

Project #1984



**METHANE MONITORING AND
RESPONSE PLAN**

**PETROGLYPH OPERATING COMPANY,
INC'S LITTLE CREEK COAL BED
METHANE RECOVERY FIELD**

HUERFANO COUNTY, COLORADO

April 2008

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NORWEST
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1 INTRODUCTION

Norwest Applied Hydrology (“Norwest”) was retained by Petroglyph Operating Company, Inc. (Petroglyph) to develop a monitoring and response plan for methane detected in domestic water supply wells located within Petroglyph’s Little Creek Field in Huerfano County, Colorado. The purpose of the plan is to detail ongoing monitoring efforts to detect methane in these domestic wells and outline a response plan that includes steps to be taken to protect the well owner health, safety, and welfare if methane is detected in these wells. The plan addresses various action levels that are dependent on the level of methane detected and the threat that the methane level represents to health and safety of the domestic well owner or user. The plan is intended to be dynamic requiring periodic review and evaluation as additional information is gathered and the plan is implemented.

Information included in the plan has been obtained from various sources. Petroglyph provided information on existing conditions, ongoing monitoring and methane detectors purchased for use by the domestic well owners and the local fire department. Records were obtained from the Colorado Division of Water Resources Office of the State Engineer on existing wells in the vicinity. Hydrogeological information for the site and surrounding area was obtained from reports by Norwest Applied Hydrology, Norwest Questa, the U.S. Geological Survey and the Colorado Geological Survey as well as information collected by the Colorado Oil and Gas Conservation Commission (COGCC). Additional information was derived from other publicly-available sources.

The plan is divided in to several sections. The next section provides background on Petroglyph’s coal bed methane operation and the methane that has been observed in the domestic water supply wells in the vicinity. This section discusses the potential causes and the response to date, including the actions taken by Petroglyph in the interest of public health and safety. Section 3 provides an overview of methane gas, how it behaves and the hazards methane gas represents. Section 4 provides the monitoring and response plan including a detailed list of ongoing monitoring and responses for various levels of methane detected during ongoing monitoring. Section 5 discusses periodic review and updating of the plan as necessary. Included with this plan in the appendices are a list of contact information, an example of a handout to be given the property owners when methane is detected on their property, background information on the methane detectors Petroglyph will provide to property owners as needed, and a form to be used to provide information on periodic updates to the Monitoring and Response Plan.

2 BACKGROUND INFORMATION

2.1 GEOLOGY AND HYDROGEOLOGY

Petroglyph's operation occurs in the Raton Basin and is located between the towns of Walsenburg and La Veta (Figure 1). The operation produces coal bed methane from the Vermejo Formation located at a depth of approximately 1,700 feet in the project area. The Vermejo Coal Formation outcrops approximately 3 to 3.5 miles to the east of the project area. The outcrop is visible in some areas and the coal has been mined along the outcrop.

Figure 2 shows the stratigraphic sequence for the project area. Underlying the Vermejo Formation is the Trinidad Sandstone Formation. The Vermejo Formation and the Trinidad Formation appear to be hydrologically connected and pumping in one formation will affect piezometric pressures in the other formation. Overlying the Vermejo Formation is the Raton Formation. The Raton Formation is approximately 600 feet thick in the project area and also contains coal seams, however within the project area these seams are less continuous and thinner than in other portions of the Raton Basin. The Poison Canyon Formation lies above the Raton Formation, approximately 800 to 1,000 feet above the Vermejo Formation and serves as a shallow drinking water source for many property owners in the vicinity of the project area. Although water is available in the Poison Canyon Formation, the sand lenses which contain the water are discontinuous and the water source is not considered to have long-term, consistent reliability. The US Geological Survey issued Water Supply Paper 1805 (Ground Water in Huerfano County, Colorado) in 1966 and in this publication discussed the limitations of the Poison Canyon Formation as a water source including the fact that yields from the aquifer were small and the use of the aquifer for water supply would be subject to perennial water shortages (USGS 1966).

Crossing the project area are numerous dike structures. These structures are intrusions radiating from and formed during the intrusion of the Spanish Peaks. The dike structures do not appear to provide hydraulic connectivity from the Vermejo and Trinidad Formations to the Poison Canyon Formation in the project area as evidenced by differences in hydraulic heads from these units.

2.2 PETROGLYPH OPERATIONS IN HUERFANO COUNTY

Petroglyph began operation of the Little Creek Field to recover coal bed methane in 1998. Water was pumped from the Vermejo coal to dewater the coal seam and allow release of the methane gas for recovery by Petroglyph. Pumping rates were increased in mid 2005 and heads in the Vermejo dropped rapidly as a result of the pumping increases. As a result of detection of methane in domestic wells, Petroglyph voluntarily and temporarily shut in its wells on July 20, 2007. Petroglyph began a program to investigate, monitor and mitigate the presence of methane in the Poison Canyon Formation.

Upon the discovery of methane in the shallow drinking water wells and shutting in of the CBM production wells, Petroglyph in a cooperative effort with the COGCC initiated an investigation, monitoring and mitigation program. The program included an evaluation of nearby domestic wells for the

presence of methane; a gas composition and isotope analysis to determine the origin of the methane, an evaluation of the potential pathways for gas migration including an evaluation of drill holes in the vicinity; and monitoring of pressure and water level in CBM wells and water wells.

2.3 INVESTIGATION AND REMEDIATION

Methane has migrated from the lower Vermejo Formation into the Poison Canyon Formation which lies approximately 800 to 1,000 feet above. While the conduit or conduits which allow this seepage to occur have not been defined and parties may disagree on the potential contribution from natural or manmade conduits, there is no argument that the methane gas present in the Poison Canyon Formation has migrated from the Vermejo Formation. Some gas could have been present in the Poison Canyon Formation prior to Petroglyph's operations and anecdotal evidence does exist that gas has been present in the drinking water aquifer in free and dissolved form for quite some time.

At this time, the size and nature of the conduit between the shallow Poison Canyon aquifer and the Vermejo coals is unknown. However; the data obtained to date does not support wide-spread naturally occurring conduits because the shallow aquifers have water pressure heads which are over 500 feet higher than the Vermejo coals and have not shown the rapid decrease and subsequent rebound that the Vermejo coal's water pressure head has shown since the mid 2005 increase in Vermejo water production and July 2007 field shut-in.

Petroglyph in conjunction with the Colorado Oil and Gas Conservation Commission (COGCC) have been actively monitoring both the shallow aquifer water wells and the Coal Bed Methane (CBM) wells to gather data for the purpose of understanding the extent and nature of the communication between the Poison Canyon formation and Vermejo coal formation, provide baseline data and to provide a scientific and data driven framework to mitigate the communication. A proactive three phase plan has been developed by Petroglyph and approved by the COGCC to mitigate methane migration from CBM wells located in the Little Creek Field in Huerfano County, Colorado.

Phase I involves aquifer data acquisition and characterization; initiation and testing of the proposed methane removal system and baseline data monitoring.

Phase II involves the initiation of the proposed hydraulic barrier and full operation of the methane removal system. The hydraulic barrier has been designed to surround the largest known accumulation of free methane in the Poison Canyon aquifer and will improve the recovery of this known methane accumulation without depleting the Poison Canyon. Data gathered from drilling, completing, and testing the proposed wells in the first two phases will be used to refine the plan to maximize the removal of methane in the shallow aquifer.

Phase III involves long term methane removal from the Vermejo coal formation; remediation of shallow aquifer, and potential for final identification and plugging of methane migration pathway. Phase III includes a strategy for de-gassing Vermejo coals in a controlled manner which would allow future public utilization of this large fresh water aquifer without methane gas release concerns.

The implementation of the mitigation system will allow for collecting and a controlled venting of the gas, instead of the currently uncontrolled movement of gas, from the shallow aquifer system. Petroglyph has evaluated the potential for flaring of the gas and, as a result, methane gas collected during the mitigation will be collected for placement in the production system, if volumes are adequate, or will be flared using an enclosed, smokeless flare.

3 OVERVIEW OF METHANE

3.1 CHEMICAL PROPERTIES

Methane is a colorless, odorless and tasteless gas. It is composed of one carbon atom and four hydrogen atoms with a chemical symbol of CH₄. With a specific gravity of 0.555, methane is the lightest of all hydrocarbons. It rises easily in air and can accumulate near the higher, stagnant parts of enclosed structures. Because of its colorless and odorless nature methane is extremely difficult to detect without gas detection instruments. Methane is not considered toxic and has no known direct health effects. However, because it will displace oxygen, it is an asphyxiant at concentrations over 50% in air. Methane is extremely flammable and, in the right mixture with air, can cause an explosive environment.

3.2 OCCURRENCE OF METHANE

Methane is the chief constituent of natural gas. It is produced by biological decay of organic materials (biogenic) and can be found around marshes, landfills and compost piles. It is also produced naturally in the digestive system of humans and animals. Methane can also be produced when organic material is exposed to high pressure and temperatures (thermogenic) causing the carbon bonds to break down. It is especially prevalent in coal beds, but occurs in non-coal rocks as well. Methane occurrence in coal is a by-product of the transformation of organic materials through biochemical and geochemical processes. As environmental conditions change, such as a reduction in pressure by dewatering, this methane is liberated from the coal.

3.3 MIGRATION OF METHANE

Methane will migrate to areas with lower pressure and concentration. These mechanisms are called pressure driven flow and diffusion. Since methane is lighter than air its tendency is to rise vertically, however barriers such as limestone or concrete pads can cause methane to collect. Methane will also collect in areas of lower pressure such as sand formations with high granular space. Methane can be released from these pockets through faulting, erosion or human activity.

3.4 METHANE HAZARDS

3.4.1 Explosion

A lower explosion limit (LEL) and upper explosive limit (UEL) value defines the range of concentrations where flammable gas or vapors are explosive when mixed with air. If the concentration is below the LEL, there is not enough of the gas in the air to ignite. If the concentration is above the UEL there is too much gas in the air to ignite. In conditions with gas concentrations between the LEL and UEL, any ignition source may ignite the gas. Ignition sources include: light switches; pump relays; natural gas appliances such as furnaces and hot water heaters (including the pilot light); lit cigarettes and other flame or spark sources. Methane is highly flammable, with an LEL of 5 percent and a UEL of 15 percent gas to air ratio by volume.

3.4.2 Asphyxiation

Asphyxiation results when there is not enough oxygen available in the air. Like all non-toxic gases, high concentrations of methane can displace oxygen and become an asphyxiant. Oxygen levels in air are normally around 21%. When oxygen is reduced to 16% breathing becomes difficult and at 10% unconsciousness usually occurs.

Methane becomes a problem when it migrates from its source to the surface. Entry into a structure can occur through cracks in the floor, along buried utilities, or as a dissolved component of water. If high enough concentrations of methane enter a structure, then a fire or explosion is possible. The structure could be a home, shed, well house or well bore. Methane dissolved in water can exsolve as water is agitated or pressure is reduced, causing bubbles to form. These methane bubbles can accumulate in a confined space which leads to the potential for an explosive environment. Cisterns are the most likely location in a water system for methane to collect.

When the presents of methane is known or suspected above ambient concentrations the severity of the hazard must be assessed. When concentrations of methane pose a threat, action must be taken to mitigate the hazard and protect public safety.

4 MONITORING AND RESPONSE PLAN

4.1 METHANE MONITORING LEVELS

The response to measured levels of methane will vary based on the concentration of methane. The following table of atmospheric methane equivalency levels is useful for conversion from various methane measurements to compare against the response level table.

TABLE 1 – METHANE EQUIVALENCY LEVELS

Percent of Methane in Atmosphere (%)	Parts Per Million of Methane (ppm)	% of Lower Explosive Level (LEL)
0.05	500	1
0.10	1,000	2
0.25	2,500	5
0.50	5,000	10
1.00	10,000	20
1.25	12,500	25
2.00	20,000	40
3.00	30,000	60
4.00	40,000	80
5.00	50,000	100

The table below should be used as a guideline for appropriate responses based on results of methane investigations.

