

Complaint # 200074345



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AUG 17 2005

COGCC

August 15, 2005

Ms. Debbie Baldwin  
Colorado Oil and Gas Conservation Commission  
1120 Lincoln Street, Suite 801  
Denver, Colorado 80203

RE: Methane Survey Report  
McWilliams Property  
Bayfield, Colorado

Dear Ms. Baldwin:

LT Environmental, Inc. (LTE) is pleased to provide the Colorado Oil and Gas Conservation Commission (COGCC) with this letter summarizing the results of the methane survey on the McWilliams property (Site) located near Bayfield, Colorado on July 25, 2005.

## BACKGROUND

The McWilliams residence burned in a fire on July 2, 2005. Local fire marshals suspected methane gas from an undefined seep may have contributed to the fire when the structure re-ignited on July 11, 2005 and burned to the ground. In addition, the fire marshal reported methane in the ambient air in the vicinity of the residence at concentrations ranging from 50 parts per million (ppm) to 150 ppm following the fire. The COGCC requested that LTE conduct a subsurface methane survey on the Site to determine if methane seeps are present.

## SITE DESCRIPTION

The Site is located at 2414 County Road 505 in Bayfield, Colorado, approximately 20 miles east of Durango, Colorado (Figure 1). The Site is located in the southeast quarter of the southwest quarter, Section 14, Township 35 North, Range 7 West of the Sixth Principal Meridian, approximately five miles north of the town of Bayfield in La Plata County, Colorado.

The Site is located approximately 0.5 miles south of the Pine River Ranches methane seep area. However, the Site is not located on the geologic outcrop of the Fruitland Formation as is the case at the Pine River Ranches methane seep area. The Site is situated on the Kirtland Formation based on observed surface geology.

The Site consists of a tract of land covering approximately 14 acres. The survey area includes the Site and portions of the Morgan, Leming, and Meloche properties. The Site and surrounding land use consists of rural residential properties. The Pine River (also known as the Los Pinos River) is located approximately 0.2 miles east of the Site flowing from north to south. Figure 2 shows the layout of the Site and surrounding properties including land ownership information. Site photographs are presented in Attachment 1.



The Meloche property is not located in close proximity to the survey area. The residence is located approximately 1.0 miles west of the survey area and was inspected at the request of the landowner and approval of the COGCC to determine if the structure was at risk from methane seepage. The Meloche property is not depicted in the maps included in this report.

## **METHANE GAS SURVEY**

### **Methodology**

On July 25, 2005, LTE was on site to conduct a methane gas survey of the Site. The procedures utilized during the survey were similar to those used during surveys of a methane seep area in Bondad, Colorado and as part of the Fruitland Formation Outcrop Monitoring program.

Essentially, a slide-hammer is used to drive a steel rod to a depth of approximately three feet below ground surface (bgs). The rod is then removed from the ground and plastic tubing is inserted into the borehole. A four-gas meter was then used to measure the subsurface gas concentration by pulling a vacuum on the tubing. The four-gas meter, a Mine Safety Appliances (MSA) Gasport<sup>®</sup>, reports concentrations of methane, oxygen, hydrogen sulfide, and carbon monoxide. Each soil gas measurement location was recorded using a Trimble GeoXT<sup>®</sup> global positioning system (GPS).

To insure accurate methane concentration measurements, LTE calibrated the field meter per the manufacturer's specifications three times during the day. All calibration events indicated that the field meter was operating correctly.

### **Soil Gas Survey Results**

LTE personnel advanced a total of 108 subsurface probes across the project area. Results of the soil gas survey indicated that methane gas was not detected at any of the measurement locations. Figure 3 illustrates the location of the subsurface soil gas measurements and corresponding methane concentration measured within each borehole. Attachment 2 contains the GPS and field meter data.

LTE inspected the banks of the Pine River east of the Site for the presence of visible methane seeps in the river. No visible seeps were noted within the Pine River.

LTE also inspected the interior residence and crawlspace of the Leming residence (located approximately 800 feet to the south of the Site) and the Meloche residence (located approximately 0.75 miles west of the Site). No methane was detected within or around either of the residences. A map showing the location of the Meloche residence was not prepared for this report since methane was not detected in the area and the structure is not located in close proximity to the primary survey area.

An area of stressed vegetation (grass) was noted on the flood plain of the Pine River east of the McWilliams property. It appeared that this area of stressed grass was a result of drought conditions or lack of irrigation rather than methane seepage. No methane was detected within the stressed vegetation or around the vegetation. A dead cottonwood tree was also noted near the Pine River. No methane was detected at the base of the tree.





