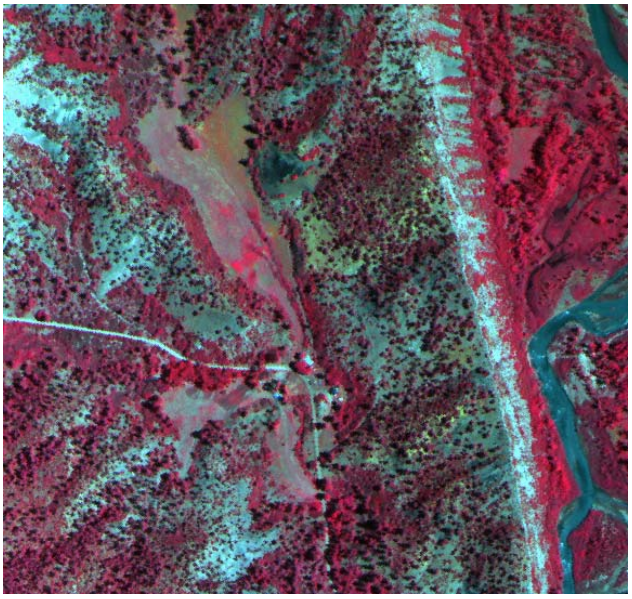
FRUITLAND OUTCROP MONITORING REPORT

ARCHULETA COUNTY, COLORADO

JANUARY 2006



Prepared for:

ELM RIDGE RESOURCES, INC.
Dallas, Texas

And

PETROX RESOURCES, INC.
Meeker, Colorado

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TABLE OF CONTENTS

Page

TABLE OF CONTENTS (continued)

LIST OF FIGURES

LIST OF TABLES

APPENDICES

EXECUTIVE SUMMARY

In June 2004, the United States Forest Service (USFS) and the Bureau of Land Management (BLM) issued a Draft Environmental Impact Statement (DEIS) pertaining to the oil and gas industry's request to conduct coal bed methane (CBM) production on Federal lands within the northern rim of the San Juan Basin (SJB). One of the potential impacts identified in the DEIS is methane seepage at the outcrop of the Fruitland Formation (Kf), a phenomenon already observed in many areas of the western half (La Plata County) of the northern rim of the SJB.

Project Area

The project area includes approximately 18 miles of Kf outcrop starting from the La Plata County – Archuleta County boundary and extending southeast along the outcrop to the Southern Ute Indian Tribe (SUIT) Reservation Boundary near the confluence of the Piedra River and Stollsteimer Creek.

Purpose and Scope

This Fruitland Formation (Kf) Outcrop Monitoring Report has been prepared at the request of Elm Ridge Resources, Inc. (Elm Ridge) and Petrox Resources, Inc. (Petrox). Elm Ridge and Petrox are the majority lease holders in the eastern half of the northern rim of the SJB in Archuleta County, Colorado. This outcrop monitoring program has been conducted to meet the Conditions of Approval for the Pargin Mountain 10U #3 production well permit. The purpose of the program is to identify methane seepage along the Kf outcrop and to monitor changes in seepage conditions over time and space. A similar program has been underway along the Kf outcrop in La Plata County since 1997.

The objective of this monitoring event was to identify and monitor methane gas seep activity on the Kf outcrop, if present. Over time, continued monitoring efforts will be implemented to document changes in methane seep activity within the project area. The overriding goal of the monitoring program is to ensure the safety of the public.

The scope of work included: aerial imagery acquisition using an infrared (IR) camera; identification of suspect areas containing stressed and/or dead vegetation on the imagery; and field-verification of the suspect areas to determine the presence or absence of methane. In addition to the methane monitoring, LTE performed a survey of natural springs located on the outcrop. This information provides a baseline of surface water conditions on the outcrop.

The scope of work also included collection of water samples from each of the three Candelaria Springs (two of which are not located on the Kf outcrop); soil gas survey and installation of permanent gas monitoring probe at the Big Horn-Schomburg #1 abandoned well site; performance of a soil gas survey around the two Candelaria residences; and inspection of surface water using a field meter to check for desorbing methane gas in Pole Gulch, Squaw Creek, Little Squaw Creek, and Fossett Creek.

Results

The results of the monitoring effort indicate that methane seeps were not detected along the Kf outcrop. LTE identified 46 suspect areas that appeared to intersect the Kf outcrop. LTE field-checked 36 of the 46 suspect areas. LTE collected 154 subsurface gas concentration measurements in the study area. Methane was not detected at any of the measurement locations. Oxygen concentrations were typically reported ranging from 19 percent (%) to 21%. Carbon monoxide was detected at 17 measurement points and detected concentrations ranged from 1 part per million (ppm) to 16 ppm. Hydrogen sulfide was not detected at any of the subsurface gas measurement locations.

Methane was detected in an inactive water well adjacent to the Susie Candelaria residence. Methane was also detected at relatively low dissolved concentrations below the Colorado Oil and Gas Conservation Commission (COGCC) guideline of 2 milligrams per liter (mg/L) in several of the natural springs identified during the spring survey. Methane was not detected in the soil around the Candelaria residences, Schomburg #1 abandoned well, or in the major surface water drainages.

Recommendations

LTE recommends continued outcrop monitoring using IR imagery acquisition and field verification of suspect areas on a three year interval.

LTE recommends annual monitoring using a soil gas survey of the area in close proximity to the Candelaria residences. The monitoring program should include water quality analysis of the natural springs currently used by the Candelaria family for water supply and livestock watering.

LTE recommends abandonment of the inactive well behind the Candelaria residence. The well is currently seeping methane gas at a concentration of 5,000 parts per million (ppm) which is 10% of the lower explosive limit (LEL). The close proximity of the well to the residential structures increases the risk for the accumulation of explosive vapors in confined spaces.

LTE recommends annual monitoring of the Schomburg #1 well site to assess the potential for methane seeps over time. Annual monitoring of the well is required by the Conditions of Approval for the Pargin Mountain 10U #3 permit.

Long term monitoring will provide information regarding changes in methane seepage over time and space and allow for ongoing assessment of potential risks to human health and the environment. This assessment will assist local, municipal, county, and State policy makers to make informed decisions regarding land use.

Quick-Reference Summary

LTE has prepared a quick-reference summary of this monitoring effort organized by geographic location. The quick-reference summary is provided in the table presented below:

QUICK-REFERENCE SUMMARY

Site Location	Summary Notes
Beaver Creek	No methane detected. Dead/stressed vegetation noted due to drought and/or senescence. No access to Watson property east of Beaver Creek. One natural spring noted NW of Beaver Creek (see Ramona Leonard Spring below).
Uplands b/w Beaver Creek and Yellowjacket Pass	No methane detected. Isolated areas of dead/stressed vegetation present, pine beetle infestation noted.
Yellowjacket Pass	No methane detected. Dead/stressed vegetation present, pine beetle infestation noted. No methane noted in surface water within Squaw Creek using field meter.
Little Squaw Creek	No methane detected. Limited dead/stressed vegetation present. Surface water drainage not present.
Pole Gulch	No methane detected. Scattered pine tree mortality present, pine beetle infestation noted. Surface water drainage not present. One natural spring noted SE of Pole Gulch with detectable methane (see Section 14 Spring below).
Peterson Gulch	No methane detected. Limited dead/stressed vegetation present. Two natural springs noted in Peterson Gulch, one with detectable methane (see John Grub and Section 12U Springs below).
Candelaria Ranch	No methane detected in subsurface soil on property. Methane detected at 5,000 ppm in out-of-use water well behind residence. Well drilled by Candelaria, date unknown. No methane detected in crawlspace of residences. Six natural springs noted on Candelaria property, two are dry, two with detectable methane (see Spring 3424 and Spring 1212 below).
Piedra River	No suspect areas identified in 2005. Reconnaissance in 2004 did not identify methane.
Stollsteimer Creek	No methane detected. Dead/stressed vegetation present, senescence, flooding, overgrazing, and pine beetle infestation noted. Reclaimed open-pit coal mine present. One natural spring noted (see Vaughn Spring below).
Uplands b/w Stollsteimer Creek and Cabezon Canyon	No methane detected. Dead/stressed vegetation present, pine beetle infestation noted.
Cabezon Canyon	No methane detected. Large tracts of land not accessible at request of landowners. Dead/stressed vegetation present, senescence and pine beetle infestation noted.
Big Horn Schomburg #1	Abandoned well drilled and plugged in 1961. No methane detected near well. Permanent monitoring probe installed, no methane detected.

QUICK-REFERENCE SUMMARY (continued)

Spring ID	Location	Summary Notes
Ramona Leonard Spring	NESW, Sec 13, T35N, R6W	No methane detected.
Spring 3424	SESE, Sec 13U, T34N, R5W	Methane detected at 0.0017 mg/L, below COGCC threshold of 2.0 mg/L. Spring is water supply to Candelaria residences.
Candelaria trib 3424	SESE, Sec 13U, T34N, R5W	Tributary to Spring 3424, not sampled.
Spring 1212	SWSW, Sec 14U, T34N, R5W	Methane detected at 0.0005 mg/L, below COGCC threshold of 2.0 mg/L. Spring is water supply to Candelaria homestead property, not currently in use.
Section 10U Spring	SWSE, Sec 10U, T34N, R5W	No methane detected. Candelaria spring is not located on Fruitland outcrop.
Section 12U Spring	SWSW, Sec 12U, T34N, R5W	No methane detected. Spring ponds in area and channels into small stream on Fruitland outcrop.
NW John Grub Spring	NWNE, Sec 11U, T34N, R5W	Methane detected at 0.015 mg/L, below COGCC threshold of 2.0 mg/L.
SE John Grub Spring	SENE, Sec 11U, T34N, R5W	No methane detected.
Section 14 Spring	SWNE, Sec 14, T34N, R5W	Methane detected at 0.0006 mg/L, below COGCC threshold of 2.0 mg/L.
Candelaria A Spring	NWNE, Sec 24U, T34N, R5W	Not sampled, spring was dry.
Candelaria B Spring	SWNE, Sec 24U, T34N, R5W	Not sampled, spring was dry.
Vaughn Spring	SWSE, Sec 25U, T34N, R5W	Not sampled, spring was submerged by Stollsteimer Creek.

Other Quick-Reference Information

- Initial reconnaissance performed in September 2004, no methane detected.
- Infrared aerial imagery collected June 8, 2005.
- Field verification activities performed September 14 through 22, 2005.
- Field measurements of methane, hydrogen sulfide, oxygen, and carbon monoxide collected at 154 locations in 2005, 160 locations in 2004.
- Follow-up inspection of Candelaria property, Schomburg #1 and natural spring sampling scheduled for May 2006.
- Infrared imagery capture and follow-up field verification scheduled for Fall 2008.

SECTION 1.0

INTRODUCTION

In June 2004, the United States Forest Service (USFS) and the Bureau of Land Management (BLM) issued a Draft Environmental Impact Statement (DEIS) in June 2004 pertaining to the oil and gas industry's request to conduct coal bed methane (CBM) production on Federal lands within the northern rim of the San Juan Basin (SJB). While CBM production has been on going in the area for at least the past 10 years, much of the project area of concern is undeveloped Federal lands, most of which lie in Archuleta County. One of the potential impacts identified in the DEIS is methane seepage at the outcrop of the Fruitland Formation (Kf), a phenomenon already observed in the western half of the northern rim in La Plata County (*Fruitland Outcrop Monitoring Report, October 2004*). The DEIS recommends surveys of the Kf outcrop to monitor the potential for methane seepage and document changes over time and space.

This Fruitland Formation Outcrop Monitoring Report has been prepared at the request of Elm Ridge Resources, Inc. (Elm Ridge) and Petrox Resources, Inc. (Petrox). Elm Ridge and Petrox are the majority lease holders in the eastern half of the northern rim of the SJB in Archuleta County, Colorado.

1.1 PROJECT AREA DESCRIPTION

The project area includes approximately 18 miles of Kf outcrop starting on the west end at the La Plata County – Archuleta County boundary near Beaver Creek and extending southeast along the Kf outcrop to the Southern Ute Indian Tribe (SUIT) Reservation Boundary near the confluence of the Piedra River and Stollsteimer Creek. Figure 1A illustrates the project area. A detailed project area map is included as Figure 1B.

1.2 BACKGROUND INFORMATION

Since 1997, LT Environmental, Inc. (LTE) has conducted methane seep monitoring on the Kf outcrop in La Plata County, Colorado. The monitoring program in Archuleta County has been modeled after work already completed in the western half of the northern rim of the SJB.

As stated in the DEIS, methane seeps have been observed and reported in the SJB, particularly from the outcrop of the coal beds in the Fruitland Formation since the late 1800s. The report also states that existing data suggests that the intensity and areal extent of known seeps has increased during the last 20 years and that new seeps developed after CBM development began. Over the past eight years, drought conditions have prevailed in the SJB, which may affect methane seepage. While there is conflicting data regarding the changes in gas seepage over time and the cause of the seepage, seep activity can be monitored through detailed mapping, subsurface methane measurements, and reconnaissance across the outcrop looking for areas of stressed and dead vegetation.

In September 2004, LTE conducted an initial reconnaissance of the Kf in Archuleta County. The scope of the initial reconnaissance event included an aerial reconnaissance of the entire outcrop followed by field inspection of suspect areas. "Suspect areas" are areas of stressed and dead

vegetation on the Kf outcrop and areas where surface water bodies, namely rivers, transect the Kf outcrop (i.e. the Piedra River south of US Highway 160). No methane seep activity was noted during the initial reconnaissance. Areas of observed dead and stressed vegetation appeared to be the result of the drought conditions and/or pine beetle infestation.

1.3 SCOPE OF WORK

The scope of work used in the monitoring program includes aerial imagery acquisition using an infrared (IR) camera. Once the imagery is obtained, LTE georeferences each image and identifies areas with dead and/or stressed vegetation or other anomalous feature in the image. These areas are considered "suspect areas" and require field-verification for the presence or absence of methane. LTE conducts a field inspection of the suspect areas; collects shallow subsurface gas concentration measurements; and inspects the vegetation to identify other potential causes of mortality.

In addition to the methane monitoring, LTE performed a survey of natural springs located on the outcrop. This information provides a baseline of surface water conditions on the outcrop.

In order to satisfy the Colorado Oil and Gas Conservation Commission (COGCC) Conditions of Approval for the Pargin Mountain 10U #3 Application for Permit to Drill (APD), LTE collected water samples from each of the three Candelaria Springs (two of which are not located on the Kf outcrop); installed a permanent gas monitoring probe at the Big Horn-Schomburg #1; inspected the shallow soil around the perimeter of the two Candelaria Residences; measured gas concentration in the crawlspace beneath the two Candelaria Residences; and used a field meter to check for methane gas desorbing from the surface water in Pole Gulch, Squaw Creek, Little Squaw Creek, and Fossett Creek.

The methodologies used in implementing the aforementioned scope of work are described in detail in Section 2.0.

1.4 PROPERTY ACCESS

LTE acquired land ownership information from the Archuleta County Assessor's Office prior to initiation of the field activities. LTE used a Geographic Information System (GIS) to cross-reference the parcel data and the Kf outcrop to select those parcels located on the Kf outcrop. LTE attempted to contact the private landowners along the Kf outcrop in Archuleta County. Much of the land covering the Kf outcrop was public forest lands, therefore, it was not necessary to obtain permission to access those parcels. Figure 2 illustrates areas where access was not available.

