METHANE SEEP SURVEY REPORT
BONDAD, COLORADO

MARCH 2005

Prepared for:

COLORADO OIL AND GAS CONSERVATION COMMISSION
Denver, Colorado

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COLORADO OIL AND GAS CONSERVATION COMMISSION
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EXECUTIVE SUMMARY

This report completed by LT Environmental, Inc. (LTE) for the Colorado Oil and Gas Conservation Commission (COGCC) is a summary of the methane seep survey activities recently completed at the Bondad Explosion Site (Site), located in Bondad, Colorado (Figure 1, Site Location Map).

Purpose and Scope

The purpose of the survey was to identify the horizontal extent of methane seep activity at the Site. The survey also included observations of site geology as a means to understand the potential source areas and migration pathways.

This methane seep survey was performed in response to an explosion of a residence located at 4040 US Highway 550 (Yoakum Residence). Figure 2 illustrates the site layout including the location of several buried utilities, nearby residential structures, water supply wells, gas production wells, and other pertinent features. The explosion occurred on the morning of February 12, 2005.

Site Geology

The near-surface geology at the Site consists of gravel outwash deposits ranging from two feet to 20 feet thick overlying bedrock, which is the Site area consists of a 15 to 20 foot thick sandstone. Several hundred feet of alternating beds of sandstone and shale comprise the uppermost aquifer in which the nearby water supply wells are completed. Gas production wells in the area penetrate the Fruitland Formation (Kf) more than 2,000 feet below ground surface (bgs). Former oil and/or conventional natural gas production wells in the area penetrate deeper gas and oil reservoirs more than 7,000 feet bgs.

Initial Assessment

On February 15, 2005, Four Corners Geoscience (FCG) was on site to conduct an initial reconnaissance of the area and to collect water and gas samples from nearby water wells and a gas sample from beneath the trailer. Analytical results detected the presence of methane at elevated concentrations. Isotopic analysis of the gas indicated that the gas is thermogenic and similar to the coalbed methane (CBM) gas being produced from the Kf.

Soil Gas Survey

During the period from March 21 through March 24, 2005, LTE conducted soil gas survey activities in the project area extending radially outward approximately 3,000 feet in all directions from the Nick Spatter Bryce Farms #1 (NSBF #1) production well, which is located in close proximity to the Yoakum residence.

LTE personnel advanced 372 subsurface probe holes across an area covering approximately 95 acres. LTE also inspected the crawlspace and interior living space of four residences; the interior of the fire station; and unoccupied land along the nearby Animas River and Florida River.

Methane was not detected in the crawl space of the four residences but elevated methane gas was identified within the fire station.

The results of the initial soil gas investigation have identified the presence of thermogenic methane similar in composition to the methane found in each of the water wells located within the project area.

Observations

The NSBF#1 well and associated "step-over" boreholes plugged in 1994 continue to leak methane gas based on the elevated concentrations of methane detected at the ground in the vicinity of this well.

Methane is present at elevated concentrations in the soil beneath the Yoakum residence. It is not certain at this time whether the potential conduit could be the orphaned production well NSBF #1, a water supply well, or subsurface fractures. All indications are that the primary source of the methane is the NSBF #1 production well cluster, but the horizontal distribution mechanism in the near surface has not been defined.

Thermogenic methane gas at elevated concentrations has been detected in the water supply wells within the project area. It appears that methane gas from the Kf migrates upward through the deeper boreholes, but it is also migrating laterally through different preferential, more permeable layers and/or naturally occurring fractures.

Based on the extent of methane seep activity and the elevated concentrations of methane detected, it is possible that another well or wells, whose exact location is not currently known, exist in the project area, particularly in the area of the Yoakum residence.

Based on the currently defined extent of methane seep activity, no additional structures are at risk from the accumulation of methane gas at hazardous concentrations, with the exception of the fire station building.

Recommendations

Based on the results of the initial survey work, eight recommendations are presented to address the Bondad Seep issue. The recommendations are listed below in order of importance:

- Vent potentially combustible gas vapors from within the fire station (currently scheduled for March 16, 2005);
- Install methane detection systems in fire station, Bennet Residence, Budhue Residence, Grant Residence, and Weston water well house (currently scheduled to begin on March 16, 2005);
- Visit explosion site with Mr. Yoakum, help him salvage any additional personal possessions, and take photographs to document the existing conditions at the site and the condition of the remains of the trailer and personal possessions (scheduled to begin on March 16, 2005).

- Arrange to have utilities disconnected, disconnect propane lines and move propane tanks, which belong to Mr. Yoakum. Cleanup debris from the explosion site;
- Survey the area around Mr. Yoakum's subsurface water well house
- Conduct geophysical surveys to identify other potentially buried wells or other yet unidentified conduits for gas migration, and characterize the near-surface geology (depth to bedrock);
- Conduct investigative excavation beneath Yoakum residence to determine the mechanism that allowed gas to migrate up to the ground surface;
- Conduct additional soil gas surveys to determine if seep activity is changing;
- Conduct natural spring survey to characterize geologic environment and to collect water and gas samples for chemical and isotopic analysis; and
- Identify appropriate mitigation methods.

SECTION 1.0

INTRODUCTION

This report completed by LT Environmental, Inc. (LTE) for the Colorado Oil and Gas Conservation Commission (COGCC) is a summary of the methane seep survey activities recently completed at the Bondad Explosion Site (Site), located in Bondad, Colorado (Figure 1, Site Location Map).

1.1 SITE DESCRIPTION

The Site consists of several tracts of land covering more than 100 acres. The land use consists of residential properties, a fire station, US Highway 550, the Animas River, and the Florida River. The majority of land area is privately owned. Figure 2 illustrates the layout of the Site including land ownership boundaries.

Throughout the history of the assessment work performed within the project area, there have been several naming conventions for wells, samples, and land owners. The names have been based on land ownership, tenant name, and/or geographic location. In some cases, incorrect names were inadvertently used, but an attempt has been made to make correct and to standardize the names.

This report summarizes data collected from various sources. To clarify the data presented in this report, LTE has summarized the naming used at the Site in Table 1.

1.2 PURPOSE AND SCOPE

The purpose of this survey was to identify the horizontal extent of methane seepage at the Site. The survey also included observations of site geology as a means to evaluate the potential source areas and migration pathways.

As part of the emergency response activities at the project area, the COGCC contracted Ms. Lynn Fechter of Four Corners Geoscience (FCG) to conduct sampling of several nearby water supply wells and other suspected natural gas sources in the area.

This report summarizes the results of the sampling conducted by FCG, LTE's site observations, and the results of the soil gas survey.

1.3 REPORT ORGANIZATION

This report is divided into six sections including this introduction. Section 2.0 presents a discussion of the geologic setting. A summary of the initial sampling activities is presented in Section 3.0. Section 4.0 presents a summary of the soil gas survey activities. Section 5.0 discusses site observations. Section 6.0 provides recommendations for additional work. Tables and figures follow the text.

Analytical reports from the initial water well sampling performed in 2001 and 2002 is presented in Appendix A. Water well logs are presented in Appendix B. Appendix C contains production well logs. Appendix D contains the laboratory analytical reports for the water samples collected by FCG. Specifications for the equipment used by LTE during the soil gas survey are included as Appendix E. Laboratory analytical reports for the soil gas samples collected by LTE are included as Appendix F.

1.4 PROJECT BACKGROUND

This methane seep survey was performed in response to an explosion of a residence located at 4040 US Highway 550 (Yoakum Residence). Figure 2 illustrates the site layout including the location of several buried utilities, nearby residential structures, water supply wells, gas production wells, and other pertinent features. The explosion occurred on the morning of February 12, 2005. Investigation of the propane stove/tank system within the residence and nearby methane transmission pipelines showed that these were not the source of the gas that had caused the explosion and that indicated that an alternate source of methane gas was present.

An abandoned gas production well with a prior history of leaking methane has been identified as a potential source for the methane seepage since it is located in close proximity to the Yoakum residence. The Nick Spatter Bryce Farm #1 (NSBF#1) production well was drilled in the late 1930's, but apparently had not been abandoned properly. In the early 1990's, the NSBF #1 well was believed to be the source for methane identified in the Carl Weston water supply well located on the west side of US Highway 550. The NSBF #1 was plugged in 1994 and dissolved methane concentrations detected in the Weston water supply well subsequently decreased. At the time of the abandonment activities, it was determined that at least two additional "step-over" production boreholes were present near the NSBF#1 and may have contributed to the methane seep impacts. In 1994, it was reported that these three production wells/boreholes were interconnected and that all three had been plugged to the extent possible.

Following the development of residential properties east of the NSBF #1 well and also shortly before the drilling of the nearby Petrogulf Corporation (Petrogulf) Cain 31-2 coalbed methane (CBM) production well, water samples were collected from the water wells at each residence (Bennet, Budhue, and Grant residences). Water samples from these residences were referred to as the northern, central, and southern water supply wells, respectively. The samples were analyzed and reported dissolved methane in the groundwater at concentrations of 20.27 milligrams per liter (mg/L), 6.77 mg/L, and 9.44 mg/L, respectively.

Analysis of the gas obtained from the northern water supply well in February 2002 reported methane at a concentration of 78.46% in the gas desorbing from the water. Isotopic analysis of the gas indicated the presence of carbon isotopes of methane at -43.36 per mil and hydrogen isotopes of methane at -150.6 per mil. These ratios indicate the methane detected is thermogenic gas.

Analysis of various water quality parameters such as alkalinity, total dissolved solids (TDS), and other parameters were also conducted on water samples from the Bennet and Budhue water supply wells in August 2001 and February 2002, respectively. Analytical reports for the initial water well sampling activities conducted in 2001 and 2002 are included in Appendix A.

SECTION 2.0

GEOLOGIC SETTING

During the soil gas survey activities conducted during the week of February 21, 2005 and a subsequent visit to the Site on March 2, 2005, LTE's field geologists conducted a preliminary evaluation of the geologic setting at the Site through field observation, literature review, and inspection of available geologic logs for nearby water supply wells and existing and former gas production wells. The site geology is depicted on Figure 3 which was taken from the United States Geological Survey (USGS) *Geologic Map of the Durango Quadrangle, Southwestern Colorado* compiled by T.A. Steven, P.W. Lipman, W.J. Heil Jr., Fred Barker, and R.G. Luedke dated 1974.

2.1 GENERAL TOPOGRAPHY

The Site is located approximately 0.25 miles north of the confluence of the Animas River to the west and the Florida River. The local topography is a relatively flat terrace with an elevation of approximately 6,050 feet above mean sea level (amsl). The elevation drop between the terrace and the Animas River to the west and the Florida River to the east is approximately 40 feet to 60 feet. Bondad Hill, a prominent mesa in the area, is located approximately one mile north of the Site. Other large hills rising more than 600 feet above the Site are located within 0.25 miles east of the Site and within 0.5 miles west of the Site. The site topography is presented on the Site Location Map, Figure 1.

2.2 ALLUVIAL DEPOSITS

The Site lies on a Quaternary-aged glacial outwash deposit comprised of sands, gravels, and boulders. The gravel deposit ranges in thickness from approximately two feet to more than 20 feet. It appears that the gravel terrace has undergone regrading, historic mining, or other surficial disturbance since an elevated terrace (approximately three to five feet relief) was noted within the gravel deposit itself. The main methane seep area observed during the soil gas survey appears to generally follow the extent of this elevated gravel terrace.

2.3 NEAR-SURFACE GEOLOGY (GROUND SURFACE TO 240 FEET BGS)

Based on the lithologic logs developed during installation of nearby water wells and available geologic maps, the gravel deposit is underlain by a sandstone member of the Tertiary-aged Nacimiento Formation (Tn). The sandstone is approximately 15 feet to 22 feet thick. It is fine to medium-grained, well-cemented, relatively massive, but also cross-bedded (more thinly cross-bedded within the top two feet), and fractured. Based on observed surface geology, a relatively small section of this sandstone layer on the west side of US Highway 550 appears to be vertically displaced. The displacement appears to be approximately 10 feet to 15 feet lower as compared to the elevation of the sandstone layer on the east side of US Highway 550 and west side of the Animas River. This displacement is also supported by the observed abrupt diversion of the Animas River against the more competent sandstone layer west of US Highway 550 near the Weston Residence (Figure 2). Both the top and bottom surfaces of this sandstone unit were

predominantly covered by gravel or weather shale, but were observed to be undulating in areas where the unit was exposed. The sandstone beds appear to be horizontal with no observed dip. Competent, in-place bedding planes for strike and dip measurements of the outcropping sandstone could not be located during the field activities.

The sandstone unit is underlain by a gray shale which was observed to be laminated and highly fractured. On the river cut of the Animas River, small springs were noted in the shale unit beneath the sandstone outcrop.

Geological information obtained from the water wells drilled at or in the vicinity of the Site indicate that the shale unit extends to more than 240 feet below ground surface (bgs). The water wells are screened within the shale unit at depth and report poor water quality and methane gas. The depth to static water in the water wells is approximately 35 feet to 50 feet bgs. Geologic logs from well drilling reports observed water at depths ranging from 60 to 110 feet bgs. Drilling logs from the water wells are presented in Appendix B. LTE created a cross-section diagram based on the geology noted the lithologic logs from nearby water wells and field observations. The location of the cross-section line A-A' is presented on Figure 4. The geologic cross section of the near-surface geology is presented as Figure 5.

2.4 SUBSURFACE GEOLOGY (GREATER THAN 240 FEET BGS)

Geologic information obtained from the NSBF #1, Cain 31-2, and Nick Spatter #1 well logs indicate that the Tn is approximately 1,600 feet thick and consists of shale and sandstone units. The Ojo Alamo Formation (TKoa) is a late-Cretaceous/early-Tertiary Aged sandstone unit approximately 200 feet thick. The Kirtland Formation (Kk) underlies the Ojo Alamo, is approximately 400 feet thick, and contains predominantly shale units with limited sandstone intervals. The Fruitland Formation (Kf) is the primary CBM production zone in the San Juan Basin. The top of the Kf at the Site is approximately 2,200 feet bgs. The NSBF #1 well has a measured total depth of 2,240 feet bgs and is plugged and abandoned, as previously stated. The Cain 31-2 total depth is 2,630 feet bgs and is producing CBM from the Kf. The Nick Spatter #1 is 7,661 feet in total depth. This well was drilled into the Mesaverde Group (Kmv) but was plugged and abandoned in May 1998. Well log information from nearby production wells is presented in Appendix C.

A geologic cross section of the subsurface geology was developed based on the information provided from the NSBF#1 well. The names of the geologic formations and approximate depths are also based on information provided in the drilling logs from the Cain 31-2, N. Spatter #1, and Ben Ute #2 production wells. The geologic cross-section of the subsurface geology at the Site is presented as Figure 6. The cross-section line for Figure 6 is the same line used for the cross-section on Figure 5. The major differences between the two cross-sections are the vertical extent depicted and the vertical scale.

SECTION 3.0

INITIAL SAMPLING ACTIVITIES

On February 15, 2005, FCG was on site to conduct an initial reconnaissance of the area and to collect water and gas samples from nearby water wells and a gas sample from beneath the Yoakum trailer.

The source of the methane gas causing the explosion appears to be from a hole or natural "vent" approximately two to three inches wide by four to five inches long located beneath the west side of the trailer between the two rear axles. Combustible methane gas was measured at the vent location at a concentration of 100%.

FCG collected several field measurements from the area using a Lumidor® four-gas meter capable of measuring the concentrations of methane, oxygen (O_2), carbon monoxide (CO), and hydrogen sulfide (H_2S). The areas measured include the NSBF #1 well, two locations beneath the Yoakum residence, and within the Yoakum water well. Methane was detected at all four locations at peak concentrations ranging from 12,000 parts per million (ppm) [1.2% methane beneath the east side of the Yoakum residence to 15.7% methane at the NSBF #1 well. CO was detected at the NSBF #1 well only. H_2S was not detected at any of the field measurement locations. O_2 was generally detected at a concentration of 20% except at the NSBF #1 well where O_2 was measured at 15.8%, due to the elevated methane concentrations detected in this location. Table 2 summarizes the field measurements made by FCG.

FCG collected water samples from six water wells located in the project area. The wells are located at the three residences east of the NSBF #1 well, the fire station, and two water samples from the Weston property (Figure 2). The two samples from the Weston Property include Carl Weston #1 and Carl Weston #2. The sample Carl Weston #1 was collected from the old house located west of US Highway 550, west of the explosion site. The sample Carl Weston #2 was collected from the Weston mobile home located approximately 0.5 miles north of the project area and is not depicted on the maps contained within this report. The Bennet and Budhue water supply wells located on the east side of the Site were collected as a composite sample from the treatment system located near the Budhue residence. Analytical results reported dissolved methane in each of the wells sampled at concentrations ranging from 1.42 mg/L to 13.68 mg/L. The samples were also analyzed for various water quality parameters as summarized in Table 3. Laboratory analytical reports for the water sampling conducted by FCG are included in Appendix D.

On February 15, 2005 and again on March 1, 2005, FCG collected gas samples from various sources within the project area to characterize the gas seeping at the ground surface and present in the water supply wells nearby. The gas samples collected on February 15, 2005 were collected from the gas vent identified beneath the trailer and the Yoakum water well. Methane was detected in the gas at concentrations of 91.92% and 3.14%, respectively. Isotopic analysis of the gas sample from the vent beneath the trailer was also performed. The isotopic ratios identified in the soil gas sample from the vent beneath the trailer were similar to those found

during the gas analysis in 2002 of the Bennet residence water well. The isotopic ratios from both samples indicate that the gas is thermogenic.

The gas samples collected on March 1, 2005 from the two Weston water wells, the fire station water well, and the combined sample from the Bennet and Budhue water wells identified methane at concentrations in the gas ranging from 10.08% to 76.21%, respectively. Isotopic analysis of the gas was consistent with other gas samples collected from the area. The isotopic ratios indicate that the gas is thermogenic. Analytical results of the gas sampling at the Site are summarized in Table 4. A chart showing the distribution of the isotopic data relative to the type of source gas is presented as Figure 7.

SECTION 4.0

SOIL GAS SURVEY ACTIVITIES

During the period from March 21 through March 24, 2005, LTE conducted soil gas survey activities in the project area extending radially outward approximately 3,000 feet in all directions from the NSBF #1 well (Figure 8). The survey methods used were similar to the methane seep surveys performed on the Kf outcrop located along the northern rim of the San Juan Basin.

4.1 METHODOLOGY

LTE's two-person field team used a slide hammer and a three-foot long steel rod to bore a 1/4-inch diameter hole to a depth of approximately two to three feet bgs. A three-foot long section of plastic tubing, with the bottom six inches perforated, was lowered into the borehole and used to measure the concentration of methane in the subsurface with a hand-held Mine Safety Appliances (MSA) GasPort® four-gas meter. In addition to methane, concentrations of O_2, CO, and H_2S are also recorded.

At the time of the survey, the area was receiving a large amount of precipitation, which saturated the ground surface. Therefore, LTE had to frequently modify the measurement procedure to prevent water from entering the four-gas meter. When ground conditions were saturated, the slide hammer was used to bore a hole into the soil. However, instead of lowering tubing into the borehole, LTE fitted a funnel over the open borehole at the ground surface. The four-gas meter was then able to measure gas escaping from the borehole, captured by the funnel, and transmitted into the four-gas meter.

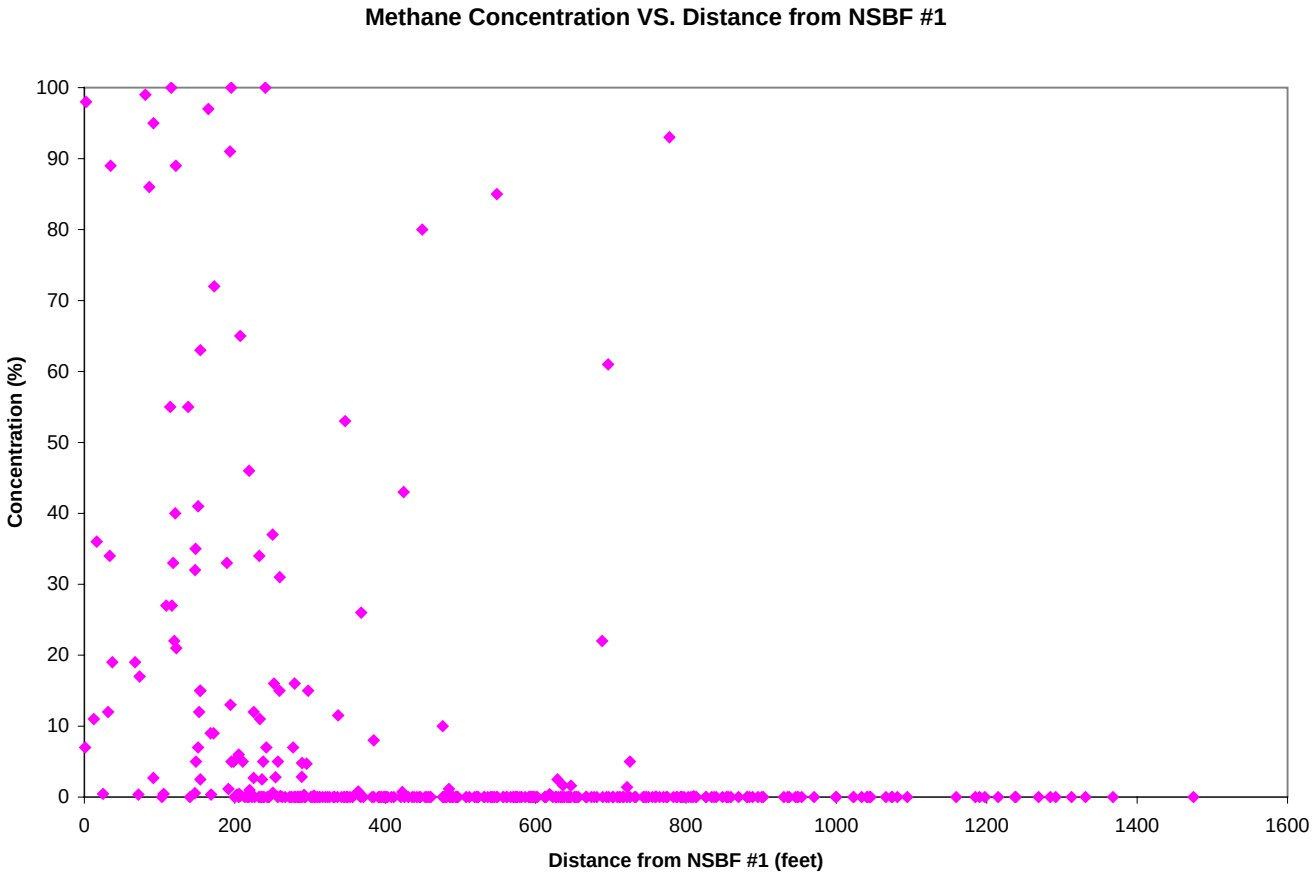
Each borehole location was mapped using a Trimble GeoXT® global positioning system (GPS). The GPS has the ability to locate the horizontal position of a point with sub-meter accuracy. In addition, the GPS has datalogging capability. Data (subsurface methane, O_2, CO, and H_2S concentration measurements) collected from each borehole was input into the GPS as the point was being logged by the GPS. Data was then transferred to a laptop computer for post-processing and input into a geographic information system (GIS) for evaluation and presentation.