## CONCLUSIONS AND RECOMMENDATIONS

The McWilliams residence is located on the Kirtland Formation, not the Fruitland Formation. Known gas seeps in the Pine River ranches are associated primarily with the Fruitland Formation. No evidence of geologic faulting or other preferential migration pathways that would allow the migration of methane gas from the Fruitland Formation on to the Site was observed. In addition, no evidence of extensive areas of stressed and/or dead vegetation were noted at the Site. Based on the results of the soil gas survey and field observations, methane seeps are not present in and/or around the McWilliams residence at this time. The potential for methane seep activity to have contributed to the fire appears very low.

It is unknown what may have caused the local fire marshal's explosimeter to record the presence of methane in the ambient air at concentrations of 50 ppm to 150 ppm. These concentrations are considered extremely high for ambient air and are much higher than ambient air concentrations observed by LTE in known methane seep areas in La Plata County. If the ambient air concentrations measured by the fire marshal were accurate, LTE would expect to find large areas of dead vegetation; concentrations of methane in the shallow subsurface ranging in concentration from 90% to 100% methane; and very high gas flow rates, most likely through preferential pathways such as water wells, gas wells, or subsurface utility corridors. As previously stated, no such evidence was noted at the time of LTE's survey.

The fire marshal was present at the time of LTE's soil gas survey and could not reproduce the elevated ambient air methane concentration measurements indicating that the elevated methane concentrations detected in ambient air at the Site were likely erroneous.

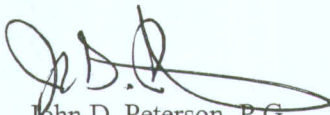
No methane was detected within the interior or around the exterior of the Leming residence or the Meloche residence.

LTE recommends no further action regarding the monitoring/assessment for methane seeps on or around the McWilliams residence and property.

LTE appreciates the opportunity to provide environmental services to the COGCC. If you have any questions regarding this report or would like additional information, please contact us at (303) 433-9788.

Sincerely,

LT ENVIRONMENTAL, INC.



John D. Peterson, P.G.  
Project Manager

Attachments (2)

FIGURES





# **LEGEND**



## **SITE LOCATION**

SE1/4, SW1/4, SECTION 14, TOWNSHIP 35 NORTH,  
RANGE 7 WEST



0 375 750 1500  
FEET

SOURCE: TOPOZONE.COM  
USGS 7.5' QUADRANGLE  
LUDWIG MOUNTAIN, CO 1964  
(NAD27)