LTE was denied access in two primary areas within the study area. The Watson property, located adjacent and east of Beaver Creek, is the largest contiguous private parcel of land that denied access. In addition, LTE was denied access to nearly all of the private parcels located in Cabezon Canyon. Suspect areas were identified on these parcels, however, it appears that these suspect areas are likely related to pine beetle infestation and/or drought conditions rather than methane mortality based on the mortality patterns observed and field measurements in nearby areas.

1.5 OBJECTIVES

The objectives of this monitoring event were to establish baseline conditions with regard to methane seep activity. Over time, continued monitoring efforts will be implemented to document any observed changes in methane seep activity within the project area. This long term monitoring program will provide additional data to demonstrate the effects from the methane seepage. The overriding goal of the monitoring program is to ensure the safety of the public.

The scope of work was developed to provide the most efficient means by which to characterize the general condition of seep activity, if any, along the entire project area and to inspect those areas with the greatest potential for seep activity based on review of the IR imagery and characteristics identified in methane seeps along the Kf outcrop in La Plata County.

The objective of the natural spring survey is to provide a baseline of surface water conditions on the Kf outcrop, particularly geographic location and elevation, discharge rates, and water quality. These data may prove useful in addressing potential future landowner issues regarding surface water quality and quantity. The data may also be useful in various aspects of the Kf reservoir engineering models.

1.6 ORGANIZATION OF REPORT

This report is organized into five sections including this introduction, which presents the objective of the study and discusses background information related to the project. The field methods used to complete the scope of work are described in Section 2.0. Section 3.0 presents the results of the IR reconnaissance and field verification activities. Section 4.0 presents the information obtained as part of the natural spring survey. The conclusions and recommendations are summarized in Section 5.0. Figures, tables, and appendices follow the text in separate sections. Pertinent photographs have been included in the text.

SECTION 2.0

FIELD METHODS

This section describes the approach and procedures used to conduct the IR reconnaissance event, the natural spring survey, and the additional work requested in the Conditions of Approval. Photographic documentation of the field activities is included throughout the report.

2.1 AERIAL IMAGERY RECONNAISSANCE

The purpose of the IR imagery is to assist in long term reconnaissance monitoring of the Kf outcrop to identify changes in methane seepage over time and space. While the imagery cannot identify specific seep areas, it is useful in identifying areas of dead and/or stressed vegetation that may or may not be attributable to methane seepage. Therefore, LTE contracted Mr. Kevin Lee Hayes, a digital IR imaging expert from Colorado State University (CSU), to assist in identifying suspect areas along the outcrop.

Suspect areas are defined as areas observed within the IR image that appear anomalous when compared to the surrounding areas. For example, a light gray colored area surrounded by bright red colored areas would be considered a suspect area. The natural features that often produce such suspect areas include areas of dead vegetation, shadows, rock outcrops, exposed surface soil, and patches of stressed vegetation.

2.1.1 Image Acquisition

Imagery acquisition by Agro Engineering (Agro) of Alamosa, Colorado, was selected based on image quality, availability, logistical considerations, and cost. Agro conducted the image flight on June 8, 2005. This time of year was selected to provide the greatest potential for healthy vegetation conditions with minimal influence from drought and/or senescence (growth phase of a plant from maturity to death). Agro was able to follow the GPS flight path supplied by LTE accurately and completely.

The photo-mission traversed the entire 18 mile long outcrop three times, collecting three different resolutions (0.5 meters, 1.0 meters, and 1.5 meters). The flying altitude was approximately 15,000 feet, over rugged terrain with elevations between 6,400 to 8,400 feet. The interpretation and analysis for the entire outcrop was performed using the 1.5 meter resolution images since they were determined to be useful for identifying suspect areas and also require fewer images to rectify and evaluate across the entire outcrop area. A total of 50 images were captured in Archuleta County at the 1.5 meter resolution and cover approximately 19,000 acres of land area. The surface area of the Kf outcrop is approximately 6,400 acres. The specification sheet for the IR camera used for this project is presented in Appendix A.

2.1.2 Image Georectification

In order to present the data and aerial IR imagery, it is first necessary to georectify the imagery. This process assigns a coordinate system to the IR imagery so that geographic features can be mapped and presented on the imagery as a map base.

LTE contracted Mr. Hayes to process and georectify the 50 images collected at 1.5 meter resolution during the June 8, 2005 flight of the Kf outcrop area. The images were tiled together into two mosaics and imported into the GIS for the project area by Agro.

The accuracy of a georectified base map is proportional to the number of control points available and the time and effort exerted during the rectification process. DOQQs were used as the reference map and the IR image was rectified to the DOQQ. Therefore, the accuracy of the IR base map image is limited but still provides a frame of reference for the field mapping data collected. In some cases the IR image is accurate to within one meter of the actual location because a control point is available nearby. In certain portions of the same image, accuracy can be skewed as much as 10 meters to 15 meters due to lack of control. When viewing the data presented in this report, remember that GPS data is accurate to within one meter and the actual position of the feature mapped should be trusted over the position of the features observed within the IR image. Ultimately, we can obtain the required accuracy to perform the field verification activities but can also control project costs.

2.2 IR IMAGERY REVIEW

A variety of software imaging packages was used. Microsoft Photo Editor®, Adobe Photoshop®, Kodak Photo Imager®, and ACDSee® proved helpful for cursory examination on a color computer monitor. All of these imaging packages are not appropriate for viewing pixel-level detail (i.e. zoomed in or enlarged).

Spectral analysis using ERDAS Imagine® software further refines the utility of the imagery but the effort involved in obtaining the data outweighs the usefulness of the result. Therefore, LTE has concluded that the "heads-up" method of image evaluation is suited to identify areas with significant vegetation mortality. Field verification of these suspect areas could then determine if the mortality was a result of methane seepage.

The images acquired within the study area were evaluated by Mr. Hayes using simple visual techniques. Based on professional experience in evaluating IR imagery and knowledge gained during the pilot test process in La Plata County, Mr. Hayes was able to identify suspect areas across the 18-mile Kf outcrop that appeared to contain vegetation mortality or, in some cases, vegetative stress.

2.3 FIELD INSPECTION/VERIFICATION

Upon completion of the aerial reconnaissance activities, LTE initiated field inspection of suspect areas with the goal of identifying the presence or absence of methane. Due to private property considerations, not all areas of the outcrop could be inspected on foot because landowners did not grant access to the property. A majority of the land intersecting the Kf outcrop in Archuleta County is public forest lands. Areas where access was denied has been presented on Figure 2.

The field verification was conducted during the period from September 14 through September 22, 2005. The LTE field crew was equipped with the aerial photographs, topographic maps, digital camera, sampling equipment (slide-hammer and probe), global positioning system (GPS), and an MSA GasPort® capable of detecting methane, hydrogen sulfide (H_2S), oxygen (O_2), and

carbon monoxide (CO). The specification sheets for the GPS and MSA GasPort® are presented in Appendix A.

Using a GPS, slide hammer, and methane meter, LTE visited each of the suspect areas, where accessible, and collected subsurface methane measurements within each polygon. LTE also collected photographs of the area and described the features observed.

2.3.1 Features Observed

LTE did not attempt to record and map all features observed or attempt to generate a comprehensive map of dead or stressed vegetation. The field verification process included inspecting the suspect area to determine the presence or absence of methane and recording the observations of the vegetation conditions within the suspect area. The mapping results are presented in figures, which are contained in a separate section following the text. The subsurface methane measurement location symbols are graduated based on concentration measured. Suspect areas are denoted as polygon features.

2.3.2 Use of GPS

LTE used a Trimble GeoXT® GPS with a real-time correction processor to map each feature. Specifications of the unit are included in Appendix A. The methane measurements and other relevant field notes were stored as attributes in the GPS unit with the associated GPS mapped positions. The GPS data were later downloaded and grouped according to the type of feature, as points, lines, or polygons.

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

2.3.3 Gas Measurement Collection

A slide hammer was used to advance a 3/8-inch diameter steel rod (probe) to a depth of approximately 36 inches during the field investigation. Some probe holes were shallower than 36 inches due to the density of the ground surface. One-quarter inch diameter polyethylene tubing perforated at the bottom six inches was inserted into each probe hole to collect subsurface gas measurements. The MSA GasPort® field meter was utilized to measure the concentration of methane, H_2S, CO, and O_2 in each probe hole.

The MSA GasPort® is capable of detecting methane in concentrations from zero parts per million (ppm) to 100 percent (%) methane. Specifications for the unit are included in Appendix A. The field meter was calibrated to methane, H_2S, and CO each morning and again at midday to ensure the equipment was working properly.

2.4 NATURAL SPRING SURVEY

Prior to investigating natural springs in the field, LTE conducted a literature search to identify natural springs that were previously mapped. LTE interviewed regulatory agencies including the

BLM, United States Forest Service (USFS), Colorado Division of Wildlife (CDOW), and the Office of the State Engineer (SEO) to identify the locations of any known natural springs on the Kf outcrop.

LTE also prepared property boundary maps using aerial photography as a base map layer and the ownership parcel data from the Archuleta County Assessor's office. The maps were sent to all the landowners whose property intersects the Kf outcrop. A letter requesting information about natural springs on the property was included. Landowners were asked to draw in the location of natural springs on their property and return the maps to LTE. LTE compiled the data and digitized the locations into the GIS. This research method was, by far, the most useful in obtaining information on existing and historic springs.

During the field-verification activities, LTE inspected the natural springs, located the position and elevation with the GPS, and collected water quality measurements of pH, total dissolved solids (TDS), conductivity, oxidation-reduction potential (ORP), and temperature. Water samples from each spring identified were also collected and submitted to an analytical laboratory. The samples were delivered to Four Corners Geoscience (FCG) for analysis of dissolved methane in water using a method developed by the United States Geological Survey (USGS) and BLM.

Spring flow rate estimates were measured by capturing surface water into a graduated container. The time to fill the container was timed using a stop-watch. The flow rate was reported in gallons per minute and recorded in the GPS.

LTE understands that the BLM is currently conducting a similar natural spring survey of the outcrop area. LTE requested a copy of the data collected as part of this survey but had not received any response from the BLM at the time of publication of this report.

2.5 ADDITIONAL WORK TO SATISFY CONDITIONS OF APPROVAL

As previously stated, LTE performed several additional tasks in order to satisfy the requests in the Conditions of Approval for the Pargin Mount 10U #3 well APD. The procedures used to perform each task are described below.

2.5.1 Natural Spring Testing - Candelaria Ranch

In addition to the natural spring survey described in Section 2.4, LTE was asked to inspect and sample two natural springs located on property owned by Gilbert and Leonard Candelaria. The two springs in question are located in Sections 10U and 14U of Township 35 North, Range 5 West and not located on the Kf outcrop. The springs are named "Section 10U Spring" and "Spring 1212". Each spring was located with the GPS, water quality was measured with the field meter, and a water sample was collected for laboratory analysis of dissolved methane concentration.

2.5.2 Soil Gas Survey - Candelaria Ranch Residences

LTE was tasked to conduct a soil gas survey around the two residential structures located on the Candelaria Ranch in Section 24 U, T35N, R5W. These structures are located on the Kf outcrop.

The survey included the advancement of soil gas probes on each side of the building, measurement of methane concentration in the crawlspace beneath the structures, and identification of stressed/dead vegetation in close proximity to the residences.

2.5.3 Soil Gas Survey - Big Horn Schomburg #1

LTE conducted a soil gas survey in the vicinity of the Schomburg #1 well. This well has been abandoned since 1961. The survey included the advancement of five temporary soil gas probes. The concentration of methane, H_2S, CO, and O_2 was measured in each probe hole and the location was mapped using the GPS.

Per the requirements of the Conditions of Approval, LTE installed a permanent soil monitoring probe. The probe was installed using a slide hammer to advance a 3/8-inch diameter steel rod (probe) to a depth of approximately 36 inches below ground surface (bgs). One-quarter inch diameter polyethylene tubing perforated at the bottom six inches was inserted into the probe hole to the bottom of the borehole. Native material was backfilled in the annular space to a depth of approximately one foot bgs.

Using a hand trowel, LTE excavated an area around the tubing with a radius of approximately six inches to a depth of approximately six inches bgs. LTE installed a one-inch diameter Schedule 80 polyvinyl chloride (PVC) casing at the surface to protect the polyethylene tubing. The PVC surface casing was set in concrete and capped. Small boulders were also stacked around the stick-up casing for added surface protection. Once installed, the location of the probe was mapped using the GPS and the gas concentration within the tubing was measured.

2.5.4 Methane Check on Surface Water

The Conditions of Approval requested a methane check on the surface water at Pole Gulch, Squaw Creek, Little Squaw Creek, and Fossett Creek. LTE inspected these drainages where the drainage cuts across the Kf outcrop. Using the field methane meter and a funnel attached to tubing, LTE placed the funnel over the stream to capture any desorbing methane from the water. At the time of this survey, no channeled flow of water was observed in Pole Gulch, Little Squaw Creek, or Fossett Creek, therefore no measurement could be collected at these locations.

2.6 LIMITATIONS

Generally, readings collected with the GPS unit can be located within one-meter radius of accuracy. But the type of terrain that exists along the Kf outcrop 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 results on the maps.

Soil probing in consolidated materials along the outcrop 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.

Finally, LTE was restricted by property owners from accessing several areas within the project area. These areas are denoted on Figure 2.

SECTION 3.0

MONITORING RESULTS

This section describes the results of the aerial IR imagery reconnaissance observations and the field investigation activities conducted within the project area during the period from September 14, 2005 through September 22, 2005. The suspect areas identified during the aerial reconnaissance and the locations of subsurface methane measurements are illustrated on Maps A through S. A location key to Maps A through S is presented on Figure 3.

3.1 IR IMAGERY REVIEW AND FIELD VERIFICATION ACTIVITIES

IR aerial imagery was captured on June 8, 2005. The imagery acquired covers approximately 19,000 acres of land in Archuleta County. The Kf outcrop covers approximately 6,400 acres of land in the study area.

During the imagery evaluation phase of the project, LTE identified 46 suspect areas that appeared to intersect the Kf outcrop. Many of the suspect areas appeared to be vegetation mortality from drought conditions and/or beetle infestation based on the IR image patterns shown and our experience interpreting these patterns.

During the period from September 14 through 22, 2005, LTE conducted the field verification of the suspect areas and was able to inspect 36 of the 46 suspect areas identified on the imagery. Five of the 10 suspect areas not inspected were in inaccessible areas. Upon field inspection, the remaining five areas were not located on the Kf outcrop. Typically, the suspect area consisted of vegetation mortality associated with pine beetle infestation, drought conditions, and/or natural die-back of Gamble's oak (scrub oak) trees.

LTE collected 154 subsurface gas concentration measurements in the 36 suspect areas within the study area. Methane was not detected at any of the measurement locations. Oxygen concentrations were typically reported ranging from 19 percent (%) to 21%. Carbon monoxide was detected at 17 measurement points and detected concentrations ranged from 1 part per million (ppm) to 16 ppm. Hydrogen sulfide was not detected at any of the subsurface gas measurement locations in the study area.

Detailed discussion about the various areas across the Kf outcrop monitoring area is described in the sections below.

3.1.1 Beaver Creek (Map A)

Suspect areas were noted on both sides of the Beaver Creek (Map A). LTE investigated the area northwest of the creek. The anomaly was identified to be stressed prairie grass and die-back on scrub oak. No methane was detected in this area. It appears the vegetation mortality is a result of drought and/or senescence.

Access was not granted on the Watson property (which encompasses half of Map a, all of Map B, and portions of Map C) located on the southeast side of Beaver Creek, therefore these areas

could not be investigated. The suspect areas not inspected on the Watson property are shown in Maps A through C.