TABLE 2 – RESPONSE LEVELS

Action Level	Atmospheric Concentration (Percent Volume) OCCUPIABLE SPACES (HOMES)	Dissolved in Water (mg/liter)
Level 1 – No Immediate Action	≤ 0.25%	≤ 10 mg/L
Level 2 – Monitor to Determine Trends	> 0.25% but < 0.5%	
Level 3 – Warning, Investigate	> 0.5% but < 1.0%	> 10 mg/L but < 28 mg/L
Level 4 – Immediate Action	> 1.0%	> 28 mg/L

The above action levels were developed based on a review of health and safety regulations from the Occupational Safety and Health Administration (OSHA), Mine Safety and Health Administration (MSHA) and California Code of Regulations. The U.S. Department of the Interior, Office of Surface Mining (OSM) document *Technical Measures for the Investigation and Mitigation of Fugitive Methane Hazards in Areas of Coal Mining* published in September 2001 provides action levels for methane dissolved in water based on the U.S. Geologic Survey Water Resources Pamphlet No. 19, *Methane in the Fresh-Water Aquifers of Southwestern Louisiana and Theoretical Explosion Hazards* published in 1962.

4.1.1 Level 1 - No Immediate Action

When occupiable spaces have methane concentrations equal to or below 0.25% (5% LEL) and water has a dissolved concentration of methane equal to or below 10 mg/L no immediate action is required.

In cases where an investigation determines methane levels are at or below these levels, no immediate action is required. However, it is recommended that the location be sampled monthly for three months to verify that the methane levels are stable and not increasing. The location can then be monitored every six months, or until levels show an increase.

4.1.2 Level 2 - Monitor to Determine Concentration Trend

Methane concentrations between 0.25% and 0.5% (5% - 10% of LEL) in occupiable spaces should be provided with increased ventilation and monitored periodically to determine trends.

Should a preliminary investigation indicate that methane concentrations are at this level, it is recommended that the home be equipped with a combustible gas monitor. Bi-weekly monitoring should be conducted for three months to determine if methane levels are stable or increasing. If methane levels are stable, monitoring frequency can be reduced to monthly.

Passive ventilation should be provided for enclosed areas with methane concentrations within Level 2.

4.1.3 Level 3 - Warning and Investigation

Methane at concentrations between 0.5% and 1.0% (10% - 20% of LEL) in occupiable spaces and between 10 mg/L and 28 mg/L in water indicate that methane is moving toward potentially hazardous levels. The appropriate action is to provide notification to the property owner that elevated levels of methane are present, provide signage that smoking and other ignition sources are prohibited in the area and attempt to ventilate the area to reduce methane concentrations.

At Level 3, it is recommended that homeowners have combustible gas monitors with a remote visual alarm, if there is not already one present in locations with Level 3 methane concentrations. An investigation to determine all areas with elevated concentrations of methane is warranted. Mitigation activities to reduce concentrations of methane are necessary.

Areas with concentrations within this range should be monitored bi-weekly to evaluate trends and determine if ventilation is sufficient to remove the threat. A bi-weekly monitoring schedule is recommended until methane levels can be reduced to Level 2 or lower.

4.1.4 Level 4 - Immediate Action

Immediate evacuation is required when methane concentrations in occupiable spaces (large enough for a person to enter) is greater than 1.0% (20% of LEL) or more than 28 mg/L is dissolved in water.

The discussions in the following paragraphs provide information on the ongoing monitoring and responses to changes in the monitoring data.

4.2 MONITORING

The following discussions are specific to methane monitoring currently ongoing in the Little Creek Field and provide information on the monitoring frequency and current results as well as the appropriate responses to changes in the data.

4.2.1 Well Monitoring and Response

Petroglyph monitors or has monitored 76 wells for gas content including levels of methane, oxygen, carbon monoxide, and hydrogen sulfide. The program has evolved during the time period of monitoring and continues to evolve to include wells that have shown detectable methane and wells added or removed at the request of well owners. Of these 76 wells, 5 are no longer sampled and 8 were not sampled during the most recent monitoring period of Mid-February to Mid-March. Of the remaining 63 wells, 48 were monitored on a bi-weekly basis and the remaining 15 were monitored once during the most recent reporting period.

The monitoring results for the 63 wells sampled showed that 39 wells had no change from the previous monitoring period measurements. % LEL and % by volume CH₄ were evaluated to determine if the wells were showing an increase or decrease. Four wells showed increases in % LEL and % by volume methane, with 2 wells increasing only slightly in those values. Seventeen wells showed a decrease in % LEL and % by volume CH₄, with 10 wells showing only a slight decrease in these values. Two wells showed variable results and one well was a new sampling site with no data yet available.

Well monitoring varies from month to month, primarily as a result of additional requests from homeowners to sample their wells. Should aerial surveys, outcrop monitoring or seep monitoring indicate a change in methane levels or areas where methane is present, any water wells that could potentially be affected by such changes would be added to the monitoring list. If added wells do not show detectable levels of methane upon sampling, such wells would be sampled at least twice before removing them from the sampling list.

Should a water well sample show a change in the % LEL that would result in an increase in the response levels outlined in Section 4.1, the well owner would be notified of the change and appropriate measures taken as outlined in Section 4.1. Response levels could include more frequent monitoring, additional ventilation or the installation of an alarm system, depending on the level of the increase.

Wells showing a decrease would not result in downgrading of the response level unless such wells showed an ongoing decrease over a minimum period of four months. A decreased response level could result in decreased monitoring, however the alarm system and additional ventilation would remain in place unless removal was requested by the well owner.

Monitoring Well Result	Change in Response
Increase in LEL to Response Level 2	Equip homes with gas monitor. Passive ventilation provided for enclosed areas. Bi-weekly monitoring conducted for three months to determine if methane levels are stable or increasing. If methane levels are stable, monitoring frequency reduced to monthly.
Increase in LEL to Response Level 3	Install combustible gas monitors with a remote visual alarm, if there is not already one present. Evaluate ventilation. Monitor bi-weekly to evaluate trends and determine if ventilation is sufficient to remove the threat. Reduce monitoring only when level drops to Level 2 or lower.
Increase in LEL to Response Level 4	Immediate evacuation is required.
Decrease in LEL to Response Level 3	Monitor bi-weekly to evaluate trends. Reduce monitoring only when level drops to Level 2 or lower.
Decrease in LEL to Response Level 2	Bi-weekly monitoring conducted for three months to determine if methane levels are stable or increasing. If methane levels are stable, monitoring frequency reduced to monthly.
Decrease in LEL to Response Level 1	Sample monthly for three months to verify that the methane levels are stable and not increasing. Then monitor every six months, or until levels show an increase.

4.2.2 Aerial Surveys Monitoring and Response

Periodic aerial surveys will continue to be conducted to monitor for methane seepage in the vicinity of the Little Creek Field. Petroglyph conducted an aerial survey to identify methane seepage locations in 2007 and will conduct a second aerial survey in August 2008.

Petroglyph will confirm any aerially identified seepage locations through hand-held monitoring within two months of receiving the results from the aerial survey. Should hand-held confirmation indicate the presence of methane seepage in occupied areas, Petroglyph will work with the homeowner to provide an appropriate level of mitigation based on the level of methane detected and the Response Levels outlined in Section 4.1 including providing ventilation, adding any wells to the well monitoring list, and the need for an in-home methane detector. Well sampling will be added to the monitoring program as appropriate and sampling will commence on the well in accordance with the parameters currently being monitored for

domestic well (see Section 4.2.2). Sampling will initially occur bi-weekly for three months in accordance with the procedures for Response Level 2, unless levels warrant that the Response Level be raised. After three months of bi-weekly monitoring, response levels can be reduced, if appropriate, in accordance with Response Level 2.

4.2.3 Hand Held Seep Monitoring and Response

Petroglyph conducts periodic ground surveys using a hand held methane detector at locations where gas has previously been detected, at locations where a property owner requests such a survey or at locations where previous surveys such as the helicopter survey have detected gas seepage. These surveys are conducted based on need or urgency so can range from several times a week or a one time survey based on concerns from a property owner.

As discussed above under the aerial survey, Petroglyph will work with the homeowner to provide an appropriate level of mitigation based on the level of methane detected and the Response Levels outlined in Section 4.1 including providing ventilation, adding any wells to the well monitoring list and the need for an in-home methane detector. Well sampling will be added to the monitoring program as appropriate and sampling will commence on the well in accordance with the parameters currently being monitored for domestic well (see Section 4.2.2). Sampling will initially occur bi-weekly for three months in accordance with the procedures for Response Level 2, unless levels warrant that the Response Level be raised. After three months of bi-weekly monitoring, response levels can be reduced, if appropriate, in accordance with Response Level 2.

4.2.4 In Home Monitoring and Response

Petroglyph offers in home monitors to any homeowners living at the property in the vicinity of Petroglyph's Huerfano County operations with a detectable level of methane in their water well. In addition, if requested by a homeowner Petroglyph will provide an in-home monitor. In-home gas detectors have been provided to 14 landowners with detectable methane in their wells and on request. Multiple detectors have been provided in some cases to more effectively monitor different locations which could be collecting methane gas. Monitors originally provided were in almost all cases installed by the homeowners after instructions by Petroglyph. A card describing actions to be taken by homeowners if the alarm sounds has been provided with the gas detectors. Additionally, Petroglyph has offered to install updated monitors that include both an audible alarm and a visible outside strobe alarm to any homeowners that would like the new monitors. To date, 8 homeowners have requested installation of the new monitors. The new monitors require installation by a contractor and are being scheduled as of the date of this plan.

The original monitors installed, CCI Controls Gas Aware monitors, have a factory default alarm at 25% of LEL. The updated monitors, the Sierra Monitor Corporation Model 2001 combustible gas detector, has a factory default setting of 1,000 ppm (2% LEL), however, it is recommended that these monitors be adjusted to alarm at 10,000 ppm (20% LEL) for methane. Product documentation for both of these detectors has been included as Appendix A. If a combustible gas detector alarm sounds, homeowners are instructed to follow the procedures below. These procedures are listed on a card given to them when the gas monitors are installed.

- Do open doors and windows to the outside to access fresh air.
- Do leave the building immediately.
- From another location call 911 to report a natural gas alarm.

Do Not:

- Do not use, turn on, or turn off anything that might create a spark, such as matches, lighters, light switches, phones (including cell phones), flashlights, or any electrical equipment including computers.
- Do not operate a garage door opener or start an automobile.
- Do not return to the building until it has been examined and declared safe by emergency personnel, and you have been authorized to re-enter.

Homeowners with combustible gas detectors provided by Petroglyph have received a card (attached as Appendix B) with the above information.

No actual alarm emergencies have occurred to date. There have been several false alarms as a result of faulty equipment or power outages, but no methane alarms have occurred from the Petroglyph installed equipment. Based on the data gathered to date, an alarm that affects a number of homes is not expected to occur. If an alarm goes off in a home, starting cars, particularly inside a garage, should not occur. Therefore, the home owner would need to walk away from the home to make an emergency call. The local Fire Departments have been instructed to contact Petroglyph. Petroglyph officials would be available at all times and would respond to make sure the home owner is transported to safety and adequate care is provided to the home owner until they can re-enter their homes. Petroglyph personnel would remain on site or in contact with emergency personnel until the methane levels drop and the alarms cease to trigger. On a case by case basis Petroglyph would work with the homeowner and emergency personnel to determine what has changed within the home or well to trigger the alarm and seek to resolve the problems prior to allowing the homeowner re-entry into the home.

