



Doc #2100001

Rem #8741

January 9, 2015

Mr. Jack Sosebee
Red River Ranch Holdings at Tercio Ranch
15850 County Road 13
Weston, Colorado 81091

**RE: Soil Gas Survey at Former Gas Well, Red River Ranch Holdings at Tercio Ranch,
Trinidad, Colorado**

Dear Mr. Sosebee:

LT Environmental, Inc. (LTE) is pleased to provide Red River Ranch Holdings with this letter summarizing the results of soil gas survey activities conducted in the vicinity of the abandoned Lorencito Canyon well (API #05-071-06149) located beneath a coal bed methane produced water pond. The soil gas survey activities were conducted in response to a request by the Colorado Oil and Gas Conservation Commission (COGCC). The COGCC was concerned for the integrity of the plugging and abandonment (P&A) of the production well.

BACKGROUND

The Site referenced in this report includes the location of the abandoned production well, the coal bed methane produced water pond, and the surrounding land.

On June 26, 2008, at the request of the COGCC, LTE conducted a soil gas survey of the Site in response to a concern for the integrity of the P&A of the production well. Presently, the remaining production wells in the area are being abandoned. At the request of the COGCC, LTE re-surveyed this vicinity as part of the well abandonment. On December 9, 2014, LTE conducted this soil gas survey to ensure the continued integrity of the P&A production well.

SITE DESCRIPTION

The Site is located in Las Animas County, Colorado, approximately 10 miles south of Torres, Colorado (Figure 1). The abandoned production well is located beneath a lined produced water pond (Pond E). The land surrounding the abandoned production well site consists of forested land, with an active production well to the west, and a creek to the north and east.



The table shown below presents the legal description of the location of the abandoned production well, including the geographic coordinates measured by LTE using a Global Positioning System (GPS).

ABANDONED WELL SITE LOCATION

Lorencito Canyon (API #05-071-06149)			
Geographic Coordinates (NAD83)		PLSS Location	County
Northing	Easting		
696401.196	3164768.696	SWNW Sec. 18, T35S, R67W	Las Animas

API - American Petroleum Institute
NAD 83 - North American Datum 1983, Colorado State Plan South. Units are in feet.
PLSS - Public Land Survey System

SOIL GAS SURVEY METHODOLOGY

On December 11, 2014, LTE conducted a soil gas survey of the Site. LTE used a sampling grid layout with 50-foot spacing to cover the abandoned production well site mapping area systematically and to provide a means to delineate the extent of potential gas seepage. The sampling grid for this survey was centered over the abandoned production well.

During the survey, a slide hammer was used to advance a half-inch diameter steel rod (probe) at the corners of each square on the grid. Tubing was lowered into each borehole and gas measurements were collected directly from the shallow surface soil approximately 3 feet below ground surface (bgs). LTE measured the concentration of combustible gas (methane), carbon monoxide, hydrogen sulfide, and oxygen at each sampling location using a Mine Safety Appliances (MSA) Gasport® four-gas meter.

Subsurface gas measurements were collected at points located around the abandoned production well Lorencito Canyon (API #05-071-08976); Pond E; and the active Red River Ranch Holdings 18-3 R67W (API #05-071-08976) production well adjacent to the site. Each sample point location was recorded using GPS. The measured gas concentrations and other relevant field notes were stored as attributes in the GPS unit with the associated GPS mapped position. A total of 17 subsurface gas measurements were collected from the soil during the gas survey. LTE used the GPS to map additional pertinent site features.

SOIL GAS SURVEY RESULTS

LTE personnel advanced 17 subsurface probes across the project area. Results of this survey indicate that methane was not detected in any sample locations. Oxygen concentrations ranged from 20.7 percent (%) to 22.2%. Detectable concentrations of carbon monoxide ranged from 0 parts per million (ppm) to 3 ppm. No hydrogen sulfide was detected. No stressed vegetation was observed during the survey. Results of the soil gas survey are depicted on Figure 2. Table 1 presents the subsurface gas measurements collected during the survey.



CONCLUSIONS

During the soil gas survey completed by LTE on December 11, 2014, methane seepage was not observed in the vicinity of the abandoned production well, Pond E, or the active production well.

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

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink that reads "Jess Alexander". The signature is written in a cursive, flowing style.

