium	200	.1		
Beryllium	5.0	.06		
Boron	100	1.4	1.6	<100
Cadmium	4.0	.5		
Calcium	5000	8		
Chromium	10	.9		
Cobalt	50	.99		
Copper	25	1.4		
Iron	100	16		
Lead	3.0	.7		
Lithium	300		anr	
Magnesium	5000	8		
Manganese	15	.2		
Molybdenum	10	.45		
Nickel	40	1		
Potassium	5000	80		
Selenium	5.0	1.7		
Silver	10	.5		
Sodium	5000	160		
Strontium	20	.5		
Thallium	10	1.5		
Tin	20	1.5		
Titanium	20	.5		
Vanadium	50	.4		
Zinc	20	.8		

Associated samples MP6640: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52627
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:			09/28/07					09/28/07	
Metal	F52666-1 Original	DUP	RPD	QC Limits	F52666-1 Original	MS	Spikelot MPTW3	% Rec	QC Limits
Aluminum									
Antimony									
Arsenic									
Barium									
Beryllium									
Boron	50.1	43.9	13.2	0-20	50.1	1040	800	123.7	75-125
Cadmium									
Calcium									
Chromium									
Cobalt									
Copper									
Iron									
Lead									
Lithium	anr								
Magnesium									
Manganese									
Molybdenum									
Nickel									
Potassium									
Selenium									
Silver									
Sodium									
Strontium									
Thallium									
Tin									
Titanium									
Vanadium									
Zinc									

Associated samples MP6640: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52627
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	F52666-1 Original	MSD	Spikelot MPTW3	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic						
Barium						
Beryllium						
Boron	50.1	1010	800	120.0	2.9	
Cadmium						
Calcium						
Chromium						
Cobalt						
Copper						
Iron						
Lead						
Lithium	anr					
Magnesium						
Manganese						
Molybdenum						
Nickel						
Potassium						
Selenium						
Silver						
Sodium						
Strontium						
Thallium						
Tin						
Titanium						
Vanadium						
Zinc						

Associated samples MP6640: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F52627
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	BSP Result	Spikelot MPTW3	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron	918	800	114.8	80-120
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium	anr			
Magnesium				
Manganese				
Molybdenum				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP6640: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: F52627
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP6640
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 09/28/07

Metal	F52666-1 Original	SDL 1:5	RPD	QC Limits
Aluminum				
Antimony				
Arsenic				
Barium				
Beryllium				
Boron	50.1	56.3	12.5 (a)	0-10
Cadmium				
Calcium				
Chromium				
Cobalt				
Copper				
Iron				
Lead				
Lithium	anr			
Magnesium				
Manganese				
Molybdenum				
Nickel				
Potassium				
Selenium				
Silver				
Sodium				
Strontium				
Thallium				
Tin				
Titanium				
Vanadium				
Zinc				

Associated samples MP6640: F52627-1A, F52627-2A, F52627-3A, F52627-4A, F52627-5A, F52627-6A, F52627-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

Technical Report for

LT Environmental

Raton Basin

OGCC0604

Accutest Job Number: F52674

Sampling Date: 09/19/07

Report to:

jpeterson@ltenv.com

Total number of pages in report: **63**

ACCREDITED IN ACCORDANCE WITH nelac

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

Harry Behzadi, Ph.D.
Laboratory Director

Client Service contact: Sue Bell 407-425-6700

ACCUTEST LABORATORIES 50 YEARS 1956-2006

Certifications: FL (DOH E83510), NC (573), NJ (FL002), MA (FL946), IA (366), LA (03051), KS (E-10327), SC, AK

Test results relate only to samples analyzed.

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Sample Summary

LT Environmental

Job No: F52674

Raton Basin
Project No: OGCC0604

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
F52674-1	09/19/07	08:30	KEM	09/20/07	AQ	Ground Water	SKOWRON CREEK
F52674-1A	09/19/07	08:30	KEM	09/20/07	AQ	Groundwater Filtered	SKOWRON CREEK
F52674-2	09/19/07	07:35	KEM	09/20/07	AQ	Ground Water	DUBIS
F52674-2A	09/19/07	07:35	KEM	09/20/07	AQ	Groundwater Filtered	DUBIS
F52674-3	09/19/07	09:38	KEM	09/20/07	AQ	Ground Water	ROBINSON S
F52674-3A	09/19/07	09:38	KEM	09/20/07	AQ	Groundwater Filtered	ROBINSON S
F52674-4	09/19/07	10:20	KEM	09/20/07	AQ	Ground Water	ROBINSON G
F52674-4A	09/19/07	10:20	KEM	09/20/07	AQ	Groundwater Filtered	ROBINSON G
F52674-5	09/19/07	11:40	KEM	09/20/07	AQ	Ground Water	VAN ARTSDALEN
F52674-5A	09/19/07	11:40	KEM	09/20/07	AQ	Groundwater Filtered	VAN ARTSDALEN
F52674-6	09/19/07	12:10	KEM	09/20/07	AQ	Ground Water	GABE
F52674-6A	09/19/07	12:10	KEM	09/20/07	AQ	Groundwater Filtered	GABE
F52674-7	09/19/07	12:15	KEM	09/20/07	AQ	Water	BLANK

Sample Summary
(continued)

LT Environmental

Job No: F52674

Raton Basin
Project No: OGCC0604

Sample Number	Collected Date	Time	By	Received	Matrix Code	Type	Client Sample ID
F52674-7A	09/19/07	12:15	KEM	09/20/07	AQ	Water Filtered	BLANK

Sample Results

Report of Analysis

Accutest Laboratories

Report of Analysis

Client Sample ID:	SKOWRON CREEK		
Lab Sample ID:	F52674-1	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028154.D	1	10/03/07	JM	n/a	n/a	GXY1130
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	1.1	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	SKOWRON CREEK		
Lab Sample ID:	F52674-1	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	582	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	583	25	mg/l	1	10/02/07	LE	EPA 310.1
Bromide	0.83	0.50	mg/l	1	09/20/07 14:58	KG	EPA 300/SW846 9056
Chloride	57.3	2.0	mg/l	1	09/20/07 14:58	KG	EPA 300/SW846 9056
Fluoride	2.3	0.20	mg/l	1	09/20/07 14:58	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/20/07 14:58	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/20/07 14:58	KG	EPA 300/SW846 9056
Solids, Total Dissolved	688	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	1260	0.50	umhos/cm	1	09/20/07	LE	EPA 120.1
Sulfate	40.2	2.0	mg/l	1	09/20/07 14:58	KG	EPA 300/SW846 9056
pH	7.1		su	1	09/20/07 13:10	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	SKOWRON CREEK		
Lab Sample ID:	F52674-1A	**Date Sampled:**	09/19/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/20/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	10/01/07	10/02/07	ANJ	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Calcium	39300	1000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Lead	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Magnesium	12800	5000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Sodium	213000	100000	ug/l	10	10/03/07	10/05/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6023
(2) Instrument QC Batch: MA6024
(3) Instrument QC Batch: N:MA19868
(4) Prep QC Batch: MP13060
(5) Prep QC Batch: N:MP40944