4.2.5 County Responder Information

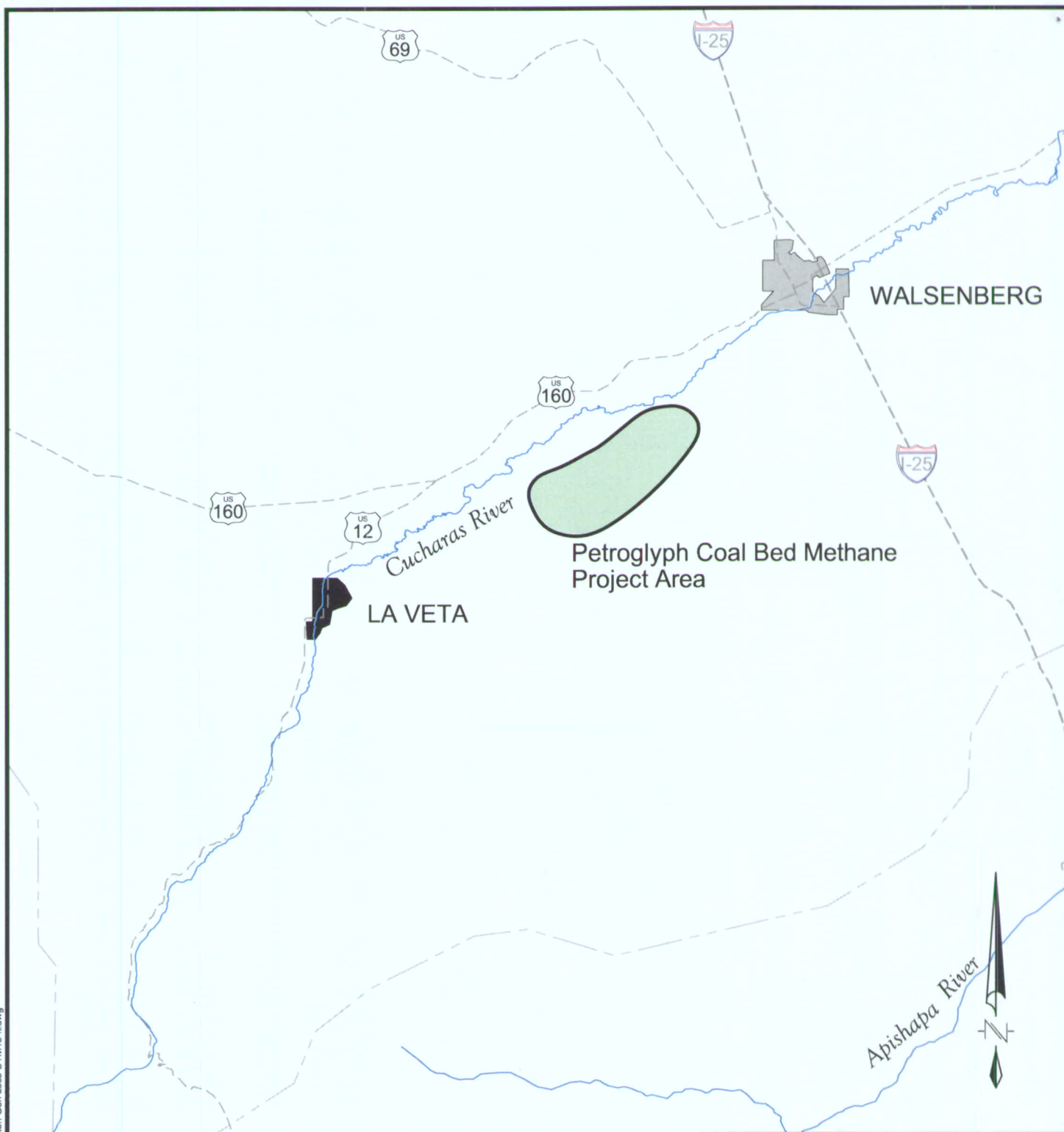
Petroglyph has met with the Huerfano County and La Veta Fire Departments to discuss safety and communication concerning methane detection emergency calls. The fire departments were provided hand held gas detectors for their use, along with Petroglyph 24 hour contact numbers. Petroglyph provided training to the La Veta Fire Department and offered training to the Huerfano County Fire Chief, although to date Huerfano County has not requested training. (Huerfano County had several hand held monitors and was believed to be familiar with their use.) Appendix C provides the Petroglyph 24 hour contact numbers that have been supplied to the Huerfano County Sheriff's office and local fire departments.

In the event that an alarm goes off and the emergency dispatch is notified, the Fire Departments have been instructed to contact Petroglyph staff to make them aware of the situation. Petroglyph staff will respond to all alarms along with the emergency personnel.

5 PLAN UPDATES

This Methane Monitoring and Response plan will be reviewed periodically to ensure appropriate response levels and actions. Petroglyph safety and health personnel, or other qualified persons, will review this document at least once per year.

FIGURES



LEGEND

- County Line
- River

20,000' 0 20,000'
SCALE IN FEET

PETROGLYPH OPERATING
COMPANY, INC.

FIGURE 1 PETROGLYPH REMEDATION GENERAL SITE LOCATION



NORWEST
Applied Hydrology

DESIGN: AHA	DATE: Nov 20, 2007	Layer Manager: -----
DRAWN: JLS	SCALE: As Shown	PLOT/PRINT: 0-00
DRAWING: Vermejo-Raton Gen Locs-UTM13-ft.dwg		

	AGE	STRATIGRAPHIC UNITS
CENOZOIC	QUATER-NARY	Alluvium
	PALEO-CENE	Poison Canyon Formation
		Raton Formation
MESOZOIC	CRETA-CEOUS	Vermejo Fm.
		Trinidad Sandstone
		Pierre Shale

PETROGLYPH OPERATING
COMPANY, INC.

FIGURE 2
GENERALIZED
STRATIGRAPHIC COLUMN



DESIGN: AHA	DATE: Nov 20, 2007	Layer Manager: -----
DRAWN: JLS	SCALE: As Shown	PLOT/ECT NEL 0-00
DRAWING: Gen Stratigraphic Section.dwg		

APPENDIX A
Information on Methane Detectors

Model 200X Series Gas Sensor Monitors

Model 2001 - Combustible Gas

Model 2003 - Hydrogen Sulfide

Model 2006 - Carbon Monoxide

The Model 200X Series are compact, solid-state, fixed-installation single alarm monitors designed for continuous area monitoring of Combustible Gas, Hydrogen Sulfide, or Carbon Monoxide.



The Model 200X Series consists of three separate gas monitors, Model 2001 for Combustibles Model 2003 Hydrogen Sulfide and Model 2006 for Carbon Monoxide. A red LED (light-emitting diode) and audible alarm activate when the concentration of gas exceeds the factory-set (and user-adjustable) level. A green LED indicator on the monitor shows that power is connected and it is a safe condition.

The standard configuration has a buzzer and normally operating open relay, a fail-safe normally operating closed relay is field selectable.

All the electronic circuitry needed to operate the monitor, except the DC input power, is contained in a compact unit. It may be mounted in any orientation. For a single-monitor installation and a local alarm, the accompanying AC-to-DC power supply may be plugged into a standard AC source. The monitors accept 9 - 24 VDC.

Semiconductor-Type Sensor

A solid-state semiconductor-type sensor and associated electronic circuitry ensure trouble-free, long-term operation. There are no pumps, filters or chemical cells to replace or maintain. Except periodic calibration to verify the alarm setting, no attention is required after installation. The user may adjust the alarm level by using a different calibration gas concentration.

A sensor self-check feature will flash the LEDs on and off alternatively and sound an interrupted tone as a warning should the sensor fail (open circuit).

Remote Alarm Available

If a remote alarm is desired, the Model 2102 Dual Channel Alarm Panel can be connected up to 500 feet from the monitors.

Features

- Self-check feature signals sensor failure
- Optional normally operating closed relay
- No chemical cells to replace, no periodic maintenance other than routine calibration
- All the electronic circuitry needed to operate the monitor contained compact unit, power supply plugs into standard AC source

Benefits

- Reliable operation
- Fail-safe configuration
- Maintenance free operation
- Quick easy installation and connection to alarm panel

Model 2001 Combustibles Gas Monitor

The Model 2001 can detect a wide range of combustibles. Typical applications include combustible gas monitoring in basements near waste dumps, manhole, tanks, parking garages and vehicle maintenance facilities, laboratories, chemical plants, and more.

Model 2003 Hydrogen Sulfide Monitor

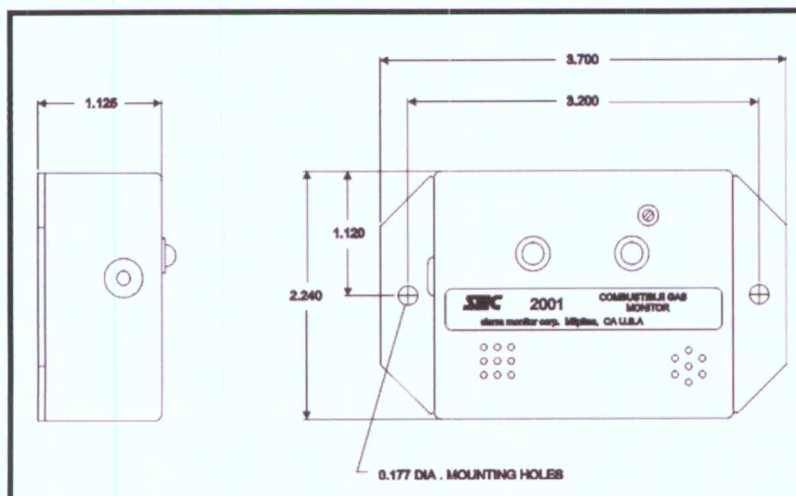
The Model 2003 can be used in such typical applications as waste water treatment plants, laboratories and chemical plants.

Model 2006 Carbon Monoxide Monitor

The Model 2006 Carbon Monoxide Gas Sensor Module can be used to provide an early warning of CO accumulation in tanks, laboratories, chemical plants, parking garages, vehicle test facilities and more.

SPECIFICATIONS

INDICATORS:		OUTPUT:	
Visual:	Green LED for Monitor "ON"/Safe Red LED for Alarm LEDs oscillate on/off for sensor failure	0.5 AMP dry contact. 100 VDC, 130 VAC Nominal 5 volts DC, source 25 mA, SAFE and ALARM signals 70 dB buzzer. TTL interface to Model 2102 Alarm Panel is user configurable.	
Audible:	Sustained alarm tone for as long as gas is present. Interrupted tone or sensor failure.	RESPONSE TIME:	
		Model 2001	Less than 30 seconds
SENSOR TYPE:	Solid-State Metal Oxide Semiconductor	Model 2003	For 50 ppm alarm, if 50 ppm H ₂ S is present, 1-4 min. If >250 ppm H ₂ S is present, 30-60 seconds.
RANGE;	(at 50% relative humidity)	Model 2006	Less than 30 seconds
Model 2001	300-2,000 ppm Hydrogen 500-10,000 ppm Methane	PERIODIC MAINTENANCE:	None, other than routine calibration
Model 2003	10-50 ppm Hydrogen Sulfide (H ₂ S)	OPERATING TEMPERATURE RANGE:	-4°F to 158°F -20°C to 70°C
Model 2006	50-500 ppm Carbon Monoxide (CO)	ENCLOSURE MATERIAL:	Aluminum
FACTORY ALARM SETPOINT:		SIZE:	3.7 x 2.2 x 1.1 in. (9.4 x 5.7 x 2.8 cm)
Model 2001	1000 ppm Methane	WEIGHT:	3.8 oz (108 g)
Model 2003	50 ppm H ₂ S		
Model 2006	100 ppm CO		
INPUT:	9 - 24VDC (±1V), 250 mA Plug-in 120 VAC AC/DC Power Supply is provided		



ORDERING INFORMATION

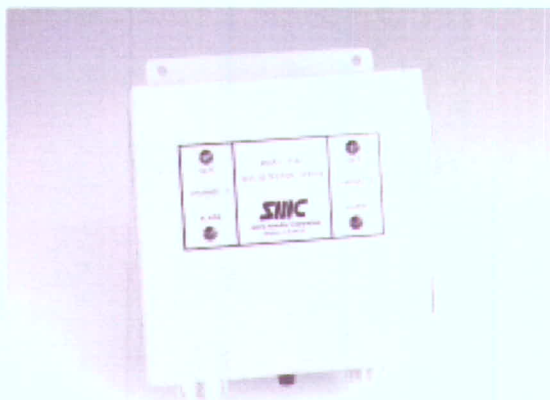
Combustible Gas	2001-00
Hydrogen Sulfide	2003-00
Carbon Monoxide	2006-00





sierra monitor corporation

Gas Alarm Panel Model 2102 - 2 Channel



The 2102 Gas Alarm Panel provides DC Power, visual alarm annunciation, and remote relays for Sierra Monitor's fixed installation combustible or toxic gas monitors (20X and 200X Series).

The Model 2102 Gas Alarm Panel from Sierra Monitor provides a simple, easy-to-install, low-cost remote annunciator system for the Model 20X and 200X fixed installation gas monitors. The Model 2102 supplies the gas monitors with DC power, individual alarm relays and LED's for visual alarm indication. An audible alarm is available on the 2102-01.

The Model 20X and 200X series are fixed installation gas sensor modules designed for continuous operation in open or confined areas. The Model 20X and 200X Series gas modules consist of the Model 201 and 2001 for Combustibles, the 203 and 2003 for Hydrogen Sulfide and the Model 206 and 2006 for Carbon Monoxide.