Specification sheets for the four-gas meter and the GPS are included as Appendix E.

4.2 SOIL GAS SURVEY RESULTS

During the period from March 21 through March 24, 2005, LTE personnel advanced 372 subsurface probe holes across an area covering approximately 95 acres. LTE also inspected the crawlspace and interior living space of four residences; the interior of the fire station; and unoccupied land along the nearby Animas and Florida rivers. Methane was not detected in the crawl space of the four residences but elevated methane gas was identified within the fire station at concentrations ranging from 3,500 ppm (0.35% methane) to 25,000 ppm (2.5% methane). These concentrations correspond to 7% of the Lower Explosive Limit (LEL) to 50% of the LEL. Methane was not detected along the Animas River or Florida River.

Results of the soil gas survey indicated that elevated methane gas was detected in an elliptically-shaped area centered over the NSBF#1 well and covering approximately 14 acres with the long axis of the ellipse oriented North 8 Degrees West. The highest methane concentrations were detected within a 300-foot radius of the NSBF #1 well, which includes the Yoakum residence. Detected methane concentrations ranged from 0.0026% to 100% methane. Figure 8 illustrates the distribution of methane in the subsurface. The chart below illustrates the distribution of methane based on distance from the NSBF #1 production well. Charts illustrating the distribution of O_2, CO, and H_2S based on distance from the NSBF#1 well and are presented in Appendix F.



4.3 LABORATORY SAMPLING AND ANALYSIS

LTE collected three soil gas samples from within the methane seep area. A gas sample was collected from the shallow surface soil near the NSBF #1 well, south of the NSBF #1 well, and from an area located on the west side of US Highway 550. The gas samples were labeled OGCC0501-a, OGCC0501-b, and OGCC0501-c. Analytical results indicated the presence of methane in the gas at concentrations of 85.08%, 13.03%, and 16.49%, respectively. Isotopic ratios for the three gas samples identified the methane as thermogenic gas and reported carbon

and hydrogen isotopes of methane at concentrations similar to those identified in the other five samples collected within the project area with the exception of the Carl Weston #2 sample. Analytical results of the soil gas samples collected on February 24, 2005 are summarized in Table 3. Figure 7 illustrates the distribution of the isotopic data relative to the type of source gas. Laboratory analytical reports for the soil gas samples collected by LTE are presented in Appendix G.

SECTION 5.0

OBSERVATIONS

This section outlines some of the initial observations made by LTE based on the available information. These observations are subject to change as additional investigations are completed.

The results of the initial investigation activities have identified the presence of thermogenic methane similar in composition to the CBM developed from the Kf in each of the water wells located within the project area. With the exception of the water well at the fire station, each of the wells are located in areas not in contact with the methane seep area delineated at the ground surface near the NSBF #1 well.

The NSBF#1 well and associated "step-over" boreholes plugged in 1994 continue to leak methane gas based on the elevated concentrations of methane detected at the ground surface and focused in the vicinity of this well cluster. It is possible, although unlikely, that these boreholes are no longer leaking and that the methane gas detected is from a trapped gas source in the subsurface that was created prior to the plugging activities.

Methane is present at elevated concentrations in the soil beneath the Yoakum residence. Based on the elevated concentrations and distance from the NSBF#1 boreholes, it is possible that an additional conduit is present in close proximity to the trailer. It is unclear at this time whether the potential conduit could be another orphaned production well, unknown water well, or subsurface fractures.

Thermogenic methane gas at elevated concentrations has been detected in the water supply wells within the project area. The depths of these water supply wells range from approximately 150 feet to 300 feet bgs. Therefore, it is reasonable to assume that multiple horizons of methane gas seepage are present. It is believed that the NSBF #1 and/or associated "step-over" boreholes are the initial conduit to the Kf. Methane gas from the Kf migrates upward through the boreholes, but is also migrating laterally through different horizons depending on formation permeability and/or natural fracturing. It is also likely that low permeability formations enhance the lateral migration of the seeping gas.

Based on available information, it is likely that the methane gas is migrating in fractures from an unknown depth using the abandoned production wells as the initial conduit. It is not reasonable to assume that fractures are present in the area that create a conduit from the Kf to the ground surface covering a vertical distance of more than 2,200 feet. If such large fractures were present, it is unlikely that the methane seep area would be limited in extent to the area surrounding the NSBF #1 well. In addition, it is likely that methane concentrations would be more dilute than currently detected if the gas was traveling through a large complex system of fractures over a distance of more than 2,200 feet.

Based on the extent of methane seep activity and the elevated concentrations of methane detected, it is possible that additional deep wells exist in the project area, particularly in the area

of the Yoakum residence. If no additional wells exist and the only shallow conduit identified is fractures in the topographic plateau-forming sandstone, it is likely that methane gas from the known conduits is migrating beyond the well bore at a relatively shallow depth beneath the sandstone layer. Gas would then be able to migrate through fractures in this sandstone layer and be detected at high concentrations at the ground surface.

Based on the currently defined extent of methane seep activity, no additional structures are at risk from the accumulation of methane gas at hazardous concentrations, with the exception of the fire station building. The extent of gas seep activity appears to be confined to an elliptically-shaped area near the NSBF #1 well (Figure 8).

SECTION 6.0

RECOMMENDATIONS

Based on the results of the initial survey work, eight recommendations are presented to further address the Bondad Seep risk. The recommendations include immediate installation of methane monitoring systems in the nearby structures, mitigation of vapors in existing structures, conducting additional surveys and investigations, and synthesizing all data collected to identify a possible mitigation method. The recommendations are described below in order of importance.

6.1 VENTILATE POTENTIALLY HAZARDOUS ENVIRONMENT

Combustible gas vapors were identified within the fire station at levels approaching the LEL. LTE recommends that a ventilation system be installed in the residential portion of the building and that the existing ventilation system in the garage be used to vent methane gas accumulating within the building. At the request of the COGCC, this action is currently in progress and scheduled for implementation during the week of March 14, 2005.

6.2 METHANE DETECTION SYSTEMS

As an added safety precaution for those residents within close proximity to the seep area, LTE recommends the installation of a methane detection system within the houses. The system would use two sensors located within the residences and the fire station that monitor the concentration of methane in air continuously. The detection system would have several alarm levels to warn occupants that methane had accumulated to dangerous levels. The occupants could then evacuate a potentially hazardous environment and notify the appropriate authorities. At the request of the COGCC and in cooperation with the residents and Durango Fire Department, this action is currently in progress and scheduled for installation during the week of March 14, 2005.

6.3 CLEANUP DEBRIS

Currently, the debris from the Yoakum residence remains at the Site. LTE recommends that debris be removed from the Site and transported to a landfill for disposal. This will facilitate additional investigation of the source of methane gas beneath the Yoakum trailer.

6.3 GEOPHYSICAL SURVEYS

Upon completion of the reclamation activities at the Yoakum residence, LTE recommends that several geophysical surveys be performed. Through the use of magnetic and electromagnetic geophysical survey devices, it is possible to identify the presence of any buried former production wells or other potential vertical conduits, provided a metallic casing is present. If former production wells or water supply wells are present in the area, they may be acting as conduits from methane gas to migrate to the surface. The magnetic geophysical surveys can assist in identifying these potential conduits.

To better understand the shallow subsurface structure controlling the migration of methane gas within the seep area, LTE recommends the implementation of a seismic refraction survey in the

most active seep area. This geophysical survey can assist in the characterization of the subsurface structure including the thickness of the gravel deposit and potentially a characterization of subsurface structure in the sandstone layer.

6.4 INVESTIGATIVE EXCAVATION

LTE recommends limited investigative excavation of the gas vent beneath the Yoakum trailer. During the reclamation activities of the explosion debris, excavation equipment can easily conduct the removal of debris and be used to "pothole" in the area of the gas vent to determine if a conduit (former well) is present.

6.5 CONDUCT ADDITIONAL SOIL GAS SURVEY

In order to demonstrate that the methane seep area is not changing and as an added safety precaution for nearby residents, LTE recommends an additional soil gas survey of the seep area. The supplemental soil gas survey can be decreased in scope as compared to the initial survey since the seep area has been delineated. LTE recommends a grid sampling soil gas survey program covering the existing seep area with a small buffer zone to monitor changes in methane seep activity. It is anticipated that this survey will be conducted in mid-April, but the exact schedule is weather dependent.

6.6 CONDUCT SPRING SURVEY

During initial site visits, LTE noted a small spring on the Weston property beneath the sandstone unit that seeps water into the flood plain of the Animas River. LTE recommends a survey to identify additional springs along the Animas River valley and the Florida River valley in close proximity to the Site. LTE also recommends that water samples from the springs be collected and analyzed for water quality parameters, dissolved methane concentration, and stable isotopes. These data may assist in determining if an area of trapped methane gas is present beneath the sandstone layer.

6.7 IDENTIFY MITIGATION METHOD

Once the additional investigation and survey activities are completed, LTE recommends that the data are evaluated to determine if a mitigation method is plausible. For example, if additional conduits are identified, it may be possible to plug the conduits and reduce the methane seeps. Other mitigation efforts such as active venting of the seep area will also be evaluated at that time.

TABLES

TABLE 1

NAMING CLARIFICATION
BONDAD, COLORADO

Land Ownership	Physical Location	Mailing Address	Tenant Name	Other Aliases	Name Used for Report
Carl and Jeanne Weston	Western portion of Project Area (west of US Highway 550)	Unknown	Currently vacant, used by Weston on occasion	Carl Weston #1 - Old House #3475; Weston Residence	Weston
Two Square LLC	Explosion site, central portion of the Project Area (east of US Highway 550)	4043 US Highway 550	Yoakum	Two Square LLC; Holcomb; Yoakum; Yoakum Residence; Yoakum water well	Yoakum
Peggy A Grant	Southeastern portion of Project Area	4036 US Highway 550	Grant	Peggy Grant South Unit Modular; south unit; River Front Homes "South Unit"; south unit; south modular; Peggy Grant So. Unit; Grant Residence; Grant water well	Grant
Special Conservator of Anthony G Moore	Central portion of Project Area, north of Two Square LLC property	4038 US Highway 550	Budhue	Shannon Bennet Middle Unit Middle Modular; middle unit; middle modular; River Front Homes "Middle Unit"; 4038 Hwy 550 South Bondad; Commingled North and Middle Wells Before Chlorination; Budhue Residence; Bondad Tony Moore Middle Water Well	Budhue
Animas Fire Protection District	Northern portion of Project Area, east of US Highway 550, west of Shannon Investment Company property	4040 US Highway 550	Fire Station	Fire Station Bondad; Bondad Firestation - aerated sample	Fire Station
Shannon Investment Company	Northeast portion of Project Area	4042 US Highway 550	Bennet	Shannon Bennet "North Unit" 4042; north unit; "North Unit" #4042; Bondad North Unit; Commingled North and Middle Wells Before Chlorination; Bennet residence	Bennet
Carl and Jeanne Weston	Northwest and outside of Project Area (west of US Highway 550)	280 Aaron Drive	Weston	Carl Weston #2 - Mobile #3476;	Weston #2

TABLE 2

FIELD MEASUREMENTS OF METHANE, CO, H_2S, AND O_2
BONDAD, COLORADO

Date	Location	GPS Reading		Lumidor Measurements				
		Longitude	Latitude		Methane	CO	H_2S	O_2
2/15/2005	NSBF #1	-107.87289	37.05412	*Peak Rdgs*	315	497	0	15.8
				Avg Rdgs	66	121	0	19.5
2/15/2005	Gas Seep Hole Under Trailer (west side)	-107.87252	37.05372	*Peak Rdgs*	222	NR	0	20.0
				Avg Rdgs	60	NR	0	20.0
2/15/2005	Eastside of Trailer	-107.87244	37.05372	*Peak Rdgs*	24	NR	0	19.5
				Avg Rdgs	11	NR	0	20.0
2/15/2005	Yoakum water well	-107.87205	37.05379	*Peak Rdgs*	40	NR	0	20.0
				Avg Rdgs	22	NR	0	20.0

Notes:

Samples collected by Four Corners Geoscience, Inc.

GPS = global positioning system

CO = carbon monoxide

H_2S = hydrogen sulfide

O_2 = oxygen

Rdgs = readings

Avg = average

NR = no reading

TABLE 3

WATER SAMPLE ANALYTICAL RESULTS
BONDAD, COLORADO

Sample Date	Sample Name	SWL	Permit#	Gallons Pumped	pH* SU	EC* uS/cm	TDS* mg/L	Temp* (C)	H_2S* mg/L	Methane mg/L	Alkalinity mg/L	Bicarbonate mg/L	Carbonate mg/L	Hydroxide mg/L	Calcium mg/L
2/28/2005	Weston #2 Water Well	44	142751	60	8.1	940	588	10.2	<0.1	1.42	220	220	<10	<10	16.3
2/28/2005	Weston Water Well	46	33593	160	7.37	1070	669	12	0.1 to 0.3	2.17	400	400	<10	<10	103
3/1/2005	Fire Station Water Well	No record	47716	166	7.58	1000	625	14	0.1 to 0.3	12.44	610	610	<10	<10	67.5
3/1/2005	Grant Water Well	35	231383	30	6.03	70	44	10.2	<0.1	2.89	13	13	<10	<10	<0.5
3/1/2005	Commingle Bennet and Budhue Water Wells	40/35	231376/231382	40	7.25	3000	1875	12	0.5	13.68	490	490	<10	<10	169
3/1/2005	Budhue Water Well	35	231376	16.5	5.95	70	44	16.2	<0.1	4.69	NA	NA	NA	NA	NA

Sample Date	Sample Name	Chloride mg/L	Conductivity uS/cm	Fluoride mg/L	Fe mg/L	Mg mg/L	Mn mg/L	Nitrate/Nitrite mg/L	pH SU	Potassium mg/L	Selenium mg/L	Sodium mg/L	Sulfate mg/L	TDS mg/L	Hardness mg/L	CAB %
2/28/2005	Weston #2 Water Well	24	970	0.5	<0.05	0.8	0.03203	<0.02	7.97	0.7	<0.001	220	255	535	44	4.23
2/28/2005	Weston Water Well	82	1080	0.7	0.45	33.3	0.93439	<0.02	7.19	1.9	0.004	113	84	505	394	9.51
3/1/2005	Fire Station Water Well	26	1020	0.3	0.11	6.3	0.32794		7.65	1.9	0.003	196	13	595	194	6.21
3/1/2005	Grant Water Well	16	71	<0.2	<0.05	<0.5	<0.005		6	<0.5	<0.001	14.9	<10	15	<10	1.24
3/1/2005	Commingle Bennet and Budhue Water Wells	620	2870	1	0.3	12.7	0.7996		7.32	2.1	0.008	438	70	1540	474	2.86
3/1/2005	Budhue Water Well	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Notes:

Samples collected by Four Corners Geoscience
* = field measured
SWL = static water level
EC = electrical conductivity
TDS = total dissolved solids
C = celsius
H_2S = hydrogen sulfide
mg/L = milligrams per liter
Fe = iron
Mg = magnesium
Mn = manganese
CAB = cation/anion balance

TABLE 4

GAS SAMPLE ANALYTICAL RESULTS
BONDAD, COLORADO

Isotech Lab No.	Sample Date	Sample Name	Ar %	O_2 %	CO_2 %	N_2 %	CO %	C_1 %	C_2 %	C_2H_4 %	C_3 %	iC_4 %	nC_4 %	iC_5 %	nC_5 %	C_6+ %	$d^{13}CO_2$ ‰	$d^{13}C_1$ ‰	dDC_1 ‰	H_2S %	Specific Gravity	BTU	Helium dilution factor *
78855	2/15/2005	Yoakum Water Well	0.902	20	0.18	75.77	0	3.14	0.0069	0	0	0	0	0	0	0	NM	NM	NM	0	0.986	32	NA
78773	2/15/2005	hole under trailer @ axle- west side	0.0188	0.375	5.99	1.51	0	91.92	0.164	0	0.0149	0.0024	0.0020	0	0	0.002	16.57	-43.15	-196.1	NM	0.621	936	NA
79627	2/24/2005	OGCC0501-a	0.089	1.9	5.36	7.40	0	85.08	0.153	0	0.0135	0.0021	0.0023	0	0	0	NM	-43.76	-198.1	NM	0.648	866	NA
79628	2/24/2005	OGCC0501-b	0.831	18.47	0.88	66.76	0	13.03	0.0232	0	0.0019	0	0	0	0	0	NM	-44.73	-199.9	NM	0.947	132	NA
79629	2/24/2005	OGCC0501-c	0.785	17.31	1.09	64.29	0	16.49	0.0285	0	0.0024	0	0	0	0	0	NM	-44.82	-200.2	NM	0.932	168	NA
79634	2/28/2005	Weston #2 Water Well	1.46	3.20	0.76	84.46	0	10.08	0.0267	0	0.0120	0	0	0	0	0	NM	-34.54	-119.1	NM	0.94	103	0.76
79635	2/28/2005	Weston Residence Water Well	1.14	3.92	8.00	76.07	0	10.84	0.026	0	0	0	0	0	0	0.007	NM	-44.3	-167.5	NM	0.977	111	0.74
79636	2/28/2005	Firestation Water Well	0.342	3.06	4.33	15.87	0	76.21	0.184	0	0.0088	0	0	0	0	0	NM	-43.06	-189.9	NM	0.682	776	0.64
79637	2/28/2005	Commingled Budhue and Bennet Wells	0.381	6.36	5.84	15.54	0	71.64	0.226	0	0.0120	0	0	0	0	0	NM	-42.67	-194.4	NM	0.714	730	0.69

Notes:

All samples except OGCC0501-a, OGCC0501-b, and OGCC0501-c were collected by Four Corners Geoscience

Sample OGCC0501-a, OGCC0501-b, and OGCC0501-c were collected by LT Environmental, Inc.

Chemical analysis based on standards accurate to within 2%

* Analysis is of gas extracted from water by headspace equilibration. Analysis has been corrected for helium added to create headspace.

Ar = argon

O_2 = oxygen

CO_2 = carbon dioxide

N_2 = nitrogen

CO = carbon monoxide

C_1 = methane

C_2 = ethane

C_2H_4 = ethylene

C_3 = propane

iC_4 = i-butane

nC_4 = n-butane

iC_5 = i-pentane

nC_5 = n-pentane

C_6 = hexane

$d^{13}CO_2$ = isotopic carbon of carbon dioxide

$d^{13}C_1$ = isotopic carbon of methane

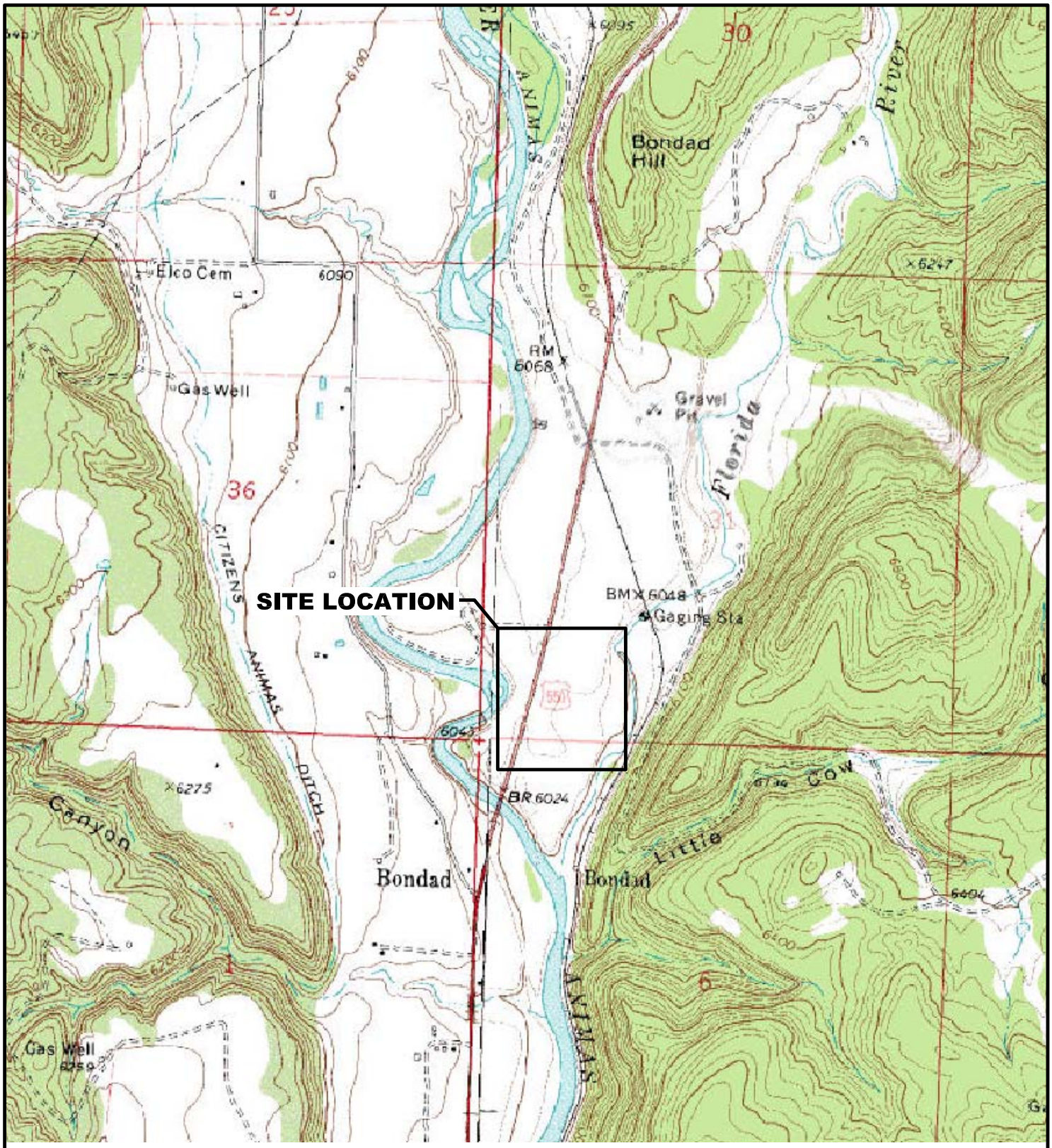
dDC_1 = isotopic hydrogen of methane

H_2S = hydrogen sulfide

BTU = british thermal units

NM = not measured

FIGURES



LEGEND

SITE LOCATION
SEC 31,T33N,R9W

COLORADO
SITE

0 375 750 1500
FEET

SOURCE: TOPOZONE.COM
USGS 7.5' QUADRANGLE
BONDAD HILL, CO 1968
(NAD27)

FIGURE 1
SITE LOCATION MAP
BONDAD GAS SEEP
BONDAD, CO
COLORADO OIL AND GAS CONSERVATION COMMISSION

LTE

OGCC050101_SL 3/05

LEGEND

- Water Supply Well
- Gas Well
- Potential Former Oil and Gas Well
- Former Oil and Gas Well
- Yoakum Residence

Utilities

- Buried Gas Service Line
- Buried Gas Pipeline
- Buried Electric Service Line
- Buried Electric Line