(a) Analysis performed at Accutest Laboratories, Dayton, NJ.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	DUBIS		
Lab Sample ID:	F52674-2	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028163.D	10	10/03/07	JM	n/a	n/a	GXY1130
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	6330	5.0	1.6	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID: DUBIS
Lab Sample ID: F52674-2
Matrix: AQ - Ground Water
Project: Raton Basin

Date Sampled: 09/19/07
Date Received: 09/20/07
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	437	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	438	25	mg/l	1	10/02/07	LE	EPA 310.1
Bromide	< 0.50	0.50	mg/l	1	09/20/07 15:13	KG	EPA 300/SW846 9056
Chloride	14.4	2.0	mg/l	1	09/20/07 15:13	KG	EPA 300/SW846 9056
Fluoride	2.0	0.20	mg/l	1	09/20/07 15:13	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/20/07 15:13	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/20/07 15:13	KG	EPA 300/SW846 9056
Solids, Total Dissolved	757	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	802	0.50	umhos/cm	1	09/20/07	LE	EPA 120.1
Sulfate	10.7	2.0	mg/l	1	09/20/07 15:13	KG	EPA 300/SW846 9056
pH	8.0		su	1	09/20/07 13:10	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID: DUBIS
Lab Sample ID: F52674-2A
Matrix: AQ - Groundwater Filtered
Project: Raton Basin

Date Sampled: 09/19/07
Date Received: 09/20/07
Percent Solids: n/a

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	10/01/07	10/02/07	ANJ	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Calcium	3950	1000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Lead	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Magnesium	< 5000	5000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Sodium	168000	100000	ug/l	10	10/03/07	10/05/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6023
(2) Instrument QC Batch: MA6024
(3) Instrument QC Batch: N:MA19868
(4) Prep QC Batch: MP13060
(5) Prep QC Batch: N:MP40944

(a) Analysis performed at Accutest Laboratories, Dayton, NJ.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON S		
Lab Sample ID:	F52674-3	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028156.D	1	10/03/07	JM	n/a	n/a	GXY1130
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	0.80	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID: ROBINSON S
Lab Sample ID: F52674-3
Matrix: AQ - Ground Water
Project: Raton Basin

Date Sampled: 09/19/07
Date Received: 09/20/07
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	521	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	523	25	mg/l	1	10/02/07	LE	EPA 310.1
Bromide	0.83	0.50	mg/l	1	09/20/07 15:27	KG	EPA 300/SW846 9056
Chloride	53.9	2.0	mg/l	1	09/20/07 15:27	KG	EPA 300/SW846 9056
Fluoride	1.4	0.20	mg/l	1	09/20/07 15:27	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/20/07 15:27	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/20/07 15:27	KG	EPA 300/SW846 9056
Solids, Total Dissolved	634	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	1120	0.50	umhos/cm	1	09/20/07	LE	EPA 120.1
Sulfate	40.2	2.0	mg/l	1	09/20/07 15:27	KG	EPA 300/SW846 9056
pH	7.4		su	1	09/20/07 13:10	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON S		
Lab Sample ID:	F52674-3A	**Date Sampled:**	09/19/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/20/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	10/01/07	10/02/07	ANJ	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Calcium	60100	1000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Lead	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Magnesium	16400	5000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Sodium	164000	100000	ug/l	10	10/03/07	10/05/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6023
(2) Instrument QC Batch: MA6024
(3) Instrument QC Batch: N:MA19868
(4) Prep QC Batch: MP13060
(5) Prep QC Batch: N:MP40944

(a) Analysis performed at Accutest Laboratories, Dayton, NJ.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON G		
Lab Sample ID:	F52674-4	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028157.D	1	10/03/07	JM	n/a	n/a	GXY1130
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	0.50	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID: ROBINSON G
Lab Sample ID: F52674-4
Matrix: AQ - Ground Water
Project: Raton Basin

Date Sampled: 09/19/07
Date Received: 09/20/07
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	423	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	423	25	mg/l	1	10/02/07	LE	EPA 310.1
Bromide	0.67	0.50	mg/l	1	09/20/07 15:42	KG	EPA 300/SW846 9056
Chloride	41.8	2.0	mg/l	1	09/20/07 15:42	KG	EPA 300/SW846 9056
Fluoride	0.57	0.20	mg/l	1	09/20/07 15:42	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	0.20	0.10	mg/l	1	09/20/07 15:42	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/20/07 15:42	KG	EPA 300/SW846 9056
Solids, Total Dissolved	363	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	976	0.50	umhos/cm	1	09/20/07	LE	EPA 120.1
Sulfate	58.8	2.0	mg/l	1	09/20/07 15:42	KG	EPA 300/SW846 9056
pH	7.6		su	1	09/20/07 13:10	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	ROBINSON G		
Lab Sample ID:	F52674-4A	**Date Sampled:**	09/19/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/20/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Barium	340	200	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	10/01/07	10/02/07	ANJ	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Calcium	28000	1000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Lead	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Magnesium	< 5000	5000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Manganese	44.1	15	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Sodium	177000	100000	ug/l	10	10/03/07	10/05/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6023
(2) Instrument QC Batch: MA6024
(3) Instrument QC Batch: N:MA19868
(4) Prep QC Batch: MP13060
(5) Prep QC Batch: N:MP40944

(a) Analysis performed at Accutest Laboratories, Dayton, NJ.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	VAN ARTSDALEN		
Lab Sample ID:	F52674-5	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028179.D	50	10/04/07	JM	n/a	n/a	GXY1131
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	27200	25	8.0	ug/l	

(a) Sample re-analyzed beyond hold time; reported results are considered minimum values. Sample was not preserved to a pH < 2.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	VAN ARTSDALEN		
Lab Sample ID:	F52674-5	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	1900	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	8.7	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	1910	25	mg/l	1	10/02/07	LE	EPA 310.1
Bromide	3.1	0.50	mg/l	1	09/20/07 15:56	KG	EPA 300/SW846 9056
Chloride [a]	305	2.0	mg/l	1	09/20/07 15:56	KG	EPA 300/SW846 9056
Fluoride	2.9	0.20	mg/l	1	09/20/07 15:56	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	0.14	0.10	mg/l	1	09/20/07 15:56	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/20/07 15:56	KG	EPA 300/SW846 9056
Solids, Total Dissolved	1900	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	3280	0.50	umhos/cm	1	09/20/07	LE	EPA 120.1
Sulfate	67.3	2.0	mg/l	1	09/20/07 15:56	KG	EPA 300/SW846 9056
pH	7.9		su	1	09/20/07 13:10	LE	EPA 150.1

(a) Estimated value, above calibration range.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	VAN ARTSDALEN		
Lab Sample ID:	F52674-5A	**Date Sampled:**	09/19/07
Matrix:	AQ - Groundwater Filtered	**Date Received:**	09/20/07
		Percent Solids:	n/a
Project:	Raton Basin		