Reliable, continuous monitoring

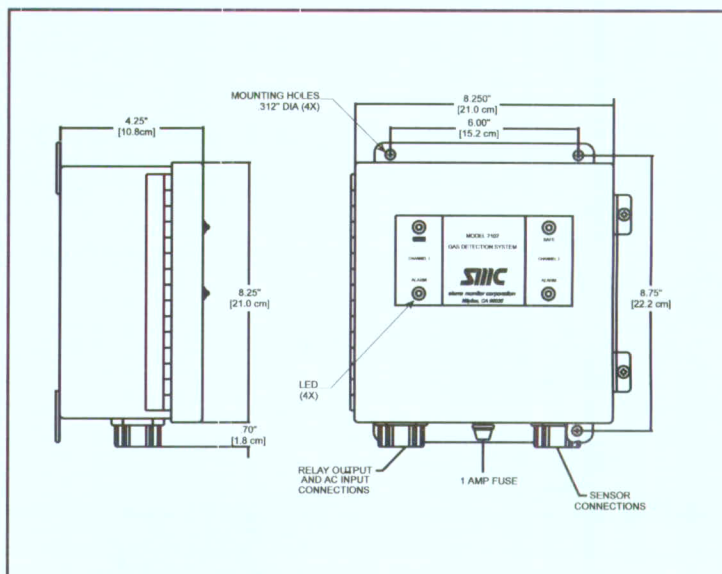
Solid state indicators and circuitry provide you with reliable long term operation. Each panel contains a set of red and green LED's (light emitting diodes) for each channel. Under normal conditions the alarm panel provides a constant "SAFE" light status for each module. This indicates that all monitors are on and are detecting an absence of hazardous level of gas at each monitor location. When a high gas concentration occurs at any module alarm LEDs will identify monitor number and alarm condition.

Easy installation

Each alarm panel is quick and easy to install. The panels are lightweight, self-contained units that can be mounted to a wall or other vertical surface. The alarm panels can be mounted up to 500 feet from the gas sensor modules.

SPECIFICATIONS AND ORDERING INFORMATION

ENCLOSURE:	NEMA 3, JIC Type
INPUT POWER	120 VAC/50-60 Hz
Voltage:	(220 VAC available)
Current (@ 130 VAC):	250 mA
Power (@ 130 VAC):	30 watts
Fuse:	1/4 amp
OUTPUT POWER (per channel)	
Voltage:	9-13 VDC Adjustable
Current:	350 mA DC/Channel
RELAYS:	Two 6 Amp dry contacts SPDT 300 VAC 28 VDC
OPERATING TEMPERATURE:	+32°F to 113°F (0°C to +45°C)
STATUS INDICATORS:	Audible Alarm (2102-01) Red and Green LEDs
SIZE (Hx Wx D):	8.3 x 8.3 x 4.4 in (20.0 x 20.0 x 10.0 cm)
WEIGHT:	7.5 lb. (3.4 Kg)



Streamline® Low Profile Mini Strobe

Model LP1

COMPACT, ECONOMICAL STROBE LIGHT — IDEAL FOR CONTROL PANEL APPLICATIONS

- Easy access dome available in five colors
- Available in 12VDC, 24VDC, 120VAC and 240VAC
- Surface mount
- Low profile — only 2.6" High by 2.33" Wide by 5" Long
- UL Listed, CSA Pending
- Type 4X, IP65 enclosure

Federal Signal introduces the Model LP1 low profile strobe light. This rectangular Type 4X strobe light is available in five colors: amber, blue, clear, green and red. The LP1 is designed to be flush mounted to control panels or other flat surfaces. Mounting is accomplished with two supplied 1 1/4", 8/32 slotted hex bolts. A polypropylene gasket is supplied to create a water-tight and dust-tight seal. The gasket mounts between the base of the light and the mounting surface.

The user replaceable strobe tube is rated for 4,000 hours of life. The LP1 is available in 12VDC, 24VDC, 120VAC and 240VAC versions. The unit is UL Listed. Access to the printed circuit board and strobe tube is provided through the back of the unit.

With its Type 4X rating, small size, and bright signal, the LP1 suits an endless number of applications. The LP1 is especially suited for use on control panels, machines, above entry ways, on walls, and along assembly lines. The 12/24VDC units are suitable in battery backup systems and vehicular applications such as forklifts and moving guided vehicles.

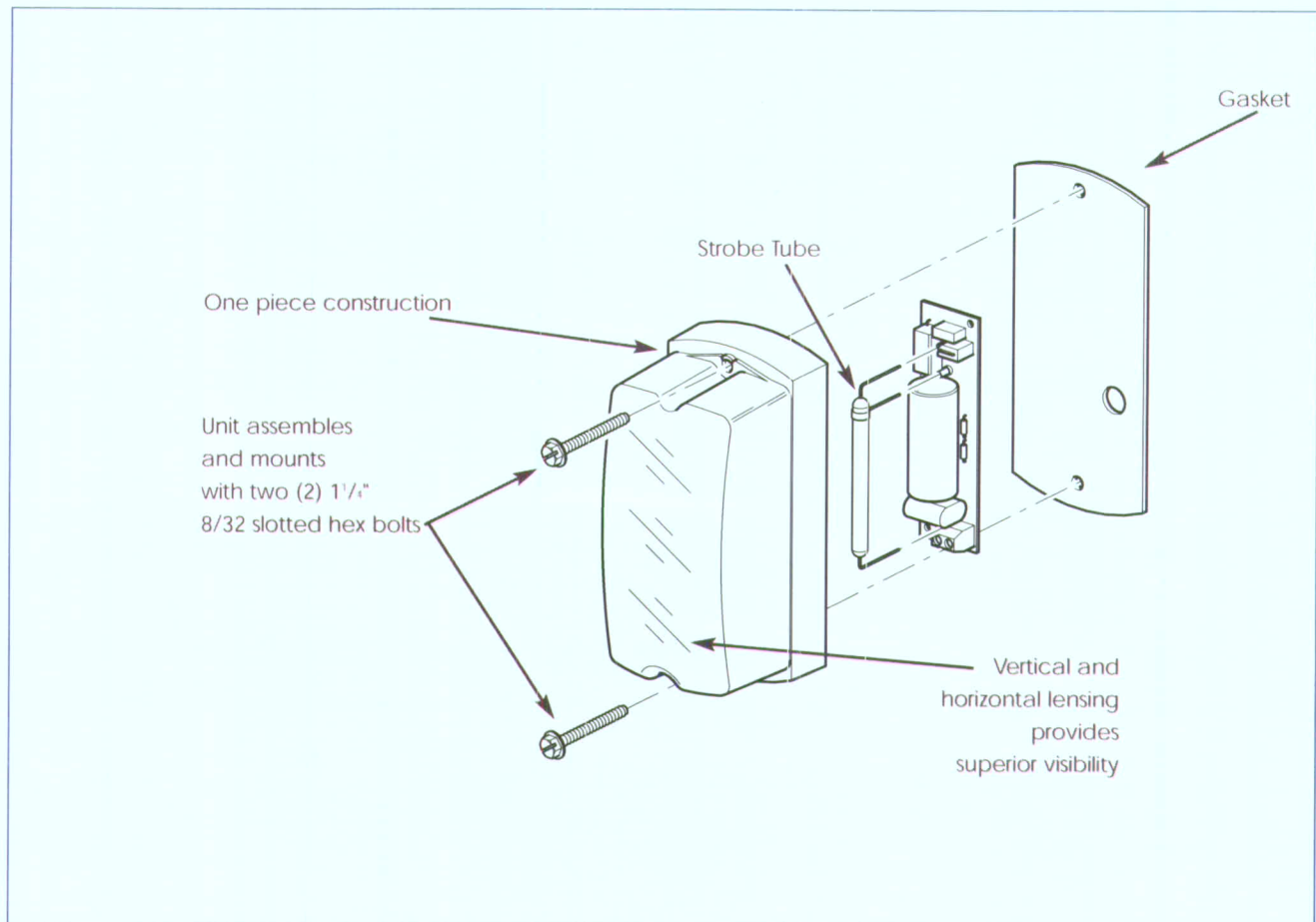
Model	Voltage	Operating Current	Flash Rate/ Minute	Candlepower Peak ¹	ECP ²	Mount
LP1	12VDC	0.18 amps	80	108,000	30	Surface
LP1	24VDC	0.08 amps	80	108,000	30	Surface
LP1	120VAC	0.06 amps	80	108,000	30	Surface
LP1	240VAC	0.03 amps	80	108,000	30	Surface

¹ Peak candlepower is the maximum light intensity generated by a flashing light during its light pulse

² ECP (Effective Candlepower) is the intensity that would appear to an observer if the light were burning steadily



LOW-PROFILE MINI STROBE (LP1)



SPECIFICATIONS

Lamp Life:	4,000 hours	4,000 hours
Lamp Style:	Strobe	Strobe
Net Weight:	0.23 lbs.	0.1 kg
Shipping Weight:	0.6 lbs.	0.27 kg
Height:	2.61"	6.63 cm
Width:	2.33"	5.92 cm
Length:	5.05"	12.83 cm

HOW TO ORDER

- Specify model, voltage and color
- Please refer to Model Number Index LP1 beginning on page 373

REPLACEMENT PARTS

<u>Description</u>	<u>Part Number</u>
Replacement Strobe Tube	K149128A
Dome, Amber	K8435711A-02
Dome, Blue	K8435711A-03
Dome, Clear	K8435711A
Dome, Green	K8435711A-04
Dome, Red	K8435711A-01

7500 Series Instructions

Please **READ THESE INSTRUCTIONS FIRST** before installing the detector. Then, follow these instructions step by step. **KEEP** these instructions for future reference.

7500 Detector Start-up Instructions

Detector Start-Up Instructions:

WARNING! Be prepared for high a 85db audible alarm sound.



1. Remove plastic and all shipping material from detector.
2. **Before installing the batteries**, plug the detector into any 110V electrical outlet.
3. Wait for the detector's yellow **fault light** to illuminate (takes 5 to 30 seconds).
4. Once the yellow light is illuminated, remove (unplug) the detector from 110V outlet. **Now, plug back the detector into the wall outlet again.**
5. The detector's green light (now solid green) should be on indicating normal detector operation. **If green and/or red light begins flashing** along with the illuminated **fault yellow light**, simply REMOVE the detector from the wall outlet and reinstall again.

Alarm Condition:

6. Once reinstalled, the detector will now go into **alarm**, usually within 15 seconds of installation; the alarm will sound the red light will flash.

This function illustrates how the detector operates and signals the user when a gas leak is discovered.

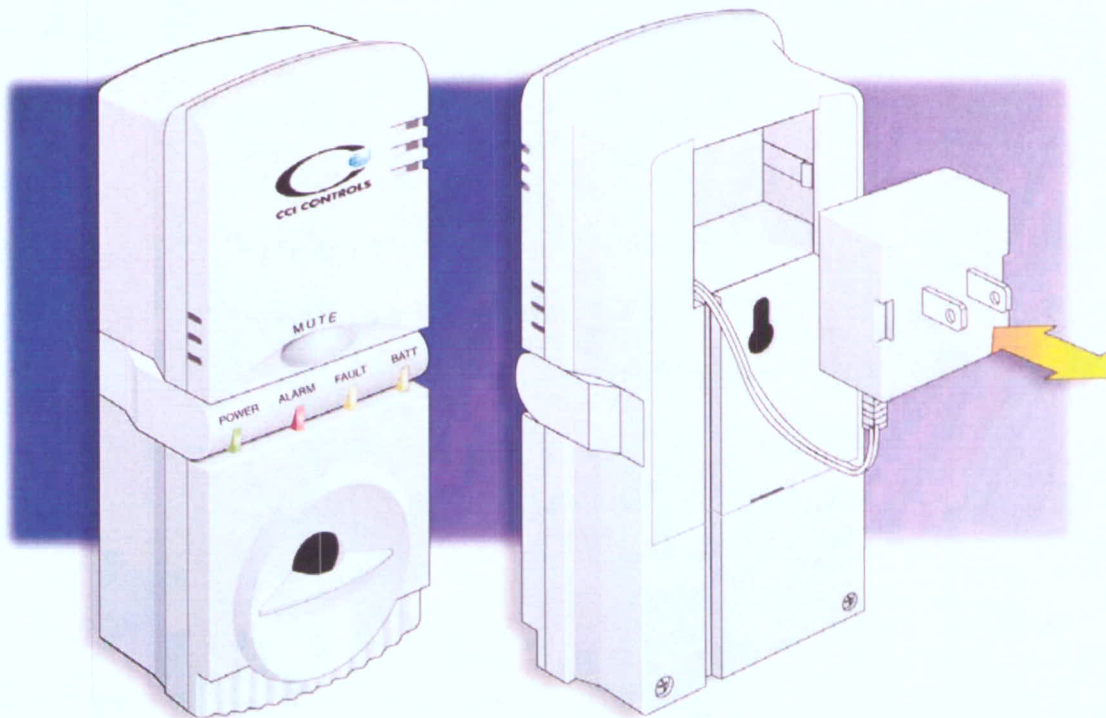
7. The detector will remain in alarm until the MUTE BUTTON is pushed; or, if the detector is left unattended, it will sound for up to 2.5 minutes.