3.1.2 Upland Area Between Beaver Creek and Yellowjacket Pass (Maps B through E)

Several suspect areas were noted in the upland area between the Watson property and Yellowjacket Pass (Maps D and E). The areas were described as containing 90 to 95 percent living vegetation. No methane was detected in these areas. Large areas of exposed soil and sandstone outcrops were also noted. Pine beetle kill and die-back of scrub oak was the predominant cause of mortality in the vegetation.

3.1.3 Yellow Jacket Pass (Maps F through H)

Suspect areas were noted in several areas near Yellowjacket Pass (Maps F through H). Upon inspection, LTE noted many dead pine trees and scrub oak trees. Much of the large trees had already fallen down and new undergrowth was noted. The mortality appears to be a result of pine beetle infestation based on the boreholes observed in the dead trees. No methane was detected in this area.

3.1.4 Little Squaw Creek (Map I)

One suspect area was noted in this valley near the transition zone between the Kf and Kirtland Formation (Kk) (Map I). The area was a grassy meadow with some pine trees and scrub oak. The anomaly in the imagery appears to be attributed to die-back of the scrub oak and exposed surface brown surface soil in the meadow. No methane was detected in this area.

3.1.5 Pole Gulch (Map J)

LTE identified several suspect areas on the southeast side of Pole Gulch (Map J). The areas were in and upland area approximately 0.25 miles from the bottom of the valley. The mortality noted in the imagery consists of scattered pine tree mortality and fallen down pine trees. Pine beetle infestation was noted in the trees. No methane was detected at any of these suspect areas.

Southeast of Pole Gulch

3.1.6 Peterson Gulch (Maps K and L)

The suspect area identified in Peterson Gulch consists of the lowland alluvial valley floor and associated creek and springs (Map K). Prairie grass and senescent cheet grass were noted. Pine trees and scrub oak trees were noted around the perimeter of the valley. The vegetation surrounding the springs was lusher than the areas away from the water source, as expected. No methane was detected in this alluvial valley.

Two smaller suspect areas were noted southeast of the alluvial valley (Map L). The anomalies noted in these two areas were the result of brown and black exposed soil. Coal outcrops were noted. Sandstone and shale was exposed in several gullies. No methane was detected in either of these areas. GPS signal could not be obtained in the northern most suspect area on Map L, therefore, the five subsurface methane measurement points were not mapped but are noted on the map.

Exposed coal near Peterson Gulch.

3.1.7 Candelaria Ranch (Maps M and N)

LTE noted several suspect areas in the vicinity of the Candelaria Residences (Map M). In the valley north of the residences, LTE noted senescent forbs and erosional soil deposits within the valley. It appears as if this valley experiences significant runoff during storm events based on the observed sediment deposition in the area. No methane was detected in the alluvial valley.

The suspect areas west of the residences were noted to contain dead scrub oak, pine, and some juniper trees. Pine beetle infestation and/or drought appear to be the cause of the mortality. Large areas of exposed soil and sandstone outcrop were also noted during inspection of these areas. No methane was detected in any of these suspect areas.

LTE noted a suspect area in an upland area northwest of the Piedra River (Map N). The suspect area was noted near the transition zone of the Kf and Kk. Several dead pine trees were noted in the area, the cause of the mortality appears to be pine beetle infestation. GPS signal could not be

obtained in this area, therefore the subsurface measurement locations could not be mapped. No methane was detected in the five subsurface measurements collected in this area as noted on Map N.

Senescent forbs in alluvial valley north of Candelaria residences.

3.1.8 Stollsteimer Creek (Maps O through Q)

LTE noted several suspect areas along the alluvial valley floor of Stollsteimer Creek (Maps O and P). Upon inspection, LTE noted that the areas consisted predominantly of senescent cheet grass and prairie grasses. Exposed soil and gravel alluvium are believed to be the cause of the anomaly in the imagery. No methane was detected in the alluvial valley.

The suspect area identified adjacent to the former coal strip-mine (Map P) consists of a marshy area. The dead/stressed vegetation in this area appears to be a result of flooding and/or trampled grasses by livestock. No methane was detected in this area.

A suspect area was noted in the uplands area south of the former coal mine (Map Q). This area was inspected and LTE noted many fallen down pine trees with boreholes from beetle infestation. New undergrowth was developing. No methane was detected in this area.

3.1.9 Upland Area Between Stollsteimer Creek and Cabezon Canyon (Map R)

LTE identified several large suspect areas in the upland area west of Cabezon Canyon (Map R). These areas typically consisted of fallen down pine trees containing boreholes from beetle infestation, steep hillsides with shale soil erosion exposure, and some scrub oak areas. Methane was not detected at any of the suspect areas inspected.

3.1.10 Cabezon Canyon (Map S)

Only one suspect area was identified in the valley bottom of Cabezon Canyon (Map S). This area consisted of senescent grass and weeds in the valley bottom. No methane was detected in this area.

3.2 NATURAL SPRING SURVEY

During LTE's literature and interview research, 12 potential natural springs were identified on the Kf outcrop in Archuleta County. All 12 natural springs identified through research were located in accessible areas. However, LTE was only able to field-verify six of the 12 natural springs. The remaining six springs identified during the research were noted to be either areas of very moist soil without a pronounced flow channel (wetland area west of Candelaria), submerged by a nearby stream (Vaughn Spring), or completely dry (Candelaria A&B). LTE was unable to locate the spring noted on the Wood property near Beaver Creek. It is possible that the spring is dry during the fall season.

While in the field, LTE identified three natural springs not originally noted during the research phase of the project, two of which (Spring 1212 and Section 10U Spring) are not located on the Kf outcrop but were specifically included in the sampling program. The third spring is a tributary to the Spring 3424 approximately 200 feet from the main channel. Locations of the natural springs are noted on Figure 4.

Special attention was focused on Spring 3424 and the tributary spring. These springs are located north of the Candelaria residences. The springs begin to channelize approximately 900 feet north of the Susie Candelaria residence (northern residence). A cistern is located along the main channel and collects water from the springs. Water is then gravity fed to the well pump house approximately 20 feet north of the residence. The water enters a pressure tank system and water softener and is then piped into both of the Candelaria residences. By the time the water passes by the northern residence approximately 30 feet west of the building, flow in the channel is greater than 20 gallons per minute (gpm). Figure 5 contains a detailed view of the Candelaria Ranch area.

A total of eight water samples were collected by LTE. Four of the eight water samples analyzed for dissolved methane concentration contained detectable concentrations of methane. Dissolved methane concentrations detected ranged from the detection limit of 0.0005 milligrams per liter (mg/L), which was detected in Spring 1212 (not located on the Kf outcrop) to 0.015 mg/L, which was detected on the John Grub property in Peterson Gulch on the Kf outcrop. The COGCC currently uses 2 mg/L as the action level for methane in water systems. The COGCC recommends that water systems containing dissolved methane concentrations above 2 mg/L has an increased risk to desorb from the water and create potentially explosive conditions in confined spaces.

Field measurements for temperature, pH, conductivity, ORP, TDS, and flow as well as the reported methane concentration from the springs identified on the Kf outcrop in Archuleta County are summarized in Table 2.

3.3 OTHER WORK

3.3.1 Soil Gas Survey - Candelaria Residences

Per the requirements of the Conditions of Approval for the APD, LTE conducted a soil gas survey in the vicinity of the Candelaria residences. This work also included inspection of the crawlspace/basement areas beneath the two residences. No methane was detected beneath either of the residences or in the soil gas around the perimeter of the structures.

As part of the inspection of the Candelaria properties, LTE noted a former water well located behind the Susie Candelaria residence. Mr. Gilbert Candelaria could not recall the construction specifications of this well but it is believed to be relatively shallow. Since the well is located on the Kf outcrop, it is likely that the well is screened in the Kf. No permit for this water well could be located at the SEO. LTE detected methane gas in the well casing of this water well at a concentration of 5,000 ppm (10% LEL). No methane was noted in the soil surrounding the well. A detailed map of the soil gas survey performed at the Candelaria Ranch is presented as Figure 6.

Inactive well at Candelaria residence.

3.3.2 Big Horn Schomburg #1

LTE conducted a soil gas survey at the Big Horn Schomburg #1 abandoned well located in southeast quarter, southeast quarter, Section 14U, T34N, R5W. The well was drilled and abandoned in 1961 and drilling information indicates that the Kf is close to or comes to the ground surface at this location. Geologic maps from the DEIS indicate that the well is located in the transition zone between the Kf and the Kk.

LTE conducted the survey on September 14, 2005. LTE used a GPS to measure the location of the abandoned well marker. LTE advanced five temporary soil probes in the area to measure for the presence or absence of methane. No methane was detected at any of the sample locations. In addition, LTE constructed a permanent monitoring probe adjacent to the abandoned well marker.

No methane was detected in the permanent monitoring probe. Figure 7 illustrates the area surveyed at the Schomburg #1 well site.

Permanent monitoring probe at Schomburg #1.

3.3.3 Major Surface Water Drainages

LTE also conducted a methane check on the surface water in Pole Gulch, Squaw Creek, Little Squaw Creek, and Fossett Creek. Pole Gulch, Little Squaw Creek, and Fossett Creek were not flowing, therefore no measurement could be collected. LTE used a funnel and the field meter to measure for methane vapors desorbing from the small stream in Squaw Creek. No methane was detected with the field meter at Squaw Creek.

SECTION 4.0

CONCLUSIONS AND RECOMMENDATIONS

4.1 IR AERIAL RECONNAISSANCE AND FIELD VERIFICATION

The IR aerial reconnaissance appears to be an effective tool to identify suspect areas with the potential to contain methane seepage based on the condition of vegetation. Even though methane seeps were not detected along the Kf outcrop in Archuleta County, the technology was able to identify relatively subtle changes in vegetative condition. LTE was able to identify several areas with relatively limited vegetation mortality such as scrub oak die back and isolated areas of pine tree death, even though the cause of mortality was often pine beetle infestation and/or drought. If seep activity along the Kf outcrop were to occur at a rate sufficient to cause vegetation mortality, the IR imagery is capable of detecting the mortality.

Field verification is necessary in order to determine the presence or absence of methane seepage in suspect areas. The imagery along is not capable of detecting methane seepage. When used in tandem with the IR imagery, it provides an efficient method to observe and monitor large areas for methane seepage. The IR imagery acquisition and the field verification activities have created a baseline of the methane seepage conditions along the Kf outcrop in Archuleta County. Current data indicates that there are no methane seeps along the Kf outcrop in Archuleta County.

LTE recommends continued regional reconnaissance of the Kf outcrop using IR aerial imagery acquisition and field verification. The recommended monitoring interval is once every three years. Aerial imagery should be acquired in late Spring to limit the evaluation of suspect areas with mortality caused by senescence. Field verification should be performed in the late Summer season to allow time for interpretation of the imagery but also to coordinate field verification activities with natural spring survey work.

4.2 NATURAL SPRING SURVEY

Based on the data collected during the natural spring survey, methane was noted in two of the three flowing springs (Spring 1212 and Spring 3424) on the Candelaria properties. Spring 1212 is not located on the Kf outcrop but methane was detected at a concentration of 0.0005 mg/L, which is also the detection limit for the laboratory method. Spring 3424 is located on the Kf outcrop and is the water source for the two Candelaria residences also positioned on the Kf outcrop. Methane was detected in the sample from Spring 3424 at a concentration 0.0017 mg/L.

Methane was also detected in a spring on the John Grub property located in Section 11U of Township 34 North, Range 5 West. Two springs were identified on the Grub property, one of which reported a dissolved methane concentration of 0.015 mg/L. This is the highest concentration detected in the water samples submitted for analysis. Methane was also detected at a spring in Section 14U at a concentration of 0.0006 mg/L.

The methane concentrations detected in the springs are very low. In fact, there is insufficient gas in the water to conduct isotopic analyses to determine if the gas is biogenic or thermogenic. The COGCC has established a methane concentration of 2.0 mg/L as the threshold limit for which there is an increased risk of creating a hazardous atmosphere in a water well or residential water

piping system. The methane concentrations currently detected in the natural springs sampled are below the 2.0 mg/L threshold limit.

LTE recommends continued monitoring of the springs on an annual basis. The Conditions of Approval also request annual monitoring of the natural springs.

4.3 OTHER WORK

Results of the soil gas survey around the residences indicate no methane is present at this time. These residences are located on the Kf outcrop. LTE observed coal outcrops nearby the ranch area. LTE recommends annual monitoring of the soil gas in the vicinity of these residential structures due to an increased risk of exposure at residential properties located on the Kf outcrop.

The presence of an inactive water well with seeping methane gas (reported concentration of 5,000 ppm or 10% LEL) in close proximity to the Candelaria residence poses a potential threat to the residents. The water well is likely screened in the Kf and is acting as a conduit for free gas in the formation. The close proximity of this well to the residents increases the potential for seeping gas to threaten the structure. LTE recommends abandonment of this well to eliminate the potential for the well to act as a conduit.

The soil gas survey at the Schomburg #1 well site did not detect methane at this time. LTE recommends annual monitoring of this abandoned well site to evaluate the risk of exposure to seeping methane gas in the future. The Conditions of Approval for the Pargin Mountain 10U #3 APD also requires annual monitoring of this site.

Methane has not been detected in the surface water drainages transecting the Kf outcrop at this time. LTE does not recommend annual monitoring of these surface water features at this time. If methane seepage were to occur in these areas, it is likely that vegetation mortality would also occur. Monitoring of the vegetation mortality along the Kf outcrop on three year intervals appears to be sufficient at this time. Should methane seep activity occur or increase in the future, LTE would recommend annual detailed monitoring of any active seep areas.