Landowner and Property Boundaries Labeled in White

N

0 400

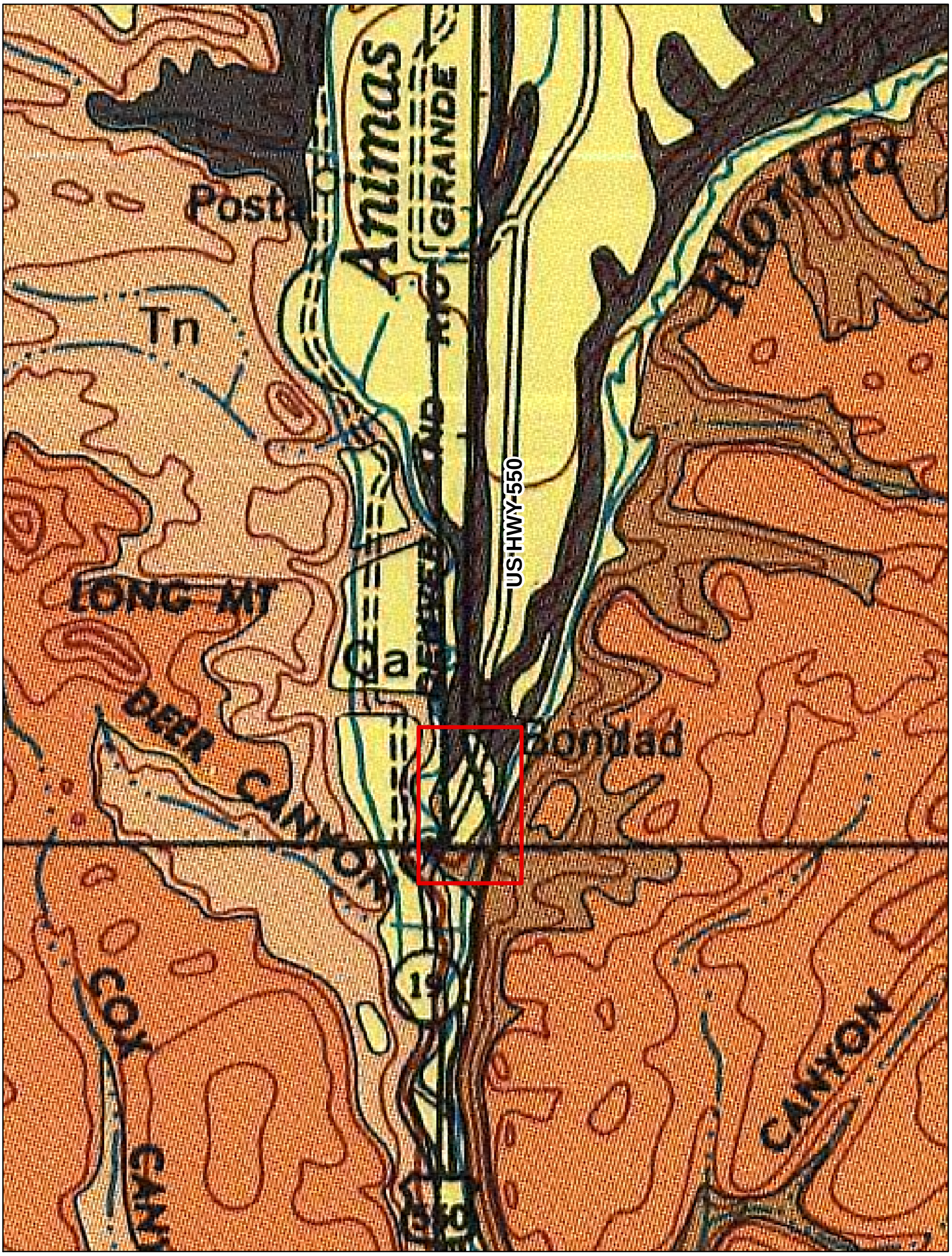
Feet

1 INCH = 200 FEET

FIGURE 2
SITE MAP
BONDAD GAS SEEP
BONDAD, CO

COLORADO OIL AND GAS CONSERVATION COMMISSION

OGCC050102 03/05



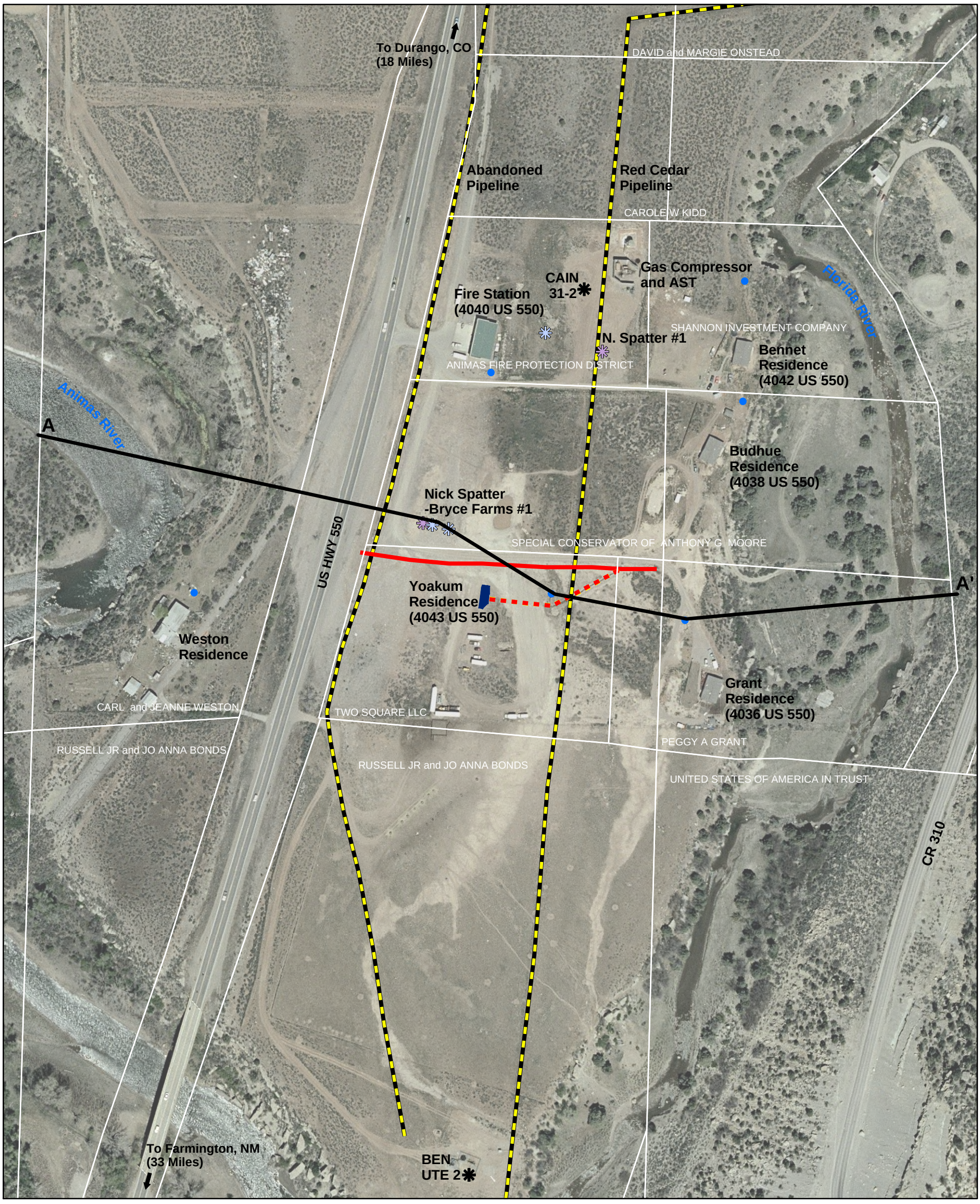
LEGEND

- Site Location
- Qa — Quaternary Alluvium
- Tsbt — San Jose, Blanco Basin, and Telluride Conglomerate Formations
- Tn — Nacimiento Formation
- Tka — Animas Formation
- Tkna — Nacimiento and Animas Formations

FIGURE 3
GEOLOGIC MAP
BONDAD GAS SEEP
BONDAD, CO

COLORADO OIL AND GAS CONSERVATION COMMISSION

OGCC050103 03/05



LEGEND

- Water Supply Well
- Gas Well
- Potential Former Oil and Gas Well
- Former Oil and Gas Well
- Yoakum Residence

Utilities

- Buried Gas Service Line
- Buried Gas Pipeline
- Buried Electric Service Line
- Buried Electric Line
- A—A' Geologic Cross-Section Line
- Landowner and Property Boundaries Labeled in White

N

0 400

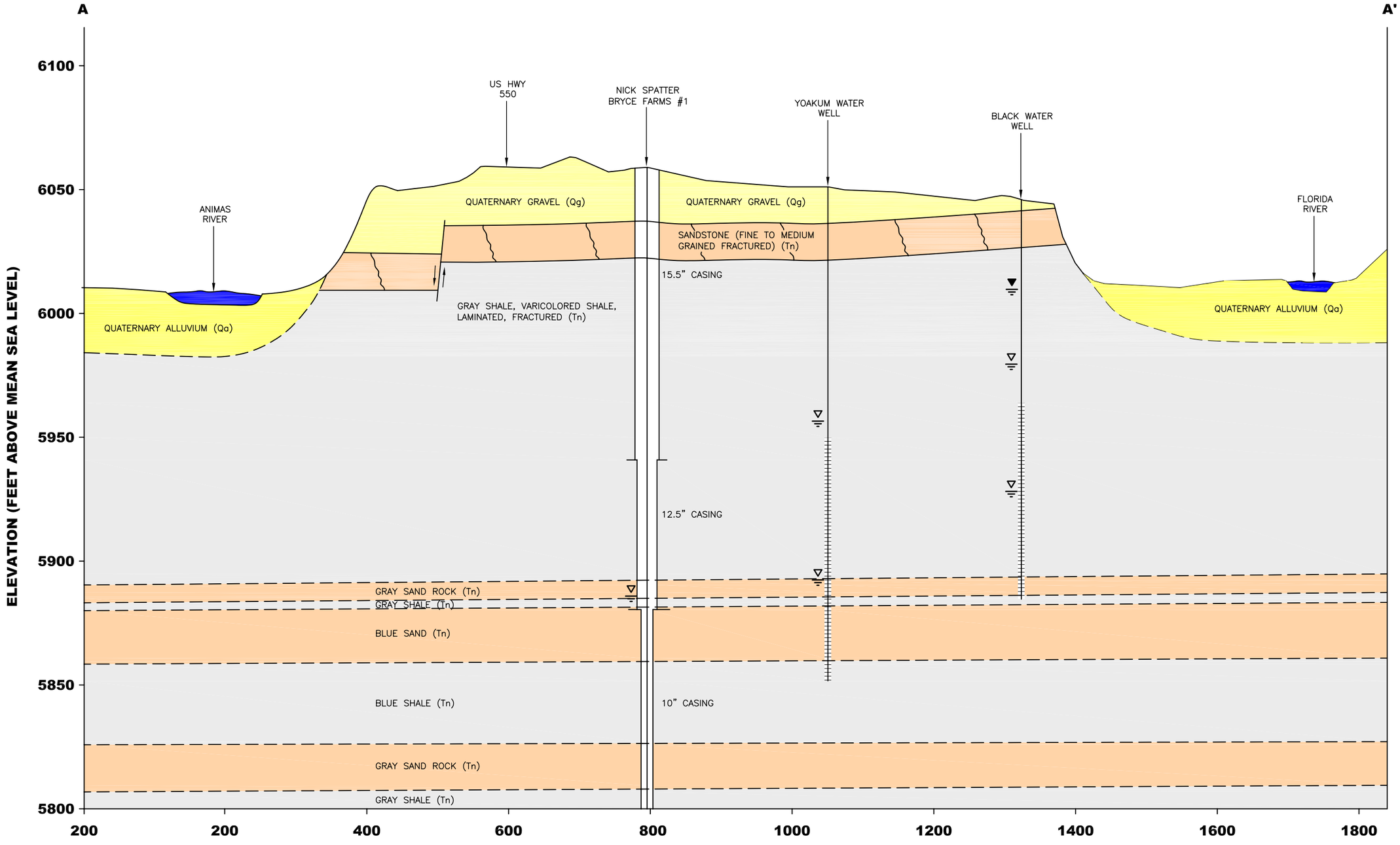
Feet

1 INCH = 200 FEET

FIGURE 4
GEOLOGIC CROSS - SECTION A - A'
LOCATION MAP
BONDAD GAS SEEP
BONDAD, CO

COLORADO OIL AND GAS CONSERVATION COMMISSION

OGCC050104 03/05



LEGEND

- STATIC H_2O LEVEL
- OBSERVED H_2O DURING DRILLING
- SCREENED INTERVAL

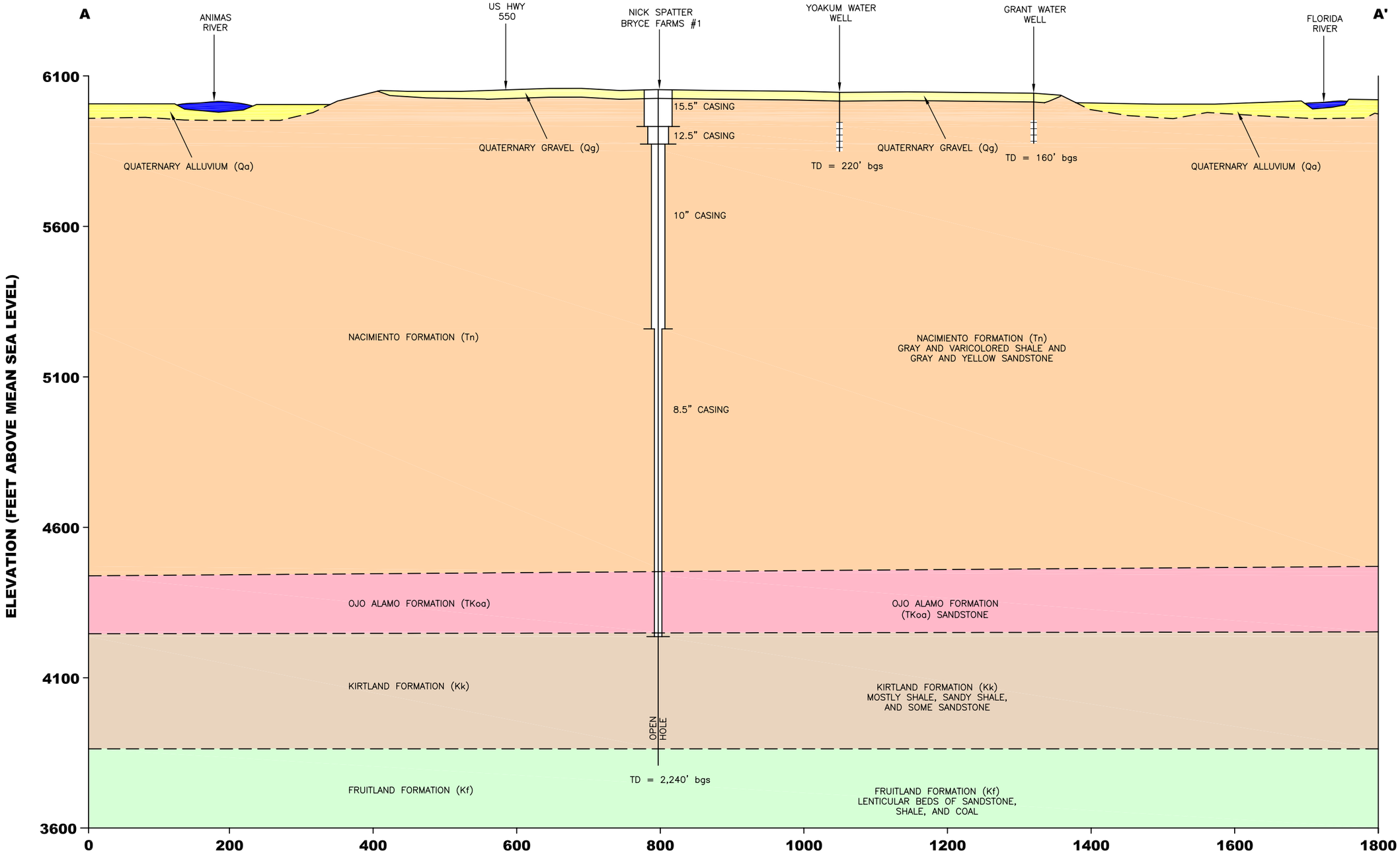
- Qa — QUATERNARY ALLUVIUM
- Qg — QUATERNARY GRAVEL
- Tn — NACIMIENTO FORMATION

GEOLOGIC DESCRIPTIONS DERIVED FROM FIELD OBSERVATIONS AND HISTORIC WELL LOG INFORMATION

FIGURE 5
GEOLOGIC CROSS SECTION A–A'
NEAR SURFACE GEOLOGY
BONDAD GAS SEEP
BONDAD, CO
COLORADO OIL AND GAS CONSERVATION COMMISSION

LTE

OGCC050102 3/05



LEGEND

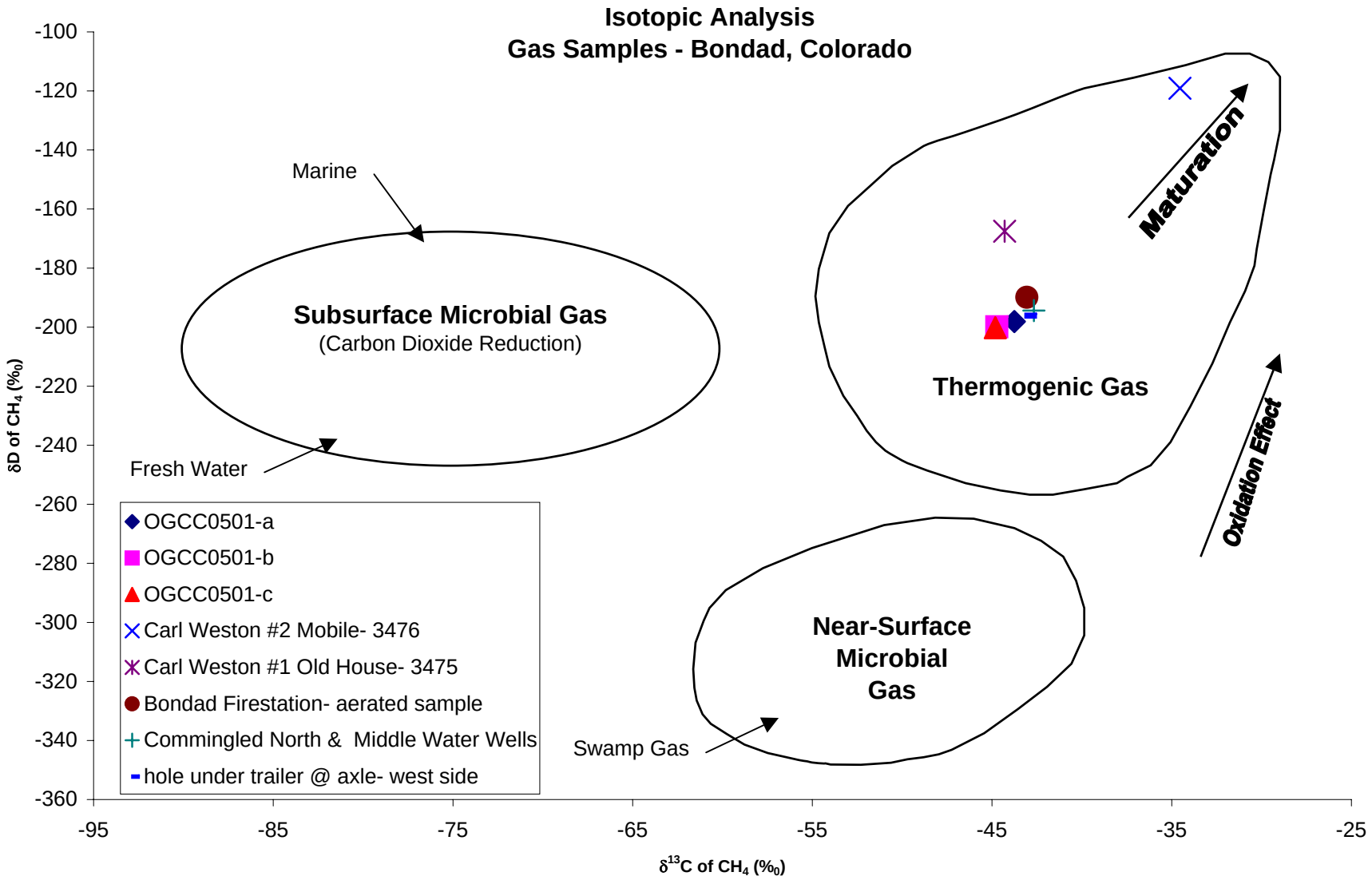
Qa	QUATERNARY ALLUVIUM	Kk	KIRTLAND FORMATION
Qg	QUATERNARY GRAVEL	Kf	FRUITLAND FORMATION
Tn	NACIMIENTO FORMATION		SCREENED INTERVAL
TKoa	OJO ALAMO FORMATION		

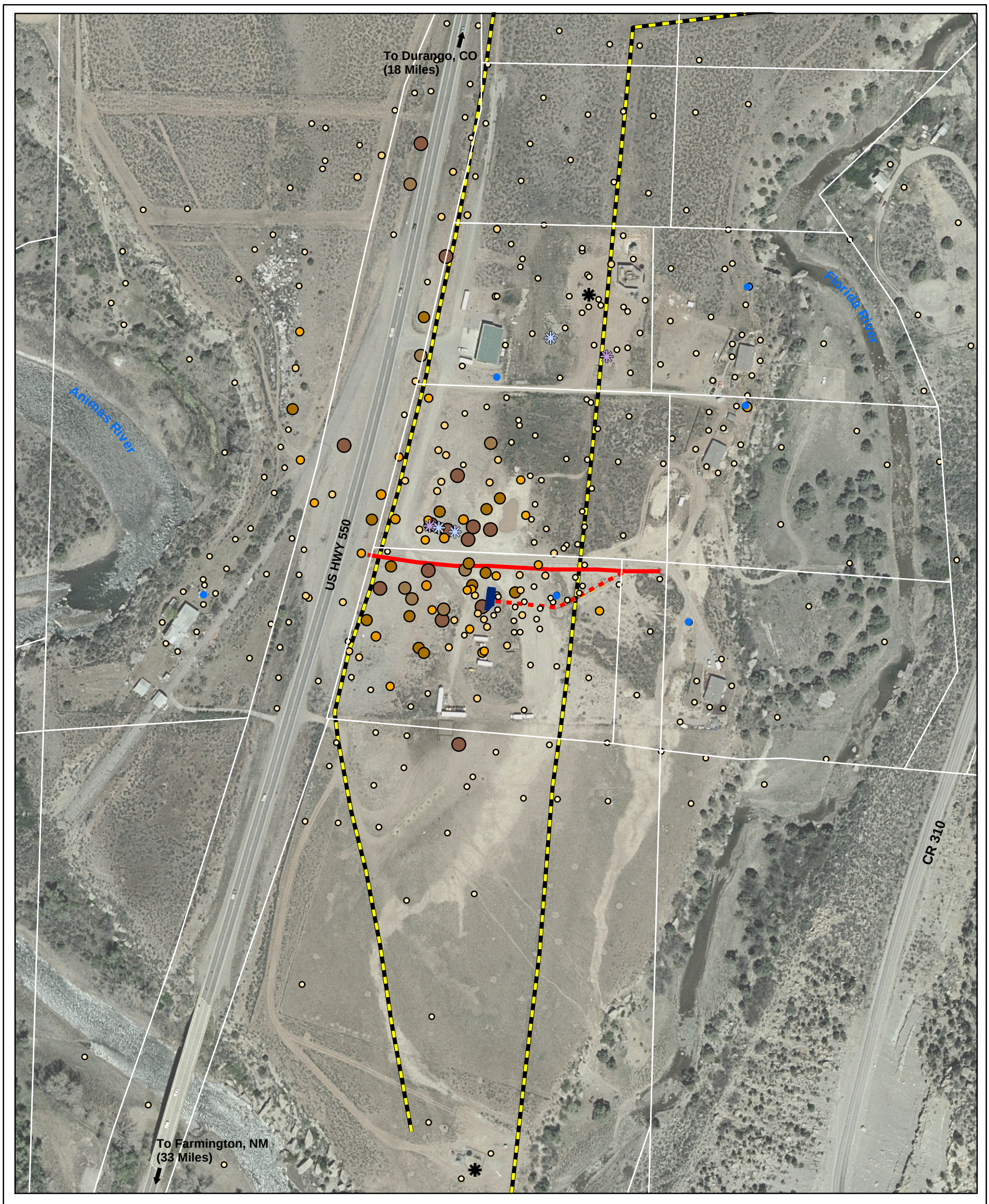
FIGURE 6
GEOLOGIC CROSS SECTION A–A'
SUBSURFACE GEOLOGY
BONDAD GAS SEEP
BONDAD, CO
COLORADO OIL AND GAS CONSERVATION COMMISSION