After this conditioning period, the detector will stop alarming, and the detector's green light will stay lighted. Now, install the (2) enclosed rechargeable AA batteries.

Battery Installation:

8. Remove the detector from the 110V wall outlet again. Turn the detector over and remove the battery compartment cover. Install the two rechargeable AA batteries making sure of battery polarity. Replace the battery compartment cover.
9. Reinstall the detector into the 110V wall outlet.
10. The detector's green **POWER** light will light (solid), indicating the unit is now totally operational.
11. **IF** the yellow battery light also illuminates (begins flashing), this indicates the detector is charging the batteries. The yellow light will remain flashing until the batteries are fully charged and then it will go out. If after you have installed the batteries and a solid yellow light comes on, you **MUST** reinstall the batteries. There can only be two detector conditions at this point; (1) a **solid green POWER** light **and/or** (2) a **flashing BATTERY** yellow.
12. For all other detector conditions, please review the information in your Gas Aware User's Manual pages 19 and 20.

13.If you have any questions or need further assistance, call our toll free number at: 800-521-5228.



USER'S MANUAL

NATURAL GAS LEAK ALARM

MODEL 7550



Important notes:

- Please read this manual thoroughly to ensure proper installation, operation, and maintenance of this alarm.
- This natural alarm is only intended for use in residential applications such as a home, apartment, townhouse, or condominium.

Gas Testing Area.

Thank you for purchasing your natural gas alarm from CCI Controls. For over 20 years CCI Controls has been leading the industry in developing high-quality gas leak detection products. CCI Controls is committed to providing state of the art products and excellent service to all customers.

This manual includes information about the installation, maintenance, and operation of your natural gas alarm. It is important to keep this guide in a handy location so you can refer to it as necessary for future use. We believe that a properly installed and maintained alarm is an important part of your family's safety plan. Therefore, prior to installing the natural gas alarm, please read this manual thoroughly.

In the event you have questions regarding the use of your natural gas alarm, contact us at (800) 521-5228, Monday through Friday, 8AM to 5PM Pacific Standard Time.

About natural gas, and your propane gas alarm:

Every day millions of people around the world use natural gas as a fuel to cook food, to heat water, and to warm their homes. Natural gas is an abundant resource, and is considered a safe fuel under normal circumstances in a controlled environment. When natural gas is released into the air through an open burner or leaking pipe, it mixes with air and may combust if ignited. A combustible gas can burn, causing fire, personal injury, and may even cause death. It is because this potential hazard exists, that a natural gas alarm can help protect you and your family.

The point at which a gas can become combustible is referred to as the lower explosive limit (LEL). When a gas concentration reaches 100% of its LEL, a strong potential exists for it to become a combustible gas. This natural gas alarm has been designed to sound an alarm when natural gas is at or near 25% of its LEL at the gas sensor. This means an alarm will sound four times earlier than the point at which a gas becomes a combustible gas. To help alert you to a gas leak, an odorous substance has been added to the natural gas that is supplied to your home. Keep in mind that although the detector is designed to sound an alarm before a combustible condition exists at the gas sensor, you may smell this odorant much earlier.

There are three major parts to the natural gas alarm you purchased. The alarming devices (indicator lights and beeping sounds), the gas sensor, and the power source. In this natural gas alarm, the gas sensor has been built-in to the alarm unit. The natural gas alarm uses a gas sensor to sample the air in the immediate area of the space where installed. When natural gas is detected at the gas sensor, the device sounds an 85DB alarm. The primary power source is from a standard household outlet (120 VAC outlet). This natural gas alarm also has a battery backup system with built-in recharging technology. For your convenience the batteries are included with this unit.

Battery installation and maintenance:

This natural gas alarm uses two 1.2 volt nickel metal hydride (NiMH) batteries 2300 mAH or higher as a backup power source. In the event of an AC power loss, the natural gas alarm can operate using the battery backup power source for approximately 10 hours with fully charged batteries.

When installing batteries for the first time or replacing the batteries follow these steps.

1. Remove the natural gas alarm from its packaging or disconnect the natural gas alarm from AC power.
2. Push and pull up the battery compartment's locking tab and remove the cover.
3. While observing polarity, install or replace the batteries. When the batteries are installed correctly, the GREEN power indicator LED will flash.
4. Replace the battery compartment's cover and connect to AC power. **Batteries must be charged for 24 hours.**
5. Battery installation is complete.

USER'S MANUAL

NATURAL GAS LEAK ALARM

MODEL 7550

Installing your natural gas alarm:

Install the batteries by referring to the Battery Installation and Maintenance section on page 1.

Determine the best location for your natural gas alarm:

In most instances the proper location for any natural gas alarm is within the immediate area where a leak or venting of gas is likely to occur. Many people install natural gas alarms near range tops, stoves, or around heating units. Others consider installing natural gas alarms near appliances that use natural gas as their primary source of fuel. These might include gas dryers or hot water heaters.

Locations not to install the natural gas alarm:

- The natural gas alarm should not be installed next to doors, windows, or other areas where air drafts are likely to occur. Air drafts can blow the natural gas away from the gas sensor.
- The natural gas alarm should not be installed in closets, cabinets, corners of a room, or where air circulation is at a minimum.
- The natural gas alarm should not be installed near intense electromagnetic fields as the fields may produce unpredictable operation. For example, a radio transmitter in close proximity to the natural gas alarm may cause the sensor to malfunction.
- The AC power adapter must never be connected to a wall outlet that is controlled by a wall switch.
- The natural gas alarm is not suitable for installation in hazardous locations as defined in the U.S. National Electric Code.
- The natural gas alarm should not be installed outdoors.

Locations to avoid:

- Avoid installing the natural gas alarm too low to the ground where items such as water and other household chemicals can pollute the sensor.
- Avoid installing the natural gas alarm where it could be exposed to volatile liquids or grease, as these types of agents can pollute the sensor.

Mounting the natural gas alarm:

- Mount the natural gas alarm as close as possible to the appliances or gas fixtures that could be potential sources of gas leaks. It is suggested the natural gas

alarm be wall-mounted at least 12 inches away from any corner or window. The six foot power cord can help position the natural gas alarm in the immediate area where a leak or venting of gas is likely to occur.

- Once AC power is applied, the GREEN power LED will flash for up to one minute. The flashing indicates the natural gas alarm is in the warm-up mode. During the warm-up mode, the sensor stabilizes to your home's unique climate such as temperature and humidity.
- Once the warm-up mode is completed, the GREEN power LED will illuminate continuously (not flash) indicating the alarm is ready to detect natural gas. If only batteries are powering the alarm, the GREEN power LED will flash until AC power is applied.
- Installation is now complete. The final step is to test your natural gas alarm (see How to test your natural gas alarm).

How to test your natural gas alarm:

- The natural gas alarm should be tested following the initial installation. To ensure the continued safe operation of the natural gas alarm, we recommend that you test the natural gas alarm once a week. We want to ensure that the natural gas alarm is working properly, and that you maintain familiarity with its operation.
- For your convenience, the natural gas alarm can be tested using a butane cigarette lighter as a gas source. Since this test requires a butane lighter, it MUST be performed by an adult.

An adult must perform this test:

- Press and release the mute button on the natural gas alarm. The alarm will sound one beep and the RED LED will blink once.
- Wait 20 seconds.
- Position the lighter's gas nozzle so it points into the alarm's gas-test inlet located to the right side of the alarm's front cover. The sensor is located behind this inlet. **(Please note the picture on page 1.)**
- Without rotating the flint wheel, press the lighter's gas release button for two seconds (more than two seconds can cause flooding of the sensor).
- The alarm will sound within five seconds after the butane has successfully entered the gas test inlet.
- Press and release the MUTE button to silence the alarm (see important notes regarding flooding your alarm's sensor).
- The test is complete

USER'S MANUAL

NATURAL GAS LEAK ALARM

MODEL 7550

Important notes:

- The natural gas alarm must be powered up for a minimum of one minute before it can be accurately tested.
- Do not flood the natural gas alarm's sensor with gas during this test. If you overgas the sensor, the natural gas alarm will enter an excessive gas alarm mode and will not stop beeping until the gas successfully clears the unit. When this occurs, move the natural gas alarm to a well ventilated area to air out the sensor, then reinstall the natural gas alarm and repeat the test.
- Each time the natural gas alarm has been disconnected from its AC source, or relocated to another area or room, it must be re-tested.

What you should know if AC power is lost:

In the event of an AC power loss, the natural gas alarm will rely on the battery backup system as a secondary power source. When the natural gas alarm is operating on battery backup power, the GREEN power LED will flash until AC power is applied, or the charged batteries have expired, whichever comes first. Once AC power is restored, the GREEN power LED will illuminate continuously.

If the natural gas alarm is operating using the battery backup system, it will indicate a low battery signal when the batteries are low. When the battery backup system measures a low battery charge, the alarm will beep once every minute and the YELLOW fault LED will flash simultaneously. When this occurs, replace the batteries immediately with fully charged batteries.

Important notes:

- The natural gas alarm can operate using its battery backup power for approximately ten hours with fully charged batteries.
- If the batteries are not installed, the natural gas alarm will not function when AC power is lost.
- If the batteries are not properly installed and maintained, the natural gas alarm may malfunction.
- Since the batteries act as a backup power source, it is important to replace them with fresh batteries as necessary, especially during extended or frequent AC power outages.

What you should know if the natural gas alarm sounds:

- When natural gas is detected, the natural gas alarm will sound an 85 DB alarm and the RED alarm LED will flash. The natural gas alarm will continue to sound the alarm until the natural gas has dissipated or until

the MUTE button is activated. If you press and release the MUTE button, the natural gas alarm will silence the "alarm sound" for approximately two minutes. If natural gas is still present at the gas sensor after this time period, the "alarm sound" will resume.

- It is important to know how to respond if the alarm sounds. Therefore, listed below are some things you should do, and things you should not do.
- In the event of a natural gas leak, always follow your local gas supplier's safety instructions. Usually instructions are found in the phone book, or a safety manual that may be available from your local gas utility company.

Do:

- Do open doors to the outside and windows to access fresh air.
- Do extinguish all open flames such as candles, cigarettes, cigars, gas ranges, and pilot lights if these steps can be done safely.
- Do vacate and relocate to a safe distance from your home to avoid exposure.
- Do use a neighbor's telephone to call the local utility and/or fire department.

Do Not:

- Do not assume that gas from a household product has caused the alarm.
- Do not use your telephone or any electrical switch. This includes on/off wall switches.
- If your lights are on, **leave them on!**
- Do not use your garage door opener as this also uses an electrical switch.
- Do not re-enter your home until the alarm has silenced and the cause of the problem has been corrected.

Technical Information:

Sensor Level:

At or near 25% of the Lower Explosive limit (LEL) for natural gas.
85db @ 10 feet.

Audio alarm:
Primary power
Backup power

120 Volts AC 60 Hz. 5.6 W from AC adapter.
Two rechargeable 1.2V Nickel metal hydride batteries. 2300 mAh or higher.
3 1/2 inches X 7 X 15/8 inches

Dimensions:
Storage
temperature:

32°F to 120° (0°C to 49°C). humidity less than 95% noncondensing.

Operating
temperature:

32°F to 120° (0°C to 49°C). humidity less than 95% noncondensing.

USER'S MANUAL

NATURAL GAS LEAK ALARM

MODEL 7550

What you should know about the alarm's fault mode:

As an added safety feature, your natural gas alarm has been designed to sense a fault or potential problem with its electronics. In the event the natural gas alarm senses a fault in its electronics, the YELLOW fault LED will illuminate and then sound a beep every 45 seconds. The GREEN LED will then turn off indicating that the alarm is no longer monitoring for natural gas. If such action should occur, call CCI Controls for assistance during normal business operations.