**FIGURE 1**  
**SITE LOCATION MAP**  
**McWILLIAMS PROPERTY**  
**BAYFIELD, COLORADO**

COLORADO OIL AND GAS CONSERVATION COMMISSION



OGCC050301\_SL





Legend

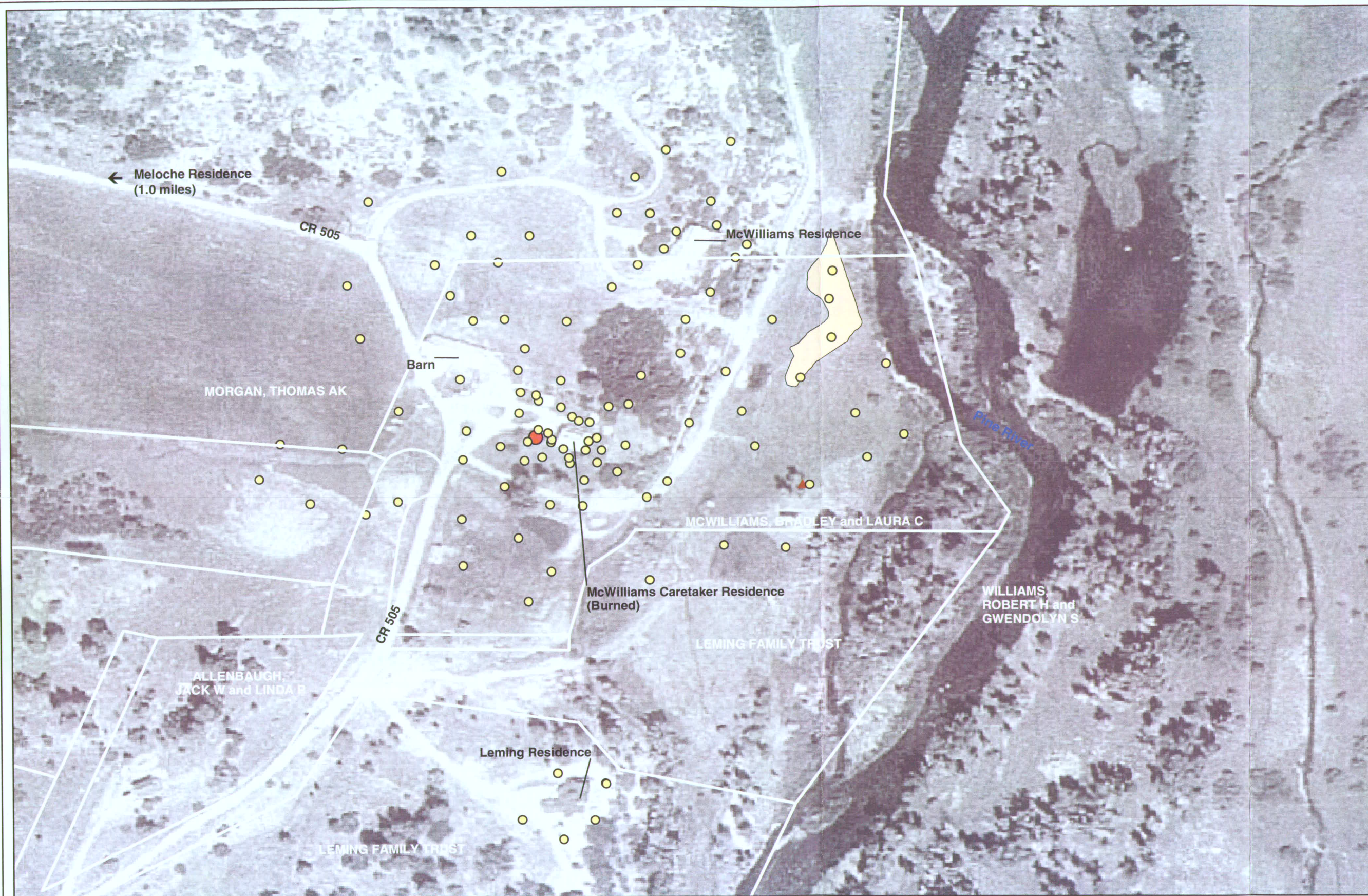
● Propane Tank

0 400  
Feet



Figure 2  
Site Map  
McWilliams Property  
Bayfield, Colorado





- Legend**
- Subsurface Methane Measurement
- 0 ppm CH<sub>4</sub>
- Trees
- ▲ Dead Cottonwood
- Vegetation
- Stressed Vegetation
- Propane Tank