FIGURES

Beaver Meadows

Beaver Creek

Yellow Jacket Pass

La Plata County

Archuleta County

Little Squaw Creek

Pole Gulch

Peterson Gulch

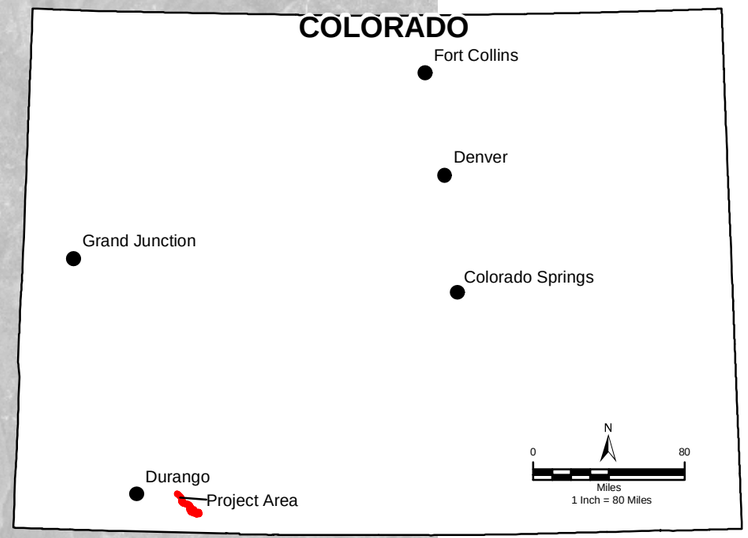
Candelaria Ranch

Piedra River

Stollsteimer Creek

Cabezon Canyon

Southern Ute Indian Tribe Reservation Boundary



Legend

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)
- Southern Ute Indian Tribe Reservation Boundary
- County Boundary

N

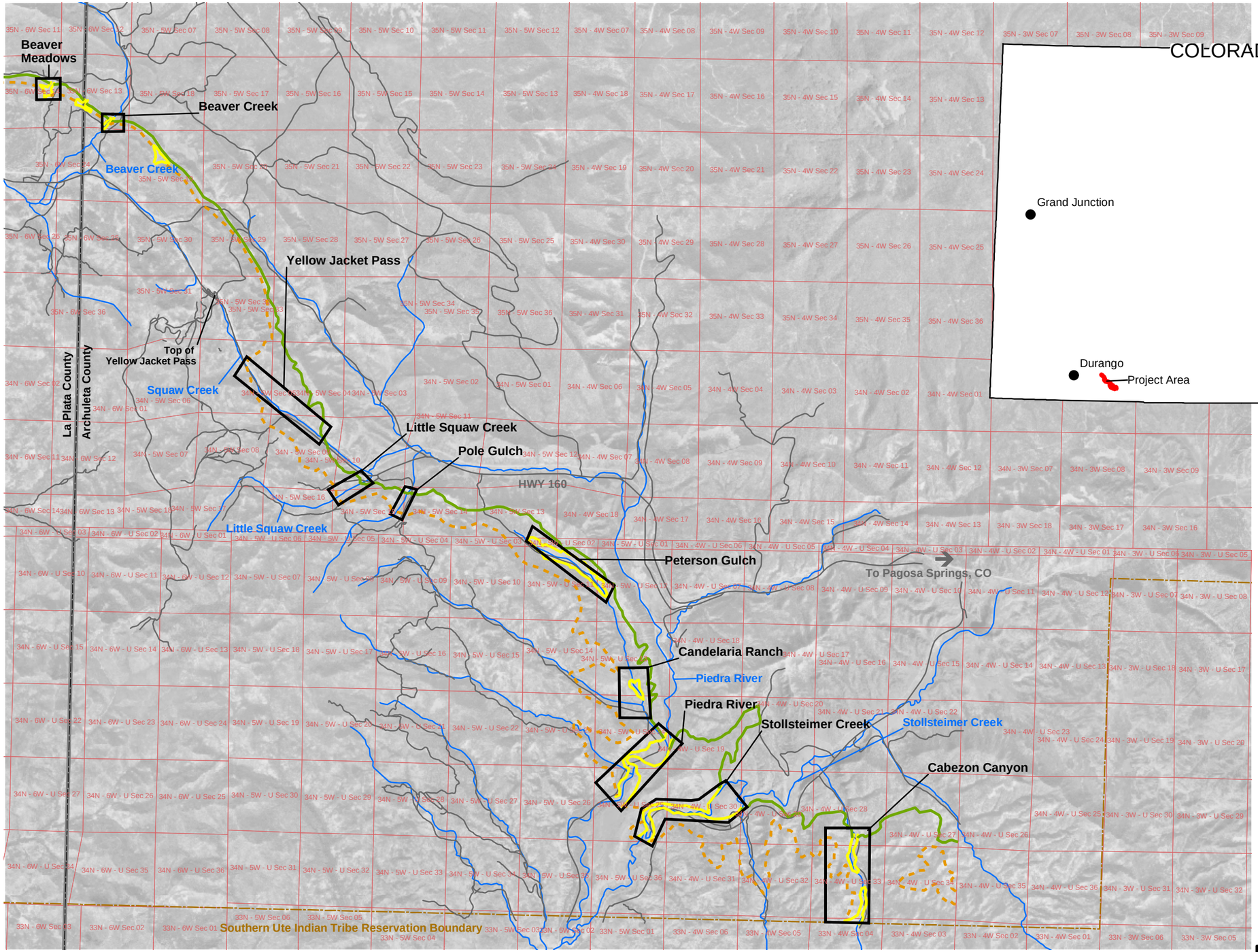
0 15,000

Feet

1 Inch = 7,400 Feet

FIGURE 1A
PROJECT AREA MAP - DETAIL
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

- Roads

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)
- County Boundary
- Rivers
- Southern Ute Indian Tribe Reservation Boundary
- Township Range Section

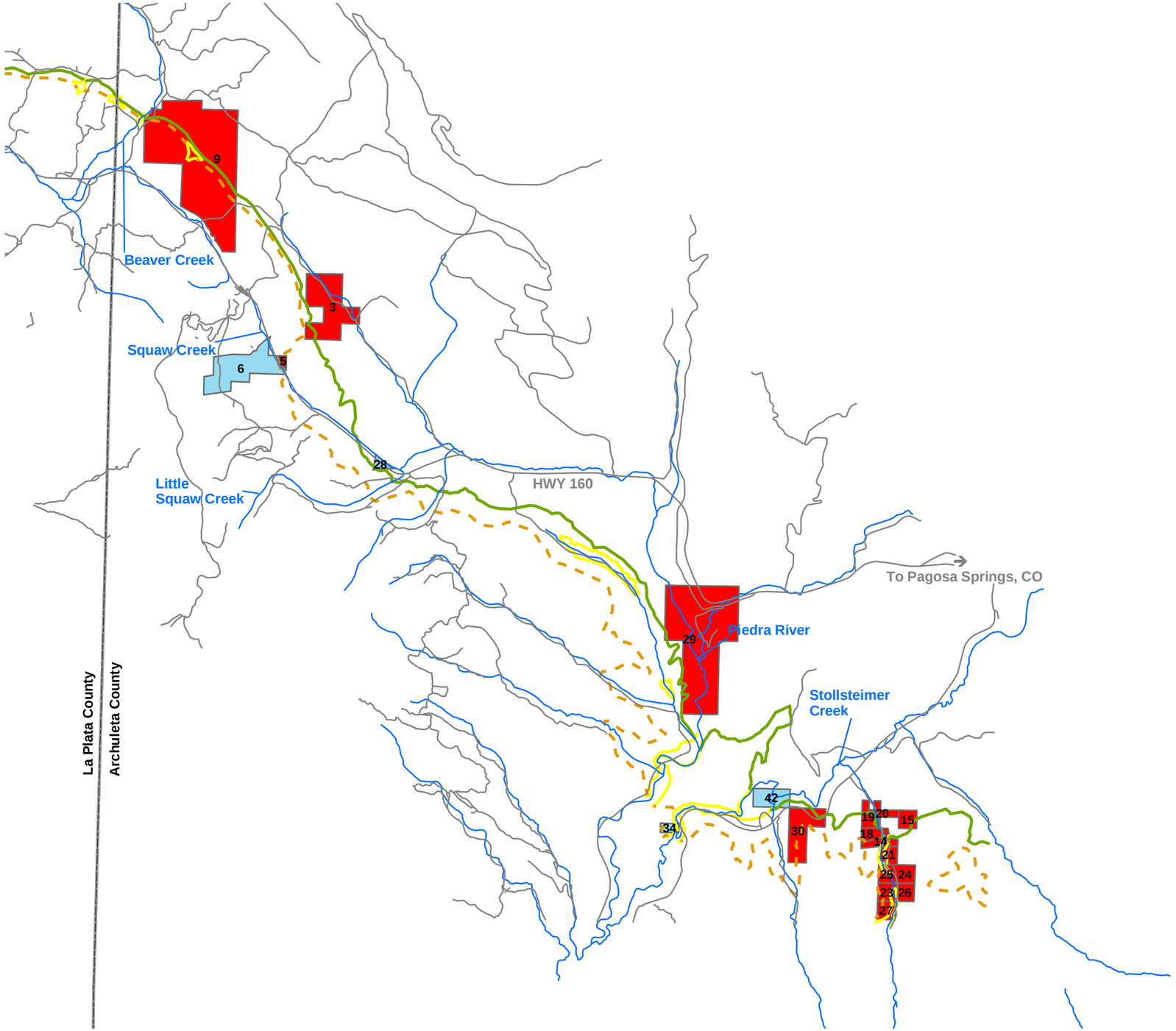
0 14,800 Feet

1 Inch = 7,400 Feet

N

FIGURE 1B
PROJECT AREA MAP - DETAIL
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

- Rivers
- Roads

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Access Availability

- 9 No Access
- 6 No Response to Access Request

All other areas gave approval to access or are located on Public Lands.

Number listed on parcel refers to ownership listing in Table 1.

0 16,000

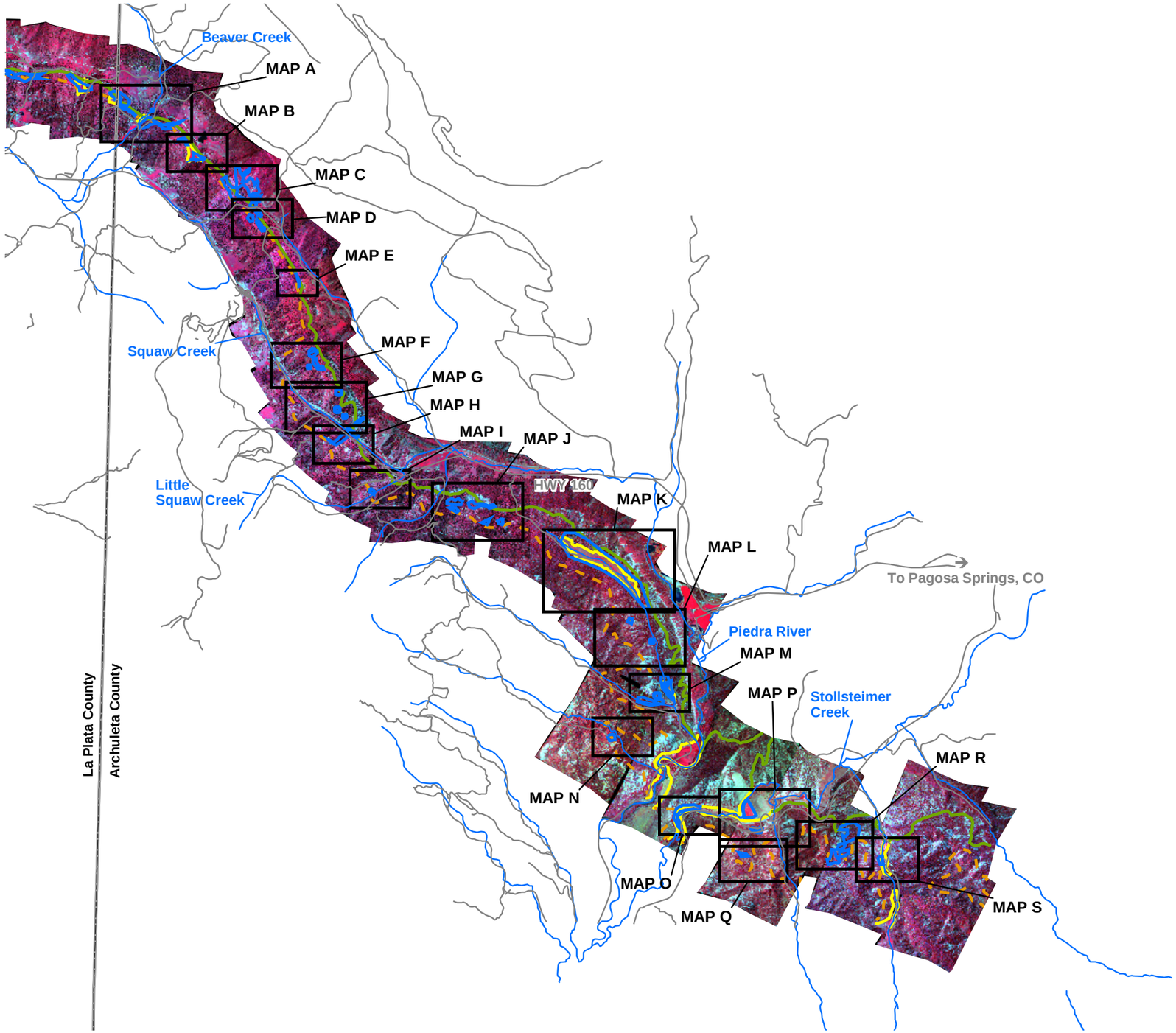
Feet

1 Inch = 8,000 Feet

N

FIGURE 2
PROPERTY ACCESS MAP
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

- Map Location Areas
- Suspect Areas
- Roads
- Rivers

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

0 16,000

Feet

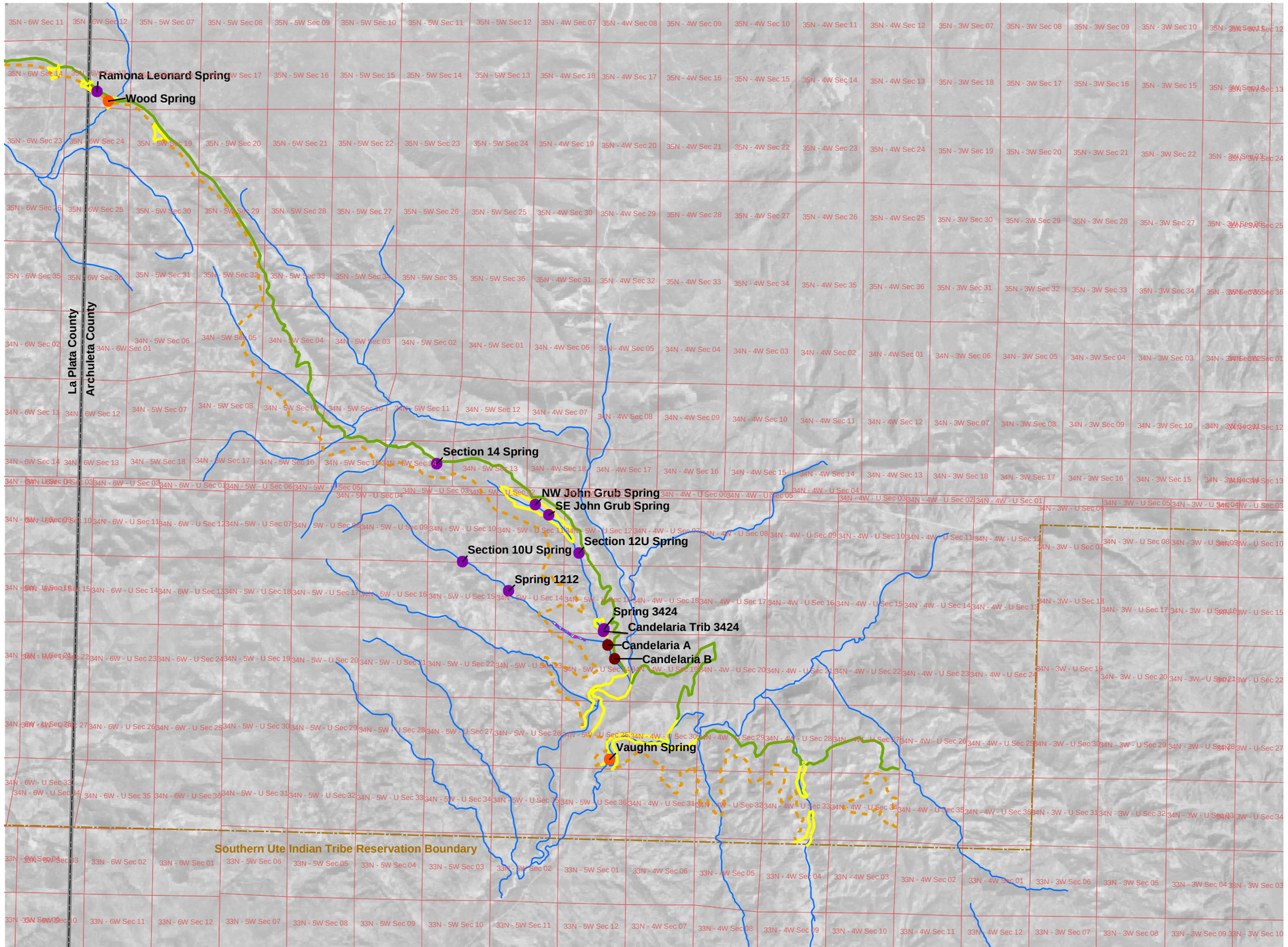
1 Inch = 8,000 Feet

N

IR Imagery Taken: June 2005
Mapping Data Collected: September 2005

FIGURE 3
SUSPECT AREAS AND INFRARED MAP KEY
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

- Rivers
- Natural Spring Location
  - Sampled
  - Not Sampled
  - Dry
  - wetland area, no channel flow
- Geology
  - Fruitland Formation (Kf)
  - Fruitland Formation Tongue (Kft)
  - Kirtland Formation (Kk)
  - Pictured Cliffs Formation (Kpc)
  - Pictured Cliffs Formation Tongue (Kpct)
  - Quaternary Alluvium (Qa)
  - Quaternary Gravel (Qg)
  - Township Range Section

0 — 16,000 Feet

1 Inch = 8,000 Feet

N

Only natural springs on Fruitland Outcrop were identified and mapped, with the exception of Section 104 Spring and Spring 1212.