LTE

OGCC050101 3/05

FIGURE 7


Isotopic Analysis
Gas Samples - Bondad, Colorado
-100
-120
-140
-160
-180
-200
-220
-240
-260
-280
-300
-320
-340
-360
δD of CH4 (‰)
-95
-85
-75
-65
-55
-45
-35
-25
δ13C of CH4 (‰)
Marine
Subsurface Microbial Gas
(Carbon Dioxide Reduction)
Fresh Water
Maturation
Thermogenic Gas
Oxidation Effect
Near-Surface
Microbial
Gas
Swamp Gas
OGCC0501-a
OGCC0501-b
OGCC0501-c
Carl Weston #2 Mobile- 3476
Carl Weston #1 Old House- 3475
Bondad Firestation- aerated sample
Commingled North & Middle Water Wells
hole under trailer @ axle- west side



LEGEND

- Water Supply Well
- Gas Well
- Potential Former Oil and Gas Well
- Former Oil and Gas Well
- Yoakum Residence

Utilities

- Buried Gas Service Line
- Buried Gas Pipeline
- Buried Electric Service Line
- Buried Electric Line

Landowner and Property Boundaries Labeled in White

Subsurface Methane Gas

- 0 - 25 ppm
- 25 ppm - 5%
- 5% - 15%
- 15% - 25%
- 25% - 50%
- 50% - 75%
- 75% - 100%

N

0 400

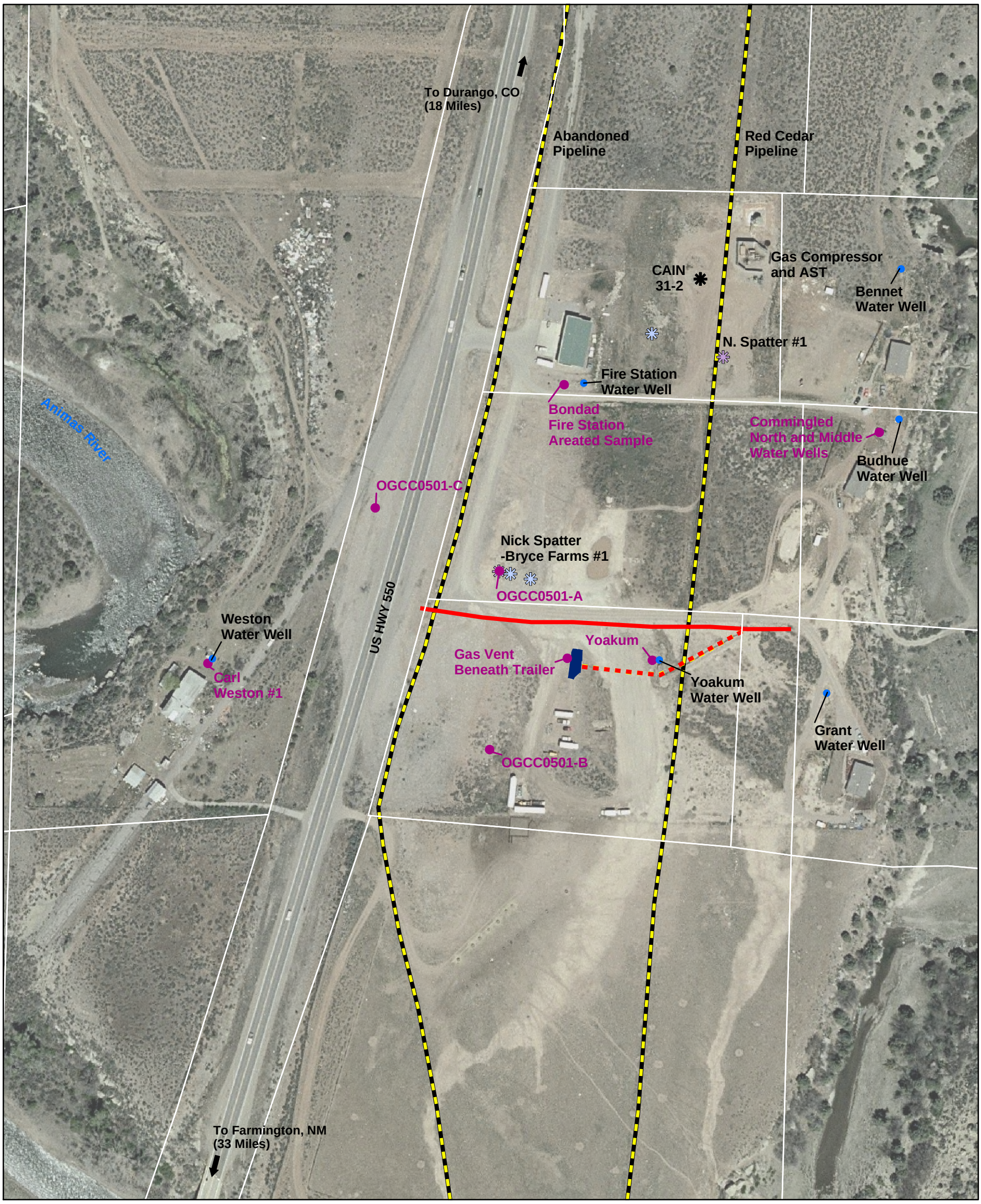
Feet

1 INCH = 200 FEET

FIGURE 8
SUBSURFACE METHANE MEASUREMENTS
BONDAD GAS SEEP
BONDAD, CO

COLORADO OIL AND GAS CONSERVATION COMMISSION

OGCC050108 03/05



LEGEND

- Water Supply Well
- Gas Sample Location
- Gas Well
- Potential Former Oil and Gas Well
- Former Oil and Gas Well
- Yoakum Residence

Utilities

- Buried Gas Service Line
- Buried Gas Pipeline
- Buried Electric Service Line
- Buried Electric Line

Landowner and Property Boundaries Labeled in White

N

0 380

Feet

1 INCH = 160 FEET

FIGURE 9
GAS SAMPLE LOCATIONS
BONDAD GAS SEEP
BONDAD, CO

COLORADO OIL AND GAS CONSERVATION COMMISSION

OGCC050109 03/05

APPENDIX A

INITIAL WATER WELL SAMPLING ANALYTICAL REPORTS - 2001 AND 2002

FOUR CORNERS GEOSCIENCE

Please deliver immediately

FACSIMILE TRANSMITTAL SHEET

TO: Debbie Baldwin
FROM: Lynn M. Fechter
COMPANY: COGCC
DATE: 2/28/05
FAX NUMBER: 303 894 2109
TOTAL NO. OF PAGES INCLUDING COVER: 18
PHONE NUMBER: (( )) 2100 x111
SENDER'S REFERENCE NUMBER: 970-247-5046*51
RE: BONDAD - 3 Modulars - Water Tests
YOUR REFERENCE NUMBER:

☐ URGENT ☐ FOR REVIEW ☐ PLEASE COMMENT ☐ PLEASE REPLY ☐ PLEASE RECYCLE

NOTES/COMMENTS:

3 Modulars EAST of Holcomb Trailer
Designated as

1.) Shannon Bennet "North Unit" 4042
   a.) RONTATE Consult - CH_4 only
   b.) Petroguf - Chems, CH_4 Isotope
2.) Shannon Bennet - Middle Unit - Middle Modular
   a.) CH_4, Chem's - by Bennet (Fa Sale of Site)
3.) Shannon Bennet - South 4036 "South Unit
   CH_4 & Field - No Chems.

- Petroguf conducted tests on ONLY "NORTH UNIT" due to prox. to CAIN 31-2

- Other tests by Bennet - For Sale of Modulars. Referred to Water Treatment Specialists. at time of tests.

ALL other Data Released by FCGeo fa BONDAD INVESTIGATION. Properties (South and Middle SOLD; new owners.

Feb 28 05 10:19a Lynn Fechter F C Geo 9702559514 p.1

03/08/2005 16:20 3038942109 COGCC PAGE 02/19

Four Corners Geoscience

28 Trilobite Trail
Oxford, CO

54 Wassinger Drive
Bayfield, CO 81122

Mailing Address: P.O. Box 4224 • Durango, CO 81302
(970) 247-5046

Lab Number

Report Due Date:

Fax Results Y N | Page of

Client

Address

City, State & Zip

Contact

Phone

Fax

P.O. Number

Collector's Name

Project Name

Project Number

PUBLIC WATER SUPPLY INFORMATION

System Name

PWS No. | Report to State/EPA Y N

POE No. | DWR No.

Collection Point

City | County

SAMPLE TYPE CODES

DW = drinking water
WW = waste water
MW = monitoring well
HW = hazardous waste
TB = travel blank
SD = solid
SO = soil
SL = sludge

Compliance Monitoring Y N

TURNAROUND TIME REQUESTED

Standard
RUSH
Special

Lab Manager Approval

CLIENT'S SAMPLE ID/LOCATION	Date	Time	Sample Type	Containers	Analyses Requested	Spl. No.

Instructions/Comments/Special Requirements:

SAMPLE RECEIPT	Date	Time	Samples Relinquished By	Samples Received By
Received Cold Y N				
Custody Seals Y N				
Seals Intact Y N				
No. of Containers				

Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

To the maximum extent permitted by law, the Client agrees to limit the liability of Four Corners Geoscience for the Client's damages to the total compensation received unless other arrangements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted.

Bennet Residence Water Well

Four Corners Geoscience P.O. Box 4224 Durango,CO 81302 (970)247-5046
Dissolved Methane Analysis

DATE
2/4/02

FCG#
020402-1

Client Name
Bondad North Unit

NAME
Shannon Bennett

MAILINGADD
C/O Ron Tate Water Solutions Bayfield CO 81122

TELEPHONE_
970-884-2336

Methane Result mg/L	CH4_MG_L	Detection Limit 0.02 mg/L
	21.36 mg/L	

COMMENTS
Please note: Please refer to previous methane analysis for this water well on on 12/4/2001.At that time this the water was dark brown turbid with some sediment. The water was effervescent

Dr. Joe Bowden instructed Shannnon to "pump" the well to clean it up. Afet collecting and running the methane analysis Lynn told Shanno that another methane analysis should be run after the well was pumped and that the methane result could be higher than the analysis on 12/4/01. Result on 12/4/-1 16.76 mg/L

Sample collected by Dr. Ron Tate at 1100 hours on 2/4/2002 and delivered to Four Corners Geoscience on 2/4/2002 at 1545 hrs.Methane analysis run less than 24 hours from collection

Headpsace Gas Analysis for Dissolved Gases per EPA Method # SW3810, Kampbell, et al,1989 and 1998 and USGS, BLM, San Juan Resource Area La Plata County Colorado
Four Corners Geoscience is not liable for interpretation of methane analysis or data results. Please contact professional water treatment specialist for recommendations and interpretations.

Bennet Residence Water Well

Shannon Investments
Groundwater Monitoring
Water Well Field Data Results

Shannon Bennett "North Unit" 4042 | 2/19/2002 | no | 021902-1 | 231382

4042 Highway 550 Durango,CO 81303 | Petrrogulf will send

Water Well Location and Permit Information | 240 | Feet | 40 | 900S1200W

-107.87077 | 37.05549 | Garmin GPS Decimal Degrees

SESW | 31 | 33 | North | 9 | West

Cain #31-2 Land Spatter | PetrogulfCain #31-2 (SpatterP&A)

Field Chemistries | ACCULAB | PETRGULF2/19/02

7.56	3600	2375	11.5	Celsius

Methane Result in mg/L | 20.27 mg/L | Detection Limit 0.0004 mg/L

Hydrogen sulfide(HACH Test Kit Field) | >2<5.0 mg/L | Detection Limit 0.1 mg/L

San Juan Basin Health-State of Colorado Health Dept Test | NO TEST

Pretreatment sample taken off faucet at base of PressTank per Tate.StrongH2S odor,White suspended particles.Clear-Sl.Cloudy Some effervescence,ISOTOPE

Four Corners Geoscience conducted onsite field chemistries, observation of physical characteristics of water while pumping system to receive a fresh aquifer sample. Water samples were collected and delivered to EPA quality assured lab for analysis. Water samples for bacterial analysis were collected and delivered to San Juan Basin Health in Durango, CO.Samples for headspace gas analysis were taken to FCG lab per USGS standard and methods for these analysis. Four Corners Geoscience is not liable for the results of these analysis and recommends referral to specialists in the field or water treatment. All methods are conducted in accordance with the requirements for this groundwater monitoring program in La Plata Colorado per colorado Oil and Gas Conservation Commission Order # 112-156 and 112-157 established in July 2000.

F8733 Rev. C

Acculabs Inc.

[ ] 1046 Olive Drive Davis CA 95616 — 530-757-0920 Fax 753-6091
[ ] 175 Suttle St. Durango CO 81301 — 970-247-4220 Fax 247-4227
[ ] 4663 Table Mountain Dr. Golden CO 80403 — 303-277-9514 Fax 277-9512
[ ] 992 Spice Islands Dr. Sparks NV 89431 — 775-355-0202 Fax 355-0817

Lab Number: 7-202-037-01
Report Due Date:

Client: PETROGULF Corp
Address: 518-17th Street Ste 1455
City, State & Zip: Denver CO 80203
Contact: Bruce Pattenson
Phone: 303-893-5400
Collector's Name: Lynn
Fax:
Project Name: Shannon Bennet
P.O. Number:
Project Number: Spather Proj

Fax Results Y N
Page of

PUBLIC WATER SUPPLY INFORMATION
System Name:
PWS No.: Report to State/EPA Y N
POE No.: DWR No.:
Collection Point:
City: County:

SAMPLE TYPE CODES

DW = drinking water; TB = travel blank
WW = waste water; SD = solid
MW = monitoring well; SO = soil
HW = hazardous waste; SL = sludge

Compliance Monitoring Y N

TURNAROUND TIME REQUESTED

Standard
RUSH
Special

Lab Manager Approval

CLIENT'S SAMPLE ID/LOCATION	Date	Time	Sample Type	Containers	Analyses Requested: Pb, Cl, NO3	Spl. No.
Shannon Bennet "North UNIT" #4042 FC# 021902-1	2/19/02	1545	DW	3	✓ ✓ ✓	01

Instructions/Comments/Special Requirements:

SAMPLE RECEIPT	Date	Time	Samples Relinquished By	Samples Received By
Cold	2/19/02		Lynn Fechter	Debbie Zufelt

Acculabs, Inc.'s Standard Terms and Conditions apply unless written agreements specify otherwise. Payment terms are Net 30.

To the maximum extent permitted by law, the Client agrees to limit the liability of Acculabs, Inc. for the Client's damages to the total compensation received unless other arrangements are made in writing. This limitation shall apply regardless of the cause of action or legal theory pled or asserted.

301.2E

BENNET RESIDENCE WATER WELL

ACCULABS, INC.

Acculabs I.D.: 7-202-037-01
Date Received: 02/19/02
Date Reported: 03/11/02
QC Batches:

Petrogulf Corp
518 17th Street, Ste #1455
Denver, CO 80203
Attention: Bruce Patterson

PROJECT NAME: Shannon Bennet
PROJECT NUMBER: Spatter Project
SAMPLE I.D.: "North Unit" #4042

Sample Date: 02/19/02
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	DATE ANALYZED	ANALYST
Alkalinity, Total	2320B	10	242	1	mg/L		
Alkalinity, Bicarbonate	2320B	10	238	1	mg/L		
Alkalinity, Carbonate	2320B	10	<10	1	mg/L		
Alkalinity, Hydroxide	2320B	10	<10	1	mg/L		
Calcium	200.7	0.5	180	1	mg/L		
Chloride	4500CL	10	1300	1	mg/L		
Conductivity	120.1	1.0	4250	1	uS/cm		
Fluoride	4500F C	0.2	1.4	1	mg/L		
Iron	200.7	0.05	0.33	1	mg/L		
Magnesium	200.7	0.5	1.5	1	mg/L		
Nitrate/Nitrite as N	353.2	0.05	<0.05	1	mg/L		
pH	150.1	NA	7.74	NA	SU		
Potassium	200.7	0.5	1.8	1	mg/L		
Selenium	200.9	0.005	<0.005	1	mg/L		
Sodium	200.7	0.5	610	1	mg/L		
Sulfate	4500SO4	10	12	1	mg/L		
TDS	160.1	10	2530	1	mg/L		
Hardness	Calc	14	456	1	mg/L		
CAB	Calc		6.95		%		

John Green, Laboratory Manager

317-398-[illegible] Fax [illegible]

ISOTECH
1308 Parkland Court
Champaign IL 61821

Analysis Requested by Call Bruce for info
Name Bruce Patterson
Company PetroGulf Corp
Address 518 17th Street Ste 1455
Denver Co 80202
Fax 303-893-0519
Tele: 303-893-5400 x 29

Project Shannon Bennett "North Unit"
Location SW4 Sec 3 T33N R9W
La Plata Cty, CO
Sampled by Lynn 4C Geo
Email to Lynn

Sample Description

Cylinder Number	Source or Description of Sample	Date Sampled	NG-1 Analysis	NG-2 Analysis	NG-3 Analysis	BG-1 Analysis	BG-2 Analysis	BG-3 Analysis	SIW analysis	RAG Analysis	TAG Analysis	Comments
104.	Shannon Bennett "North Unit 4042"	2/ /02				X						1445 hrs.
	Create Headspace - Unable to set up on collection due to Pretreatment valve system. Field CH4 & some IL w/ H_2S — Called to ask Dennis in Kupferle											

Chain of Custody Record

	Signature	Company	Date	Time
Relinquished by	Lynn McFatridge	Four Corners Geo for Petrogulf Fed Ex	2/21/02	1600
Received by				
Relinquished by				
Received by				
Relinquished by				
Received by				

BENNET RESIDENCE WATER WELL

Isotech

Isotech Lab No.	Sample Name	Field Name	He %	H_2 %	Ar %	O_2 %	CO_2 %	N_2 %	CO %	C_1 %	C_2 %	C_2H_4 %	C_3 %	iC_4 %
39633	Shannon Bennett North Unit 4042	Shannon Bennett North Unit	0	0	0.33	2.62	1.19	16.91	0	78.46	0.48	0	0.0057	0

pg 1 Isotope

Petrogulf has original 2/19/02

[illegible] 20[illegible]

Isotope – North Moral [illegible]
Bennett [illegible]

BENNET WATER WELL (cont)

nC_4 %	iC_5 %	nC_5 %	C_6+ %	$\delta^{13}C_1$ per mil	δDC_1 per mil	Comments
0	0	0	0	-43.46	-150.8	Headspace created by adding helium. Dilution factor of 0.57.

pg 2 of 4 pages

Budhue Residence Water Well
Middle Unit = Middle Modular

Groundwater Monitoring
Water Well Field Data Results

Shannon Investment Company — NAME
8/29/2001 — DATE
no — BLM_
082901-5 — FCG_
UNK — Permit#_

Highway 550 Durango CO 81303 — AddressWaterWell
511 CR 220 Durango, CO 81303 — MAILINGADD
970-259-3139 — TELEPHONE_

Water Well Location and Permit Information
160 — WELLDEPTH
Feet
35 — STATICWATE
FTG

Garmin GPS Decimal Degrees
LONG
LATITUDE

QTRQTR
SECTION
TOWNSHP
North
RANGE
West

River Front Homes "MiddleUnit" — NUMBER
Petrogulf Splatter — LocationGasWell

Field Chemistries

7.57	980	613	15	Celsius
PH_FIELD	COND_FIELD	TDS_CALC	H2O_TEMP	

Water samples were collected and delivered to Acculab Laboratory by Four Corner Geoscience visit. Results will be mailed to you upon completion of analysis.Contact water treatment specialist for interpretation

Methane Result in mg/L
6.77 mg/L — CH4_MG_L
Detection Limit 0.0004 mg/L

Hydrogen sulfide(HACH Test Kit Field)
>5.0 mg/L — H_2_S_MG_L
Detection Limit 0.1 mg/L

San Juan Basin Health-State of Colorado Health Dept Test
By owner — BACTERIA_E

Kithchen sink pH 7.45 Cond 1900TDS 1187cholox smell dark yellow colorPos FE&SO4Water in Bathtub grey,black particulates in bottom

COMMENTS

Four Corners Geoscience conducted onsite field chemistries, observation of physical characteristics of water while pumping system to receive a fresh aquifer sample. Water samples were collected and delivered to EPA quality assured lab for analysis. Water samples for bacterial analysis were collected and delivered to San Juan Basin Health in Durango, CO.Samples for headspace gas analysis were taken to FCG lab per USGS standard and methods for these analysis. Four Corners Geoscience is not liable for the results of these analysis and recommends referral to specialists in the field or water treatment. All methods are conducted in accordance with the requirements for this groundwater monitoring program in La Plata Colorado per colorado Oil and Gas Conservation Commission Order # 112-156 and 112-157 established in July 2000.

ACCULABS, INC.