What you should know about interaction with other products:

In concentrated amounts, some common household products may cause the alarm to sound. These items could include alcohol, liquor, kerosene, gasoline, deodorants, colognes, household cleaning products, and aerosols. When this occurs, move the natural gas alarm to a well-ventilated area to air out the sensor. The glues, paints, and other materials used in construction and remodeling often produce hydrocarbon vapors that may be detected. These hydrocarbon vapors may cause the alarm to sound. If this occurs, move the natural gas alarm to a well-ventilated area to air out the sensor with fresh air.

Important notes:

- Some products may prevent or delay your natural gas alarm from detecting natural gas. Therefore your natural gas alarm should not be:
- Installed too low where items such as water and household chemicals can pollute the sensor.
- Covered, obstructed, or painted.
- Exposed to sulfur products or powders of any kind.

Warranty Information.

Five Year Limited Warranty.

CCI Controls warrants the equipment described herein to be free from defects in material and workmanship under normal use and service when installed and used in accordance with all applicable state and local laws and regulations. CCI Controls' sole obligation hereunder shall be limited to repairing or replacing the component or components shown to have been defective at time of shipment or to have become inoperative within the terms of this warranty. This warranty does not cover transportation to and from the service locations; loss of time, inconvenience, commercial loss, loss of use, incidental changes or other consequential damages. This warranty excludes the batteries. See batteries for warranty information. All other components are warranted for the term of five years from the date of the sale to the consumer. The consumer will be required to produce the original sales contract or receipt to identify the date of purchase.

Important: Not suitable as a smoke and fire detector.

The chart below highlights the different operating modes and operations:

Green LED Power	Red LED Alarm	Yellow LED Fault	Yellow LED Battery	Sounder Alarm	Indicates
Flashing	Off	Off	Off	Off	Warm-up 1 minute.
On	Off	Off	On	Off	No batteries installed.
On	Off	Off	Off	Off	Normal 120 VAC operation.
Flashing	Off	Off	Off	Off	Normal battery operation with no AC power.
On	Flashing	Off	Off	Alarm	Gas detected.
On	Flashing	Off	Off	Off	Gas detected. MUTE function active.
Flashing	Flashing	Off	Off	Alarm	Gas detected during AC power outage.
Off	Off	On	Off	Beep every 45 seconds	The alarm has detected a fault in its electronics.
Off	Off	On	Off	Beep every 45 seconds	Alarm is unable to detect gas. Loss of AC power and low battery.

Important notes:

- This natural gas alarm contains no user-serviceable parts. If you have questions as to servicing this natural gas alarm, contact CCI Controls.
- This warranty is voided if the alarm's casing is opened.
- This natural gas alarm is intended for the detection of natural gas only. It is not intended nor has it been tested to detect other gases, including but not limited to propane gas and carbon monoxide.
- This natural gas alarm only indicates the presence of natural gas at the alarm's sensor. Natural gas may be present in other areas of the household.

For servicing of this alarm, call CCI Controls.
(800) 521-5228 Monday through Friday
8 A.M. to 5 P.M. Pacific Standard Time.



5052 Cecelia St. South Gate, CA 90280
Phone (323) 560-6060 FAX (323) 560-1136
www.ccicontrols.com

APPENDIX B

Property Owner Handout

PETROGLYPH



Tips on Natural Gas Safety from
Petroglyph Operating Company, Inc.

Natural gas, (Methane), is a clean, efficient, and versatile fuel that is used to heat more homes nationwide than all other heating fuels combined.

Natural gas is colorless, odorless, and nontoxic. Natural gas is lighter than air, and when outdoors it can rise and dissipate quickly. However, when indoors natural gas can collect in a building and create a hazard.

Natural gas requires a specific amount of oxygen in order to burn. It is combustible only when there is a 5 to 15% of natural gas to air. More or less gas results in no combustion. The 5% gas to air mixture is the point at which natural gas can become combustible and is referred to as the lower explosive limit (LEL). When a natural gas concentration reaches 100% of its LEL it can become combustible.

For your protection, in the unlikely event that natural gas enters your home, Petroglyph has provided some homeowners with natural gas alarms model 7550 made by CCI Controls. This natural gas alarm is designed to sound an alarm when natural gas is at 25% of its LEL at the gas sensor. This means that an alarm will sound four times earlier than the point at which a mixture of gas and air becomes combustible. When natural gas is detected at the alarm level, the alarm will sound an 85db signal and the red LED will flash. Petroglyph recommends that you read the instruction manual that came with the alarm thoroughly.

IF THE ALARM SOUNDS YOU SHOULD OBSERVE THE FOLLOWING PROCEDURE.

Do:

- Do open doors and windows to the outside to access fresh air.
- Do leave the building immediately.
- From another location call 911 to report a natural gas alarm.

Do Not:

- Do not use, turn on, or turn off anything that might create a spark, such as matches, lighters, light switches, phones (including cell phones), flashlights, or any electrical equipment including computers.
- Do not operate a garage door opener or start an automobile.
- Do not return to the building until it has been examined and declared safe by emergency personnel, and you have been authorized to re-enter.

Petroglyph is concerned with your safety and that you are in a safe non-hazardous environment at all times.
11-08-07

APPENDIX C

Emergency Contact Information

December 4, 2007

To: Huerfano County Sheriff and Emergency Dispatch
Subject: Emergency response to calls concerning gas detector alarms

Petroglyph Operating recently distributed the enclosed instruction card to home owners that currently have home gas monitors in the there houses. These cards tell the home owner what to do if there gas detector alarm sounds. We have also discussed the procedure with Huerfano County Fire Chief and the La Veta Fire Chief. The Chiefs requested that we also give emergency dispatch the Petroglyph contacts to call if there is a call concerning gas detection in a home.

If you do get a call concerning gas detection in a home. Page the appropriate fire department and then call the Petroglyph contact.

During regular office hours call:

Petroglyph Office 742-5570

If there is no live person in the office call

Tom Melland, Cell 719-859-3161

Gary Valdez, Cell 719-859-3970

Brion Stephen, Cell 719-859-1178

Keith Tatman, Cell 719-859-4146

Any other time call the above cell phone numbers or

Tom Melland, Home 742-5160

Gary Valdez, Home 742-3765

Brion Stephen, Home 746-2278

Enclosed is a laminated information card with the contact numbers on the back of the card.

Best regards

Tom Melland
Raton Basin District Manager

Cc: Gerald Jerant, Dave DeTray.

APPENDIX D
Agency Reporting Form

Methane Alarm Response Report

To Be Completed in the Event that an In-Home Methane Alarm is Reported and Determined to be Due to Methane Levels.

1. Name and Telephone Number of Person Making Report:

2. Date and Time of Alarm:

3. Location of Alarm:

4. Responders to Alarm:

6. Steps Taken to Eliminate Gas and Allow Home Re-Entry:

7. Date and Time of Homeowner Re-Entry to Home:

8. Any Additional Homeowner Concerns or Response:

Petroglyph Operating Company, Inc.
Monthly Report – October 2008

Petroglyph Operating Company, Inc. (Petroglyph) is submitting this monthly report for the activities that have occurred at their Little Creek Field in the Raton Basin from the last date of data collection for the September Monthly Report (September 30, 2008) through November 3, 2008. Along with this monthly report, Petroglyph is submitting an electronic copy of all data including Microsoft Excel spreadsheets from which the attached summaries and graphs were created.

1.0 Investigation

Aquifer Characterization: The Methane Mitigation Well Aquifer Testing Report was submitted to the COGCC and EPA for review on September 25, 2008. The report submittal was followed by a meeting on September 29th to summarize the report and report findings and discuss the next steps. COGCC consultant, Whetstone Associates provided comments on the report which were transmitted to Petroglyph on November 4th. A response to the comments will be developed and submitted during the next reporting period. Overall, Whetstone felt that the report contained sufficient data to allow the Phase 1 system to move forward.

Petroglyph continues to monitor gas production from the recovery wells. Recovery 1 Kittleson has shown continued gas production which is slowly decreasing. The latest reading available for this report, taken on October 30th, showed 12.59 mcf/day being produced at the well. The October 30th reading represents a large drop from the last previous reading of 20.23 mcf/day on October 29th. In reviewing the data, the well shows a large drop about once each week for the last several weeks and then subsequent readings return to higher levels. The cause of this is not understood.

Both Recovery 4 Barrett and Recovery 3 PEI showed a decrease in gas production to zero and then began producing gas again in late September. Gas production in Recovery 3 PEI dropped to zero around August 12 when Petroglyph attempted to clear the well of murky water by adding Walsenburg city water. The latest reading available for Recovery 3 PEI was 0.3322 mcf/day, taken on October 30th. Gas production in Recovery 4 Barrett dropped to zero around September 9 but began producing gas again in late September. The latest reading available for Recovery 4 Barrett was 0.2565 mcf/day on October 30th. POI 55 is no longer producing gas at the surface. Attachment 1 shows the changes in gas production at POI 55 and each of the recovery wells. Actual measurements for each well are included in the data disk.

Recovery and injection well pipelines and surface equipment for the remediation system are complete. As of October 31st the injection is ready to operate and awaiting final regulatory approval from EPA. The flare is operational for methane from the off gassing from the wells.

The initial data collection from operation of the system will allow for review of the simulation model being developed and refinement to match field conditions. This data and model simulation will be used for the Phase 2 injection system operation.

Dissolved Methane Sampling: Petroglyph's consultant, Norwest Applied Hydrology, has completed initial sampling for dissolved methane in water wells within a one mile radius of the remediation system. Sampling results were included in the April monthly report with additional results during the August monthly report. Dissolved methane will be resampled after the remediation system has been in operation for approximately one month.

Methane Source Investigation

In an ongoing effort to understand the source of the methane which has migrated from the Vermejo Formation and the zones in which migration is occurring (as well as the potential role of dikes in the methane movement), Petroglyph has applied to the Bureau of Land Management (BLM) for permission to drill an exploratory hole on BLM land in the vicinity of the Bounds property. This hole will be located to determine if gas is present, at what level the gas occurs and whether or not additional venting or treatment is needed at that location. The hole should provide additional information on gas that may be contributing to the Bounds well. The current date for a BLM decision on the well is not known.

2.0 Monitoring

Down-hole Pressure and Fluid Level Monitoring

Barrett, Bergman, Coleman, and Meyer have continuous pressure monitoring for fluid levels that have been installed by Petroglyph. Information from these wells is downloaded monthly by Petroglyph and included in electronic format with this monthly report. The POCI 55 Monitoring Well also has a pressure gage. In addition, pressure transducers were also installed in the Evendon and Garza-Vela wells during the reporting period and information from those wells has been included in this reporting period. Attachment 2 shows graphically the changes in pressure for each of these wells. As can be seen on the graphs, some wells have pressure and associated water levels trending downward (Barrett, Bergman, Coleman, and Meyer), while other wells have pressure and associated water levels trending upward (POCI 55, Bruington) or remaining relatively steady (Evendon and Graza-Vela). There are no significant changes from previous monthly reports.

Gas Flow Monitoring

Gas flow monitors have been installed by Petroglyph at the Angely, Bruington, Coleman, and Smith wells. Continuous gas flow monitoring occurs at Coleman and Smith, while gas flow is spot monitored with a gage and orifice tester at Angely and Bruington. Gas pressure at Bounds and Angely wells is currently monitored by COGCC or their consultant, however the data is presented in this report. The data from this monitoring is provided in Attachment 3. While gas flow can be variable, in general gas flow has shown an overall decrease in all wells. Gas flows from the Smith and Angely wells have been at

zero for a sustained period of time; in the case of Smith since April 21, 2008 and for Angely since February 6, 2008. The Bruington well had decreased from approximately 35 mcf/day in January to 0.747 mcf/day in September with one 0 reading in mid-September. In October this well dropped to 0 on October 16th and has had two subsequent readings showing it staying at 0 gas flow. In late May the Bounds well showed a decrease from approximately 2.37 mcf/day to less than 1 mcf/day (0.747 mcf/day). The well remained at 0.747 mcf/day until this reporting period. The October 15th reading was 0.528 mcf/day and the last reading in October, on October 29th, was 0. It is not known if the 0 reading will continue in subsequent measurements.

The Coleman well only shows gas flows when the well is pumped. The gas flows stop after some period of well pumping. Since July these gas flows have varied between 57 and 31 mcf/day for a duration of between as low as 5 minutes and as high as 45 minutes.