FIGURE 4
NATURAL SPRING LOCATION MAP
2005 FRUITLAND OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES

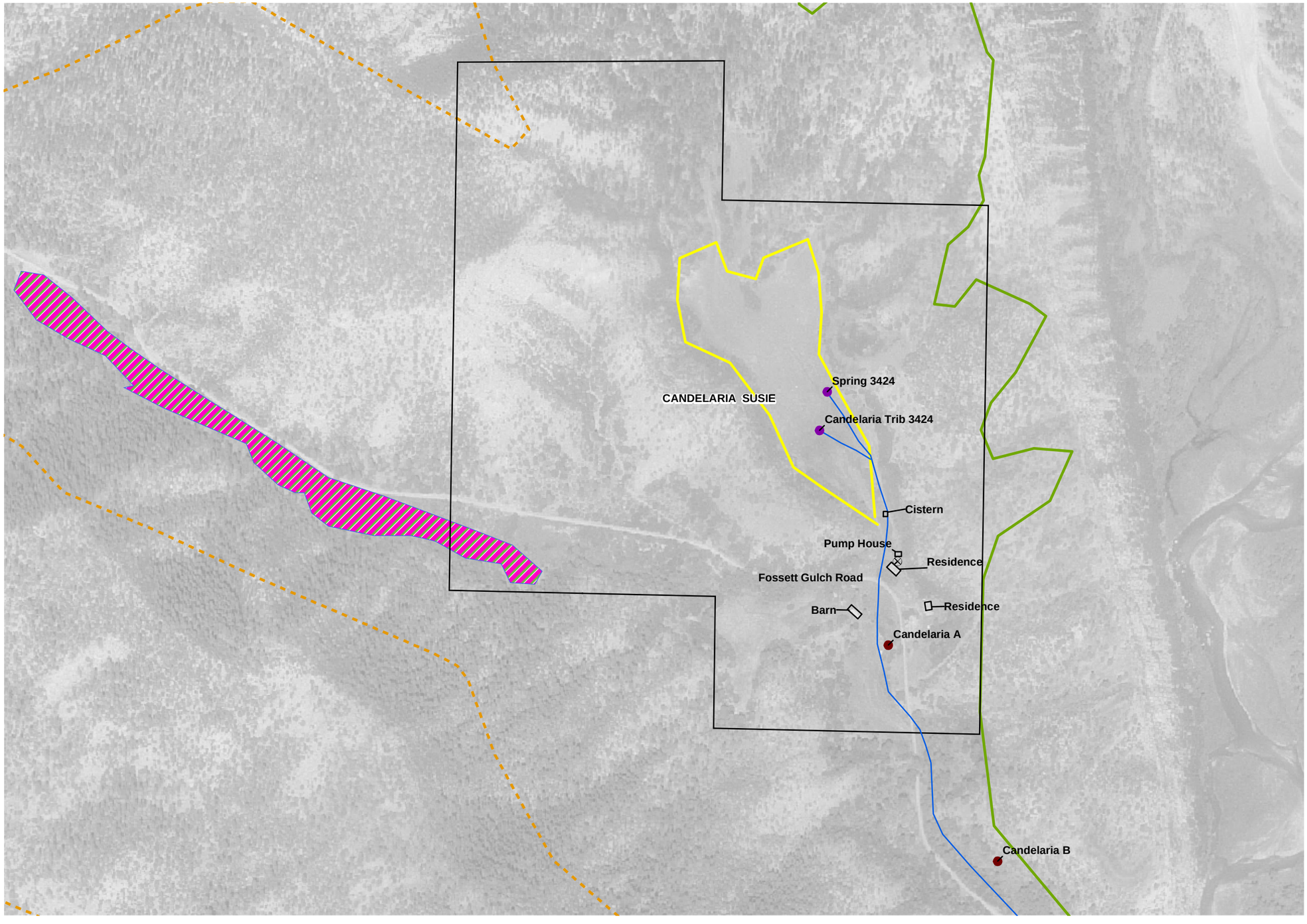


FIGURE 5
CANDELARIA RANCH - DETAIL
NATURAL SPRING LOCATION MAP
2005 FRUITLAND OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES

Legend

- Candelaria Well

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

0 240

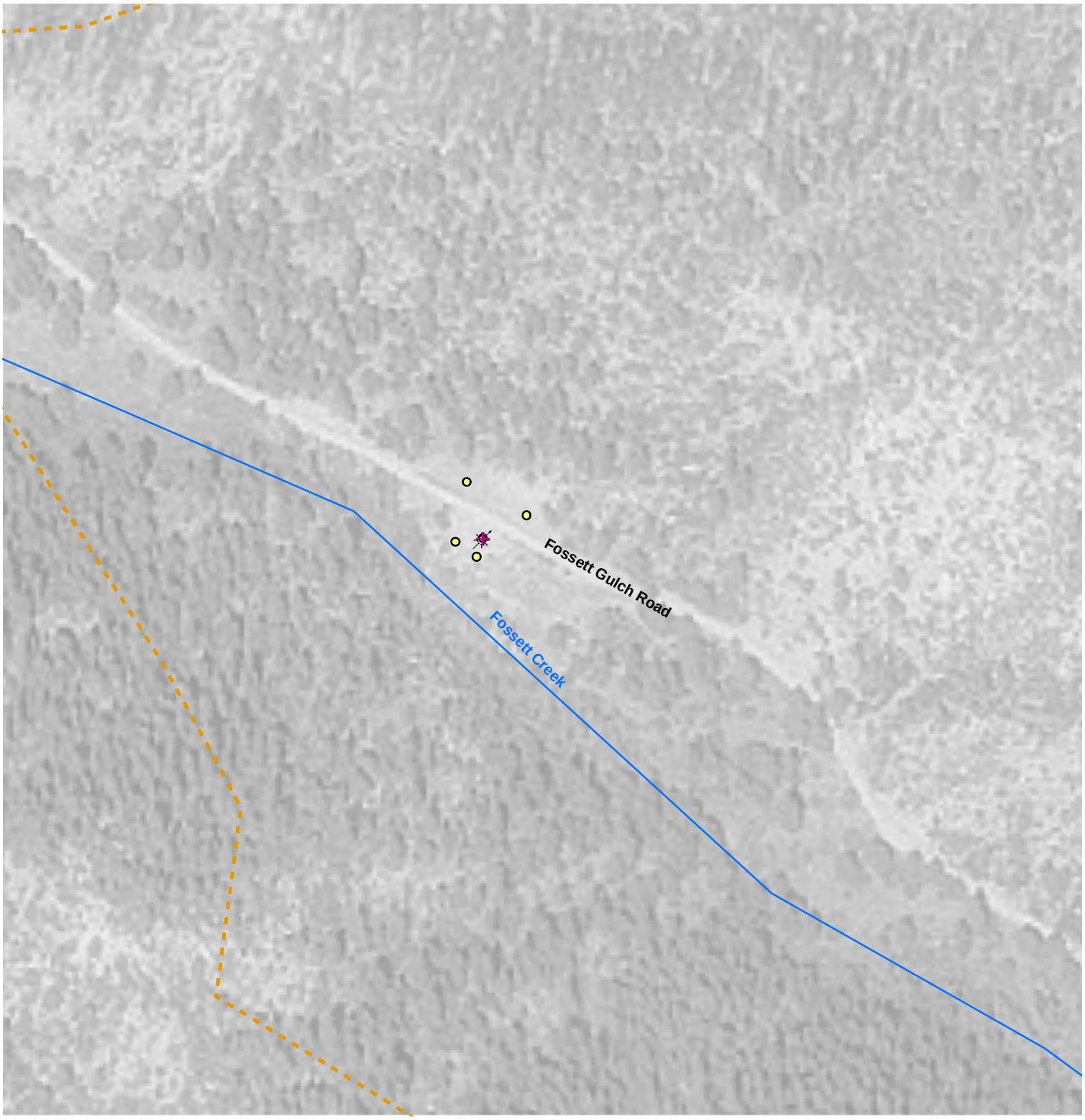
Feet

1 Inch = 120 Feet

N

FIGURE 6
CANDELARIA RANCH DETAILED MAPPING
2005 FRUITLAND OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Permanent Monitoring Probe

Abandoned Oil and Gas Well

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

0 400

Feet

1 Inch = 200 Feet

N

FIGURE 7
SCHOMBURG #1 ABANDONED OIL AND GAS WELL
2005 FRUITLAND OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES

TABLES

TABLE 1

PROPERTY OWNER AND ACCESS INFORMATION
FRUITLAND FORMATION OUTCROP MONITORING 2005
ARCHULETA COUNTY, COLORADO

ID Number	Parcel Number	LTE Access	Physical Address	Owner Name	Mailing Address	Mailing City	Mailing State and Zip	Legal Description	Parcel Size (acres)	Geographic Position
1	568301100001	Access		Federal					0.000	
2	568501100001	Access		Federal					0.000	
3	568333200010	No	W HIGHWAY 160 X ESMT	HALVERSON HAROLD D ESTATE	23541 COUNTY RD S	DOLORES	CO 81323-0000	35-5W SEC 33	278.913	107.4276285W 37.2588724N
4	568510300009	Access	W HIGHWAY 160 26410	EDWARDS DURWOOD	710 E HOLLAND	ALPINE	TX 79830-0000	34-5W SEC 10	12.495	107.4170414W 37.2288842N
5	568505100016	No	W HIGHWAY 160 28061	KAHLER NOBLE GENE	PO BOX 405	BAYFIELD	CO 81122-0000	34-5W SEC 5	8.277	107.4397366W 37.2475521N
6	568505200020	No Response	W HIGHWAY 160 28444	INN ABOVE ONION CREEK INC	4444 HWY 150 WEST	KYLE	TX 78640-0000	34-5W SEC 5	245.669	107.4488552W 37.2467916N
7	568332300040	NA	W HIGHWAY 160 28644	COLORADO YELLOW JACKET LTD PTNSHP	PO BOX 774525	STEAMBOAT SPRINGS	CO 80477-0000	34-5W SEC 5	91.258	107.4471289W 37.2545177N
8	568332300009	NA	W HIGHWAY 160 28945	STRICKLAND SCOTT L & NIOBRA J	28945 E US HWY 160	BAYFIELD	CO 81122-0000	35-5W SEC 32	16.709	107.4437179W 37.2564906N
9	568319200034	No	W HIGHWAY 160 30301A	WATSON DAVID LLOYD &	30301 US HWY 160	BAYFIELD	CO 81122-0000	35-5W SEC 19	1064.422	107.4633925W 37.2839436N
10	567913300015	Access	W HIGHWAY 160 31861M	LEONARD RAMONA	PO BOX 207	MAYER	AZ 86333-0000	35-6W SEC 13	26.772	107.4807203W 37.2986948N
11	567913400016	Access	W HIGHWAY 160 31861B	PEINADO EMILIO JR & KAREN R	PO BOX 706	BAYFIELD	CO 81122-0000	35-6W SEC 13	40.098	107.4751287W 37.2974749N
12	567913400017	Access	W HIGHWAY 160 31861L	WOOD LEE THOMAS & PEGGY DARLENE	31861 L W HWY 160	BAYFIELD	CO 81122-0000	35-6W SEC 13	37.432	107.4772925W 37.2954878N
13	589701400003 SJNF	Access		Federal					0.000	
14	589528400043	No	COUNTY RD 917 1023	EGAN JOHN T	1023 COUNTY ROAD 917	PAGOSA SPRINGS	CO 81147-0000	34U-4W SEC 28	35.213	107.2895008W 37.1560879N
15	589528400051	No	COUNTY RD 917 1000A	LEISER SANDRA J		MADISON	KS 66860-0000	34U-4W SEC 28	39.470	107.2827076W 37.1606722N
16	589511200003	Access	HIGHWAY 151 368	UNITED STATES OF AMERICA T/F	PO BOX 737	IGNACIO	CO 81137-0000	34U-4W	3505.197	107.2846571W 37.1913186N
17	589528400042	Access	COUNTY RD 917 1000	HALLOCK JAMES & NORA	1000 COUNTY RD 917	PAGOSA SPRINGS	CO 81147-0000	34U-4W SEC 28	35.086	107.2871869W 37.1588274N
18	589528400049	No	COUNTY RD 917 1019	MUHLIG BRITT & MAYUMI	1019 COUNTY RD 917	PAGOSA SPRINGS	CO 81147-0000	34U-4W SEC 28	34.963	107.2905460W 37.1573476N
19	589528300041	No	COUNTY RD 917 1001	CHENAULT ROBERT G	1001 COUNTY RD 917	PAGOSA SPRINGS	CO 81147-0000	34U-4W SEC 28	34.960	107.2917877W 37.1615535N
20	589528400050	No	COUNTY RD 917 1000	LEISER SANDRA J		MADISON	KS 66860-0000	34U-4W SEC 28	35.036	107.2886189W 37.1615376N
21	589528400053	No	COUNTY RD 917	WOZNY THEODORE G TRUST ACCOUNT	1601 COUNTY RD 917	PAGOSA SPRINGS	CO 81147-0000	34U-4W SEC 28	35.375	107.2872467W 37.1534398N
22	589533200046	Access	COUNTY RD 917 1601	LEON EUGENIA &	1601 A CR 917	PAGOSA SPRINGS	CO 81147-0000	34U-4W SEC 33	41.103	107.2902055W 37.1534003N
23	589533400048	No	COUNTY RD 917 1859	MODISETTE JERRY L & BEVERLY A	17110 CYPRESS ROSE HILL DR	CYPRESS	TX 77429-0000	34U-4W SEC 33	39.371	107.2873806W 37.1462336N
24	589533100045	No	COUNTY RD 917 1590	MISER PATRICIA	2341 JOY AVE	WHITE BEAR LAKE	MN 55110-0000	34U-4W SEC 33	42.697	107.2833805W 37.1498740N
25	589533100047	No	COUNTY RD 917 1589	SCHAEFER JAMES & NANCY	2754 S LAS PALMAS	MESA	AZ 85202-0000	34U-4W SEC 33	36.129	107.2874029W 37.1498359N
26	589533400033	No	COUNTY RD 917 1818	MODISETTE JERRY L & BEVERLY A	17110 CYPRESS ROSE HILL RD	CYPRESS	TX 77429-0000	34U-4W SEC 33	39.329	107.2828948W 37.1462775N
27	589533400034	No	COUNTY RD 917 2255	ADAM ROBERT J	12611 JONES RD STE #200	HOUSTON	TX 77070-0000	34U-4W SEC 33	39.331	107.2874383W 37.1426306N
28	568510300010	No Response	W HIGHWAY 160 26260	DREW DANNY S	PO BOX 13	CHIMNEY ROCK	CO 81127-0000	34-5W SEC 10	17.346	107.4141421W 37.2285446N
29	589712400002	No	COUNTY RD 175 2117 & 2119 & 2121	COONEY PROPERTIES 21 LLC	33 INVERNESS PL	DURANGO	CO 81301-0000	34U-5W SEC 12	792.487	107.3344796W 37.1930959N
30	589529300027	No	HIGHWAY 151 X	EF COAL RESOURCES LIMITED PRTN	PO BOX 773457	STEAMBOAT SPRINGS	CO 80477-0000	34U-4W SEC 29	157.152	107.3074462W 37.1570456N
31	589725400016	Access	HIGHWAY 151 6971	MARTINEZ AMOS MEL	2400 COUNTY RD 329	IGNACIO	CO 81137-0000	34U-5W SEC 25	19.762	107.3412769W 37.1560602N
32	589711200001	Access	W HIGHWAY 160 24160	GRUB JOHN	2841 WANDER CIR	SALT LAKE CITY	UT 84117-0000	34U-5W SEC 11	159.274	107.3596091W 37.2093422N
33	589725100011	Access	COUNTY RD 193 5801	CANDELARIA ROGER	9105 SIXTH ST	LANHAM	MD 20706-0000	34U-5W SEC 25	60.135	107.3412773W 37.1659743N
34	589725400015	No Response	HIGHWAY 151 6505A	VAUGHN LARRY C	6505A HWY 151	PAGOSA SPRINGS	CO 81147-0000	34U-5W SEC 25	19.762	107.3412769W 37.1578502N
35	589725400013	Access	HIGHWAY 151 X	MARTINEZ JOHN L &	5768 HANSEN CIR	MURRAY	UT 84107-0000	34U-5W SEC 25	39.523	107.3412770W 37.1605367N
36	589724400008	Access	COUNTY RD 193 X	CANDELARIA SY TRUSTEE & GILBERT	PO BOX 1771	ARBOLES	CO 81121-0000	34U-5W SEC 24	59.991	107.3390038W 37.1713890N
37	589713300006	Access	COUNTY RD 193 6551	CANDELARIA SUSIE	PO BOX 1764	ARBOLES	CO 81121-0000	34U-5W SEC 13	160.288	107.3436380W 37.1849042N
38	589724400010	Access	COUNTY RD 193 5801A	CANDELARIA ROGER	9105 SIXTH ST	LANHAM	MD 20706-0000	34U-5W SEC 24	19.859	107.3412824W 37.1704889N
39	589726400024	Access		Federal					0.000	
40	589725400014	Access	HIGHWAY 151 X	MARTINEZ MEL	5671 STATE HWY 151	PAGOSA SPRINGS	CO 81147-0000	34U-5W SEC 25	118.324	107.3322090W 37.1605486N
41	589724400007	Access	COUNTY RD 193 5879	CANDELARIA LUCY S &	PO BOX 1812	ARBOLES	CO 81121-0000	34U-5W SEC 24	39.283	107.3367759W 37.1750192N
42	589530100037	No Response	HIGHWAY 151 5461	CHIMNEY ROCK COAL CO C/O	3633 INLAND EMPIRE BLVD STE 480	ONTAIRO	CA 91764-0000	34U-4W SEC 30	79.285	107.3163700W 37.1642304N
43	589530100020	Access	HIGHWAY 151 5671	MARTINEZ MEL	5671 STATE HWY 151	PAGOSA SPRINGS	CO 81147-0000	34U-4W SEC 30	243.370	107.3175202W 37.1642058N
44	589529100026	Access	HIGHWAY 151 X	CAZEDESSUS CAMILE E JR	PO BOX 2340	PAGOSA SPRINGS	CO 81147-2340	34U-4W SEC 29	15.597	107.3094626W 37.1633518N
45	589725100012	Access		Federal					0.000	