Budhwa Residence Water Well

Middle Mint

Acculabs I.D.: 7-108-111-01
Date Received: 08/30/01
Date Reported: 09/26/01
QC Batches:

Shannon Investment Co.
511 CR 220
Durango, CO 81303
Attention: 0

PROJECT NAME: Bondad Acres
PROJECT NUMBER: 0
SAMPLE I.D.: 4038 Hwy 550 South Bondad

Sample Date: 08/30/01
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	DATE ANALYZED	ANALYST
Alkalinity, Total	2320B	10	418	1	mg/L		
Alkalinity, Bicarbonate	2320B	10	418	1	mg/L		
Alkalinity, Carbonate	2320B	10	<10	1	mg/L		
Alkalinity, Hydroxide	2320B	10	<10	1	mg/L		
Calcium	200.7	0.5	31.3	1	mg/L		
Chloride	4500CL	10	148	1	mg/L		
Conductivity	120.1	1.0	1210	1	uS/cm		
Fluoride	4500F C	0.2	0.6	1	mg/L		
Iron	200.7	0.05	0.05	1	mg/L		
Magnesium	200.7	0.5	1.8	1	mg/L		
Nitrate/Nitrite as N	353.2	0.05	<0.05	1	mg/L		
pH	150.1	NA	7.81	NA	SU		
Potassium	200.7	0.5	0.8	1	mg/L		
Selenium	3114B	0.001	<0.001	1	mg/L		
Sodium	200.7	0.5	210	1	mg/L		
Sulfate	4500SO4	10	34	1	mg/L		
TDS	160.1	10	715	1	mg/L		
Hardness	Calc	14	85	1	mg/L		

John Green, Laboratory Manager

GRANT RESIDENCE WATER WELL

Shannon Investments
Groundwater Monitoring
Water Well Field Data Results

Shannon Investment Company-South4036 — NAME
12/4/2001 — DATE
no — BLM_
120401-1 — FCG_
231383 — Permit#_

4036Highway 550 Durango CO 81303 — AddressWaterWell
511 CR 220 Durango, CO 81303 — MAILINGADD
970-259-3139 — TELEPHONE_

Water Well Location and Permit Information
160 — WELLDEPTH
Feet
35 — STATICWATE
200S1425W — FTG

Garmin GPS Decimal Degrees
LONG
LATITUDE

SWSW — QTRQTR
31 — SECTION
33 — TOWNSHP
North
9 — RANGE
West

River Front Homes "South Unit" — NUMBER
Petrogulf SpatterPA&Cain #31-2 — LocationGasWell

Field Chemistries
ACCULAB_
NO TESTS

8.5	4400	2750	9.4	Celsius
PH_FIELD	COND_FIELD	TDS_CALC	H2O_TEMP	

Methane Result in mg/L
9.44 mg/L — CH4_MG_L
Detection Limit 0.0004 mg/L

Hydrogen sulfide(HACH Test Kit Field)
<0.1 mg/L — H_2_S_MG_L
Detection Limit 0.1 mg/L

San Juan Basin Health-State of Colorado Health Dept Test
Unknown — BACTERIA_E

Kithchen sink sample.Beeman installed unkown water treatment for Hydrogen sulfideWater,grey color,cloudyNo"S"odor.Effervescent

COMMENTS

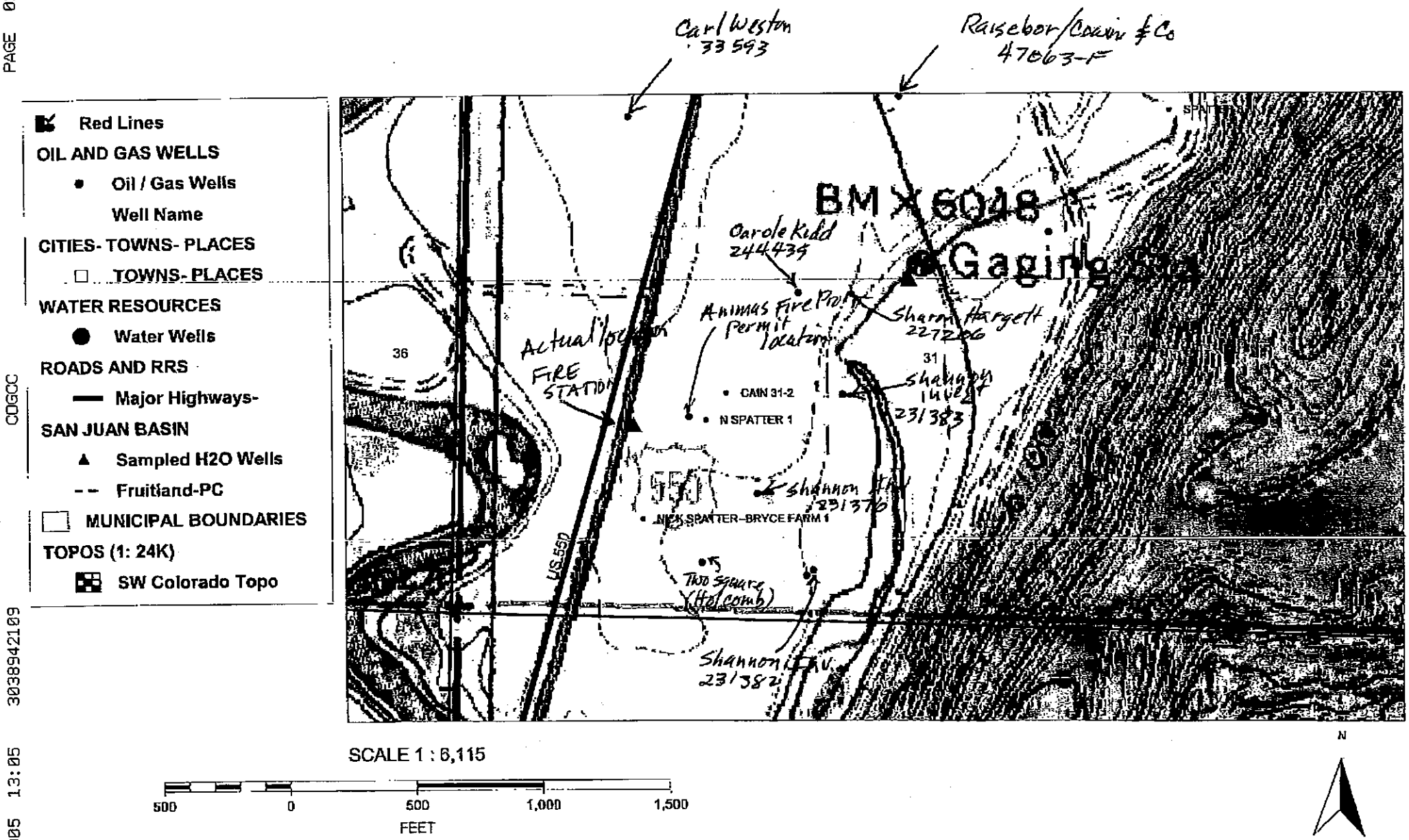
Four Corners Geoscience conducted onsite field chemistries, observation of physical characteristics of water while pumping system to receive a fresh aquifer sample. Water samples were collected and delivered to EPA quality assured lab for analysis. Water samples for bacterial analysis were collected and delivered to San Juan Basin Health in Durango, CO.Samples for headspace gas analysis were taken to FCG lab per USGS standard and methods for these analysis. Four Corners Geoscience is not liable for the results of these analysis and recommends referral to specialists in the field or water treatment. All methods are conducted in accordance with the requirements for this groundwater monitoring program in La Plata Colorado per colorado Oil and Gas Conservation Commission Order # 112-156 and 112-157 established in July 2000.

No Chimistries for South Unit

APPENDIX B

WATER SUPPLY WELL LOGS

SW Sec 31 T33N R9W



BENNET WATER WELL

FORM NO. GWS-31 01/95

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use only
9700355
RECEIVED
APR 17 2001
WATER RESOURCES STATE ENGINEER COLO.

1. WELL PERMIT NUMBER 23382

2. OWNER NAME(S) Shannon Investment
Mailing Address 511 CR 220
City, St Zip Ignacio Co 81303
Phone ( ) NORTH UNIT

3. WELL LOCATION AS DRILLED: SE 1/4 SW 1/4, Sec. 31 Twp. 33 N, Range 9W NM PM
DISTANCES FROM SEC. LINES:
900 ft. from S (North or South) Sec. line. and 1525 ft. from W (East or West) Sec. line. OR
SUBDIVISION: Midway Acres LOT 3B BLOCK ____ FILING(UNIT) ____
STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION ____ ft. DRILLING METHOD air rotary
DATE COMPLETED 4-10-01 TOTAL DEPTH 240 ft. DEPTH COMPLETED 240 ft.

5. GEOLOGIC LOG:

Depth	Description of Material (Type, Size, Color, Water Location)
0-22	Sandstone
22-240	Shale
	H2O @ 55 & 190'

6. HOLE DIAM. (in.)

From (ft)	To (ft)
0	240

7. PLAIN CASING

OD (in)	Kind	Wall Size	From (ft)	To (ft)
5	steel	3/8	0	20
4 1/2	PVC	160	20	60
"	"	"	80	120
"	"	"	200	240

PERF. CASING: Screen Slot Size: .010

4 1/2	PVC	160	60	80
"	"	"	120	200

8. FILTER PACK:
Material gravel
Size 3/8
Interval 38-240

9. PACKER PLACEMENT:
Type ____
Depth ____

10. GROUTING RECORD:

Material	Amount	Density	Interval	Placement
cement	8 sxs	12#	0-38	pumped

REMARKS:

11. DISINFECTION: Type HTH Amt. Used bags

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test.
TESTING METHOD air lift
Static Level 40 ft. Date/Time measured 4-10-01, Production Rate 4 gpm.
Pumping level unknown ft. Date/Time measured ____, Test length (hrs.) 1/2
Remarks

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104 (13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Beeman Bros Drlg Inc Phone (970) 259 1195 Lic. No. 871
Mailing Address

Name/Title (Please type or print)	Signature	Date
J L BEEMAN / PRES	J L Beeman	4-13-01

BENNET WATER WELL

Water well Data .... NORTH Moncular

Shannon Investment

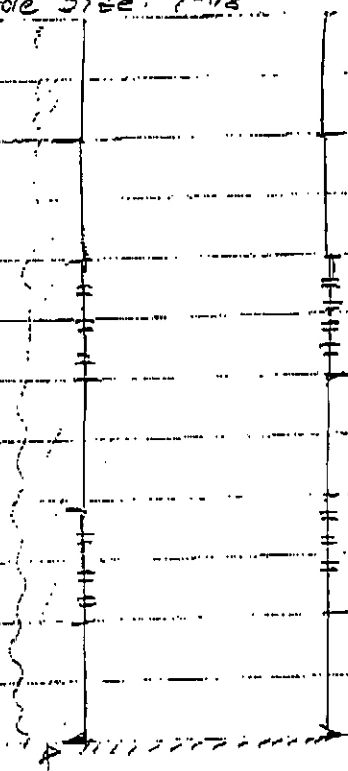
1 well Permit # 231382

900' FSL & 1525' FWL

SE/4, SW/4 Sec 31, T 33N, R-9W

Midway Acres.

Hole Size: 7-7/8"



gravel poured down backside 3/8" size

Budhue Water Well

FORM NO. GWS-31 01/93

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use only
RECEIVED
9700349
APR 17 2001
WATER RESOURCES STATE ENGINEER COLO.

1. WELL PERMIT NUMBER 231376

2. OWNER NAME(S) Beeman Investment Co
Mailing Address 511 CR 220
City, St. Zip Oso Co 81303
Phone ( ) MIDDLE UNIT

3. WELL LOCATION AS DRILLED: SW 1/4 SW 1/4, Sec. 31 Twp. 33 N, Range 9W NMPM
DISTANCES FROM SEC. LINES:
500 ft. from S (north or south) Sec. line and 1200 ft. from W (east or west) Sec. line. OR
SUBDIVISION: Midway Acres LOT 2 BLOCK ____ FILING(UNIT) ____
STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION ____ ft. DRILLING METHOD air rotary
DATE COMPLETED 4-3-01 TOTAL DEPTH 160 ft. DEPTH COMPLETED 160 ft.

5. GEOLOGIC LOG:

Depth	Description of Material (Type, Size, Color, Water Location)
0-2	clay + gravel
2-17	sandstone
17-160	shale
	Hg 0 @ 65 + 120'

6. HOLE DIAM.

(in.)	From (ft)	To (ft)
7 7/8	0	40
6 3/4	40	160

7. PLAIN CASING

OD (in)	Kind	Wall Size	From(ft)	To(ft)
5	steel	3/8	0	20
4 1/2	PVC	160	20	60
"	"	"	140	160

PERF. CASING: Screen Slot Size: .010

4 1/2	PVC	160	60	140

8. FILTER PACK:
Material gravel
Size 3/8
Interval 40-160

9. PACKER PLACEMENT:
Type ____
Depth ____

10. GROUTING RECORD:

Material	Amount	Density	Interval	Placement
cement	8 bags	12#	0-40	pumped

REMARKS:

11. DISINFECTION: Type HTH Amt. Used 6 ozs

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test
TESTING METHOD bailed
Static Level 85 ft. Date/Time measured 4-3-01, Production Rate 12 gpm
Pumping level unknown ft. Date/Time measured ____, Test length (hrs.) 1.0
Remarks

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104 (13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Beeman Bros Drlg Inc Phone (970) 259 1195 Lic. No. 871
Mailing Address

Name/Title (Please type or print)	Signature	Date
JL BEEMAN/PRES	J L Beeman	4-13-01

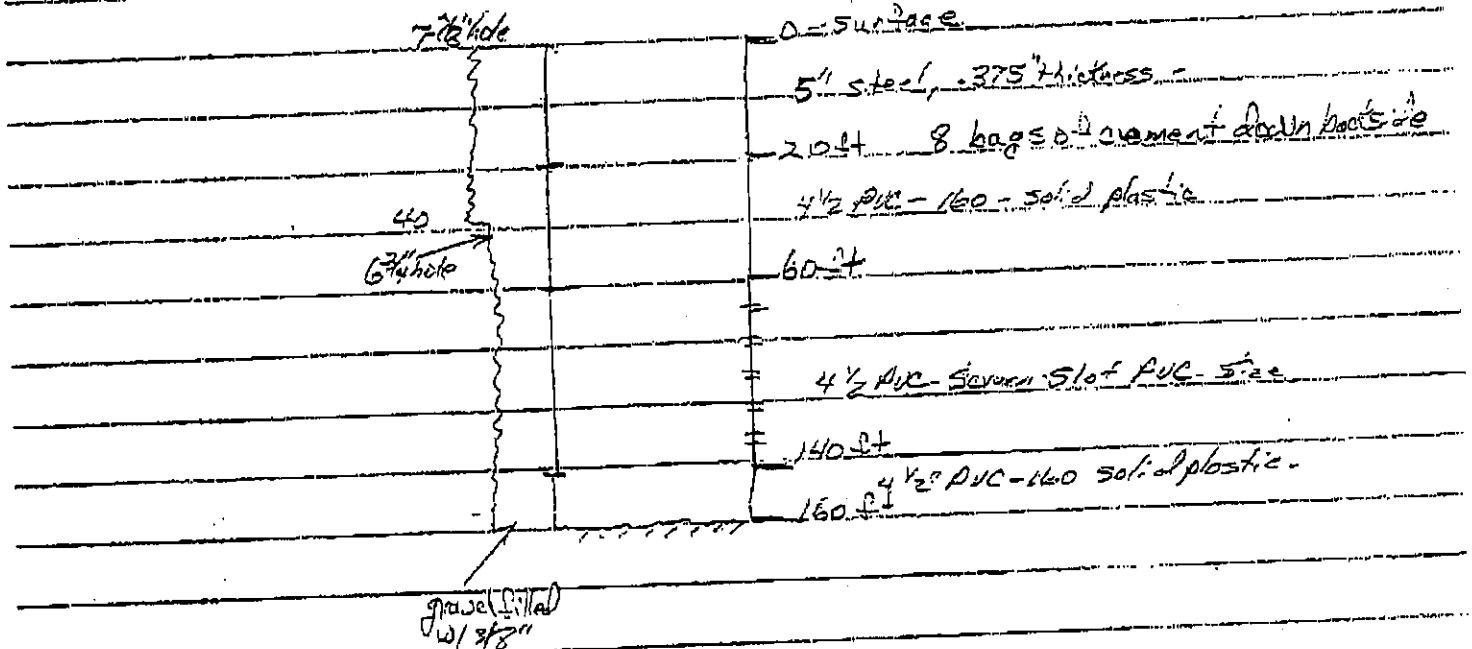
Bolthur Water Well

MIDDLE MOBILAK

Well Permit # 231376 - Shannon Investment Co.

500' FSL & 1200' FWL SW¼ SW¼ Sec 31, T-33-N R-9W

La Plata Co., Co



Yoakum Water Well

FORM NO. GWS-31 01/93

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use only
9700465
RECEIVED
OCT 15 2001
WATER RESOURCES STATE ENGINEER CO.
KRM

1. WELL PERMIT NUMBER 233433

2. OWNER NAME(S) Two Squre LLC
Mailing Address 1145 S. Camino Del Rio
City, St. Zip Suite 104 Box 245 Durango, Co. 81301
Phone (505) 749-1117 Yoakum Well

3. WELL LOCATION AS DRILLED: SW 1/4 SW 1/4, Sec. 31 Twp. 33 N, Range 9 W
DISTANCES FROM SEC. LINES:
220 ft. from S (North or South) Sec. line. and 990 ft. from W (East or West) Sec. line. OR
SUBDIVISION: Midway Acres LOT 1A BLOCK ____ FILING(UNIT) ____
STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION ____ ft. DRILLING METHOD Air Rotary
DATE COMPLETED 7-18-01 TOTAL DEPTH 200 ft. DEPTH COMPLETED 200 ft.

5. GEOLOGIC LOG:

Depth	Description of Material (Type, Size, Color, Water Location)
0-18'	Gravel
18'-200'	Fruitland Shale
H2O - 95' - 110'	

6. HOLE DIAM. (in.)

	From (ft)	To (ft)
11"	0	20
6 3/4"	20'	200'

7. PLAIN CASING

OD (in)	Kind	Wall Size	From(ft)	To(ft)
4 1/2"	PVC	Sch 40	10	100

PERF. CASING: Screen Slot Size: .010

4 1/2"	PVC	Sch 40	100	200

8. FILTER PACK:
Material Pea Gravel
Size 3/8"
Interval 40'-200'

9. PACKER PLACEMENT:
Type ____
Depth ____

10. GROUTING RECORD:

Material	Amount	Density	Interval	Placement
Cement	7 bags	15#	0-40'	Hand

REMARKS:

11. DISINFECTION: Type HTH Amt. Used 6 ozs

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well-Test.
TESTING METHOD Air Lift
Static Level 50 ft. Date/Time measured 7-17-01, Production Rate 4 gpm.
Pumping level 200 ft. Date/Time measured ____, Test length (hrs.) 1 hr
Remarks Well made a significant amount of methane.

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104 (13)(a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Beeman Bros. Drilling Phone (970) 259-1195 Lic. No. 1374
Mailing Address

Name/Title (Please type or print)	Signature	Date
Matt Beeman / V Pres	Matt Beeman	9-17-01

GRANT WATER WELL

FORM NO. GWS-31 01/98

WELL CONSTRUCTION AND TEST REPORT
STATE OF COLORADO, OFFICE OF THE STATE ENGINEER

For Office Use only
9700356
RECEIVED
APR 17 2001
WATER RESOURCES STATE ENGINEER CO.

1. WELL PERMIT NUMBER 23383

2. OWNER NAME(S) Hanson Investment Co
Mailing Address 511 CR 220
City, St. Zip Oso Co 81303
Phone ( ) SOUTH UNIT

3. WELL LOCATION AS DRILLED: SE 1/4 SW 1/4, Sec. 31 Twp. 33 N, Range 9WNMPM
DISTANCES FROM SEC. LINES:
200 ft. from S (north or south) Sec. line. and 1425 ft. from W (east or west) Sec. line. OR
SUBDIVISION: Mulvey Acres LOT 18 BLOCK ____ FILING(UNIT) ____
STREET ADDRESS AT WELL LOCATION:

4. GROUND SURFACE ELEVATION ____ ft. DRILLING METHOD air Rotary
DATE COMPLETED 4-8-01 TOTAL DEPTH 160 ft. DEPTH COMPLETED 160 ft.

5. GEOLOGIC LOG:

Depth	Description of Material (Type, Size, Color, Water Location)
0-2	clay
2-18	Sandstone
18-160	Shale
	H2O @ 624-110

6. HOLE DIAM.

(in.)	From (ft)	To (ft)
7 7/8	0	40
7 3/8	40	160

7. PLAIN CASING

OD (in)	Kind	Wall Size	From(ft)	To(ft)
5	steel	3/8	0	20
4 1/2	pvc	160	20	60
"	"	"	140	160

PERF. CASING: Screen Slot Size: .010

4 1/2	pvc	160	60	140

8. FILTER PACK:
Material gravel
Size 3/8
Interval 40-160

9. PACKER PLACEMENT:
Type ____
Depth ____

10. GROUTING RECORD:

Material	Amount	Density	Interval	Placement
cement	8 bags	12#	0-40	pumped

REMARKS:

11. DISINFECTION: Type HTH Amt. Used 6 bags

12. WELL TEST DATA: ☐ Check box if Test Data is submitted on Form No. GWS 39 Supplemental Well Test.
TESTING METHOD air lift
Static Level 35 ft. Date/Time measured 4-8-01 Production Rate 5 gpm.
Pumping level unknown ft. Date/Time measured ____ Test length (hrs.) 1.0
Remarks

13. I have read the statements made herein and know the contents thereof, and that they are true to my knowledge. [Pursuant to Section 24-4-104 (13) (a) C.R.S., the making of false statements herein constitutes perjury in the second degree and is punishable as a class 1 misdemeanor.]