Figure 1 shows the monitored gas flows in each well and the timing for drilling and testing of Petroglyph remediation system wells. As shown on this figure, the drop in gas flow in the domestic wells appears to have occurred in correlation with the drilling of remediation system wells and venting of gas through these wells. This would indicate that the remediation system has been correctly located to remediate the area of largest gas concentration in the domestic wells.

Fluid Levels in Petroglyph Production Wells

Eleven Petroglyph production wells are monitored for fluid level and casing pressure. An additional four Petroglyph production wells are continuously monitored for fluid level pressures. Three monitoring wells are also monitored for water levels. The monitoring occurs in the formation into which the wells are completed, the Vermejo Formation. Changes in fluid levels in Petroglyph's production wells are shown graphically in Attachment 4. As shown in the attachment and as would be expected since Petroglyph is no longer pumping these wells to draw down water levels, pressure is equalizing within the Vermejo coals and consequently water levels are rising in all wells although the rate of rise is slowing. There are no significant changes in the data from previous monthly reports. There is no data provided for the Rohr 09-05 well because the power in the well is off and waiting some repair work. The pressure data for Lively 03-03 is missing because the down hole gage failed and will need to be replaced.

Bi-Weekly and Monthly Water Well Monitoring

Petroglyph currently monitors approximately 78 wells in the vicinity of the site, including one new wells added during this reporting period. Note that six wells were dropped from the reporting list since they were no longer being sampled as discussed in the last monthly report. Table 1 shows all of the wells that have ever been sampled, the sampling start date, the date of the last sample, the number of samples since the last reporting period and a description of the sampling results and any changes from the previous reporting period.

Of the 78 wells, 6 were not sampled during this reporting period due to a lack of access. These wells will continue to be sampled when access is available. Sampling may vary during any one reporting period due to a variety of reasons. During this reporting period 18 wells were sampled once, 33 wells were sampled twice, 20 wells were sampled three times and 1 well had five sampling events.

As shown on Table 1, the monitoring results for the 71 wells sampled with comparable results from the last reporting period (excluding the one new sample points) showed that 49 wells had no or minimal change from the previous monitoring period measurements. Changes in % LEL, % by volume CH₄, and % volume O₂ were evaluated to determine if the wells were showing an indication of increasing or decreasing methane gas content. Of the remaining 22 wells, 12 showed increases in methane, with 4 of those only slight increases and 10 showed decreases with 6 of those well showing slight decrease.

Table 2 shows the current monitoring schedule including which wells are monitored bi-weekly and which wells are monitored monthly or at a different frequency. The schedule also includes those wells which will be monitored semi-weekly or weekly at the start up of the injection system for any changes as a result of system start up.

Hand Held Measurements

Petroglyph conducts periodic ground surveys using a hand held methane detector at locations where gas has previously been detected, at locations where a property owner requests such a survey or at locations where previous surveys such as the helicopter survey have detected gas seepage. These surveys are conducted based on need or urgency so can range from several times a week to a one time survey based on concerns from a property owner. During this reporting period hand held measurements occurred at sixteen properties where surveys had previously been conducted and seven new properties. Results for this most recent sampling and for past hand held measurements are included in the electronic database with the recent measurements during this reporting period summarized in Tables 3A and 3B. Table 3A shows properties which have had hand held surveys and Table 3B shows seeps which were monitored with the hand held monitor during the reporting period. Properties which have not had hand held methane surveys in the past are highlighted in yellow.

Helicopter Survey

Petroglyph completed a helicopter survey for methane seepage (May 16, 17, and 18) and provided that data to the COGCC under separate cover. Hand held methane detector ground surveys have been conducted for areas where the helicopter survey indicated a potential new presence of methane or to confirm other helicopter readings. These hand held surveys have been completed for the May helicopter survey.

3.0 Mitigation

Methane Alarms

There are currently a total of 14 homes with alarm systems provided by Petroglyph and that number has not changed from previous reports. Petroglyph's contractor has

completed the updating of alarm systems for 9 homeowners who requested the updated system with both visual and audible alarms. No alarms have ever been triggered by the presence of methane. One homeowner had his monitor recalibrated during this reporting period (Derowitsch).

Water Supply

Petroglyph is currently providing water to 15 homes. No new names were added to the list during this reporting period. Table 4 provides a list of the homes currently receiving water. Water is delivered as needed and can vary from month to month due to residential water use and whether or not the homes are occupied.

Other

In addition to providing water several homeowners approached Petroglyph with other requests. These are detailed in the electronic data base under the Word file titled Water Well Activities. For this reporting period other activities included recalibration of one in home gas monitor as discussed above; collection of additional water quality samples as requested from home owners; installed several pressure transducers; and investigated several instances of gas bubbles in water coming into homes.

Public Outreach

There was no public outreach during this reporting period. A detailed public outreach will occur just prior to the start up of the injection system. This public outreach will include the following elements:

- Public Notice would be provided in 4 ways:
 - Half or full page ad in the La Veta paper, and at least one of the Walsenburg papers
 - Legal notice of record in the papers, as well
 - Letters sent to well owners in the RRR project area
 - Flyers hand-delivered to those homeowners with wells in the RRR project area

Both the letter and flyer would include a proviso to contact PEI and/or the COGCC should the well owner observe changes in their well (gas discharge, water production change, etc.) after the startup of Phase One. The newspaper notice also would include contact information for Petroglyph.

Health and Safety/Emergency Planning

No changes to Petroglyph's health, safety and emergency planning occurred during the reporting period.

4.0 Schedule

The following is the currently anticipated schedule for the implementation of Phase One, pumping of water from the Poison Canyon Formation to begin methane removal and then

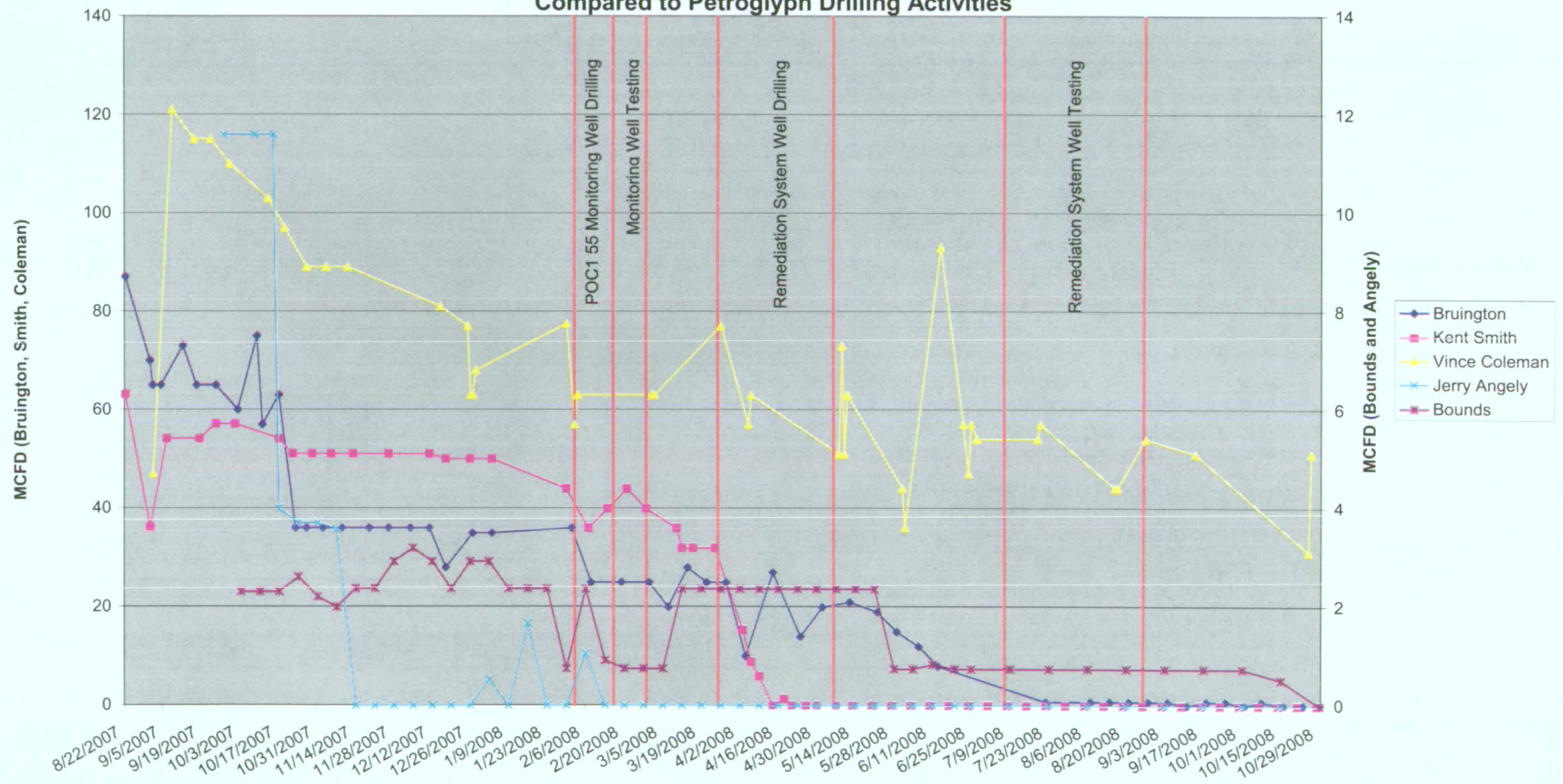
injection of the pumped water back into the Poison Canyon in approximately the same locations, as well as initiation of Phase Two.

- Commencement of injection of the Poison Canyon water is currently anticipated to begin in mid to late November or once all needed regulatory approvals have been obtained.
- An application for injection under Phase Two is currently anticipated to be submitted to the EPA for review in Late November or early December.
- At the same time application will be made through the Colorado Division of Water Resources for a change in the permitted pumping and injection wells to allow for the injection of Vermejo Formation water under Phase Two.
- Routine bi-weekly and monthly sampling will continue with new sampling sites added as needed. Sampling will be adjusted based on the monitoring results in accordance with the Petroglyph Monitoring and Response Plan submitted to the COGCC on April 7, 2008 and commitments made to COGCC and EPA for monitoring during injection start up.
- Hand held seep monitoring will continue as needed.

The currently anticipated schedule is outlined in table form below. The schedule is contingent on a number of factors including weather conditions and equipment problems.

Key Activities	Estimated Completion Date
1. Start of Phase One injection activities	Mid to late November (pending a decision from the EPA)
2. Submittal of Phase Two UIC and Division of Water Resources permit applications	Late November to Early December

Figure 1
Measured Gas Flow in Domestic Wells
Compared to Petroglyph Drilling Activities



<p style="text-align: center;">Table 1 Water Well Measurements for the Period of September 30 to November 3, 2008</p>					
Permit Number	Name	Sampling Start Date	Last Sample	Samples Since Last Monthly Report	If sampled, comparison of results from this period to last period
20783	Goemmer Cattle	9/24/07	10/20/08	10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
230572	Willis	7/11/07	10/21/08	10/8/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
84106	Rohr	7/06/07	10/27/08	10/20/08 and 10/27/08	No change from previous measurements with no detectable methane and O2% volume at 20.9. This well will be sampled quarterly from this point forward.
93386	Lowry	7/12/07	10/20/08	10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
203536	Hurley	8/2/07	10/21/08	10/7/08 and 10/21/08	<p>At the well head:</p> <ul style="list-style-type: none"> • No change in LEL at >100 • CH4 % volume decreased from 31 to 17 • H2S decreased from 3 ppm to 0 and back to 3 ppm • O2 % volume increased from 13.5 to 17.4 • CO remained at 0 <p>No change at the cistern with no detectable methane and O2% volume at 20.9</p>
121013	Schafer	8/15/07	10/20/08	10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
123144	Searle	7/11/07	10/6/08	10/6/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
145915	Carsella	7/11/07	9/23/08	Not sampled during the reporting period	Same well as Andreatta so this entry will be deleted and information moved to Andreatta
169043	Burge	7/11/07	10/20/08	10/21/08 and 10/27/08	No change from previous measurements with no detectable methane and O2% volume at 20.9. H2S was 0.5 ppm and O2% volume was 17.3 in 10/21 reading. Reading was also attempted on 10/8, but the gate was locked and the pass code not working.
181278	Bounds	7/12/07	10/29/08	10/1/08, 10/15/08 and 10/29/08	No change from previous measurement with %LEL at 100; CH4% at 100, and O2%, CO and H2S at 0, except H2S was 0.5 in 10/1/ reading and O2% was 0.3 in 10/29 reading.