Notes:

Indicates property access was denied

Indicates landowner did not respond to access request

TABLE 2

NATURAL SPRING WATER SAMPLE ANALYTICAL RESULTS
FRUITLAND FORMATION OUTCROP MONITORING 2005
ARCHULETA COUNTY, COLORADO

				Water Quality Field Measurements						Laboratory Result
Spring ID	Description	Location	Inspection Date	Conductivity (uS/cm)	pH	ORP (mV)	Temperature (C)	TDS (ppm)	Estimated Flow (gal/min)	Methane (mg/L)
Spring 3424	Spring adjacent to Susie Candelaria residence, used as water supply for both Susie and Gilbert Candelaria residences, on outcrop	SESE, Sec 13U, T34N, R5W	9/14/2005	725.2	6.86	71	16.5	504	>20	0.0017
Candelaria trib 3424	Tributary spring approx. 100 feet west of main 3424 Spring, on outcrop	SESE, Sec 13U, T34N, R5W	9/14/2005	585.5	5.35	131	22.1	400	4	NS
Spring 1212	Spring at homestead inside cistern, not located on outcrop	SWNW, Sec 14U, T34N, R5W	10/7/2005	420	6.59	NM	9.1	NM	NM	0.0005
Section 10U Spring	Candelaria property spring, not located on outcrop	SWSE, Sec 10U, T34N, R5W	9/19/2005	458.1	7.27	131	10.9	314.7	0.9	<0.0005
Section 12U Spring	spring ponds in an area then channels into a small stream, on outcrop	SWSW, Sec 12U, T34N, R5W	9/19/2005	606.3	7.19	211	16.2	414.6	NM	<0.0005
NW John Grub Spring	north spring, on outcrop	NWNE, Sec 11U, T34N, R5W	9/19/2005	415.8	6.97	NM	15.8	282.3	0.1	0.015
SE John Grub Spring	south spring, on outcrop	SENE, Sec 11U, T34N, R5W	9/19/2005	524.5	7.04	NM	15.6	358.5	0.25	<0.0005
Section 14 Spring	on outcrop	SWNE, Sec 14, T34N, R5W	9/19/2005	412.2	7.93	NM	20.2	277.5	NM	0.0006
Ramona Leonard Spring	spring on Ramona Leonard property, on outcrop near county border	NESW, Sec 13, T35N, R6W	9/19/2005	NM	NM	NM	NM	NM	NM	<0.0005

Notes:

uS/cm = microSiemens per centimeter
ORP = oxidation reduction potential
mV = millivolts
C = celsius
TDS = total dissolved solids
Flow measured using graduated container and stop-watch

ppm = parts per million
gal/min = gallons per minutes
NM = not measured
NS = not sampled
< = less than the stated laboratory method detection limit

APPENDIX A

EQUIPMENT SPECIFICATIONS

MS3100

3-CCD Camera
1392(H) x 1040(V) Pixels

HIGH RESOLUTION 3-CCD DIGITAL MULTISPECTRAL CAMERA

High Resolution 3-Chip Digital Smart Camera Available in Multiple Spectral Configurations:

Color-Infrared
RGB
RGB/CIR
Multispectral

The MS3100 acquires three channels of crisp 1392 x 1040 images for your most demanding applications. A common aperture and acurate alignment provide true color fidelity and optimum image quality. Multispectral configuration options, smart camera features, and DirectView analog preview complete this unbeatable instrument.

FEATURES

- Color separating prism with three CCD imaging sensors
- 1392(H) x 1040(V) resolution (x3) for 4.3 Million pixels of data
- Image 3-5 spectral bands from 400-1100 nm
- Standard models for RGB, CIR, and RGB/CIR
- Custom multispectral configuration to meet your needs
- Frame rates up to 7.5 fps
- ”Smart Camera” features for advanced control and processing
- Display composite, false color, or individual color plane images
- Digital Image Output - EIA-644 or RS-422
- Compact, rugged package
- Independent gain, offset, and exposure control for each channel
- External trigger input with three operating modes
- RS-232 input for configuration and control
- Optional *DirectView* video preview via NTSC/PAL or Progressive Scan
- Optional on-board image processing
- OEM Customization Available

APPLICATIONS

- Machine Vision
  - Food Processing
  - Textiles
  - Plastics
  - Lumber
  - Pharmaceuticals
- Remote Sensing
  - Precision Agriculture
  - Environmental Assessment
  - Archaeology
  - Geology
  - Oceanography
- Reconnaissance
- Advanced Surveillance
- Medical/Scientific Imaging
- Robotics

DuncanTech
A SPECTRUM OF SOLUTIONS

SPECIFICATIONS - MS3100

Image Device:	(3-ea) 1/2 inch Interline Transfer CCD
Picture Elements:	1392(H) x 1040(V)
Pixel Size:	4.65 x 4.65 micron
Pixel clock rate:	14.318 MHz Max
Sensing Area:	7.6 x 6.2 mm (1/2 inch format)
Frame Rate:	7.5 frames per second max
Digital Image Output:	8 bits x 4 taps or 10 bits x 3 taps (32 bits max). EIA644 or RS422
Signal/Noise:	60 dB
Lens Mount:	F-Mount or Canon ENG
Electronic Shutter:	Independent shutter time per channel. Range: $^1/_{8,000}$ - $^1/_{7.5}$ sec
Gain Selection:	Independent gain per channel. 0-36 dB
Offset Selection:	Independent offset per channel. 0-127 counts
External Trigger Input	Edge or level, Three modes
External Trigger Source:	Optically isolated BNC or Frame Grabber
Command/Control Input:	RS-232 port
Operating Temperature:	0-50 C
Operating Voltage:	12 VDC
Power Consumption:	10 Watts
Weight:	1.62 kg
Programmable Functions:	Offset, gain, exposure time, multiplexing, trigger modes, custom
Options:	processing.
Analog Video Output:	NTSC/PAL and Progressive Scan RGB (1280x1024 max display resolution)
Signal Processing	Thresholding, Ratios, Multipliers, Look up Tables, False Color Mapping,
	Custom Firmware Available

SPECTRAL CONFIGURATIONS

DuncanTech's multispectral cameras use a beam splitting prism and three CCD sensors to acquire images in 3-5 spectral bands within the 400-1100 nm sensitivity of the sensors. Standard configurations are available for RGB, CIR, and RGB/CIR. Custom spectral configurations are available to meet customer requirements. For more information on spectral configuration, ask for our *Spectral Configuration Guide*.

RGB CONFIGURATION

Acquires separate Red, Green, and Blue image planes for outstanding color fidelity.

CIR CONFIGURATION

Color Infrared imaging acquires Red, Green and Near Infrared bands approximating Landsat satellite bands. These images are mapped to the Blue, Green, and Red color planes to create false color images similar to color-infrared film for remote sensing applications.

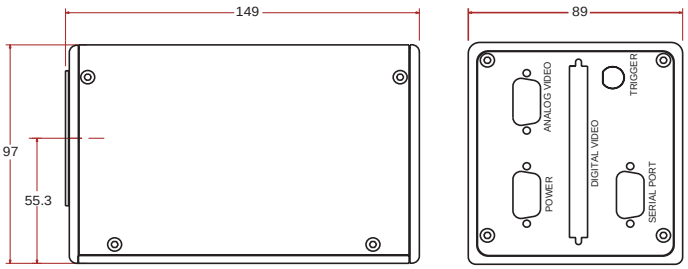
RGB/CIR CONFIGURATION

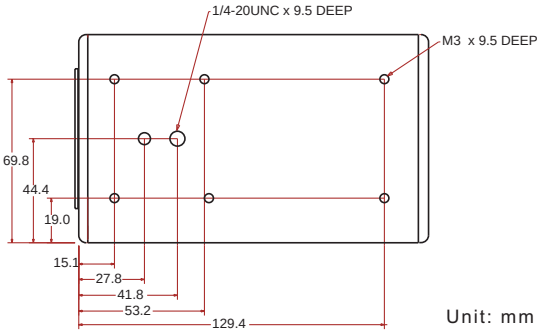
Acquires red, green, blue, and near infrared bands which can be displayed as standard color, color infrared, or single color images.

CUSTOM MULTISPECTRAL

Specify the wavelengths and bandwidths required for your application. This configuration is tailored to meet your needs.

DIMENSIONS





Unit: mm

DuncanTech
A SPECTRUM OF SOLUTIONS

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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	O2
812389	CO
812390	H2S

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 H2S
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

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

Offices and representatives worldwide
For further information:

GeoXT

The total GPS platform for all your GIS field requirements

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

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

High-accuracy integrated GPS

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

Need submeter accuracy in real-time? Use corrections from a satellite-based augmentation system (SBAS) like WAAS[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.

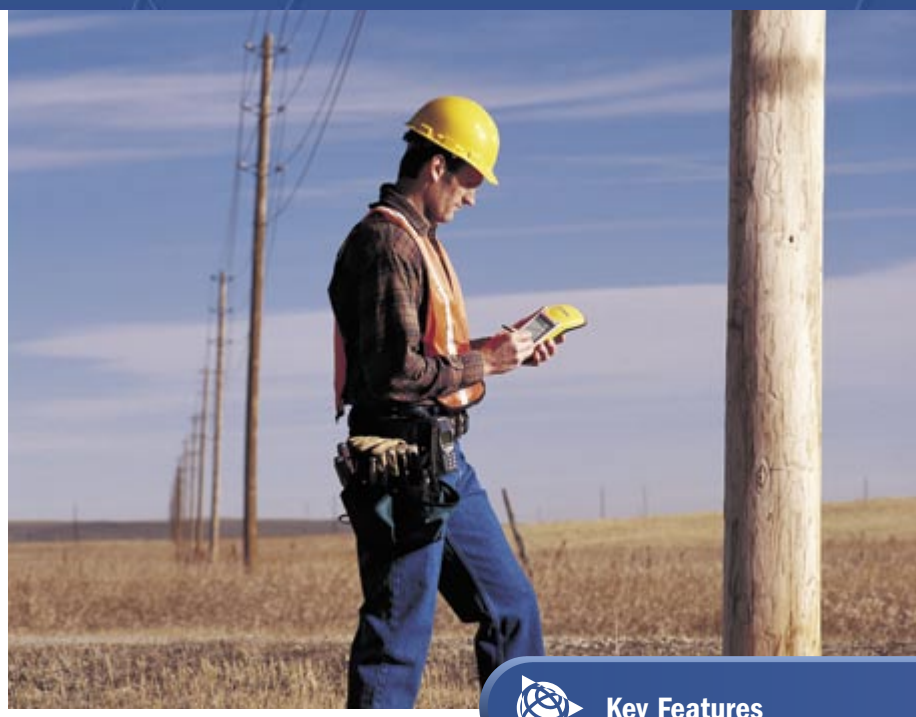
Windows Mobile includes familiar Microsoft productivity tools, including Pocket Word, Pocket Excel, and Pocket Outlook®. Pocket Outlook lets you synchronize e-mails, contacts, appointments, and data with your office computer, so whether you're in the office or in the field, you're always up to date.