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Barium	966	200	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	10/01/07	10/02/07	ANJ	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Calcium	8620	1000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Lead	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Magnesium	8160	5000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Sodium	698000	500000	ug/l	50	10/03/07	10/05/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6023
(2) Instrument QC Batch: MA6024
(3) Instrument QC Batch: N:MA19868
(4) Prep QC Batch: MP13060
(5) Prep QC Batch: N:MP40944

(a) Analysis performed at Accutest Laboratories, Dayton, NJ.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	GABE		
Lab Sample ID:	F52674-6	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028180.D	20	10/04/07	JM	n/a	n/a	GXY1131
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	12500	10	3.2	ug/l	

(a) Sample re-analyzed beyond hold time; reported results are considered minimum values. Sample was not preserved to a pH < 2.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID:	GABE		
Lab Sample ID:	F52674-6	**Date Sampled:**	09/19/07
Matrix:	AQ - Ground Water	**Date Received:**	09/20/07
		Percent Solids:	n/a
Project:	Raton Basin		

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	449	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	450	25	mg/l	1	10/02/07	LE	EPA 310.1
Bromide	< 0.50	0.50	mg/l	1	09/20/07 16:11	KG	EPA 300/SW846 9056
Chloride	14.4	2.0	mg/l	1	09/20/07 16:11	KG	EPA 300/SW846 9056
Fluoride	2.0	0.20	mg/l	1	09/20/07 16:11	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/20/07 16:11	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/20/07 16:11	KG	EPA 300/SW846 9056
Solids, Total Dissolved	398	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	803	0.50	umhos/cm	1	09/20/07	LE	EPA 120.1
Sulfate	10.7	2.0	mg/l	1	09/20/07 16:11	KG	EPA 300/SW846 9056
pH	8.3		su	1	09/20/07 13:10	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID: GABE
Lab Sample ID: F52674-6A
Matrix: AQ - Groundwater Filtered
Project: Raton Basin

Date Sampled: 09/19/07
Date Received: 09/20/07
Percent Solids: n/a

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Barium	< 200	200	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Boron [a]	< 100	100	ug/l	1	10/01/07	10/02/07	ANJ	SW846 6010B [3]	SW846 3010A [5]
Cadmium	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Calcium	4010	1000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Chromium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Copper	< 25	25	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Iron	< 300	300	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Lead	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Magnesium	< 5000	5000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Manganese	< 15	15	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Potassium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Selenium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Silver	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [4]
Sodium	168000	100000	ug/l	10	10/03/07	10/05/07	DM	SW846 6010B [2]	SW846 3010A [4]

(1) Instrument QC Batch: MA6023
(2) Instrument QC Batch: MA6024
(3) Instrument QC Batch: N:MA19868
(4) Prep QC Batch: MP13060
(5) Prep QC Batch: N:MP40944

(a) Analysis performed at Accutest Laboratories, Dayton, NJ.

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID:	BLANK		
Lab Sample ID:	F52674-7	**Date Sampled:**	09/19/07
Matrix:	AQ - Water	**Date Received:**	09/20/07
Method:	RSKSOP-147/175	**Percent Solids:**	n/a
Project:	Raton Basin		

	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
Run #1 [a]	XY028160.D	1	10/03/07	JM	n/a	n/a	GXY1130
Run #2							

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	1.20	0.50	0.16	ug/l	

(a) Sample was not preserved to a pH < 2; reported results are considered minimum values.

ND = Not detected MDL - Method Detection Limit
RL = Reporting Limit
E = Indicates value exceeds calibration range
J = Indicates an estimated value
B = Indicates analyte found in associated method blank
N = Indicates presumptive evidence of a compound

Accutest Laboratories

Report of Analysis

Client Sample ID: BLANK
Lab Sample ID: F52674-7
Matrix: AQ - Water
Project: Raton Basin

Date Sampled: 09/19/07
Date Received: 09/20/07
Percent Solids: n/a

General Chemistry

Analyte	Result	RL	Units	DF	Analyzed	By	Method
Alkalinity, Bicarbonate as CaC	8.9	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Carbonate	< 5.0	5.0	mg/l	1	10/07/07	SJL	SM18 4500CO2D
Alkalinity, Total as CaCO3	9.0	5.0	mg/l	1	10/10/07	LR	EPA 310.1
Bromide	< 0.50	0.50	mg/l	1	09/20/07 16:25	KG	EPA 300/SW846 9056
Chloride	< 2.0	2.0	mg/l	1	09/20/07 16:25	KG	EPA 300/SW846 9056
Fluoride	< 0.20	0.20	mg/l	1	09/20/07 16:25	KG	EPA 300/SW846 9056
Nitrogen, Nitrate	< 0.10	0.10	mg/l	1	09/20/07 16:25	KG	EPA 300/SW846 9056
Nitrogen, Nitrite	< 0.10	0.10	mg/l	1	09/20/07 16:25	KG	EPA 300/SW846 9056
Solids, Total Dissolved	< 100	100	mg/l	1	09/21/07 08:00	LE	EPA 160.1
Specific Conductivity	1.1	0.50	umhos/cm	1	09/20/07	LE	EPA 120.1
Sulfate	< 2.0	2.0	mg/l	1	09/20/07 16:25	KG	EPA 300/SW846 9056
pH	8.2		su	1	09/20/07 13:10	LE	EPA 150.1

RL = Reporting Limit

Accutest Laboratories

Report of Analysis

Client Sample ID: BLANK
Lab Sample ID: F52674-7A
Matrix: AQ - Water Filtered
Project: Raton Basin

Date Sampled: 09/19/07
Date Received: 09/20/07
Percent Solids: n/a

Metals Analysis

Analyte	Result	RL	Units	DF	Prep	Analyzed	By	Method	Prep Method
Arsenic	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Barium	< 200	200	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Boron [a]	< 100	100	ug/l	1	10/01/07	10/02/07	ANJ	SW846 6010B [2]	SW846 3010A [4]
Cadmium	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Calcium	< 1000	1000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Chromium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Copper	< 25	25	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Iron	< 300	300	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Lead	< 5.0	5.0	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Magnesium	< 5000	5000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Manganese	< 15	15	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Potassium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Selenium	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Silver	< 10	10	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]
Sodium	< 10000	10000	ug/l	1	10/03/07	10/04/07	DM	SW846 6010B [1]	SW846 3010A [3]

(1) Instrument QC Batch: MA6023
(2) Instrument QC Batch: N:MA19868
(3) Prep QC Batch: MP13060
(4) Prep QC Batch: N:MP40944

(a) Analysis performed at Accutest Laboratories, Dayton, NJ.