Table 1 Water Well Measurements for the Period of September 30 to November 3, 2008					
Permit Number	Name	Sampling Start Date	Last Sample	Samples Since Last Monthly Report	If sampled, comparison of results from this period to last period
191079	Brian Dale (?)	8/15/07	10/20/08	10/20/08	At well #1: <ul style="list-style-type: none"> • %LEL increased from 0 to 32 • CH4 % volume increased from 0 to 2 • O2 % volume decreased from 20.9 to 17 • CO and H2S remained at 0 At Well #2: <ul style="list-style-type: none"> • %LEL decreased from 43 to 0 • CH4 % volume decreased from 2 to 0 • O2 % volume increased from 11.4 to 20.9 • CO and H2S remained at 0
192144	Snow	8/2/07	10/22/08	10/22/08	<ul style="list-style-type: none"> • %LEL decreased from >100 to 0 • CH4 % vol decreased from 5 to 0 • O2 % vol increased from 4.2 to 20.9 • CO remained at 0 • H2S decreased from 3 ppm to 0
192203	Rankins	7/12/07	10/20/08	10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
193520X	McEntee	8/2/07	10/20/08	10/6/08 and 10/20/08	At wellhead no change in most recent measurements from previous measurements with no detectable methane and O2% volume at 20.9. In 10/6 reading O2% was 19.6 and CO was 8 ppm. At east wellhead: <ul style="list-style-type: none"> • %LEL decreased from >100 to 0 • CH4 % decreased from 27 to 0 • O2 % increased from 16.2 to 20.9 • CO and H2S remain at 0
196371	Lyon	8/15/07	10/22/08	10/22/08	<ul style="list-style-type: none"> • %LEL increased from 0 to 23 • CH4 % increased from 0 to 1.15 • O2 % decreased from 20.9 to 6.7 • No change to CO and H2S at 0 ppm
197472	Williams/Bartlett	8/15/07	9/22/08	Not sampled during this reporting period	Sampling attempted 10/7/08 and 10/21/08 but gate was locked preventing access

<p align="center">Table 1 Water Well Measurements for the Period of September 30 to November 3, 2008</p>					
Permit Number	Name	Sampling Start Date	Last Sample	Samples Since Last Monthly Report	If sampled, comparison of results from this period to last period
205195	Johnson	8/15/07	10/28/08	10/6/08, 10/20/08 and 10/28/08	<ul style="list-style-type: none"> • %LEL decreased from 10 to 0 • CH4 % decreased from 0.50 to 0 • O2 % increased from 20.3 to 20.9 • No change to CO at 0 ppm • H2S decreased from 3 to 0.5 ppm <p>Values at the cistern and 2nd wellhead have remained unchanged with no detectable methane and O2% volume at 20.9.</p>
210526	Bruington	8/7/07	10/29/08	10/2/08, 10/8/08, 10/16/08, 10/23/08, 10/29/08	<ul style="list-style-type: none"> • %LEL has not changed at >100 • CH4% has decreased from 100 to 80 • O2 % has increased from 0.4 to 9.8 • CO has decreased from 18 to 6 ppm • H2S has decreased from 6.5 to 5.5 ppm <p>Values at the cistern were unchanged at 0 for all except O2 which was 20.9.</p>
215706	Brice	7/12/07	10/6/08	10/6/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
219376	White	8/2/07	10/29/08	10/21/08 and 10/29/08	<ul style="list-style-type: none"> • %LEL remains at >100 • CH4 % increased from 5.00 to 10 and then back to 5.00 • O2 % increased from 3.2 to 8.1 • CO increased from 0 to 2 • H2S increased from 3 to 3.5 ppm
221465	Evenden	8/2/07	10/29/08	10/7/08, 10/20/08 and 10/29/08	No change from previous measurements with no detectable methane and O2% volume at 20.9 at end of month. 10/7 reading showed %LEL at 6 and CH4% at 0.3 with O2% at 14.5. H2S in 10/29 reading was 1.5
222294	Cramer	8/3/07	10/22/08	10/22/08	<ul style="list-style-type: none"> • %LEL decreased from 11 to 0 • CH4 % decreased from 0.55 to 0 • O2 % increased from 11.9 to 20.9 • CO and H2S remained at 0
222539	Lively	7/6/07	10/21/08	10/6/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9

Table 1 Water Well Measurements for the Period of September 30 to November 3, 2008					
Permit Number	Name	Sampling Start Date	Last Sample	Samples Since Last Monthly Report	If sampled, comparison of results from this period to last period
235292	Kerman/Hanson	7/6/07	10/27/08	10/6/08, 10/21/08 and 10/27/08	<ul style="list-style-type: none"> • %LEL decreased from 5 to 0 • CH4 % decreased from 0.25 to 0 • O2% stayed the same at 20.9 • CO and H2S remain at 0 No change at the cistern with all values at 0 except O2% which is 20.9.
235516	Colorado Switzer	7/12/07	10/20/08	10/6/08 and 10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
236272	Houghtling	7/6/07	10/28/08	10/6/08, 10/20/08 and 10/28/08	<ul style="list-style-type: none"> • % LEL remains unchanged at >100 • CH4 % volume has decreased from 70 to 13 • O2% volume increased from 7.2 to 18.3 • H2S and CO remain unchanged at 0 ppm Not sampled at cistern
238689	Angely	7/5/07	10/29/08	10/1/08, 10/15/08 and 10/29/08	%LEL increased from 0 to 5 with all other values remaining at 0 and %O2 volume remaining at 20.9
239657	Smith	7/5/07	10/27/08	10/6/08, 10/21/08 and 10/27/08	At Wellhead: All values at 0 except O2% which is at 20.9 except for last reading. In last reading %LEL at >100, CH4% at 11 and O2% at 18.7. See note below on well vent At Well Vent: <ul style="list-style-type: none"> • % LEL no change from >100 • CH4 % decreased from 46 to 27 • O2% volume increased from 10.5 to 16.5 • H2S and CO remain at 0 ppm The well vent was not sampled 10/27 as vent had become disconnected from well (potentially explaining higher wellhead readings on that date). Petroglyph glued the vent back in place. The cistern showed unchanged values with no detectable methane and O2% at 20.9.
240947	Wolahan	7/12/07	10/20/08	10/6/08 and 10/20/08	No change from previous measurements with no detectable methane. O2% ended the period at 20.9 after starting at 17.3. No change at the cistern with no detectable methane and O2% at 20.9.

Table 1 Water Well Measurements for the Period of September 30 to November 3, 2008					
Permit Number	Name	Sampling Start Date	Last Sample	Samples Since Last Monthly Report	If sampled, comparison of results from this period to last period
244403	Bergman	7/6/07	10/21/08	10/6/08 and 10/21/08	<ul style="list-style-type: none"> • % LEL remains unchanged at >100 • CH4 % volume has increased from 23 to 81 • O2% volume has decreased from 14.9 to 6.9 • H2S and CO remain unchanged at 0 ppm
246775	Sharp	9/9/07	10/21/08	10/7/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
248680	Campbell	8/14/07	10/27/08	10/8/08 and 10/27/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
248862	Meyer	8/14/07	10/21/08	10/8/08 and 10/21/08	<ul style="list-style-type: none"> • % LEL no change >100 • CH4 % volume has decreased slightly from 83 to 78 • O2% volume has increased from 2.4 to 9 • CO remains at 0 • H2S has increased from 0 to 1.5
248983	Tobias	8/3/07	10/21/08	10/7/08 and 10/21/08	<ul style="list-style-type: none"> • % LEL decreased from >100 to 51 • CH4 % volume has decreased from 5 to 2.55 • O2 has increased from 19.6 to 20.9 • No change for CO and H2S at 0
249181	Hentschel	9/9/07	10/21/08	10/7/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
250369	Martin	7/12/07	10/6/08	10/6/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
252931	Derowitsch	7/6/07	10/27/08	10/6/08, 10/20/08 and 10/27/08	<p>No change from previous measurements at wellhead with no detectable methane and O2% at 20.9.</p> <p>At well vent:</p> <ul style="list-style-type: none"> • %LEL decreased from 11 to 0 • CH4 % remained at 0 with a 0.75 reading on 10/20 • O2 % remained at 20.9 • CO and H2S remained at 0 <p>At the cistern:</p> <ul style="list-style-type: none"> • %LEL remained at 0 with a 15 reading on 10/20 • CH4 % remained at 0 with a 0.75 reading on 10/20 • O2 % remained at 20.9 • CO remained at 0 and H2S decreased from 6 to 0 with higher

Table 1 Water Well Measurements for the Period of September 30 to November 3, 2008					
Permit Number	Name	Sampling Start Date	Last Sample	Samples Since Last Monthly Report	If sampled, comparison of results from this period to last period
					readings on 10/6 and 10/20
253317	Gonzalez	7/12/07	10/20/08	10/6/08 and 10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
254577	Ryerson	9/9/07	10/21/08	10/7/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
255929	Conley	7/11/07	9/22/08	Not sampled during this reporting period	Sample collection attempted but gate was locked so no access.
256504	Hopke	7/5/07	10/27/08	10/6/08, 10/20/08 and 10/27/08	At wellhead: <ul style="list-style-type: none"> No change in % LEL at >100 CH4 % volume has decreased from 33 to 22 with a high reading of 43 O2% volume has increased from 15.5 to 17.8 with a low reading of 10.8 CO remains at 0 H2S increased to 2 No change at cistern with no detectable methane and O2% volume at 20.9
257113	Masters #2	7/6/07	10/20/08	10/6/08 and 10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
257994	Barrett	7/12/07	10/20/08	10/6/08 and 10/20/08	<ul style="list-style-type: none"> % LEL remains at >100 CH4 % volume increased from 15 to 21 O2% volume decreased slightly from 17.4 to 17 CO and H2S remain at 0
259122	Higgins	9/26/07	10/21/08	10/8/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
260097	Dee	7/5/07	10/6/08	10/6/08	No change from previous measurements with no detectable methane and O2% volume at 20.9.
264581	Ireland	7/12/07	10/27/08	10/6/08, 10/21/08 and 10/27/08	No change from previous measurements with no detectable methane and O2% volume at 20.9

Table 1 Water Well Measurements for the Period of September 30 to November 3, 2008					
Permit Number	Name	Sampling Start Date	Last Sample	Samples Since Last Monthly Report	If sampled, comparison of results from this period to last period
267694	Coleman	7/5/07	10/27/08	10/6/08, 10/20/08 and 10/27/08	No changes from previous measurements for wellhead with no detectable methane and O2% volume at 20.9. At well vent: <ul style="list-style-type: none"> • %LEL decreased from >100 to 26 • CH4 % decreased from 5.00 to 1.30 • O2 % increased from 19.5 to 20.6 • CO and H2S remained at 0 with H2S reading of 4 ppm on 10/6
267695	Speh	9/4/07	10/21/08	10/6/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
269435	Goacher	7/11/07	10/21/08	10/6/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
270552	Chaves	9/9/07	10/21/08	10/8/08 and 10/21/08	No change from previous measurements with no detectable methane and O2% at 20.9.
271136	May	7/12/07	10/6/08	10/6/08	No change from previous measurements with no detectable methane and O2% volume at 20.9
274468	Roloff	9/9/07	9/9/08	Not sampled during this reporting period	Readings attempted 10/6 and 10/21 but gate was locked so no access
235515	English	8/16/07	9/9/08	Not sampled during this reporting period	Reading attempted 10/6/08 but locked gate prevented access.
258815	Goodwin	7/12/07	10/28/08	10/6/08, 10/21/08 and 10/28/08	No change at wellhead with no detectable methane and O2% at 20.9. H2S was 1.5 ppm in 10/28 reading. No change at cistern from previous measurements with no detectable methane and O2% volume at 20.9
16861-F	Golden Cycle Land	7/12/07	10/20/08	10/6/08 and 10/20/08	In last reading at wellhead: <ul style="list-style-type: none"> • %LEL increased from 0 to >100 • %CH4 increased from 0 to 6 • O2% decreased from 20.9 to 20.7 • CO increased from 0 to 3 • H2S remained at 0
84108-A	McPherson	7/6/07	10/20/08	10/6/08 and 10/20/08	No change from previous measurements with no detectable methane and O2% volume at 20.9.
16861-F	Masters #1	8/13/07	10/20/08	10/6/08 and	No change from previous measurements with no detectable