0 400  
Feet



**Figure 3**  
Subsurface Methane Measurement Map  
McWilliams Property  
Bayfield, Colorado

Colorado Oil and Gas Conservation Commission





**ATTACHMENT 1**  
**SITE PHOTOGRAPHS**





Photo 1: McWilliams caretaker residence, view south



Photo 2: Propane tank on caretaker parcel, view south





Photo 3: McWilliams caretaker residence and propane tank, view south



Photo 4: Stressed vegetation on floodplain of Pine River, view southeast





Photo 5: McWilliams residence, view north



ATTACHMENT 2  
SOIL GAS SURVEY DATA



## ATTACHMENT 2

**FIELD DATA  
McWILLIAMS PROPERTY  
BAYFIELD, COLORADO**

Point ID	Survey Date	Elevation (meters)	UTM Coordinates		CH <sub>4</sub> (ppm)	O <sub>2</sub> (%)	H <sub>2</sub> S (ppm)	CO (ppm)
			Northing	Easting				
1	7/25/2005	2163.167	4130732.845	268741.844	0.0	20	0	0
2	7/25/2005	2161.252	4130723.036	268736.875	0.0	20	0	0
3	7/25/2005	2161.684	4130718.599	268751.190	0.0	20	0	0
4	7/25/2005	2160.786	4130707.071	268758.295	0.0	20	0	0
5	7/25/2005	2163.230	4130726.913	268759.543	0.0	20	0	0
6	7/25/2005	2162.550	4130734.954	268765.431	0.0	20	0	0
7	7/25/2005	2163.212	4130745.221	268762.026	0.0	20	0	0
8	7/25/2005	2163.311	4130749.113	268753.258	0.0	20	0	0
9	7/25/2005	2162.592	4130755.748	268747.707	0.0	20	0	0
10	7/25/2005	2164.543	4130760.295	268736.314	0.0	20	0	0
11	7/25/2005	2162.614	4130764.042	268735.116	0.0	20	0	0
12	7/25/2005	2162.917	4130765.964	268726.995	0.0	20	0	0
13	7/25/2005	2164.277	4130752.274	268725.969	0.0	20	0	0
14	7/25/2005	2161.320	4130733.655	268729.844	0.0	20	0	0
15	7/25/2005	2160.787	4130721.113	268727.756	0.0	20	0	0
17	7/25/2005	2160.206	4130729.626	268780.239	0.0	20	0	0
18	7/25/2005	2158.997	4130712.214	268775.381	0.0	20	0	0
19	7/25/2005	2162.937	4130718.674	268765.113	0.0	20	0	0
20	7/25/2005	2162.669	4130728.010	268747.948	0.0	20	0	0
21	7/25/2005	2163.584	4130734.575	268742.331	0.0	20	0	0
22	7/25/2005	2163.447	4130741.240	268735.500	0.0	20	0	0
24	7/25/2005	2164.090	4130739.005	268740.543	0.0	20	0	0
25	7/25/2005	2167.061	4130773.377	268748.231	0.0	20	0	0
26	7/25/2005	2167.534	4130794.925	268730.309	0.0	20	0	0
27	7/25/2005	2169.893	4130814.598	268720.379	0.0	20	0	0
28	7/25/2005	2170.834	4130831.202	268692.762	0.0	20	0	0
29	7/25/2005	2172.241	4130851.658	268685.213	0.0	20	0	0
30	7/25/2005	2175.364	4130870.456	268704.709	0.0	20	0	0
31	7/25/2005	2178.737	4130869.263	268735.054	0.0	20	0	0
32	7/25/2005	2174.144	4130852.241	268718.113	0.0	20	0	0
33	7/25/2005	2172.351	4130812.074	268752.391	0.0	20	0	0
34	7/25/2005	2174.251	4130834.026	268776.419	0.0	20	0	0
35	7/25/2005	2173.797	4130848.366	268790.335	0.0	20	0	0
36	7/25/2005	2177.299	4130858.221	268804.029	0.0	20	0	0
37	7/25/2005	2176.700	4130869.577	268810.993	0.0	20	0	0
38	7/25/2005	2174.894	4130881.970	268797.638	0.0	20	0	0
39	7/25/2005	2172.433	4130873.115	268832.031	0.0	20	0	0
41	7/25/2005	2174.083	4130889.117	268829.390	0.0	20	0	0
42	7/25/2005	2173.734	4130928.073	268840.927	0.0	20	0	0
43	7/25/2005	2176.032	4130923.721	268807.287	0.0	20	0	0
44	7/25/2005	2175.499	4130906.342	268790.912	0.0	20	0	0
45	7/25/2005	2175.338	4130882.873	268780.692	0.0	20	0	0
46	7/25/2005	2181.933	4130912.002	268721.915	0.0	20	0	0
47	7/25/2005	2178.736	4130894.280	268652.382	0.0	20	0	0
48	7/25/2005	2171.169	4130839.436	268639.760	0.0	20	0	0
49	7/25/2005	2166.486	4130804.069	268645.132	0.0	20	0	0
50	7/25/2005	2163.279	4130755.587	268663.413	0.0	20	0	0
51	7/25/2005	2160.808	4130731.629	268633.598	0.0	20	0	0
52	7/25/2005	2164.546	4130735.944	268601.764	0.0	20	0	0
53	7/25/2005	2164.608	4130712.884	268590.212	0.0	20	0	0
54	7/25/2005	2164.581	4130695.960	268616.002	0.0	20	0	0
55	7/25/2005	2163.661	4130687.887	268644.488	0.0	20	0	0
57	7/25/2005	2164.919	4130695.790	268661.246	0.0	20	0	0
58	7/25/2005	2161.877	4130722.462	268695.712	0.0	20	0	0
59	7/25/2005	2161.694	4130741.706	268698.290	0.0	20	0	0
60	7/25/2005	2165.547	4130775.576	268695.847	0.0	20	0	0
62	7/25/2005	2150.259	4130726.836	268847.136	0.0	20	0	0
64	7/25/2005	2151.200	4130700.666	268874.692	0.0	20	0	0