RL = Reporting Limit

Misc. Forms

Custody Documents and Other Forms

Includes the following where applicable:

- Certification Exceptions
- Chain of Custody

CHAIN OF CUSTODY

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52674
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection: Date	Collection: Time	Sampled By	Matrix	# of bottles	Preservation: None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
1) Skowron Creek	9/19/07	735	KEM	GW	6	6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Shorthold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	KMadigan	9/19/07 1320	FX	FX	9/20/07 0900	9/20/07 0900
2						
3						
4						
5				Seal #	Preserved where applicable	On Ice: 2.6, 2.4

F52674: Chain of Custody
Page 1 of 8

CHAIN OF CUSTODY

ACCUTEST.
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F50674
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection: Date	Collection: Time	Sampled By	Matrix	# of bottles	Preservation: HCl	Preservation: NaOH	Preservation: HNO3	Preservation: H2SO4	Preservation: None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
2 Dubis	9/19/07	8:30	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note: Short hold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	9/19/07 1320	1 FX	2 FX	9/20/07 0900	2 9/20/07 0900
3		3	4		4
5		5	Seal #	Preserved where applicable	On Ice: 2.6, 2.4

CHAIN OF CUSTODY

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52674
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: VOC	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
(2) Robinson, S	9/9/07	936	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note short hold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	9/9/07 1320	1 FX	2 FX	9/20/07 0900	2 9/20/07 0900
3		3	4		4
5		5	Seal #	Preserved where applicable ☑	On Ice: ☑ 2.6, 2.4

ACCUTEST

CHAIN OF CUSTODY

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52674
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection: Date	Time	Sampled By	Matrix	# of bottles	Preservation: HCl	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
4 Robinson, G	9/19/07	1020	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	91907 1320	1 FX	2 FX	9/20/07 0940	2 9/20/07 0940
3		3	4		4
5		5	Seal #	Preserved where applicable	On Ice: 2.6, 2.4

F52674: Chain of Custody
Page 4 of 8

CHAIN OF CUSTODY

ACCUTEST
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52674
Accutest Control #:

Client Information

Name: LT Environmental
Address: 4600 W. 60th Avenue
City: Arvada, State: CO, Zip: 80003
Report to:
Phone #: 303-433-9788

Facility Information

Project Name: Raton Basin
Location: Raton Basin
Project No.: OGCC0604
Email: kmadigan@ltenv.com

Analytical Information

Field ID / Point of Collection	Collection Date	Collection Time	Sampled By	Matrix	# of bottles	Preservation: VOC	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
(5) VanArtsdalen	9/19/07	1140	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Date unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

	Relinquished by Sampler:	Date Time:	Received By:
1	K Madigan	9/19/07 1320	FX
2	FX	9/20/07 09w	
3			
4			
5			

Seal # — Preserved where applicable ☑ — On Ice: ☑ 2.4, 2.6

Received By: 2 — 9/20/07 09w
Received By: 4

CHAIN OF CUSTODY

4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #: F52674
Accutest Control #:

Client Information	Facility Information
Name: LT Environmental	Project Name: Raton Basin
Address: 4600 W. 60th Avenue	Location: Raton Basin
City: Arvada, State: CO, Zip: 80003	Project No.: OGCC0804
Report to: Phone #: 303-433-9788	Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection: Date	Time	Sampled By	Matrix	# of bottles	Preservation: VOC	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
6 Gabe	9/9/07	1210	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Analytical Information

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold time for Nitrate & Nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1	9/9/07 1320	1	2		2
Relinquished by Sampler: 3	Date Time:	Received By: 3	Relinquished By: 4	Date Time:	Received By: 4
Relinquished by Sampler: 5	Date Time:	Received By: 5	Seal #	Preserved where applicable ☐	On Ice: ☐

CHAIN OF CUSTODY

ACCUTEST
4405 Vineland Rd., Suite C15
Orlando, FL 32811
407.425.6700, fax 407.425.0707

Accutest Job #:

Accutest Control #:

Client Information	Facility Information
Name: LT Environmental	Project Name: Raton Basin
Address: 4600 W. 60th Avenue	Location: Raton Basin
City: Arvada, State: CO, Zip: 80003	Project No.: OGCC0604
Report to: Phone #: 303-433-9788	Email: kmadigan@ltenv.com

Field ID / Point of Collection	Collection: Date	Time	Sampled By	Matrix	# of bottles	Preservation: VOC	NaOH	HNO3	H2SO4	None	Dissolved Metals (As, Ba, Cd, Cr, Pb, Se, Mn, Ag, Cu)	Dissolved Methane (RSK 175)	Flouride, Bromide, Chloride, Sulfate by EPA 300	Alkalinity (Carbonate & Bicarbonate)	pH	TDS	Specific Conductance	Major Cations (Dissolved Na, Ca, Mg, K, Fe)	Nitrate as Nitrogen (N), Nitrite as Nitrogen (N) by EPA 300	Dissolved Boron
3) Blank	91907	1215	KEM	GW	6					6	X	X	X	X	X	X	X	X	X	X

Turnaround Information

- [ ] 21 Day Standard — Approved By:
- [X] 14 Day
- [ ] 7 Days *EMERGENCY*
- [ ] Other _____ (Days)

RUSH TAT is for FAX data
Data unless previously approved.

Data Deliverable Information

- [ ] NJ Reduced
- [ ] NJ Full
- [ ] FULL CLP
- [ ] Disk Deliverable
- [ ] Other (Specify)
- [ ] Commercial "A"
- [X] Commercial "B"
- [ ] ASP Category B
- [ ] State Forms

Comments / Remarks

Accutest Quote #BS12/2005-97
NOT FIELD FILTERED. PLEASE FILTER IN LAB!!
Note Short hold time for nitrate & nitrite

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished By:	Date Time:	Received By:
1 K Madigan	91907 1320	1	2		2
3		3	4		4
5		5	Seal #	Preserved where applicable: ☐	On Ice: ☐

ACCUTEST LABORATORIES SAMPLE RECEIPT CONFIRMATION

ACCUTEST'S JOB NUMBER: F52674 CLIENT: LT Env. PROJECT: Raton Basin

DATE/TIME RECEIVED: 9/20/07 0940 # OF COOLERS RECEIVED: 2 COOLER TEMPS: 2.6, 2.4

METHOD OF DELIVERY: (FEDEX) UPS ACCUTEST COURIER GREYHOUND DELIVERY OTHER

AIRBILL NUMBERS:

COOLER INFORMATION

- [ ] CUSTODY SEAL NOT PRESENT OR NOT INTACT
- [ ] CHAIN OF CUSTODY NOT RECEIVED (COC)
- [ ] ANALYSIS REQUESTED IS UNCLEAR OR MISSING
- [X] SAMPLE DATES OR TIMES UNCLEAR OR MISSING
- [ ] TEMPERATURE CRITERIA NOT MET

TRIP BLANK INFORMATION

- [ ] TRIP BLANK PROVIDED
- [ ] TRIP BLANK NOT PROVIDED
- [ ] TRIP BLANK NOT ON COC
- [X] TRIP BLANK INTACT
- [ ] TRIP BLANK NOT INTACT
- [X] RECEIVED WATER TRIP BLANK
- [ ] RECEIVED SOIL TRIP BLANK