CONTRACTOR Beeman Bros Drlg Inc Phone (970) 259 1195 Lic. No. 871
Mailing Address

Name/Title (Please type or print)	Signature	Date
JL BEEMAN / Pres	J L Beeman	4-13-01

GRANT WATER WELL

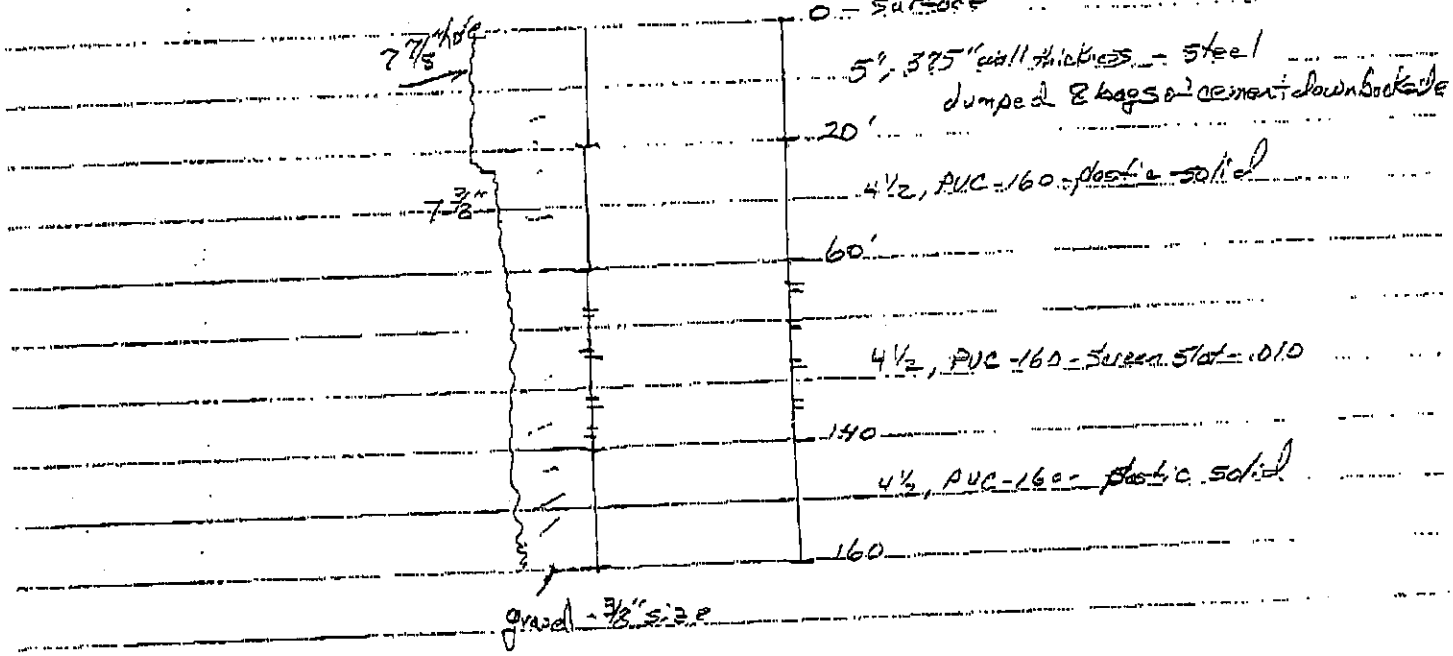
South Modular

Well Permit # 231383

200' FSL & 1425' FWL, SE/4, SW

Sec 31, T 33 N, R-9W

La Plata Co., CO.



APPENDIX C

PRODUCTION WELL LOGS

COGIS - WELL Information

Scout Card | Related | Insp. | MIT | GIS | Doc | Wellbore | Order

Surface Location Data for API # 05-067-05211 Status: DA

Well Name/No:	NICK SPATTER--BRYCE FARM #1 (click well name for production)		
Operator:	SPATTER* NICK - 81448		
Status Date:	1/1/1938	Federal or State Lease #:	
County:	LA PLATA #067	Location:	SWSW 31 3
Field:	IGNACIO BLANCO - #38300	Footages:	389 FSL 75
DRLG Contr #:		Elevation:	0 ft.
Lat:	37.053989	Long:	-107.872949

Wellbore Data for Sidetrack #00 Status: DA 1/1/1938

Wellbore Permit

Permit #:	19420000	Expiration Date:	1/1/1942
Prop Depth/Form:		Surface Mineral Owner Same:	
Mineral Owner:	FEE	Surface Owner:	
Unit:		Unit Number:	

Wellbore Completed

Compltn Date:	1/1/1938		
Measured TD:	2240	Measured PB depth:	0
True Vertical TD:	0	True Vertical PB depth:	

Log Types:

Formation	Log Top	Log Bottom	Cc

No additional interval records were found for sidetrack 00.

RECEIVED JUL 10 1967 COLO. OIL & GAS CONS. COMM.

99999999

UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
CONSERVATION BRANCH

PATENTED LAND
STATE LAND

INDIVIDUAL WELL RECORD

State ....

Lessee or owner .... County ....

Field ....

Operator .... District ....

Well No. 1 .... Subdivision .... Cor. .... Sec. ....

Location .... feet from N.-S. line and .... feet from E.-W. line of ....

Drilling approved .... 19 .... Well elevation ....

Drilling commenced .... 19 .... 19 32 Total depth ....

Drilling ceased .... Initial production

Completed for production .... Gravity A. P. I. ....

Abandonment .... Initial R. P. ....

WELL STATUS

REMARKS ....

00530037

COLORADO GAS CONSERVATION COMMISSION

Well Log Record

La Plata County
Bondad Field

Company N. Spatter & Associates
Aztec, New Mexico

Well No. 1
Sec. 31 Twp 33N Rge 9 W.

Casing Record

Size	Feet
15 1/2	120
12 1/2	179
10	802
8 1/2	1816

Lease Bryce Farm
Location SW¼ SW¼
Commenced May 31, 1937 Completed
Elevation 6220 Tools used C # R
Initial Prod. Bbls Oil
Bbls Water Cu. Ft. Gas
Log Furnished By SPATTER
Box 1234
Long Beach, Calif.

Remarks:

Bottom	Formation
20	Boulders
158	Shale (set 15½" pipe at 20')
168	Gray sandrock
175	Gray shale (set 12½" pipe at 177')
178	Blue sand (water)
200	Gray sandy shale
210	Blue shale
221	Blue shale sandy
235	Gray sandrock
252	Gray shale
256	Brown shale
265	Gray and brown shale
310	Gray sand (water 300')
316	Gray slate-hard
320	Gray slate & blue shale
326	Gray sandy shale
330	Dark soft shale
355	Dark hard blue shale
359	Gray dark shale
363	Sandy gray shale
367	Sandy gray shale, gray sand with salt water and streak of coal
371	Blue slate
382	Blueish sandrock-hard
390	Sandy shale
405	Blue shale - hole caving
408	Gray shale
413	Gray hard sand
430	Gray slate
433	Blueish sandrock
443	Gray sandy shale
447	Blue shale
451	Gray sandy shale
455	Dark shale
485	Gray sandy shale
490	Dark sandy shale
500	Gray shale, sandrock ribs
512	Blueish gray sandrock hard
525	Blueish gray shale
530	Blueish sandrock
550	Gray shale
553	Dark sandrock
574	Gray shale
580	Sandrock - blueish
582	Sandrock and shale
597	Gray shale
601	Blueish sandrock (very hard)
618	Gray shale
621	Gray sandrock - hard
676	Gray shale
686	Dark brownish shale
692	Gray shale
710	Gray shale some dark
715	Gray shale with ribs of sand
727	Gray shale and cavings
731	Gray sand - very hard
740	Dark hard slate
752	Brownish gray shale
784	Blue shale
790	Gray shale
838	Blue shale
850	Gray shale
868	Gray shale with sandrock ribs
873	Gray hard lime
885	Blueish sandstone
940	Blue shale
945	Blue shale and blue sandrock (very hard)
965	Blueish sandrock-hard
970	Blueish sandstone

(Over)

Bottom	Formation
975	Sandstone & blue slate
982	Blueish & white sandstone
995	White sandrock and slate
1005	Blue shale
1010	Grayish sandrock (Gas)
1020	White hard sandrock
1025	Blue shale
1031	Brown shale
1060	Gray and brown shale
1065	Brown shale
1072	Brown shale and gray slate with a hard clear blueish shell.
1077	Brown shale mixed with clear sandrock shells.
1082	Black and gray shale showing clear grains of sandrock.
1090	Gray shale & showing of sandrock
1100	Brown shale and gray slate
1108	Brown shale and gray slate, sandrock
1113	Mixtures of sandrock
1118	Grayish slate
1122	Dark slate and gray sandrock
1127	Dark brown slate, gray sandrock
1132	Gray limerock
1137	Brown slate and gray limerock
1142	Red rock and sandrock
1190	Red rock
1200	Gray sandrock
1206	Gray sandrock showing gas
1230	Mixture flint and sandrock
1243	Gray sand turning darker
1250	Gray sandrock
1255	Blue shale
1280	Gray sandrock
1285	Gray sandrock showing of oil of high gravity
1302	Gray sandrock
1310	Gray slate
1320	Gray sandrock
1342	Gray slate
1355	Gray sand
1360	Gray slate and lime
1375	Gray lime
1387	Gray lime and sandrock
1400	Blueish sandrock
1415	Gray shale and slate
1424	Gray shale and sandrock
1430	Gray sandrock and slate
1436	Gray and blue shale
1446	Gray and lavender shale
1450	Gray sandstone with blue and lavender
1476	Rock and gray sandrock endurated
1482	Black specks and gray sandrock
1487	Gray sandrock
1497	Green and gray shale, light sandrock
1505	Blue shale - top hard
1510	Blue shale
1525	Blue shale and gray sandrock
1527	Gray sandrock
1529	Gray rock
1550	Blue shale
1555	Blueish sandrock
1565	Gray sandrock
1568	Blue shale
1575	Gray sandrock
1580	Grayish lime rock (hard)
1583	Blue slate (hard)
1587	Blue slate (very hard)
1594	Blue shale
1602	Gray sandrock
1603	Coal
1612	Blue slate, some white (very hard)
1616	Gray sandrock
1620	Blue slate
1624	Blueish sandrock
1644	Blue shale and gray slate
1650	Blue shale
1661	Gray hard sandrock
1667	Blue shale - mixture shales, brown, blue and gray (very hard)
1671	Gray sandrock
1682	Gray sandrock
1684	Blue-gray slate
1687	Blueish gray sandrock - very warm
1690	Blue and gray shale
1693	Blue and gray shale & sandrock
1705	Blue and gray sandrock
1710	Blue to gray sandrock, conglomerate blue
1718	gray, green, dark red rocks, also mixed shales
1735	Gray sandy shale
1740	Dark sandy shale

COLORADO GAS CONSERVATION COMMISSION No.

County

Field

Well Log Record

Casing Record

Size Feet

Company N. Spatter & Associates

Lease Well No.

Location Sec. Twp. Rge

Commenced Completed

Elevation Tools used C R

Initial Prod. Bbls Oil

Bbls Water Cu. Ft. Gas

Remarks: Log Furnished By

Bottom	Formation	Bottom	Formation
1746	Dark sandy shale, and buff	1846	Blueish gray sandy shale
1749	Dark shale & blueish gray sandrock	1851	Buff to gray sandy shale
1753	Hard gray sandrock showing red and black rock	1860	Lavender gray sandy shale
1759	Hard gray sandrock with slate and partings	1865	Light gray sandrock, very hard on top softening up three feet under top showing gas - approximately 50,000'.
1764	Blueish sandrock, shale with red grains	1875	Gray sandrock
1778	Blue shale	1880	Gray sandrock & dark sandrock
1783	Gray sandy shale, red spots	1900	Dark sand and shale
1789	Dark gray sandy shale	1920	Gray sandy shale
1795	Dark gray sandy shale-softer	1940	Dark sandy shale with light lavender slate - all hard
1800	Dark gray sandy lime-hard	1945	Gray sandrock (hard) good showing gas
1805	Gray and buff sandy lime	1951	Gray fine sandrock
1806	Light sandrock (very hard) showing gas	1970	Gray sandy shale
1814	Gray sandrock, gray shale, & dark shale	1979	Gray sandy lime small pieces of free carbon & smelling of oil, also rainbows
1818	Blue gray sandrock and shale	1982	Blueish sandy lime
1822	Gray sandrock & lime (set 8 1/2" pipe at 1816)	1995	Gray and light lavender sandy shale
1827	Gray sandy shale fine hard yellowish-gray	2007	Gray sandy lime some shale
1831	Sandrock, tools and mud very warm	2015	Gray sandrock
1832	Hard brownish sandrock & gray shale	2020	Gray shale, sandy
1836	Soft dark gray sandy shale	2032	Gray & dark sandy shale
1841	Shell and gray sandy shale	2042	Gray sandy shale and lime shells
		2052	Dark gray and brown shale - lime, also

(Over)

(CARD)

Bottom	Formation
2063	Gray and greenish sandrock, buff slate, soft & cavey
2072	Gray sandrock and lime, also
2080	Brown and buff slate
2092	Dark shale, gray lime shells
2103	Gray sandy shale, and lime shells
2109	Gray lime - hard
2124	Gray, blue & dark sandy shales
2137	Dark gray sandy shale, sandy & gray limestone
2190	Dark shale & gray limerock breaks, gray lime-rock & brownish slate, 7 feet black slate & slag
2195	Black shale coal-like
2209	Black coal-like shale
2214	Slate & slag
2218	Black shale
2224	Gray lime and brown slate, gray lime & coal stringers and brownish slate, brown slate & lime
2238	also some sandrock, coal stringers - fairly hard
2240	Gas blew in

Open hole from 1816 to 2240.

COGIS - WELL Information

Scout Card | Related | Insp. | MIT | GIS | Doc | Wellbore | Order

Surface Location Data for API # 05-067-05217 Status: DA

Well Name/No:	N SPATTER #1	(click well name for production)	
Operator:	GREAT WESTERN DRILLING CO - 35600		
Status Date:	5/6/1998	Federal or State Lease #:	
County:	LA PLATA #067	Location:	SWSW 31 33N 9\
Field:	IGNACIO BLANCO - #38300	Footages:	790 FSL 990 FWL
DRLG Contr #:		Elevation:	6,044 ft.
Lat:	37.055092	Long:	-107.872127

Wellbore Data for Sidetrack #00 Status: DA 5/6/1998

Spud Date:	7/5/1954	Spud Date is:	ACTUAL

Wellbore Permit

Permit #:	19540000	Expiration Date:	
Prop Depth/Form:	3000	Surface Mineral Owner Same:	
Mineral Owner:	FEE	Surface Owner:	
Unit:		Unit Number:	

Formation and Spacing: Code: MVRD , Formation: MESAVERDE , Order: 0 , Unit Acreage: 0, Drill Unit:

Wellbore Completed

Compltn Date:	10/18/1954		
Measured TD:	7661	Measured PB depth:	
True Vertical TD:		True Vertical PB depth:	

Log Types:

Casing: String Type: SURF , Hole Size: , Size: 10.75, Top: , Depth: 347, Weight: 40

Cement: Sacks: 210, Top: , Bottom: , Method Grade:

Casing: String Type: 1ST , Hole Size: , Size: 7.625, Top: , Depth: 2649, Weight: 24

Cement: Sacks: 275, Top: , Bottom: , Method Grade:

Formation	Log Top	Log Bottom	Cored
FRUITLAND	2184		
PICTURED CLIFFS	2622		
LEWIS	2820		
CLIFF HOUSE	4274		
POINT LOOKOUT	4964		
MANCOS	5072		
GREENHORN	7018		
GRANEROS	7068		
DAKOTA	7187		
MORRISON	7423		

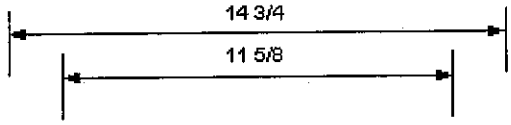
No additional interval records were found for sidetrack 00.

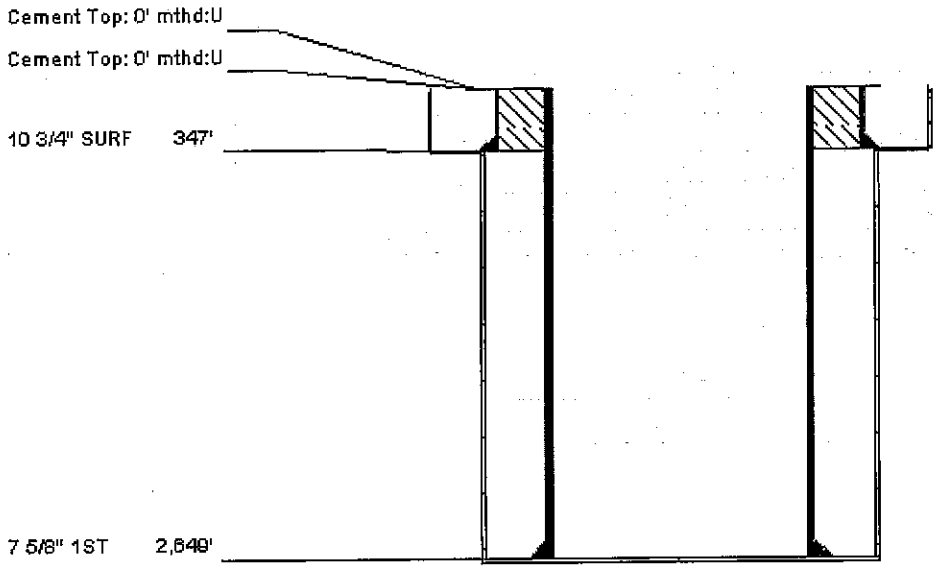
Well Completion Diagram

	API Well No:	05-067-05217-00-					
Owner:	GREAT WESTERN DRILLING CO			**Well Name:**	N SPATTER		
County:	LA PLATA	**Field:**	IGNACIO BLANCO	**Pool:**			
Coordinates: X	990 FWL	; Y	790 FSL	**Sec:**	31	**Twp:**	33N

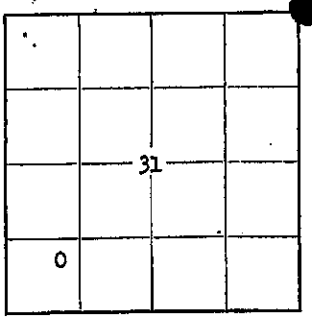
Note:Changes to the drawing do not effect the database

Bore Diameters (in.)





OGCC—Form 2



Locate Well Correctly

00561439

File [illegible] on Fee and Patented lands and [illegible] on State and School lands, with

OFFICE OF DIRECTOR

OIL AND GAS CONSERVATION COMMISSION, STATE OF COLORADO

AJJ	
DVR	
FJK	
OPS	
HHM	
AH	
JJD	
FILE	

RECEIVED
OCT 21 1954
OIL & GAS
CONSERVATION COMMISSION

LOG OF OIL AND GAS WELL

Field Wildcat Company Great Western Drilling Company

County La Plata Address Box 608, Farmington, New Mexico

Lease N. Spatter

Well No. 1 Sec. 31 Twp. 33N Rge. 9W Meridian CSM State or Pat. Pat.

Location 790 Ft. (N) of South Line and 990 Ft. (E) of West line of 31 Elevation 6055 (Derrick floor relative to sea level)

The information given herewith is a complete and correct record of the well and all work done thereon so far as can be determined from all available records.

Signed Jack Page

Date October 20, 1954 Title District Production Superintendent

The summary on this page is for the condition of the well as above date.

Commenced drilling July 5, 1954 Finished drilling September 22, 1954

OIL AND GAS SANDS OR ZONES

No. 1, from 2184' to 2622' No. 4, from ____ to ____

No. 2, from 7198' to 7386' No. 5, from ____ to ____

No. 3, from ____ to ____ No. 6, from ____ to ____

IMPORTANT WATER SANDS

No. 1, from No important sands to ____ No. 3, from ____ to ____

No. 2, from ____ to ____ No. 4, from ____ to ____

CASING RECORD

SIZE	WT. PER FOOT	MAKE	WHERE LANDED	NO. OF SKS. CEMENT	STOOD HOURS	PRESSURE TEST PSI
10-3/4"	40	National	347	210	36	500/30 min.
7-5/8"	24 & 26.4	National	2649	275	48	1000/30 min.

COMPLETION DATA

Total Depth 7661' ft. Cable Tools from ____ to ____ Rotary Tools from 0 to 7661'

Casing Perforations (prod. depth) from 2154' to 2632' ft. No. of holes 493

Acidized with 500 gallons. Other physical or chemical treatment of well to induce flow 4000 gal. diesel oil 3100# sand.

Shooting Record ____

Pump ☐

Prod. began Dry Hole 19____ Making ____ bbls./day of ____, A. P. I. Gravity Fluid on ____ Choke. ☐

Tub. Pres. ____ lbs./sq. in. Csg. Pres. ____ lbs./sq. in. Gas Vol. ____ Mcf. Gas Oil Ratio ____

Length Stroke ____ in. Strokes per Min. ____ Diam. Pump ____ in.

B. S. & W. ____ %. Gas Gravity ____ BTU's/Mcf. ____ Gals. Gasoline/Mcf. ____

WELL DATA

Indicate (yes or no) whether or not the following information was obtained.

Electrical Log yes Date July 18, Aug. 24, 1954 Straight Hole Survey ____ Type Totco

Gamma Ray yes Date August 25 19 54 Other Types of Hole Survey Caliper Type ____

Time Drilling Record Yes (Note—Any additional data can be shown on reverse side.)

Core Analysis yes Depth 7394.5' to 7398.5'
7485.5' to 7495.5'

FORMATION RECORD

Show all formations, especially all sands and character and contents thereof.