## ATTACHMENT 2 (continued)

FIELD DATA  
McWILLIAMS PROPERTY  
BAYFIELD, COLORADO

Point ID	Survey Date	Elevation (meters)	UTM Coordinates		CH <sub>4</sub> (ppm)	O <sub>2</sub> (%)	H <sub>2</sub> S (ppm)	CO (ppm)
			Northing	Easting				
65	7/25/2005	2152.169	4130717.800	268905.096	0.0	20	0	0
66	7/25/2005	2152.133	4130747.042	268899.823	0.0	20	0	0
68	7/25/2005	2152.636	4130797.357	268889.094	0.0	20	0	0
69	7/25/2005	2152.583	4130841.293	268890.936	0.0	20	0	0
70	7/25/2005	2153.977	4130822.810	268888.787	0.0	20	0	0
71	7/25/2005	2152.709	4130810.019	268858.778	0.0	20	0	0
72	7/25/2005	2152.503	4130771.383	268872.070	0.0	20	0	0
73	7/25/2005	2152.889	4130776.470	268833.500	0.0	20	0	0
74	7/25/2005	2163.942	4130829.148	268827.331	0.0	20	0	0
75	7/25/2005	2164.286	4130851.588	268840.843	0.0	20	0	0
76	7/25/2005	2160.727	4130859.902	268846.979	0.0	20	0	0
77	7/25/2005	2164.635	4130811.403	268813.877	0.0	20	0	0
78	7/25/2005	2159.718	4130789.184	268810.562	0.0	20	0	0
79	7/25/2005	2161.490	4130775.126	268789.640	0.0	20	0	0
80	7/25/2005	2163.654	4130756.632	268782.590	0.0	20	0	0
81	7/25/2005	2160.175	4130683.232	268693.760	0.0	20	0	0
82	7/25/2005	2159.420	4130670.019	268723.019	0.0	20	0	0
83	7/25/2005	2160.188	4130647.497	268739.367	0.0	20	0	0
84	7/25/2005	2159.888	4130627.980	268726.856	0.0	20	0	0
85	7/25/2005	2160.288	4130652.500	268693.692	0.0	20	0	0
86	7/25/2005	2169.881	4130514.201	268738.293	0.0	20	0	0
87	7/25/2005	2169.804	4130506.698	268762.925	0.0	20	0	0
88	7/25/2005	2168.423	4130506.240	268763.296	0.0	20	0	0
89	7/25/2005	2168.260	4130482.648	268756.747	0.0	20	0	0
90	7/25/2005	2172.613	4130470.332	268740.145	0.0	20	0	0
91	7/25/2005	2171.980	4130483.780	268719.051	0.0	20	0	0
92	7/25/2005	2156.377	4130640.052	268789.895	0.0	20	0	0
93	7/25/2005	2152.484	4130661.950	268829.094	0.0	20	0	0
94	7/25/2005	2151.126	4130659.431	268860.931	0.0	20	0	0
95	7/25/2005	2152.784	4130732.569	268924.582	0.0	20	0	0
96	7/25/2005	2151.738	4130779.211	268916.719	0.0	20	0	0
97	7/25/2005	2152.432	4130749.996	268841.098	0.0	20	0	0
98	7/25/2005	2154.426	4130743.188	268813.615	0.0	20	0	0
99	7/25/2005	2156.517	4130694.953	268790.181	0.0	20	0	0
100	7/25/2005	2155.512	4130705.092	268801.032	0.0	20	0	0
101	7/25/2005	2159.989	4130690.150	268756.945	0.0	20	0	0
102	7/25/2005	2159.454	4130691.535	268740.011	0.0	20	0	0
103	7/25/2005	2160.476	4130704.217	268716.868	0.0	20	0	0
104	7/25/2005	2160.582	4130730.712	268715.476	0.0	20	0	0
105	7/25/2005	2162.926	4130726.694	268767.731	0.0	20	0	0
106	7/25/2005	2165.317	4130755.347	268772.243	0.0	20	0	0
107	7/25/2005	2170.313	4130814.068	268704.101	0.0	20	0	0
108	7/25/2005	2164.930	4130780.819	268726.194	0.0	20	0	0
109	7/25/2005	2162.422	4130746.215	268756.566	0.0	20	0	0
110	7/25/2005	2166.147	4130732.975	268761.216	0.0	20	0	0
111	7/25/2005	2163.345	4130722.143	268750.814	0.0	20	0	0
112	7/25/2005	2234.453	4131231.216	267315.246	0.0	20	0	0
113	7/25/2005	2227.794	4131194.030	267319.961	0.0	20	0	0
114	7/25/2005	2224.912	4131161.895	267311.022	0.0	20	0	0
115	7/25/2005	2226.693	4131164.611	267288.038	0.0	20	0	0

## Notes:

UTM = Universal Transverse Mercator - North American Datum 1983 (NAD83) in meters

CH<sub>4</sub> = methane

ppm = parts per million

O<sub>2</sub> = oxygen

% = percent

H<sub>2</sub>S = hydrogen sulfide

CO = carbon monoxide