SAMPLE INFORMATION

- [ ] SAMPLE LABELS NOT PRESENT ON ALL BOTTLES
- [ ] CORRECT NUMBER OF CONTAINERS USED
- [ ] SAMPLE RECEIVED IMPROPERLY PRESERVED
- [ ] INSUFFICIENT VOLUME FOR ANALYSIS
- [ ] TIMES ON COC DOES NOT MATCH LABEL(S)
- [ ] ID'S ON COC DOES NOT MATCH LABEL(S)
- [ ] VOC VIALS HAVE HEADSPACE (MACRO BUBBLES)
- [ ] BOTTLES RECEIVED BUT ANALYSIS NOT REQUESTED
- [ ] NO BOTTLES RECEIVED FOR ANALYSIS REQUESTED
- [ ] UNCLEAR FILTERING INSTRUCTIONS
- [ ] UNCLEAR COMPOSITING INSTRUCTIONS
- [ ] SAMPLE CONTAINER(S) RECEIVED BROKEN
- [ ] % SOLIDS JAR NOT RECEIVED
- [ ] 5035 FIELD KIT NOT FROZEN WITHIN 48 HOUR'S
- [ ] RESIDUAL CHLORINE PRESENT

(APPLICABLE TO EPA 600 SERIES OR NORTH CAROLINA ORGANICS)

MISC. INFORMATION

NUMBER OF ENCORES ? Ø

NUMBER OF 5035 FIELD KITS ? Ø

NUMBER OR LAB FILTERED METALS ? Ø

SUMMARY OF COMMENTS: Recived Trip blank from client. All vials have no labels; info is on Caps.

TECHNICIAN SIGNATURE/DATE: 9/20/07 TECHNICIAN SIGNATURE/DATE: JC 9-20-07 ASBD 10/03/06

F52674: Chain of Custody

Page 8 of 63

GC Volatiles

QC Data Summaries

Includes the following where applicable:

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

Method Blank Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1130-MB	XY028152.D	1	10/03/07	JM	n/a	n/a	GXY1130

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

Method Blank Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1131-MB	XY028177.D	1	10/04/07	JM	n/a	n/a	GXY1131

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-5, F52674-6

CAS No.	Compound	Result	RL	MDL	Units	Q
74-82-8	Methane	ND	0.50	0.16	ug/l	

Blank Spike Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1130-BS	XY028153.D	1	10/03/07	JM	n/a	n/a	GXY1130

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
74-82-8	Methane	108	141	131	54-149

Blank Spike Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
GXY1131-BS	XY028178.D	1	10/04/07	JM	n/a	n/a	GXY1131

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-5, F52674-6

CAS No.	Compound	Spike ug/l	BSP ug/l	BSP %	Limits
74-82-8	Methane	108	113	105	54-149

Matrix Spike Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52894-14MS	XY028172.D	1	10/03/07	JM	n/a	n/a	GXY1130
F52894-14	XY028165.D	1	10/03/07	JM	n/a	n/a	GXY1130

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7

CAS No.	Compound	F52894-14 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	20.5		108	154	124	54-149

Matrix Spike Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52805-5MS	XY028204.D	1	10/04/07	JM	n/a	n/a	GXY1131
F52805-5	XY028196.D	1	10/04/07	JM	n/a	n/a	GXY1131

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-5, F52674-6

CAS No.	Compound	F52805-5 ug/l	Q	Spike ug/l	MS ug/l	MS %	Limits
74-82-8	Methane	92.4		108	224	122	54-149

Duplicate Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52894-14DUP	XY028171.D	1	10/03/07	JM	n/a	n/a	GXY1130
F52894-14	XY028165.D	1	10/03/07	JM	n/a	n/a	GXY1130

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7

CAS No.	Compound	F52894-14 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	20.5		19.2		7	24

Duplicate Summary

Job Number: F52674
Account: LTENVCOD LT Environmental
Project: Raton Basin

Sample	File ID	DF	Analyzed	By	Prep Date	Prep Batch	Analytical Batch
F52805-5DUP	XY028203.D	1	10/04/07	JM	n/a	n/a	GXY1131
F52805-5	XY028196.D	1	10/04/07	JM	n/a	n/a	GXY1131

The QC reported here applies to the following samples: **Method:** RSKSOP-147/175

F52674-5, F52674-6

CAS No.	Compound	F52805-5 ug/l	Q	DUP ug/l	Q	RPD	Limits
74-82-8	Methane	92.4		94.8		3	24

Metals Analysis

QC Data Summaries

Includes the following where applicable:

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13060
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:				10/03/07		10/03/07
Metal	RL	IDL	MB raw	final	MB raw	final
Aluminum	200	48				
Antimony	6.0	3.3				
Arsenic	10	3.7	-1.2	<10	-3.4	<10
Barium	200	5	0.020	<200	0.020	<200
Beryllium	4.0	1				
Cadmium	5.0	1	-0.020	<5.0	-0.12	<5.0
Calcium	1000	100	23.6	<1000	109	<1000
Chromium	10	.92	0.24	<10	0.10	<10
Cobalt	50	1				
Copper	25	1.2	-2.8	<25	-2.1	<25
Iron	300	14	-1.2	<300	-1.4	<300
Lead	5.0	2.1	-0.25	<5.0	-0.94	<5.0
Magnesium	5000	100	2.5	<5000	13.9	<5000
Manganese	15	1	0.87	<15	0.27	<15
Molybdenum	50	1.2				
Nickel	40	1				
Potassium	10000	100	8.0	<10000	14.1	<10000
Selenium	10	4	0.28	<10	-0.47	<10
Silver	10	.77	-0.10	<10	0.15	<10
Sodium	10000	500	183	<10000	132	<10000
Thallium	10	5.6				
Tin	50	2.4				
Vanadium	50	1				
Zinc	20	5				

Associated samples MP13060: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13060
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/03/07 10/03/07

Metal	F52674-1A Original	DUP	RPD	QC Limits	F52674-1A Original	MS	Spikelot MPFLICP1	% Rec	QC Limits
Aluminum									
Antimony									
Arsenic	0.0	0.0	NC	0-20	0.0	2110	2000	105.5	80-120
Barium	128	133	3.8	0-20	128	2180	2000	102.6	80-120
Beryllium									
Cadmium	0.0	0.0	NC	0-20	0.0	53.9	50	107.8	80-120
Calcium	39300	40500	3.0	0-20	39300	65300	25000	104.0	80-120
Chromium	0.0	0.0	NC	0-20	0.0	209	200	104.5	80-120
Cobalt									
Copper	0.0	0.0	NC	0-20	0.0	261	250	104.4	80-120
Iron	28.2	32.5	14.2	0-20	28.2	27500	26000	105.7	80-120
Lead	0.0	0.0	NC	0-20	0.0	525	500	105.0	80-120
Magnesium	12800	13200	3.1	0-20	12800	38600	25000	103.2	80-120
Manganese	10.6	11.1	4.6	0-20	10.6	543	500	106.5	80-120
Molybdenum									
Nickel									
Potassium	3570	3790	6.0	0-20	3570	41300	25000	150.9N(b	80-120
Selenium	0.0	0.0	NC	0-20	0.0	2150	2000	107.5	80-120
Silver	0.0	0.0	NC	0-20	0.0	48.0	50	96.0	80-120
Sodium	296000	309000(a	4.3	0-20	296000	338000(a	25000	168.0(c)	80-120
Thallium									
Tin									
Vanadium									
Zinc									

Associated samples MP13060: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Above high standard.
(b) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
(c) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13060
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/03/07