FORMATION	TOP	BOTTOM	REMARKS
			No tops picked
Fruitland	2184	2622	Show of gas on DST's (open zone)
Pictured Cliffs	2622	2820	
Lewis	2820	4274	

(Continue on reverse side)

FORMATION RECORD

Formation	Top	Bottom	Remarks
Cliff House	4274		Bottom of Cliffhouse and top of
Menefee		4964	Menefee not determined.
Pt. Lookout	4964	5072	
Mancos	5072	7018	
Green Horn	7018	7068	
Graneros	7068	7187	
Dakota	7187	7423	Show of gas on DST
Morrison	7423		TD 7661'

COGIS - WELL Information

Scout Card | Related | Insp. | MIT | GIS | Doc | Wellbore | Order

Surface Location Data for API # 05-067-08114 — Status: PR

Well Name/No:	CAIN #31-2	(click well name for production)	
Operator:	PETROGULF CORPORATION - 69100		
Status Date:	3/1/1998	Federal or State Lease #:	
County:	LA PLATA #067	Location:	SWSW 31 33N
Field:	IGNACIO BLANCO - #38300	Footages:	897 FSL 1068 F
DRLG Contr #:		Elevation:	6,045 ft.
Lat:	37.055386	Long:	-107.87186

Wellbore Data for Sidetrack #00 — Status: PR — 3/1/1998

Spud Date:	1/27/1998	Spud Date is:	ACTUAL

Wellbore Permit

Permit #:	19970955	Expiration Date:	12/16/1998
Prop Depth/Form:	2660	Surface Mineral Owner Same:	N
Mineral Owner:	FEE	Surface Owner:	FEE
Unit:		Unit Number:	
Formation and Spacing:	Code: FRLDC , Formation: FRUITLAND COAL , Order: 112-137 , Unit Acreage: 320, D		

Wellbore Completed

Complitn Date:	3/3/1998		
Measured TD:	2630	Measured PB depth:	2630
True Vertical TD:		True Vertical PB depth:	
Log Types:	SPEC DENS DUAL SPACED NEUT LOG/GR/ML		
Casing:	String Type: SURF , Hole Size: 12.25, Size: 9.625, Top: 0, Depth: 404, Weight: 36		
Cement:	Sacks: 325, Top: 0, Bottom: , Method Grade:		
Casing:	String Type: 1ST , Hole Size: 8.75, Size: 7, Top: 0, Depth: 2162, Weight: 23		
Cement:	Sacks: 348, Top: 0, Bottom: , Method Grade:		

Formation	Log Top	Log Bottom	Core
FRUITLAND COAL	2145		

Completed information for formation FRLDC

1st Prod Date:	3/9/1998	Choke Size:	0.200
Status Date:	3/1/1998	Hole Compl:	Y
Commingled:		Prod Metod:	PITOT
Formation Name:	FRUITLAND COAL	Status:	PR
Formation Treatment:			
Tubing Size:	2.875	Tubing Setting Depth:	2198
Tubing Packer Depth:		Tubing Multiple Packer:	
Open Hole Top:	2145	Open Hole Bottom:	2630
Initial Test Data:			
Test Date:	3/1/1998	Test Method:	FLOWING
Gas Dispo:	SOLD		

Test Type	Measure
CALC_BBLS_H2O	4
CALC_MCF_GAS	3579
CASING_PRESS	28

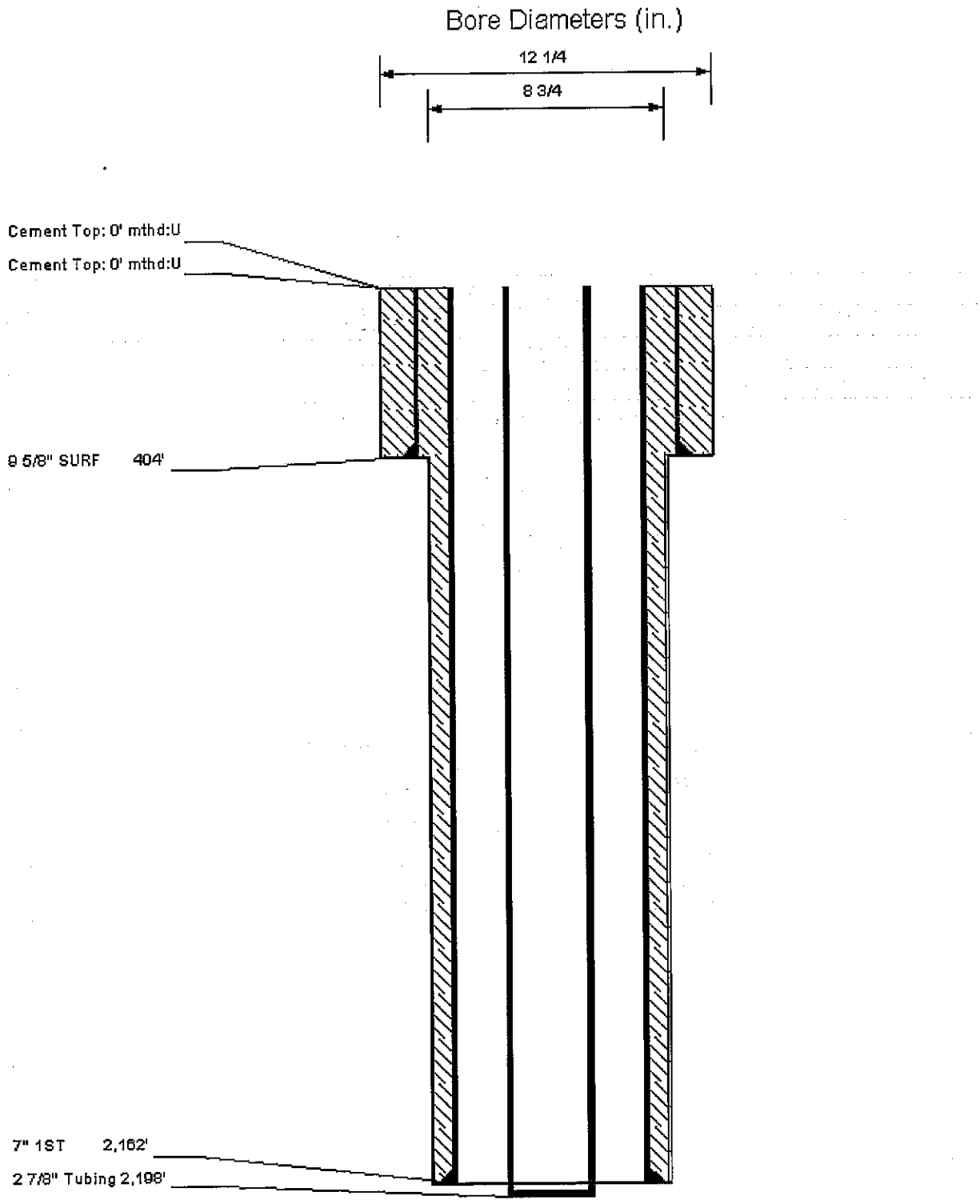
MCF_GAS 290

No Perforation Data was found for formation FRLDC .

Well Completion Diagram

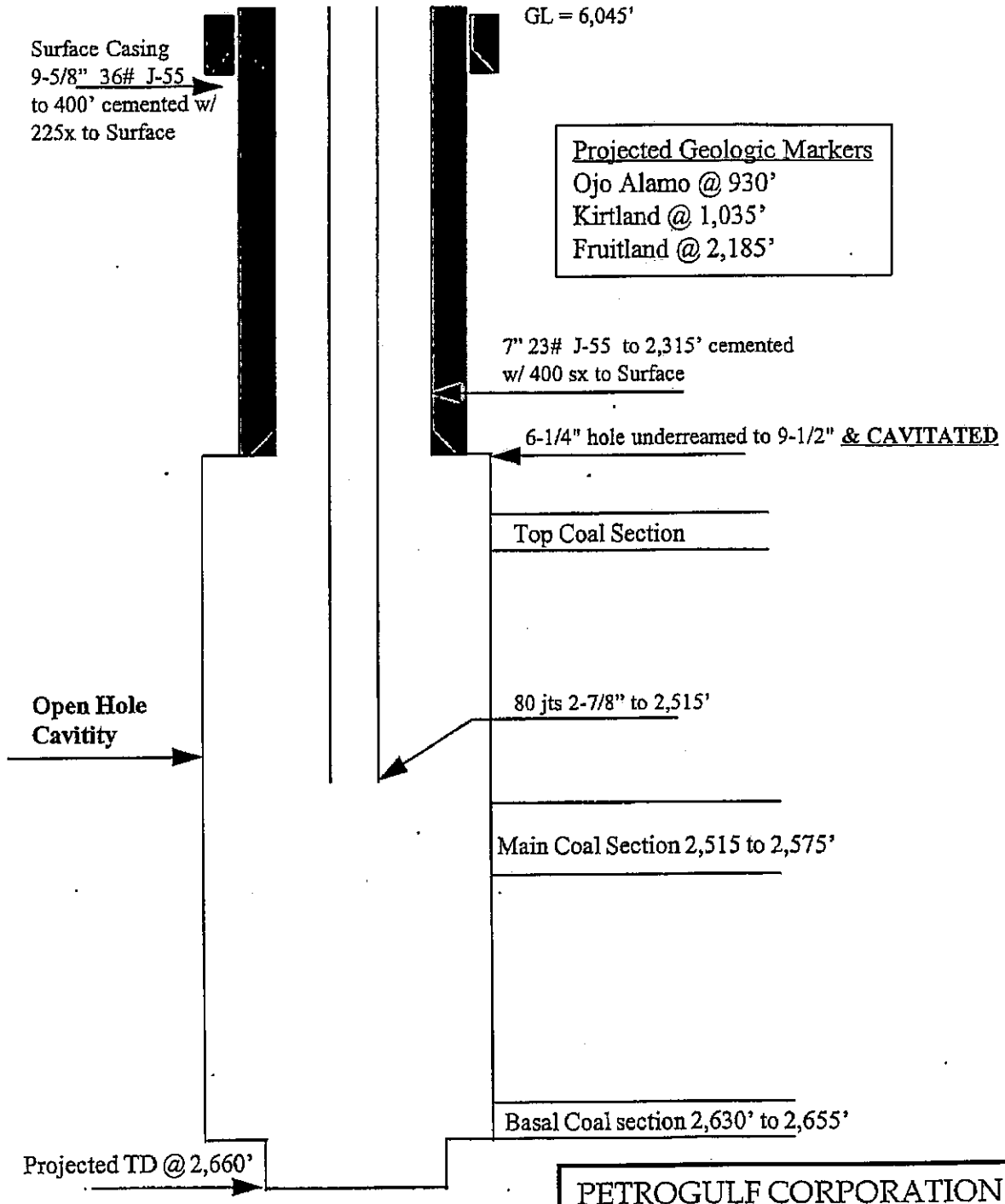
	API Well No:	05-067-08114-00-					
Owner:	PETROGULF CORPORATION			**Well Name:**	CAIN		
County:	LA PLATA	**Field:**	IGNACIO BLANCO	**Pool:**			
Coordinates: X	1068 FWL	; Y	897 FSL	**Sec:**	31	**Twp:**	33N

Note:Changes to the drawing do not effect the database



00561528

(Proposed) Well Name: Cain #31-2
Location: 897' FSL & 1068' FWL
(SW Section 31 - T33N - R9W)
Field: Ignacio Blanco
Formation: Fruitland Coal



PETROGULF CORPORATION

Wellbore Diagram
La Plata County, Colorado
Fee Lease

APPENDIX D

WATER WELL SAMPLING ANALYTICAL REPORTS - FOUR CORNERS GEOSCIENCE

Analytical Laboratories, Inc.

Fax Transmission

To: Debbie Baldwin
Lynn Fechter

Date: 3-4-05

At: COGCC

Page(s): 10 (including cover)

Fax: 303-894-2109

Original Mailed: Y N

From: Debbie Zufelt

Re: Bondad

Comments: 3-1-05 samples will be analyzed for NO3+NO2 next week.

Date:

Reply:

75 Sutile Street, Durango, CO 81303
Telephone (970) 247-4220 Fax (970) 247-4227

Analytical Laboratories, Inc.

GAL ID No.: 502-102,01-02

March 4, 2005

COGCC
1120 Lincoln Street #801
Denver, CO 80203
Attention Debbie Baldwin

Project Name: Bondad Water Well Tests
Project Number:
Date Received: 02/28/05

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, 18th & 19th editions, and Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020.

Samples were received by Green Analytical Laboratories, Inc. in good condition on 02/28/05.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Debbie Zufelt

for: John Green
Laboratory Director

Enclosure

75 Suttle Street, Durango, Colorado 81303
Telephone (970) 247-4220 Fax (970) 247-4227

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

Weston #2 Water Well

COGCC
1120 Lincoln Street #801
Denver, CO 80203
Attention: Debbie Baldwin

GAL I.D.: 502-102-01
Date Received: 02/28/05
Date Reported: 03/04/05
QC Batches:

PROJECT NAME: Bondad Water Well Tests
PROJECT NUMBER:
SAMPLE I.D.: Carl Weston #2- Mobile #3476

Sample Date: 02/28/05
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity as CaCO3	2320B	10	220	1	mg/L	
Bicarbonate as CaCO3	2320B	10	220	1	mg/L	
Carbonate as CaCO3	2320B	10	<10	1	mg/L	
Hydroxide as CaCO3	2320B	10	<10	1	mg/L	
Calcium	200.7	0.5	16.3	1	mg/L	
Chloride	4500CL	10	24	1	mg/L	
Conductivity	2510B	1.0	970	1	uS/cm	
Fluoride	4500F C	0.2	0.5	1	mg/L	4.0
Iron	200.7	0.05	<0.05	1	mg/L	
Magnesium	200.7	0.5	0.8	1	mg/L	
Manganese	200.8	0.005	0.03203	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02	<0.02	1	mg/L	
pH	150.1	NA	7.97	NA	SU	
Potassium	200.7	0.5	0.7	1	mg/L	
Selenium	200.8	0.001	<0.001	1	mg/L	0.05
Sodium	200.7	0.5	220	1	mg/L	
Sulfate	4500SO4	10	255	1	mg/L	
TDS	2540C	10	535	1	mg/L	
Hardness, as CaCO3	Calc	10	44	1	mg/L	
CAB	Calc		4.23		%	

For: John Green, Laboratory Manager

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

Weston Residence Water Well

COGCC
1120 Lincoln Street #801
Denver, CO 80203
Attention: Debbie Baldwin

GAL I.D.: 502-102-02
Date Received: 02/28/05
Date Reported: 03/04/05
QC Batches:

PROJECT NAME: Bondad Water Well Tests
PROJECT NUMBER:
SAMPLE I.D.: Carl Weston #1- Old House #3475

Sample Date: 02/28/05
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity as CaCO3	2320B	10	400	1	mg/L	
Bicarbonate as CaCO3	2320B	10	400	1	mg/L	
Carbonate as CaCO3	2320B	10	<10	1	mg/L	
Hydroxide as CaCO3	2320B	10	<10	1	mg/L	
Calcium	200.7	0.5	103	1	mg/L	
Chloride	4500CL	10	82	1	mg/L	
Conductivity	2510B	1.0	1080	1	uS/cm	
Fluoride	4500F C	0.2	0.7	1	mg/L	4.0
Iron	200.7	0.05	0.45	1	mg/L	
Magnesium	200.7	0.5	33.3	1	mg/L	
Manganese	200.7	0.005	0.93439	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02	<0.02	1	mg/L	
pH	150.1	NA	7.19	NA	SU	
Potassium	200.7	0.5	1.9	1	mg/L	
Selenium	200.8	0.001	0.004	1	mg/L	0.05
Sodium	200.7	0.5	113	1	mg/L	
Sulfate	4500SO4	10	84	1	mg/L	
TDS	2540C	10	505	1	mg/L	
Hardness, as CaCO3	Calc	10	394	1	mg/L	
CAB	Calc		9.51		%	

Peter John Green, Laboratory Manager

Green Analytical Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Page 1 of 1

Client: COGCC
Contact: Debbie Baldwin
Address: 1120 Lincoln
Denver CO 80203
Phone Number: 303 894-2100 ext 1
FAX Number: 303-894-2109

NOTES:
1) Ensure proper container packaging.
2) Ship samples promptly following collection.
3) Designate Sample Reject Disposition.
PO# Debbie Baldwin
Project Name: Bondad Water Well Tests

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

FOR GAL USE ONLY
GAL JOB #
502-102

Samplers Signature:

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

	Sample ID	Collection Date	Collection Time	Misc. Collected by: (Init.)	Misc. Matrix Type from Table 1	Misc. No. of Containers	Misc. Sample Filtered ? Y/N	Preservative(s) Unpreserved (Ice Only)	HNO3	HCl	H2SO4	NAOH	Other (Specify)	Analyses Required: COGCC pkg	Comments
(1)	1. Carl Weston #1	2/28/05	1400	LJ	2	3	N	X						X	By 3-4
	2. # 3496			LJ											
	3. "Mobile"														
(2)	4. Carl Weston #2	2/28/05	1500	LJ	2	3	N	X						X	
	5. # 3495														
#1	6. "Old House"														
	7.														
	8.														
	9.														
	10.														

Relinquished by: Lynn Mad — Date: 2/28/05 — Time: 1556
Received by: Debbie Zufelt — Date: 2-28-05 — Time: 1556
Relinquished by: — Date: — Time:
Received by: — Date: — Time:

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

GAL ID No.: 503-006,01-03

March 4, 2005

COGCC
1120 Lincoln Street #801
Denver, CO 80203
Attention Debbie Baldwin

Project Name: Bondad Water Well Tests
Project Number:
Date Received: 03/01/05

This is to transmit the attached analytical report. The analytical data and information contained therein was generated using specified or selected methods contained in references, such as Standard Methods for the Examination of Water and Wastewater, 18th & 19th editions, and Methods for Determination of Organic Compounds in Drinking Water, EPA-600/4-79-020.

Samples were received by Green Analytical Laboratories, Inc. in good condition on 03/01/05.

If you should have any questions or comments regarding this report, please do not hesitate to call.

Sincerely,

Debbie Baldwin

FOR: John Green
Laboratory Director

Enclosure

75 South Street, Durango, Colorado 81303
Telephone (970) 247-4220 Fax (970) 247-4227

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

Fire Station Hopkins Well

COGCC
1120 Lincoln Street #801
Denver, CO 80203
Attention: Debbie Baldwin

GAL I.D.: 503-006-01
Date Received: 03/01/05
Date Reported: 03/04/05
QC Batches:

PROJECT NAME: Bondad Water Well Tests
PROJECT NUMBER: 030105-1
SAMPLE I.D.: Fire Station Bondad

Sample Date: 03/01/05
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity as CaCO3	2320B	10	610	1	mg/L	
Bicarbonate as CaCO3	2320B	10	610	1	mg/L	
Carbonate as CaCO3	2320B	10	<10	1	mg/L	
Hydroxide as CaCO3	2320B	10	<10	1	mg/L	
Calcium	200.7	0.5	67.5	1	mg/L	
Chloride	4500CL	10	26	1	mg/L	
Conductivity	2510B	1.0	1020	1	uS/cm	
Fluoride	4500F C	0.2	0.3	1	mg/L	4.0
Iron	200.7	0.05	0.11	1	mg/L	
Magnesium	200.7	0.5	6.3	1	mg/L	
Manganese	200.7	0.005	0.32794	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02		1	mg/L	
pH	150.1	NA	7.65	NA	SU	
Potassium	200.7	0.5	1.9	1	mg/L	
Selenium	200.8	0.001	0.003	1	mg/L	0.05
Sodium	200.7	0.5	196	1	mg/L	
Sulfate	4500SO4	10	13	1	mg/L	
TDS	2540C	10	595	1	mg/L	
Hardness, as CaCO3	Calc	10	194	1	mg/L	
CAB	Calc		6.21		%	

D. Zufelt
For: John Green, Laboratory Manager

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

GRANT WATER WELL

GAL I.D.: 503-006-02
Date Received: 03/01/05
Date Reported: 03/04/05
QC Batches:

COGCC
1120 Lincoln Street #801
Denver, CO 80203
Attention: Debbie Baldwin

PROJECT NAME: Bondad Water Well Tests
PROJECT NUMBER: 030105-2
SAMPLE I.D.: Peggy Grant So. Unit

Sample Date: 03/01/05
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity as CaCO3	2320B	10	13	1	mg/L	
Bicarbonate as CaCO3	2320B	10	13	1	mg/L	
Carbonate as CaCO3	2320B	10	<10	1	mg/L	
Hydroxide as CaCO3	2320B	10	<10	1	mg/L	
Calcium	200.7	0.5	<0.5	1	mg/L	
Chloride	4500CL	10	16	1	mg/L	
Conductivity	2510B	1.0	71.0	1	uS/cm	
Fluoride	4500F C	0.2	<0.2	1	mg/L	4.0
Iron	200.7	0.05	<0.05	1	mg/L	
Magnesium	200.7	0.5	<0.5	1	mg/L	
Manganese	200.7	0.005	<0.005	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02		1	mg/L	
pH	150.1	NA	6.00	NA	SU	
Potassium	200.7	0.5	<0.5	1	mg/L	
Selenium	200.8	0.001	<0.001	1	mg/L	0.05
Sodium	200.7	0.5	14.9	1	mg/L	
Sulfate	4500SO4	10	<10	1	mg/L	
TDS	2540C	10	15	1	mg/L	
Hardness, as CaCO3	Calc	10	<10	1	mg/L	
CAB	Calc		1.24		%	

For: John Grant Laboratory Manager

Green Analytical Laboratories, Inc.
75 Suttle Street
Durango, CO 81303

Commingled Bodhse and Bonad Water Wells

COGCC
1120 Lincoln Street #801
Denver, CO 80203
Attention: Debbie Baldwin

GAL I.D.: 503-006-03
Date Received: 03/01/05
Date Reported: 03/04/05
QC Batches:

PROJECT NAME: Bondad Water Well Tests
PROJECT NUMBER: 030105-3
SAMPLE I.D.: Commingled North & Middle Wells Before Chlorination

Sample Date: 03/01/05
Sample Matrix: Water

Laboratory Report

RESULTS

PARAMETER	METHOD	REPORT LIMIT	RESULT	DIL	UNITS	Maximum Contamination Level
Alkalinity as CaCO3	2320B	10	490	1	mg/L	
Bicarbonate as CaCO3	2320B	10	490	1	mg/L	
Carbonate as CaCO3	2320B	10	<10	1	mg/L	
Hydroxide as CaCO3	2320B	10	<10	1	mg/L	
Calcium	200.7	0.5	169	1	mg/L	
Chloride	4500CL	10	620	1	mg/L	
Conductivity	2510B	1.0	2870	1	uS/cm	
Fluoride	4500F C	0.2	1.0	1	mg/L	4.0
Iron	200.7	0.05	0.30	1	mg/L	
Magnesium	200.7	0.5	12.7	1	mg/L	
Manganese	200.7	0.005	0.79960	1	mg/L	
Nitrate/Nitrite as N	353.3	0.02		1	mg/L	
pH	150.1	NA	7.32	NA	SU	
Potassium	200.7	0.5	2.1	1	mg/L	
Selenium	200.8	0.001	0.008	1	mg/L	0.05
Sodium	200.7	0.5	438	1	mg/L	
Sulfate	4500SO4	10	70	1	mg/L	
TDS	2540C	10	1540	1	mg/L	
Hardness, as CaCO3	Calc	10	474	1	mg/L	
CAB	Calc		2.86		%	

for: John Green, Laboratory Manager

Green Analytical Laboratories, Inc.