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

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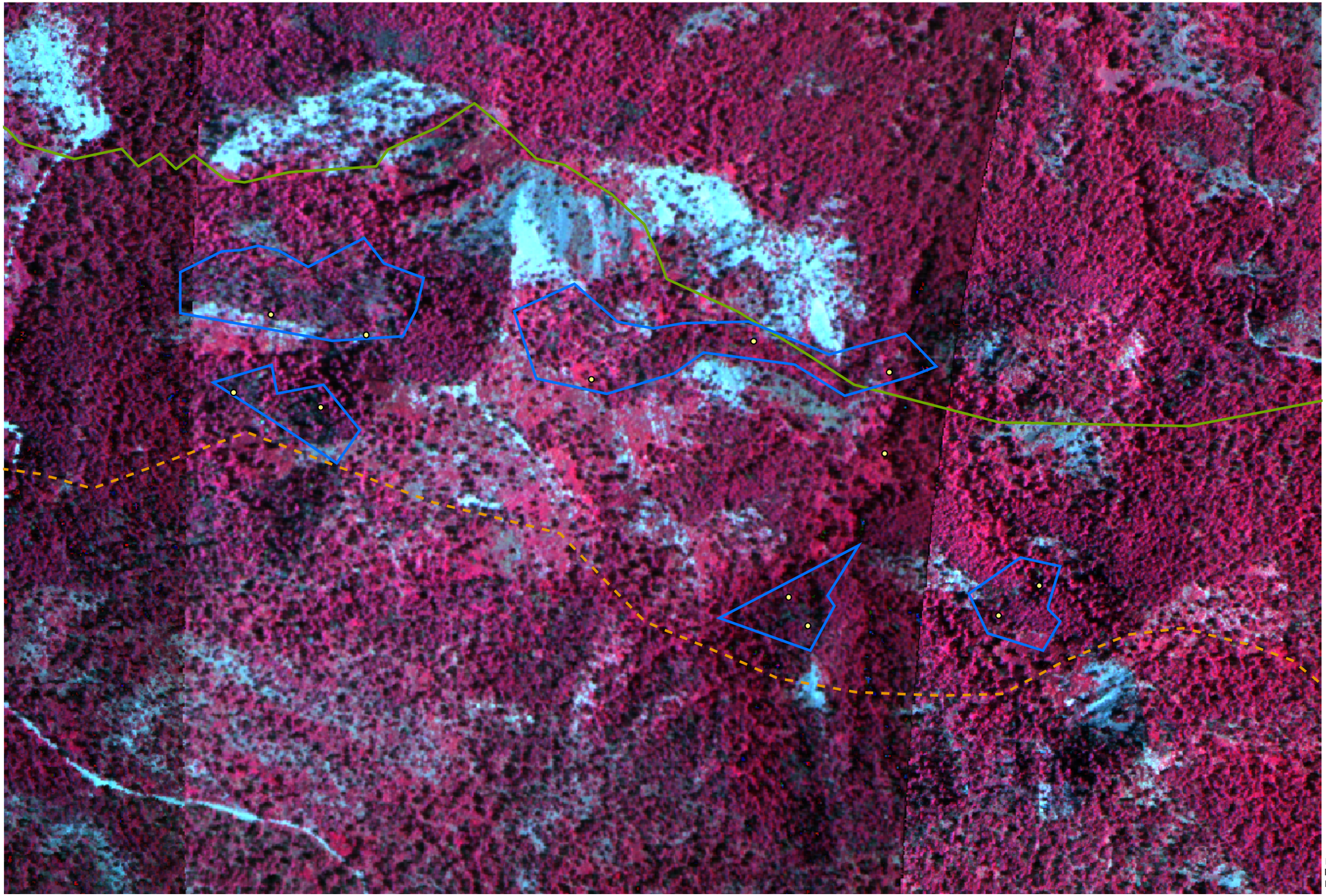
APPENDIX B

2005 INFRARED FIELD VERIFICATION MAPS - MAPS A THROUGH S



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

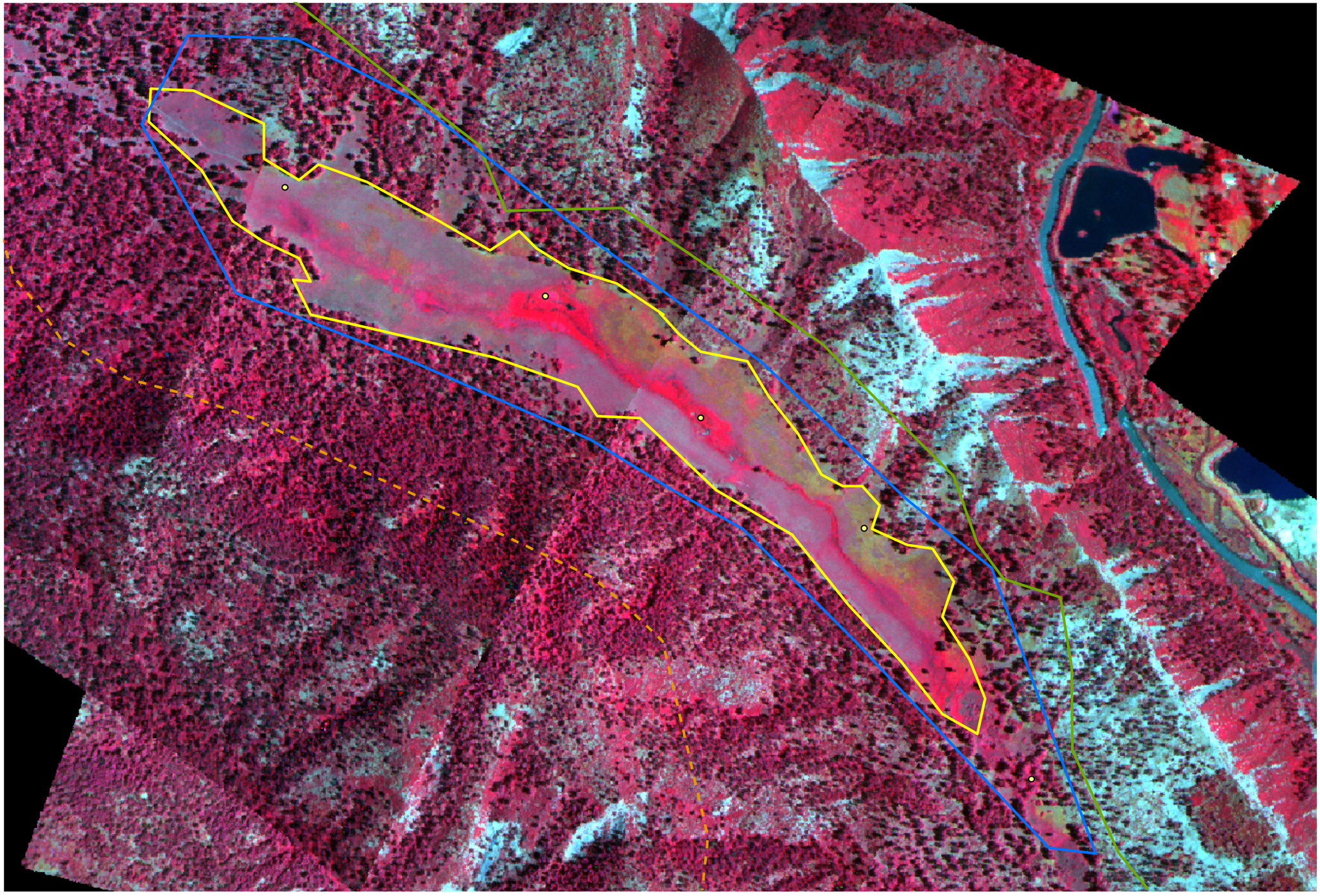
IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 900
Feet
1 Inch = 450 Feet

N

MAP J
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 1,300
Feet
1 Inch = 650 Feet

N

MAP K
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES

Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

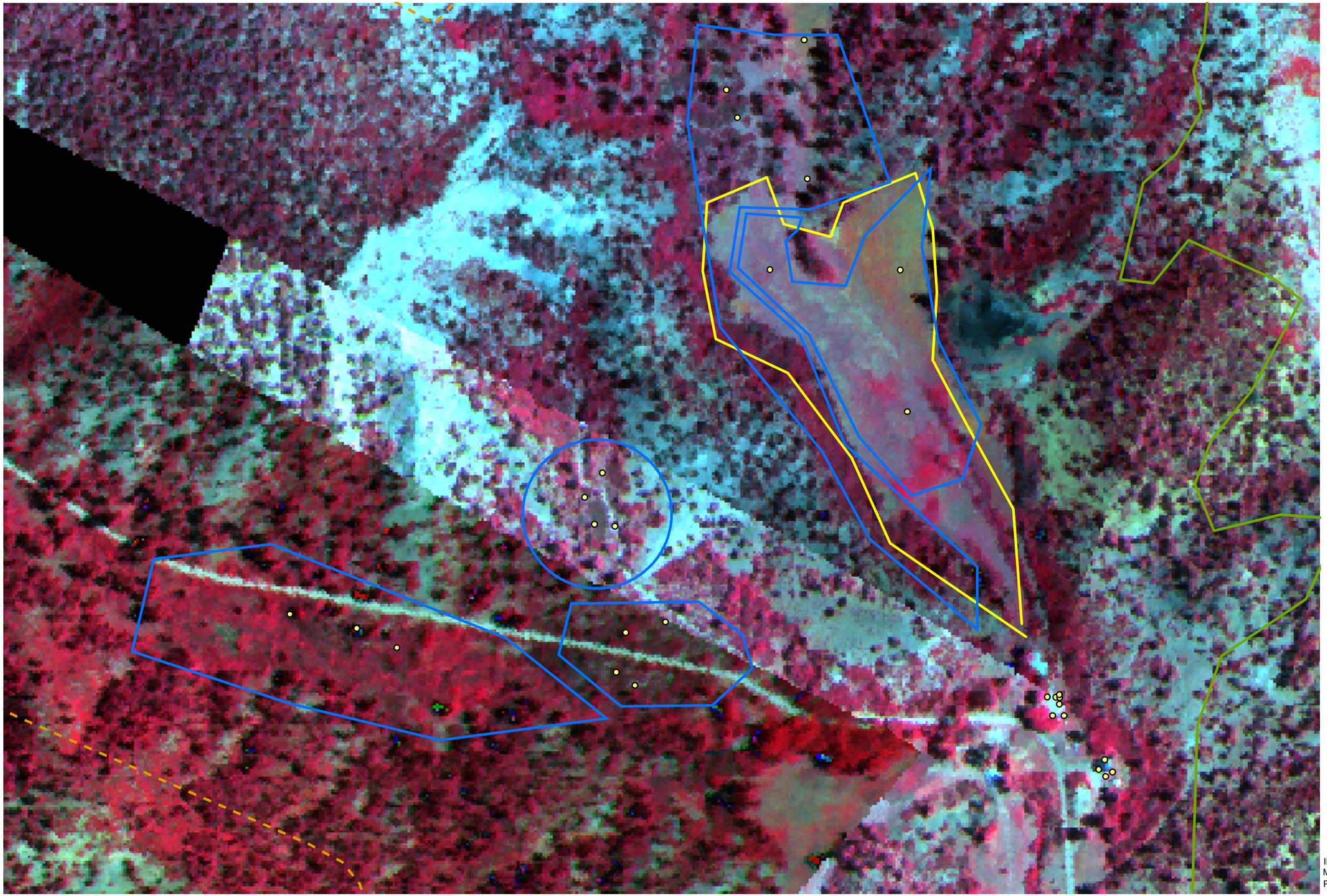
IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 900
Feet
1 Inch = 450 Feet

N

MAP L
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

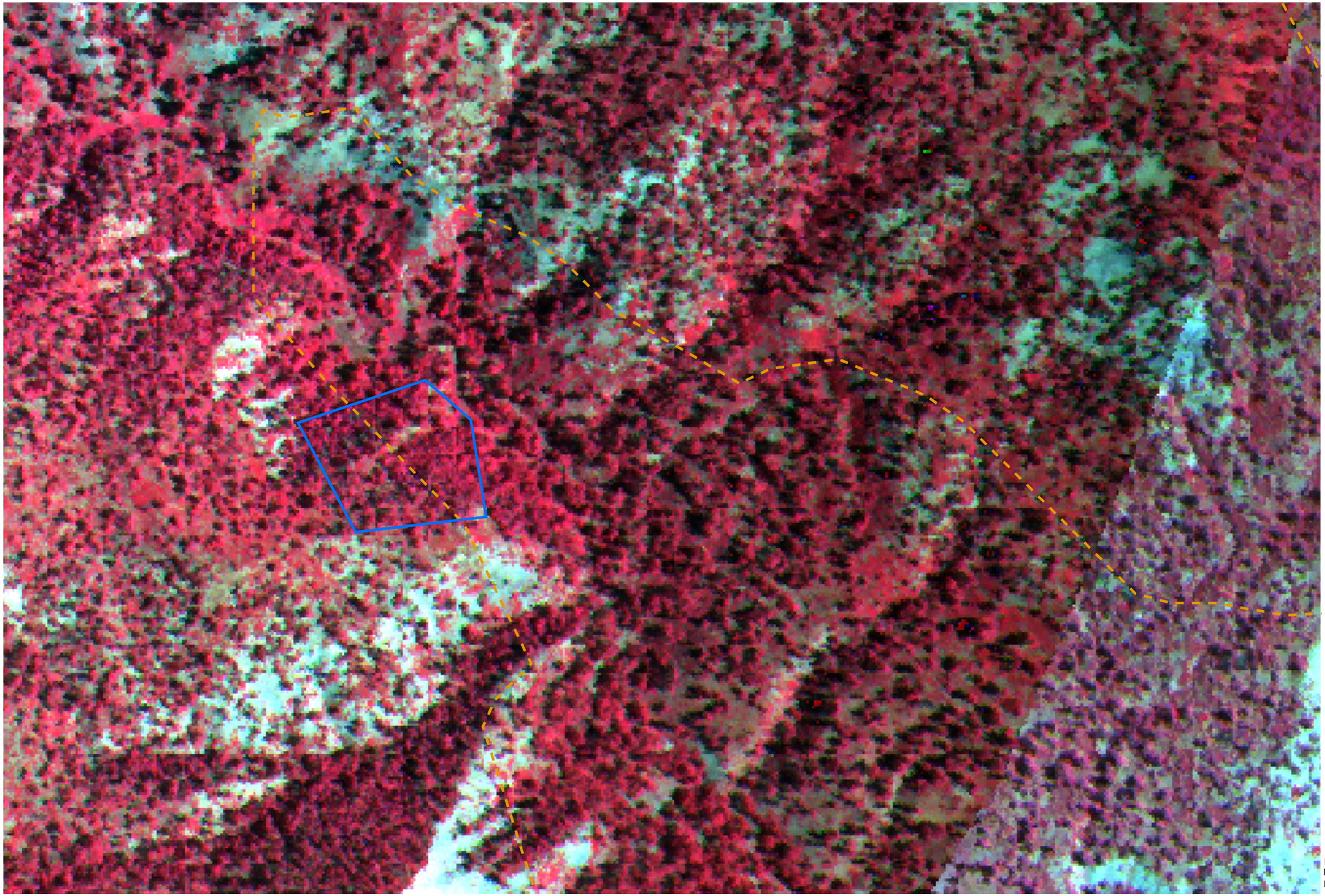
IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 600
Feet
1 Inch = 300 Feet

N

MAP M
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 600
Feet
1 Inch = 300 Feet