Metal	F52674-1A Original	MSD	Spikelot MPFLICP1	% Rec	MSD RPD	QC Limit
Aluminum						
Antimony						
Arsenic	0.0	2180	2000	109.0	3.3	20
Barium	128	2290	2000	108.1	4.9	20
Beryllium						
Cadmium	0.0	55.0	50	110.0	2.0	20
Calcium	39300	65400	25000	104.4	0.2	20
Chromium	0.0	213	200	106.5	1.9	20
Cobalt						
Copper	0.0	277	250	110.8	5.9	20
Iron	28.2	28200	26000	108.4	2.5	20
Lead	0.0	544	500	108.8	3.6	20
Magnesium	12800	39500	25000	106.8	2.3	20
Manganese	10.6	557	500	109.3	2.5	20
Molybdenum						
Nickel						
Potassium	3570	43900	25000	161.3N(a	6.1	20
Selenium	0.0	2220	2000	111.0	3.2	20
Silver	0.0	50.4	50	100.8	4.9	20
Sodium	296000	352000(b	25000	224.0(c)	4.1	20
Thallium						
Tin						
Vanadium						
Zinc						

Associated samples MP13060: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(anr) Analyte not requested
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.
(b) Above high standard.
(c) Spike amount low relative to the sample amount. Refer to lab control or spike blank for recovery information.

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13060
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/03/07

Metal	BSP Result	Spikelot MPFLICP1	% Rec	QC Limits
Aluminum				
Antimony				
Arsenic	2040	2000	102.0	80-120
Barium	2100	2000	105.0	80-120
Beryllium				
Cadmium	54.3	50	108.6	80-120
Calcium	27800	25000	111.2	80-120
Chromium	215	200	107.5	80-120
Cobalt				
Copper	255	250	102.0	80-120
Iron	28600	26000	110.0	80-120
Lead	521	500	104.2	80-120
Magnesium	26700	25000	106.8	80-120
Manganese	544	500	108.8	80-120
Molybdenum				
Nickel				
Potassium	24700	25000	98.8	80-120
Selenium	2050	2000	102.5	80-120
Silver	47.1	50	94.2	80-120
Sodium	23500	25000	94.0	80-120
Thallium				
Tin				
Vanadium				
Zinc				

Associated samples MP13060: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

QC Batch ID: MP13060
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/03/07

Metal	F52674-1A Original	SDL 1:5	RPD	QC Limits
Aluminum				
Antimony				
Arsenic	0.00	0.00	NC	0-10
Barium	128	136	6.4	0-10
Beryllium				
Cadmium	0.00	0.00	NC	0-10
Calcium	39300	42300	7.6	0-10
Chromium	0.00	0.00	NC	0-10
Cobalt				
Copper	0.00	0.00	NC	0-10
Iron	28.2	0.00	100.0(a)	0-10
Lead	0.00	0.00	NC	0-10
Magnesium	12800	13900	8.6	0-10
Manganese	10.6	11.3	6.2	0-10
Molybdenum				
Nickel				
Potassium	3570	2480	30.7 (a)	0-10
Selenium	0.00	0.00	NC	0-10
Silver	0.00	0.00	NC	0-10
Sodium	296000	246000	17.0*(b)	0-10
Thallium				
Tin				
Vanadium				
Zinc				

Associated samples MP13060: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).
(b) Serial dilution indicates possible matrix interference.

General Chemistry

6

QC Data Summaries

Includes the following where applicable:

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

METHOD BLANK AND SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	RL	MB Result	Units	Spike Amount	BSP Result	BSP %Recov	QC Limits
Alkalinity, Total as CaCO3	GN27601	25	<25	mg/l	250	245	98.0	90-113%
Alkalinity, Total as CaCO3	GN27733	5.0	<5.0	mg/l	250	260	103.0	90-113%
Bromide	GP9927/GN27492	0.50	<0.50	mg/l	12.5	12.3	98.4	90-110%
Chloride	GP9927/GN27492	2.0	<2.0	mg/l	50	48.4	96.8	90-110%
Fluoride	GP9927/GN27492	0.20	<0.20	mg/l	2.5	2.47	98.8	90-110%
Nitrogen, Nitrate	GP9927/GN27492	0.10	<0.10	mg/l	2.5	2.39	95.6	90-110%
Nitrogen, Nitrite	GP9927/GN27492	0.10	<0.10	mg/l	2.5	2.45	98.0	90-110%
Solids, Total Dissolved	GN27432	100	<100	mg/l				
Sulfate	GP9927/GN27492	2.0	<2.0	mg/l	50	46.7	93.4	90-110%

Associated Samples:
Batch GN27432: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7
Batch GN27601: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6
Batch GN27733: F52674-7
Batch GP9927: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7
(*) Outside of QC limits

DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	DUP Result	RPD	QC Limits
Alkalinity, Total as CaCO3	GN27601	F52674-3	mg/l	523	528	0.9	0-20%
Alkalinity, Total as CaCO3	GN27733	F53001-1	mg/l	108	108	0.0	0-20%
Bromide	GP9927/GN27492	F52674-1	mg/l	0.83	0.78	6.2	0-20%
Chloride	GP9927/GN27492	F52674-1	mg/l	57.3	57.5	0.3	0-20%
Fluoride	GP9927/GN27492	F52674-1	mg/l	2.3	2.3	0.0	0-20%
Nitrogen, Nitrate	GP9927/GN27492	F52674-1	mg/l	<0.10	<0.10	0.0	0-20%
Nitrogen, Nitrite	GP9927/GN27492	F52674-1	mg/l	<0.10	<0.10	0.0	0-20%
Solids, Total Dissolved	GN27432	F52627-1	mg/l	1860	1560	18.1	0-30%
Sulfate	GP9927/GN27492	F52674-1	mg/l	40.2	40.4	0.5	0-20%

Associated Samples:
Batch GN27432: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7
Batch GN27601: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6
Batch GN27733: F52674-7
Batch GP9927: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7
(*) Outside of QC limits

MATRIX SPIKE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MS Result	%Rec	QC Limits
Alkalinity, Total as CaCO3	GN27601	F52674-3	mg/l	523	250	743	88.0*(a)	90-113%
Alkalinity, Total as CaCO3	GN27733	F53001-1	mg/l	108	250	370	44.0*(a)	90-113%
Bromide	GP9927/GN27492	F52674-1	mg/l	0.83	12.5	12.6	94.2	90-110%
Chloride	GP9927/GN27492	F52674-1	mg/l	57.3	50	97.8	81.0N(a)	90-110%
Fluoride	GP9927/GN27492	F52674-1	mg/l	2.3	2.5	4.6	92.0	90-110%
Nitrogen, Nitrate	GP9927/GN27492	F52674-1	mg/l	<0.10	2.5	2.4	96.0	90-110%
Nitrogen, Nitrite	GP9927/GN27492	F52674-1	mg/l	<0.10	2.5	2.6	104.0	90-110%
Sulfate	GP9927/GN27492	F52674-1	mg/l	40.2	50	79.5	78.6N(a)	90-110%

Associated Samples:
Batch GN27601: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6
Batch GN27733: F52674-7
Batch GP9927: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6, F52674-7
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

MATRIX SPIKE DUPLICATE RESULTS SUMMARY
GENERAL CHEMISTRY

Login Number: F52674
Account: LTENVCOD - LT Environmental
Project: Raton Basin

Analyte	Batch ID	QC Sample	Units	Original Result	Spike Amount	MSD Result	RPD	QC Limit
Alkalinity, Total as CaCO3	GN27601	F52674-3	mg/l	523	250	740	0.4*(a)	20%

Associated Samples:
Batch GN27601: F52674-1, F52674-2, F52674-3, F52674-4, F52674-5, F52674-6
(*) Outside of QC limits
(N) Matrix Spike Rec. outside of QC limits
(a) Spike recovery indicates possible matrix interference and/or sample nonhomogeneity.