CHAIN OF CUSTODY RECORD

Page ____ of ____

Client: COGCC
Contact: Debbie Baldwin
Address: 1120 Lincoln St Ste 801
Denver Co 80203
Phone Number: 303-894-2100
FAX Number: 303 894 2109

NOTES:
1) Ensure proper container packaging.
2) Ship samples promptly following collection.
3) Designate Sample Reject Disposition.
PO#: Debbie Baldwin
Project Name: Bayou Gate Water Well Tests

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

FOR GAL USE ONLY
GAL JOB # 503-006

Samplers Signature: Jerry Cox

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

	Sample ID	Collection: Date	Collection: Time	Misc: Collected by: (Init.)	Misc: Matrix Type From Table 1	Misc: No. of Containers	Misc: Sample Filtered ? Y/N	Preservative(s): Unpreserved (Ice Only)	HNO3	HCl, H2SO4	NAOH	Other (Specify)	Analyses Required: COGCC Complete	Comments
(1)	1. Fire Station	3-7-05	1126	JJ	2	3	N	X					✓	030105-1
	2. Bondad													
	3.													
(2)	4. Peggy Grant	3-1-05	1234	JF JC	2	3	N	X					✓	030105-2
	5. So. Unit													
	6.													
(3)	Commingled	3-1-05		JJ	2	3	N	X					✓	030105-3
	8. North Middle													
	9. Wells Before													
	10. Elimination													

Relinquished by: Jerry Cox	Date: 3-1-05	Time: 1454	Received by: Debbie Zufelt	Date: 3-4-05	Time: 1454
Relinquished by:	Date:	Time:	Received by:	Date:	Time:

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

APPENDIX E

EQUIPMENT SPECIFICATIONS

Gasport® Gas Tester

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

Applications

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

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

Features and Benefits

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

Specifications

Gas	Range	Resolution
Methane	0–5000 ppm	50 ppm
Methane	0–100% LEL or 0–5% CH_4	1 % LEL or 0.1% CH_4
Methane	5–100% CH_4	1% CH_4
Oxygen	0–25%	0.1%
Carbon Monoxide	0–1000 ppm	1 ppm
Hydrogen Sulfide	0–100 ppm	1 ppm

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

The answer for gas utilities' gas detection needs

Gasport® Gas Tester

Ordering Information

Battery Chargers

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

Battery Packs

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

Sensors

Part No.	*Description*
813693	Combustible Gas
480566	O_2
812389	CO
812390	H_2S

Protective Boots

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

Sampling Equipment

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

Sampling Accessories

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

Calibration Check Equipment

Part No.	*Description*
477149	Calibration Kit Model RP with 0.25 lpm Regulator
491041	Calibration Gas - methane, 2.5%
473180	Calibration Gas - 300 ppm CO
813718	Calibration Gas - methane, 2.5% oxygen, 15%60 ppm CO
813720	Calibration Gas - methane, 2.5% oxygen, 15%300 ppm CO 10 ppm H_2S
710288	Gasmiser™ Demand Regulator 0 - 3.0 lpm

Accessories

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

Approvals

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

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

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

Gasport Gas Tester Kits

	LEL Display	O_2	CO	H_2S	Alarms Always	Alarms Optional	Leak Detect Page	Peak	Alkaline Battery	NiCd Battery	5ft Coiled Line	1ft Probe	Part No.
4-Gas, Selectable, NiCd	•	•	•	•		•	•	•		•	•	•	711489
4-Gas, Selectable, Alkaline	•	•	•	•		•	•	•	•		•	•	711490
3-Gas, Selectable, NiCd	•	•	•			•	•	•		•	•	•	711493
3-Gas, Selectable, Alkaline	•	•	•			•	•	•	•		•	•	711494
2-Gas, Selectable, NiCd	•		•			•	•	•		•	•	•	711495
2-Gas, Selectable, Alkaline	•		•			•	•	•	•		•	•	711496
4-Gas, Alarms On, NiCd	•	•	•	•	•		•	•		•	•	•	711491
4-Gas, Alarms On, Alkaline	•	•	•	•	•		•	•	•		•	•	711492

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

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

ID 08-04-27-MC / May 2000

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

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

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

Offices and representatives worldwide
For further information:

GeoXT

The total GPS platform for all your GIS field requirements

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

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

High-accuracy integrated GPS

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

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

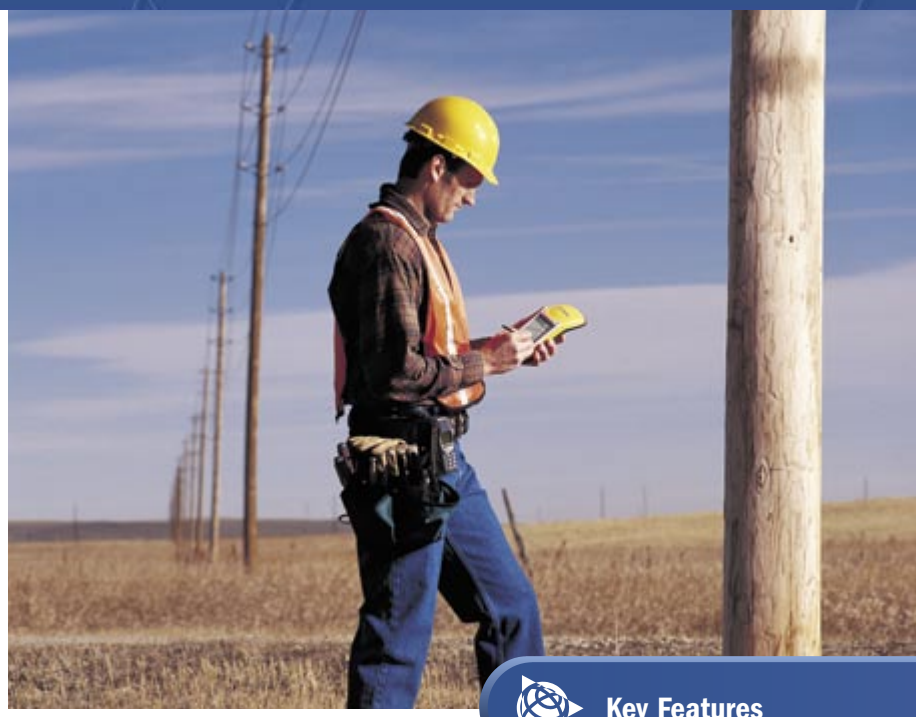
Windows Mobile includes familiar Microsoft productivity tools, including Pocket Word, Pocket Excel, and Pocket Outlook®. Pocket Outlook lets you synchronize e-mails, contacts, appointments, and data with your office computer, so whether you're in the office or in the field, you're always up to date.

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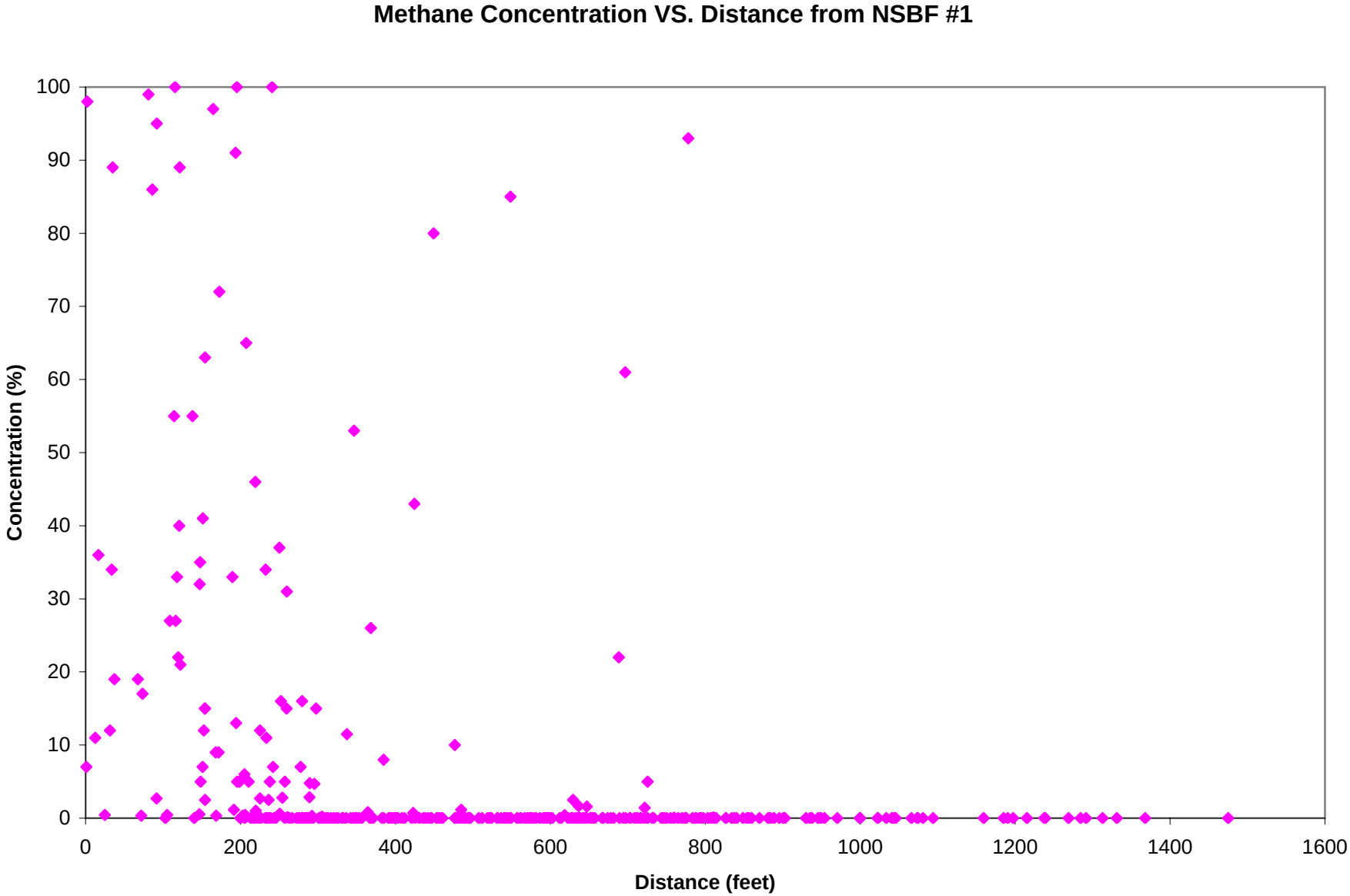
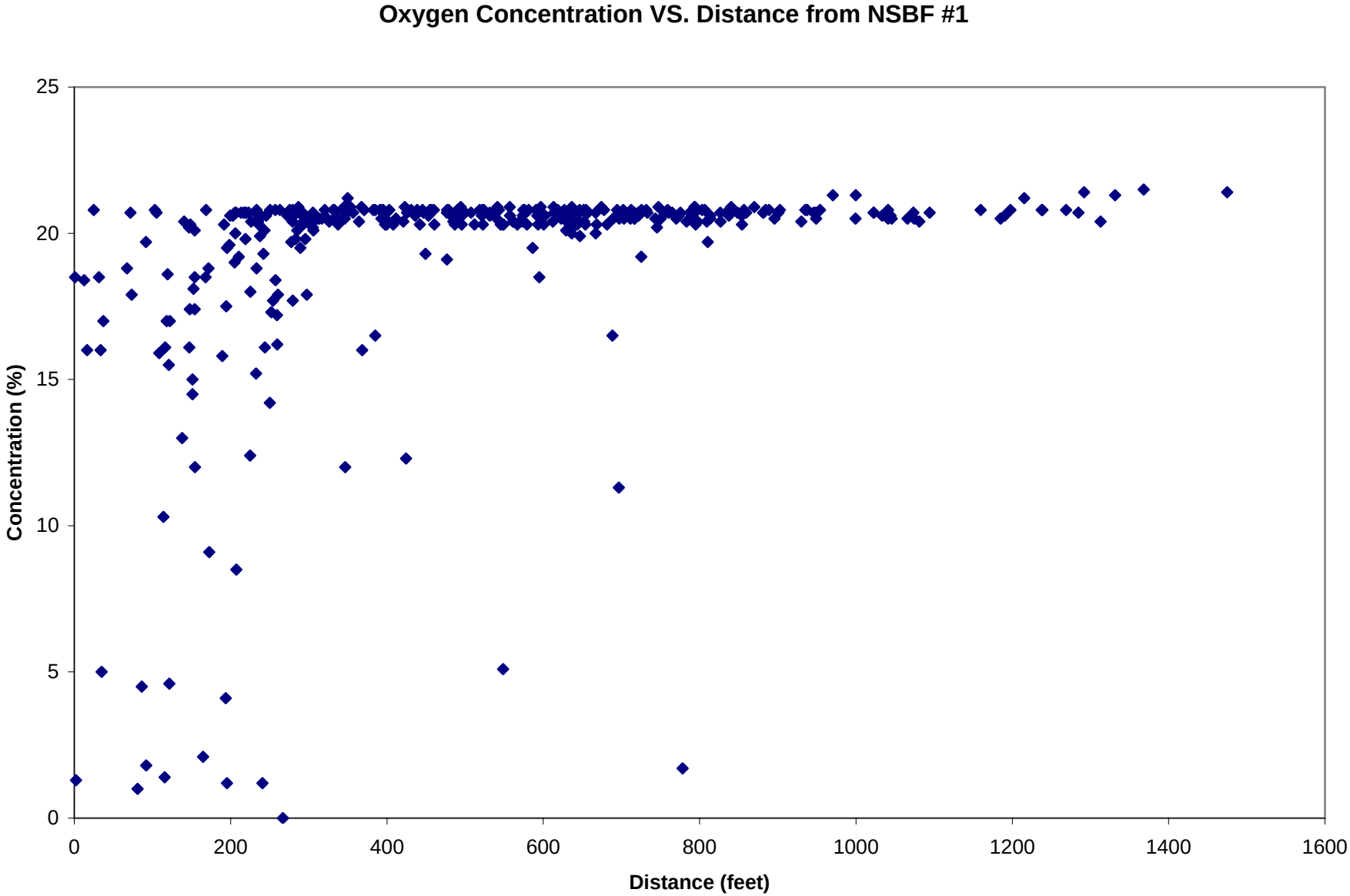
Trimble Navigation Australia Pty. Ltd
Level 1 • 123 Gotha St • Fortitude Valley
Queensland 4006 • AUSTRALIA
+61-7-3216-0044 Phone • +61-7-3216-0088 Fax

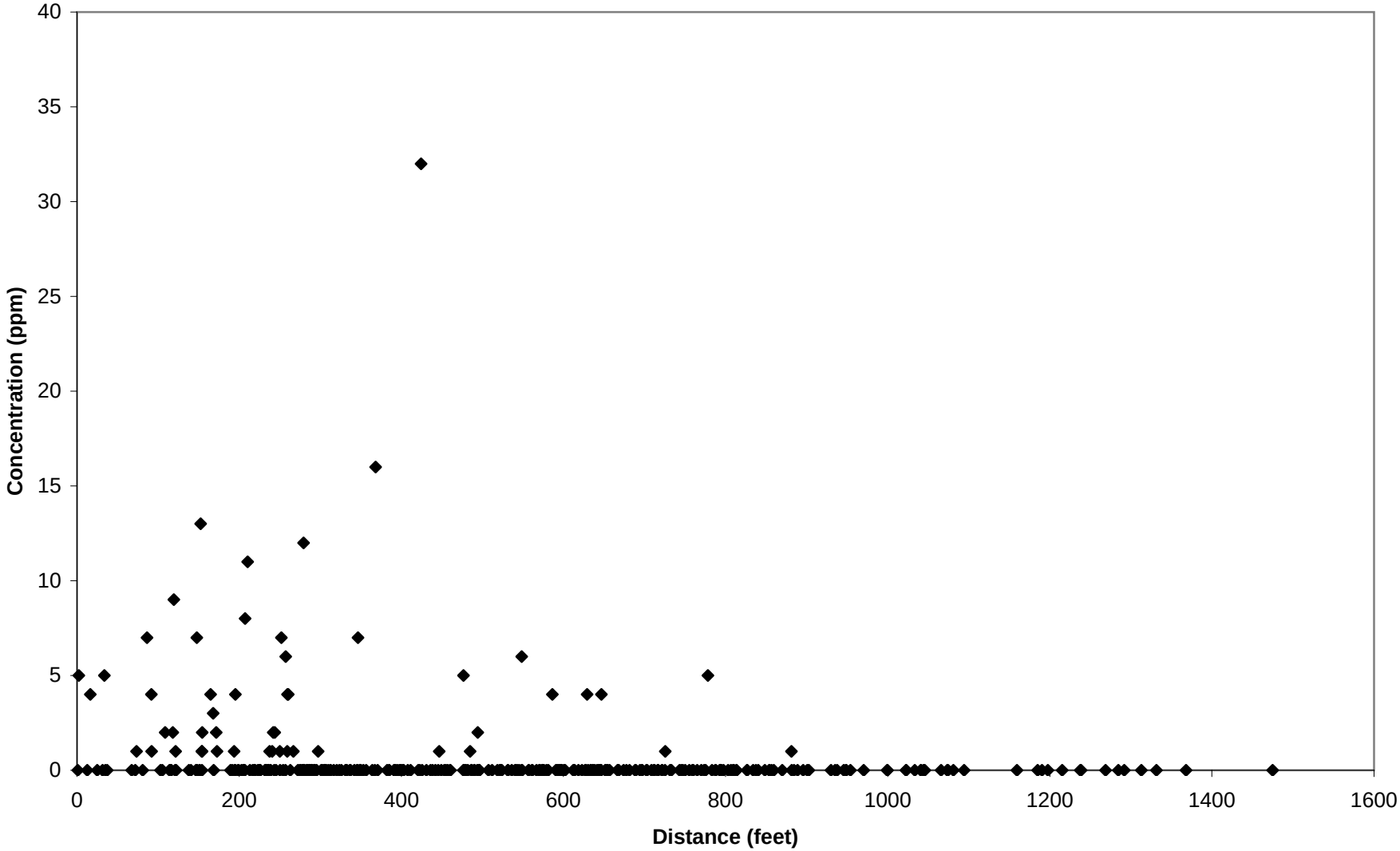
APPENDIX F

CHARTS ILLUSTRATING DISTRIBUTION OF METHANE, O_2, CO, AND H_2S

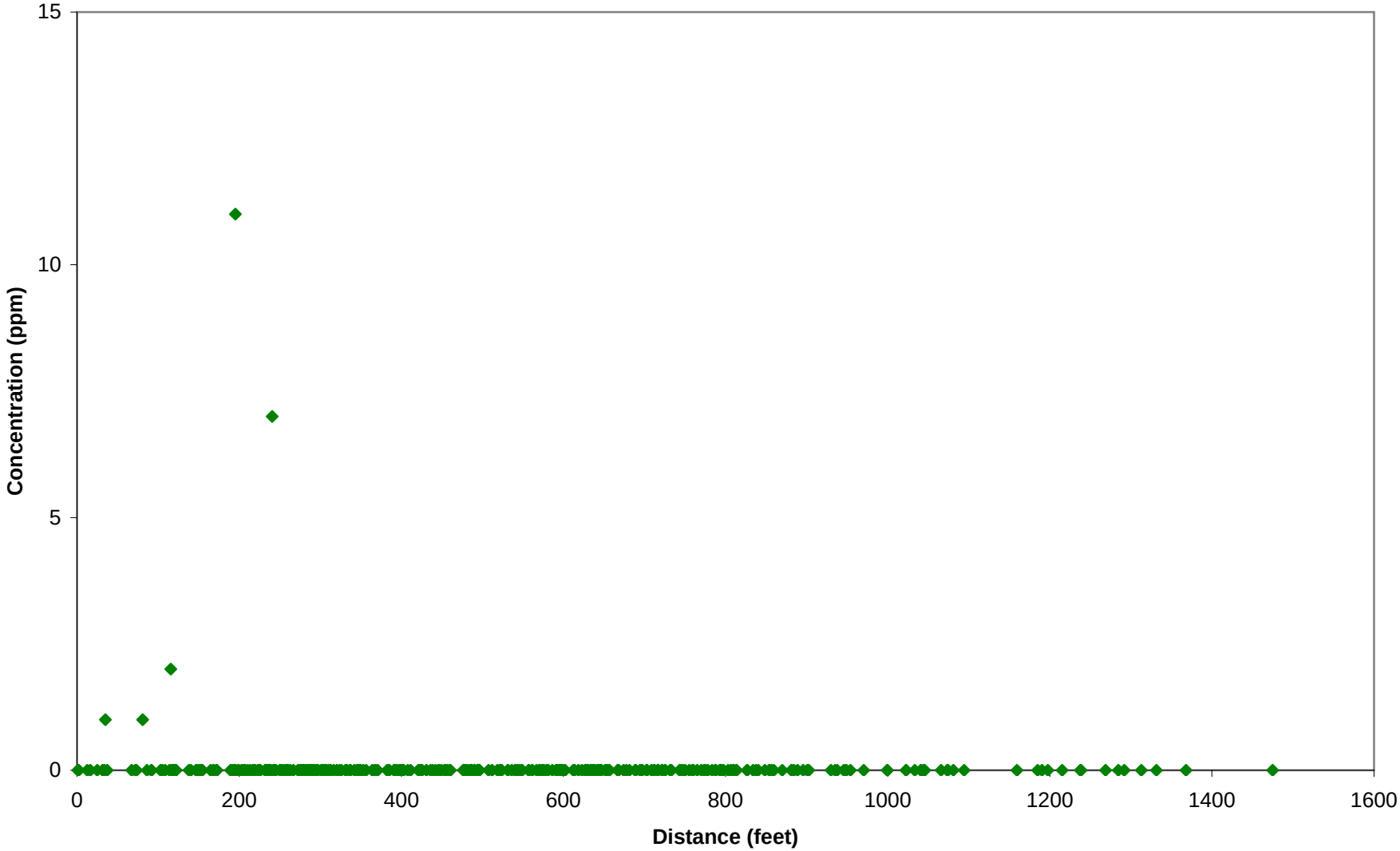

Methane Concentration VS. Distance from NSBF #1
Concentration (%)
100
90
80
70
60
50
40
30
20
10
0
0
200
400
600
800
1000
1200
1400
1600
Distance (feet)


Oxygen Concentration VS. Distance from NSBF #1
Concentration (%)
25
20
15
10
5
0
0
200
400
600
800
1000
1200
1400
1600
Distance (feet)

Carbon Monoxide Concentration VS. Distance from NSBF #1



Hydrogen Sulfide Concentration VS. Distance from NSBF #1



APPENDIX G

SOIL GAS SAMPLE ANALYTICAL REPORTS - LT ENVIRONMENTAL, INC.

ANALYSIS REPORT

Lab #:	79627	Job #:	5864
Sample Name/Number:	OGCC0501-a		
Company:	LT Environmental		
Date Sampled:	2/24/2005		
Container:	Cali-5-Bond Bag		
Field/Site Name:			
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	3/01/2005	Date Reported:	3/07/2005

Component	Chemical mol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd			
Hydrogen Sulfide	nd			
Helium	nd			
Hydrogen	nd			
Argon	0.0890			
Oxygen	1.90			
Nitrogen	7.40			
Carbon Dioxide	5.36			
Methane	85.08	-43.76	-198.1	
Ethane	0.153			
Ethylene	nd			
Propane	0.0135			
Iso-butane	0.0021			
N-butane	0.0023			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 866

Specific gravity, calculated: 0.648

nd = not detected. na = not analyzed. Isotopic composition of carbon is relative to VPDB. Isotopic composition of hydrogen is relative to VSMOW. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %. Chromatographic analysis based on standards accurate to within 2%.

ANALYSIS REPORT

Lab #:	79628	Job #:	5864
Sample Name/Number:	OGCC0501-b		
Company:	LT Environmental		
Date Sampled:	2/24/2005		
Container:	Cali-5-Bond Bag		
Field/Site Name:			
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	3/01/2005	Date Reported:	3/07/2005

Component	Chemical mol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd			
Hydrogen Sulfide	nd			
Helium	nd			
Hydrogen	0.0015			
Argon	0.831			
Oxygen	18.47			
Nitrogen	66.76			
Carbon Dioxide	0.88			
Methane	13.03	-44.73	-199.9	
Ethane	0.0232			
Ethylene	nd			
Propane	0.0019			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 132

Specific gravity, calculated: 0.947

nd = not detected. na = not analyzed. Isotopic composition of carbon is relative to VPDB. Isotopic composition of hydrogen is relative to VSMOW. Calculations for BTU and specific gravity per ASTM D3588. Chemical compositions are normalized to 100%. Mol. % is approximately equal to vol. %. Chromatographic analysis based on standards accurate to within 2%.

ANALYSIS REPORT

Lab #:	79629	Job #:	5864
Sample Name/Number:	OGCC0501-c		
Company:	LT Environmental		
Date Sampled:	2/24/2005		
Container:	Cali-5-Bond Bag		
Field/Site Name:			
Location:			
Formation/Depth:			
Sampling Point:			
Date Received:	3/01/2005	Date Reported:	3/07/2005

Component	Chemical mol. %	Delta 13C per mil	Delta D per mil	Delta 15N per mil
Carbon Monoxide	nd			
Hydrogen Sulfide	nd			
Helium	nd			
Hydrogen	nd			
Argon	0.785			
Oxygen	17.31			
Nitrogen	64.29			
Carbon Dioxide	1.09			
Methane	16.49	-44.82	-200.2	
Ethane	0.0285			
Ethylene	nd			
Propane	0.0024			
Iso-butane	nd			
N-butane	nd			
Iso-pentane	nd			
N-pentane	nd			
Hexanes +	nd			

Total BTU/cu.ft. dry @ 60deg F & 14.7psia, calculated: 168

Specific gravity, calculated: 0.932

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

Chemical analyses based on standards accurate to within 2%