N

MAP N
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES

Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

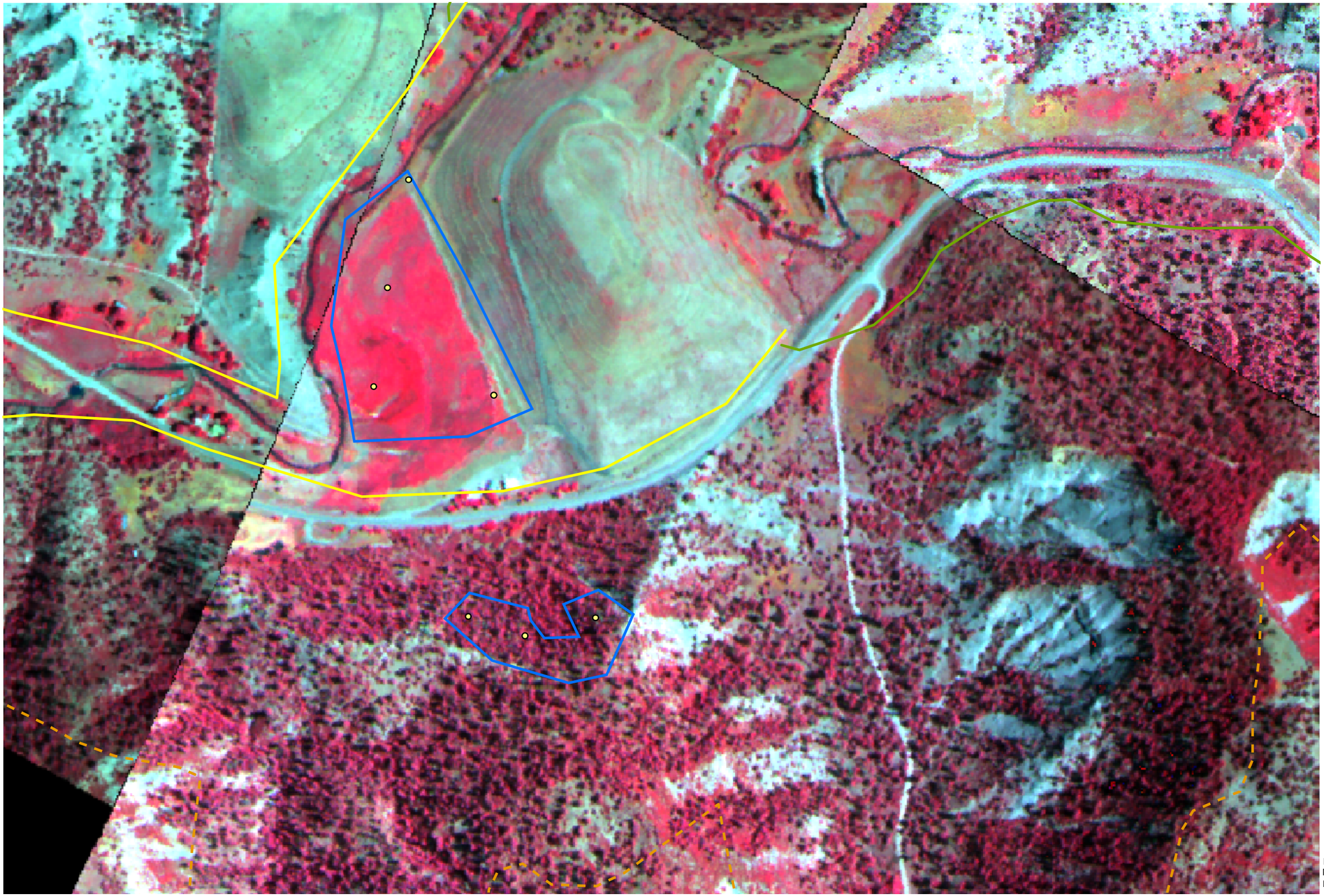
IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 600
Feet
1 Inch = 300 Feet

N

MAP O
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

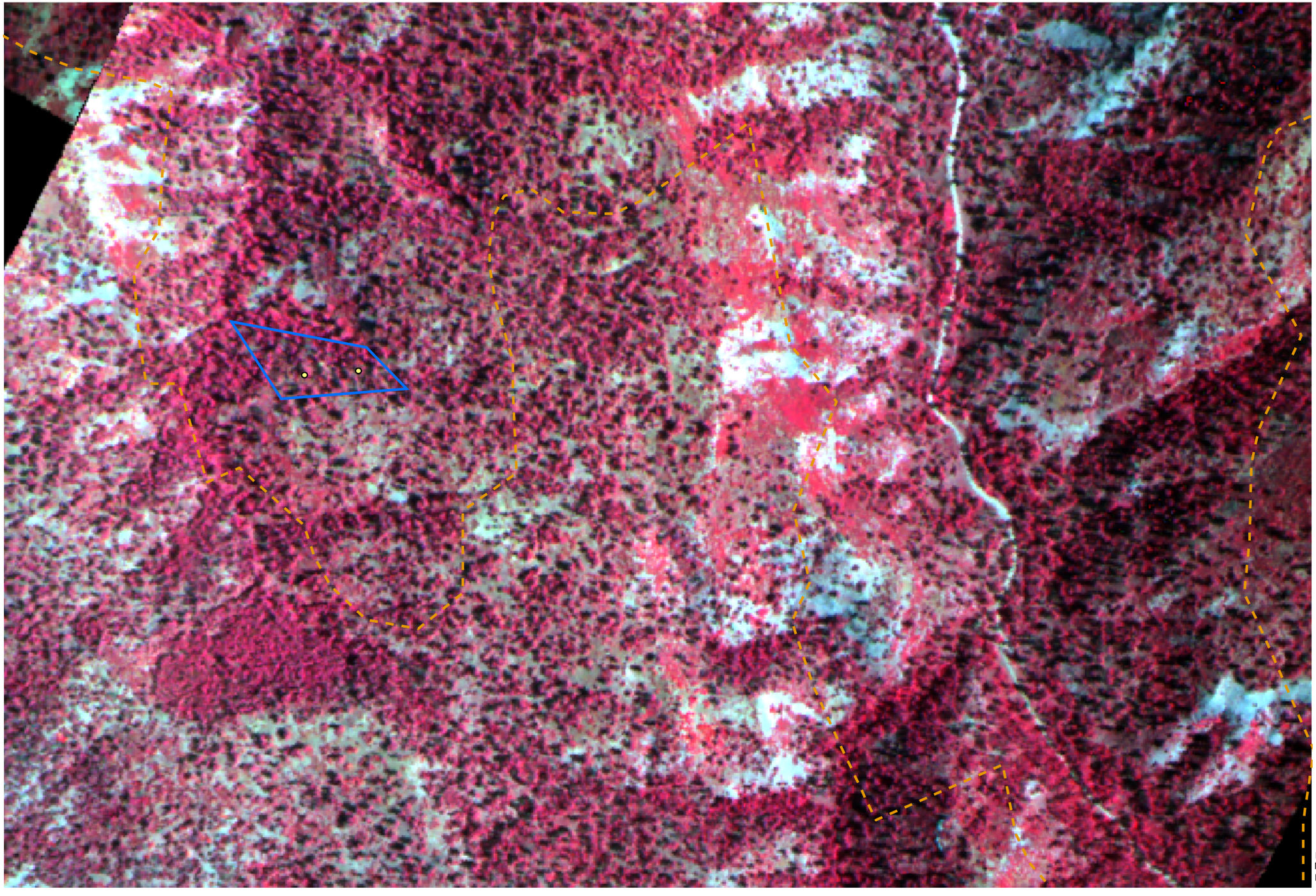
IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 900
Feet
1 Inch = 450 Feet

N

MAP P
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

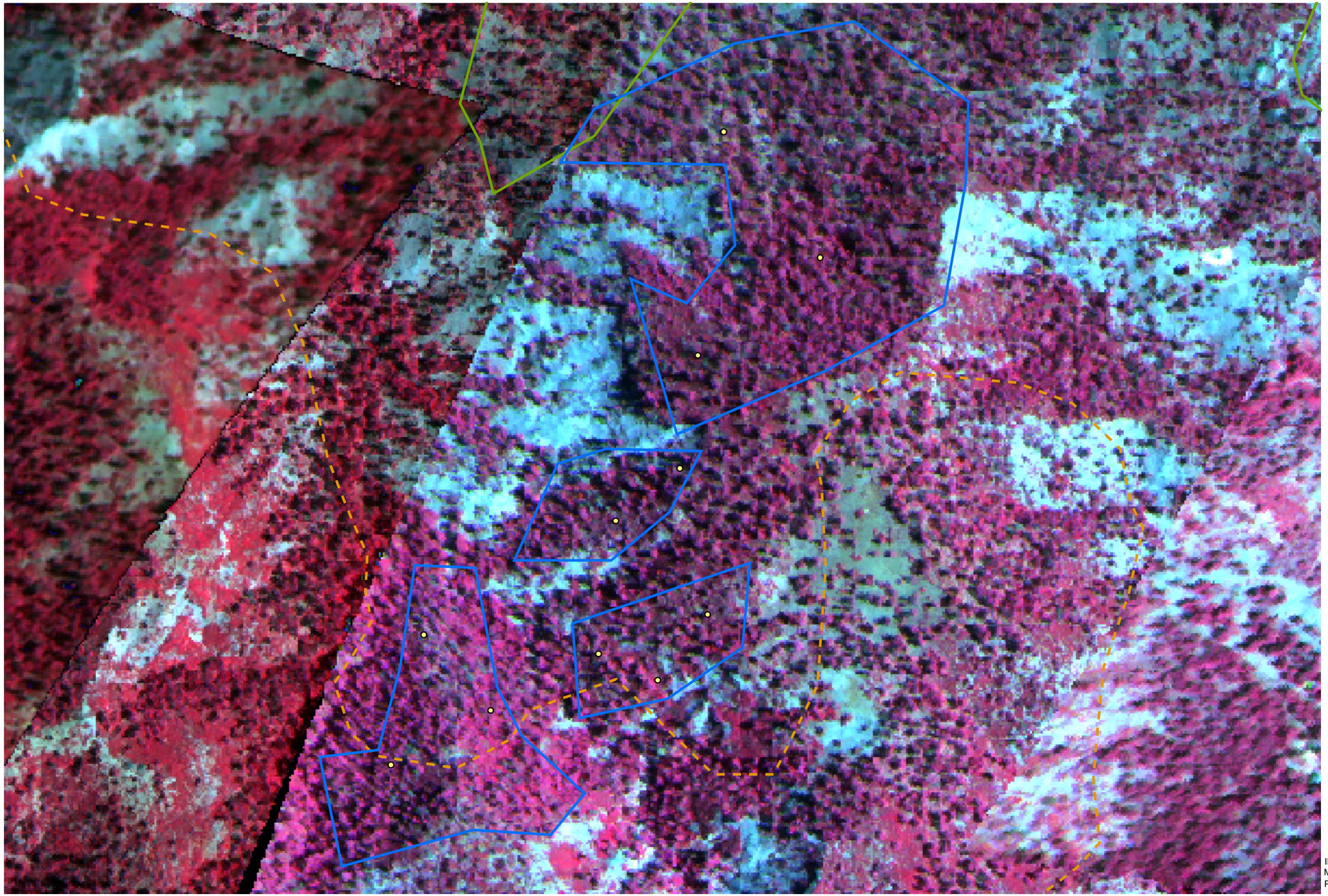
IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 800
Feet
1 Inch = 400 Feet

N

MAP Q
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

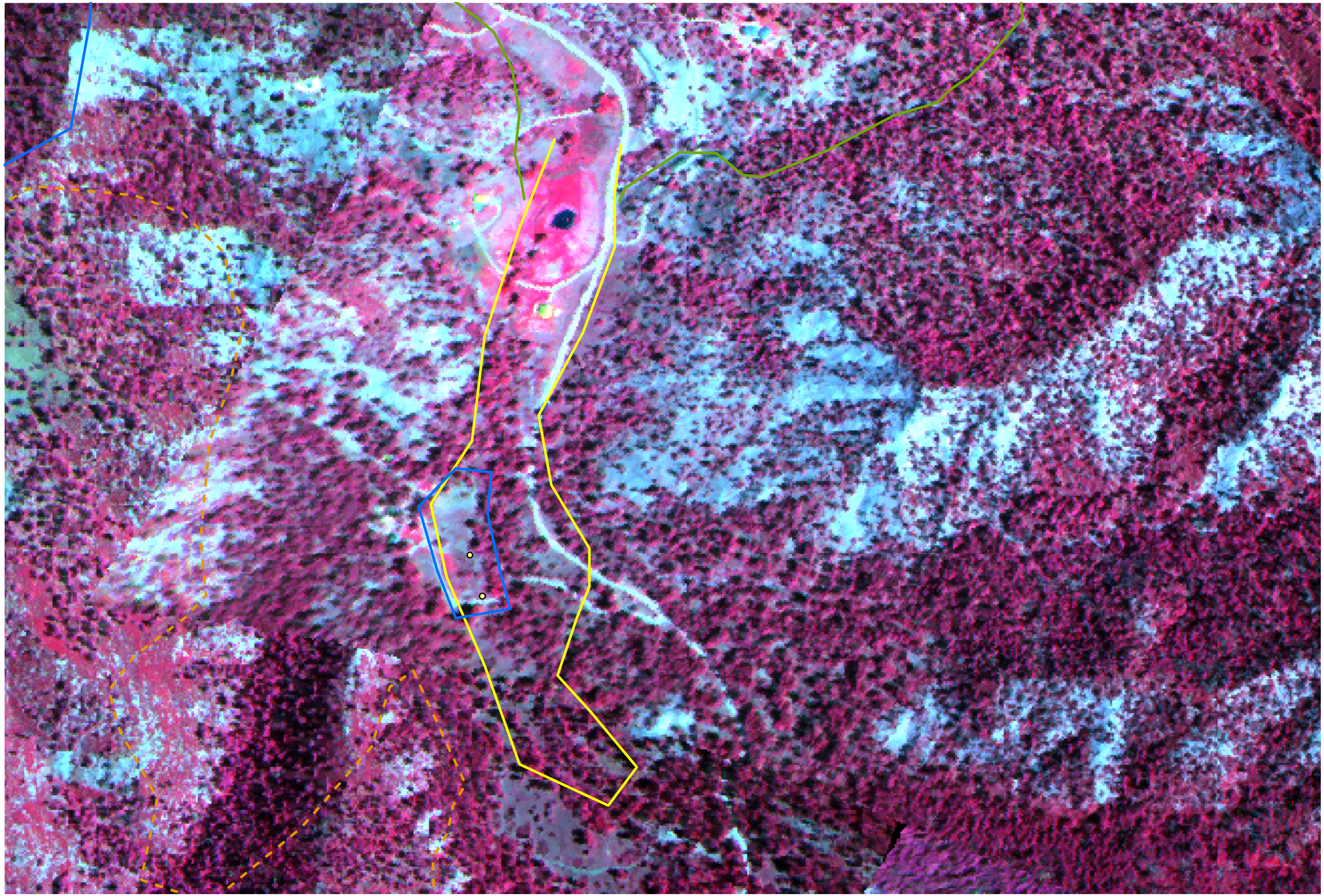
IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 700
Feet
1 Inch = 350 Feet

N

MAP R
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES



Legend

Suspect Areas

Geology

- Fruitland Formation (Kf)
- Fruitland Formation Tongue (Kft)
- Kirtland Formation (Kk)
- Pictured Cliffs Formation (Kpc)
- Pictured Cliffs Formation Tongue (Kpct)
- Quaternary Alluvium (Qa)
- Quaternary Gravel (Qg)

Subsurface Methane Measurements

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

IR Imagery Taken: June 2005
Mapping Data Collected: September 2005
Figure 3 contains a Map Key

0 800
Feet
1 Inch = 400 Feet

N

MAP S
2005 OUTCROP MONITORING
ARCHULETA COUNTY, COLORADO

ELM RIDGE RESOURCES AND PETROX RESOURCES