Misc. Forms

Custody Documents and Other Forms

(Accutest New Jersey)

Includes the following where applicable:

- Chain of Custody

ACCUTEST.

GW

Accutest Laboratories Southeast
Chain of Custody

4405 Vineland Road, Suite C-15 Orlando, Fl 32811
TEL. 407-425-6700 • FAX: 407-425-0707
www.accutest.com

Accutest JOB # PAGE_____OF_____

Accutest Quote # SKIFF#

Client / Reporting Information

Company Name: Accutest SouthEast
Address:
City State Zip
Project Contact E-mail
Phone#
Sampler(s) Name(s) (Printed)

Project Information

Project Name: F52674
Street
City State
Project #
Fax #
Client Purchase Order #

Analytical Information

Boron

Matrix Codes

DW - Drinking Water
GW - Ground Water
WW - Water
SW - Surface Water
SO - Soil
SL - Sludge
OI - Oil
LIQ - Other Liquid
AIR - Air
SOL - Other Solid
WP - Wipe

Accutest Sample #	Field ID / Point of Collection	COLLECTION DATE	TIME	SAMPLED BY:	MATRIX	TOTAL # OF BOTTLES	CONTAINER INFORMATION OTHER	NONE	HCl	NaOH	HNO3	H2SO4	NAOH-ZNAC	DI WATER	MEOH	LAB USE ONLY
	F52674-1A				GW	1					X					ME1
	2A					1										
	3A					1										
	4A					1										
	5A					1										
	6A					1										
	7A					1										

TURNAROUND TIME (Business Days)

Approved By: / Rush Code

- [X] 10 Days Standard
- [ ] 7 Day RUSH
- [ ] 5 Day RUSH
- [ ] 3 Day EMERGENCY
- [ ] 2 Day EMERGENCY
- [ ] 1 Day EMERGENCY
- [ ] OTHER

Emergency or Rush T/A Data Available VIA Email or Lablink

Data Deliverable Information

- [ ] COMMERCIAL "A" (RESULTS ONLY)
- [X] COMMERCIAL "B" (RESULTS PLUS QC)
- [ ] REDT1 (EPA LEVEL 3)
- [ ] FULT1 (EPA LEVEL 4)
- [ ] EDD'S

Comments / Remarks

AWJ

ASD

Sample Custody must be documented below each time samples change possession, including courier delivery.

Relinquished by Sampler:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:
	9.24.17 17:00	2 Fed	3 Fed	9/25/17 1000	4 PLO
Relinquished by:	Date Time:	Received By:	Relinquished by:	Date Time:	Received By:
5		6	7		8

Lab Use Only: Custody Seal in Place: (Y) N Temp Blank Provided: (Y) N Preserved where Applicable: (Y) N Total # of Coolers: 1 Cooler Temperature (s) Celsius: 3.4 °C

TKS 9/25/17

M.J.

7.1

7

F52674: Chain of Custody
Page 1 of 1
Accutest New Jersey

Metals Analysis

QC Data Summaries

(Accutest New Jersey)

Includes the following where applicable:

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

BLANK RESULTS SUMMARY
Part 2 - Method Blanks

Login Number: F52674
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP40944
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	RL	IDL	MB raw	final
Aluminum	200	13	anr	
Antimony	6.0	1	anr	
Arsenic	3.0	1.7	anr	
Barium	200	.3	anr	
Beryllium	1.0	.1	anr	
Boron	100	1	0.70	<100
Cadmium	4.0	.09	anr	
Calcium	5000	14	anr	
Chromium	10	.4	anr	
Cobalt	50	.3	anr	
Copper	25	.7	anr	
Iron	100	2.1	anr	
Lead	3.0	1	anr	
Magnesium	5000	7.6	anr	
Manganese	15	.1	anr	
Molybdenum	20	.4		
Nickel	40	.3	anr	
Palladium	50	2.2		
Potassium	10000	61	anr	
Selenium	10	2	anr	
Silicon	200	2.6		
Silver	10	.5	anr	
Sodium	10000	14	anr	
Strontium	10	.2		
Thallium	2.0	.9		
Tin	10	.5	anr	
Titanium	10	.4		
Vanadium	50	.3	anr	
Zinc	20	1.4	anr	

Associated samples MP40944: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52674
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP40944
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	J71396-3 Original	MS	Spikelot MPIOW4	% Rec	QC Limits
Aluminum	anr				
Antimony	anr				
Arsenic	anr				
Barium	anr				
Beryllium	anr				
Boron	10.0	1950	2000	97.0	75-125
Cadmium	anr				
Calcium	anr				
Chromium	anr				
Cobalt	anr				
Copper	anr				
Iron	anr				
Lead	anr				
Magnesium	anr				
Manganese	anr				
Molybdenum					
Nickel	anr				
Palladium					
Potassium	anr				
Selenium	anr				
Silicon					
Silver	anr				
Sodium	anr				
Strontium					
Thallium					
Tin	anr				
Titanium					
Vanadium	anr				
Zinc	anr				

Associated samples MP40944: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

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

MATRIX SPIKE AND DUPLICATE RESULTS SUMMARY

Login Number: F52674
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP40944
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	J71396-3 Original	MSD	Spikelot MPIOW4	% Rec	MSD RPD	QC Limit
Aluminum	anr					
Antimony	anr					
Arsenic	anr					
Barium	anr					
Beryllium	anr					
Boron	10.0	1950	2000	97.0	0.0	20
Cadmium	anr					
Calcium	anr					
Chromium	anr					
Cobalt	anr					
Copper	anr					
Iron	anr					
Lead	anr					
Magnesium	anr					
Manganese	anr					
Molybdenum						
Nickel	anr					
Palladium						
Potassium	anr					
Selenium	anr					
Silicon						
Silver	anr					
Sodium	anr					
Strontium						
Thallium						
Tin	anr					
Titanium						
Vanadium	anr					
Zinc	anr					

Associated samples MP40944: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

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

SPIKE BLANK AND LAB CONTROL SAMPLE SUMMARY

Login Number: F52674
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP40944
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date:		10/01/07				10/01/07	
Metal	BSP Result	Spikelot MPIOW4	% Rec	QC Limits	LCS Result	Spikelot MPLCW2	% Rec	QC Limits
Aluminum	anr							
Antimony	anr							
Arsenic	anr							
Barium	anr							
Beryllium	anr							
Boron	1910	2000	95.5	80-120				
Cadmium	anr							
Calcium	anr							
Chromium	anr							
Cobalt	anr							
Copper	anr							
Iron	anr							
Lead	anr							
Magnesium	anr							
Manganese	anr							
Molybdenum								
Nickel	anr							
Palladium								
Potassium	anr							
Selenium	anr							
Silicon								
Silver	anr							
Sodium	anr							
Strontium								
Thallium								
Tin	anr							
Titanium								
Vanadium	anr							
Zinc	anr							

Associated samples MP40944: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

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

SERIAL DILUTION RESULTS SUMMARY

Login Number: F52674
Account: ALSE - Accutest Laboratories Southeast, Inc.
Project: LTENVCOD: Raton Basin

QC Batch ID: MP40944
Matrix Type: AQUEOUS

Methods: SW846 6010B
Units: ug/l

Prep Date: 10/01/07

Metal	J71396-3 Original	SDL 1:5	RPD	QC Limits
Aluminum	anr			
Antimony	anr			
Arsenic	anr			
Barium	anr			
Beryllium	anr			
Boron	10.0	11.9	19.0 (a)	0-10
Cadmium	anr			
Calcium	anr			
Chromium	anr			
Cobalt	anr			
Copper	anr			
Iron	anr			
Lead	anr			
Magnesium	anr			
Manganese	anr			
Molybdenum				
Nickel	anr			
Palladium				
Potassium	anr			
Selenium	anr			
Silicon				
Silver	anr			
Sodium	anr			
Strontium				
Thallium				
Tin	anr			
Titanium				
Vanadium	anr			
Zinc	anr			

Associated samples MP40944: F52674-1A, F52674-2A, F52674-3A, F52674-4A, F52674-5A, F52674-6A, F52674-7A

Results < IDL are shown as zero for calculation purposes
(*) Outside of QC limits
(anr) Analyte not requested
(a) Percent difference acceptable due to low initial sample concentration (< 50 times IDL).

APPENDIX M

LABORATORY ANALYTICAL REPORTS – GAS SAMPLES FROM WATER WELLS

ISOTECH®
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Isotech Laboratories, Inc. 1308 Parkland Court, Champaign IL 61821-1826 Telephone (217) 398-3490 Fax (217) 398-3493

Lab #:	124863	Job #:	8934
Sample Name/Number:	Bounds		
Company:	LT Environmental		
Date Sampled:	9/17/2007		
Container:	Bottle		
Field/Site Name:	Raton Basin		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	10/09/2007	Date Reported:	11/02/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.68	0.68			
Oxygen	0.25				
Nitrogen	37.96	37.47			
Carbon Dioxide	0.35	0.35			
Methane	60.74	61.48	-48.85	-226.8	
Ethane	0.022	0.022			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 616
Specific gravity, calculated: 0.721

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. He dilution factor = 0.70

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

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Lab #:	124873	Job #:	8940
Sample Name/Number:	Dubis		
Company:	LT Environmental		
Date Sampled:	9/19/2007		
Container:	Dissolved Gas Bottle		
Field/Site Name:	Raton Basin		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	10/11/2007	Date Reported:	11/02/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.43	0.40			
Oxygen	1.13				
Nitrogen	19.36	16.01			
Carbon Dioxide	0.47	0.50			
Methane	78.59	83.07	-65.53	-261.6	
Ethane	0.021	0.022			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 797
Specific gravity, calculated: 0.648

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. He dilution factor = 0.67

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

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Lab #:	124874	Job #:	8940
Sample Name/Number:	Gabe		
Company:	LT Environmental		
Date Sampled:	9/19/2007		
Container:	Dissolved Gas Bottle		
Field/Site Name:	Raton Basin		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	10/11/2007	Date Reported:	11/02/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.44	0.41			
Oxygen	1.20				
Nitrogen	19.99	16.46			
Carbon Dioxide	0.45	0.48			
Methane	77.89	82.62	-65.41	-264.5	
Ethane	0.026	0.028			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	0.0061	0.0065			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 790
Specific gravity, calculated: 0.651

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. He dilution factor = 0.63

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

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Lab #:	124862	Job #:	8934
Sample Name/Number:	Hopke		
Company:	LT Environmental		
Date Sampled:	9/17/2007		
Container:	Bottle		
Field/Site Name:	Raton Basin		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	10/09/2007	Date Reported:	11/02/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.93	0.93			
Oxygen	3.62				
Nitrogen	51.22	45.60			
Carbon Dioxide	0.48	0.58			
Methane	43.72	52.85	-45.42	-189.8	
Ethane	0.035	0.042			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 443
Specific gravity, calculated: 0.798

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. He dilution factor = 0.73

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

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Lab #:	124864	Job #:	8934
Sample Name/Number:	Manning		
Company:	LT Environmental		
Date Sampled:	9/18/2007		
Container:	Bottle		
Field/Site Name:	Raton Basin		
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	10/09/2007	Date Reported:	11/02/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.79	0.79			
Oxygen	0.11				
Nitrogen	42.96	42.77			
Carbon Dioxide	0.51	0.51			
Methane	55.62	55.92	-62.92	-192.1	
Ethane	0.014	0.014			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 564
Specific gravity, calculated: 0.744

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. He dilution factor = 0.68

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

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Lab #: 124383 Job #: 8882
Sample Name/Number: Slevec-2
Company: LT Environmental
Date Sampled: 9/17/2007
Container: Bottle
Field/Site Name: OGCC0604.04
Location: Raton Basin
Formation/Depth:
Sampling Point:
Date Received: 9/26/2007 Date Reported: 10/02/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	0.0030	0.0030			
Hydrogen	nd	nd			
Argon	0.012	0.0022			
Oxygen	0.22				
Nitrogen	0.53	nd			
Carbon Dioxide	0.09	0.09			
Methane	99.12	99.87	-53.16	-257.3	
Ethane	0.030	0.030			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 1006
Specific gravity, calculated: 0.558

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

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Lab #:	126488	Job #:	9017
Sample Name/Number:	Van Artsdalen		
Company:	LT Environmental		
Date Sampled:	10/31/2007		
Container:	Dissolved Gas Bottle		
Field/Site Name:	OGCC0604.04		
Location:	Raton Basin		
Formation/Depth:			
Sampling Point:			
Date Received:	11/01/2007	Date Reported:	11/09/2007

Component	Chemical mol. %	Chemical Air Free vol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd	nd			
Hydogen Sulfide	nd	nd			
Helium	nd	nd			
Hydrogen	nd	nd			
Argon	0.027	nd			
Oxygen	0.71				
Nitrogen	1.39	nd			
Carbon Dioxide	2.28	2.33			
Methane	95.57	97.65	-40.42	-201.3	
Ethane	0.019	0.019			
Ethylene	nd	nd			
Propane	nd	nd			
Iso-butane	nd	nd			
N-butane	nd	nd			
Iso-pentane	nd	nd			
N-pentane	nd	nd			
Hexanes +	nd	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 969
Specific gravity, calculated: 0.586

Remarks:

Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace. Helium dilution factor = 0.49

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