Jess Alexander
Project Environmental Scientist

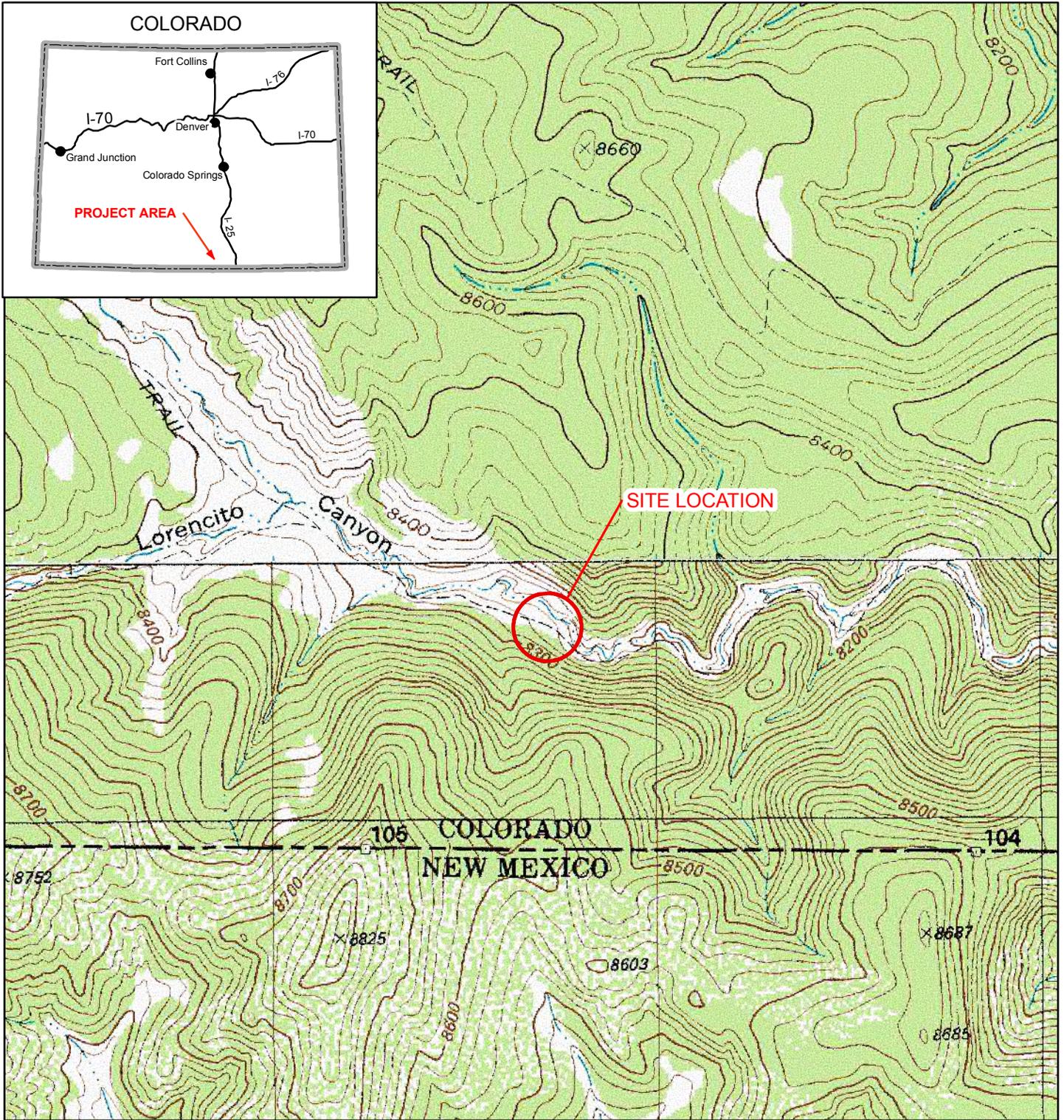
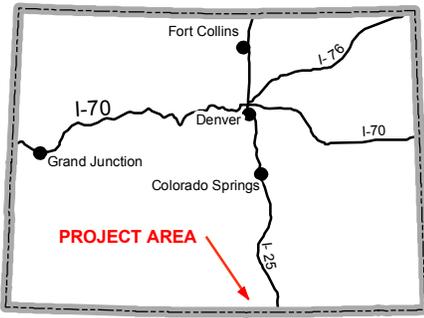
A handwritten signature in black ink that reads "Rob Rebel". The signature is written in a cursive, flowing style.

Rob Rebel, P.E.
Project Engineer

Attachments

FIGURES AND TABLE

COLORADO



Map Source: USGS/NRCS, 2005

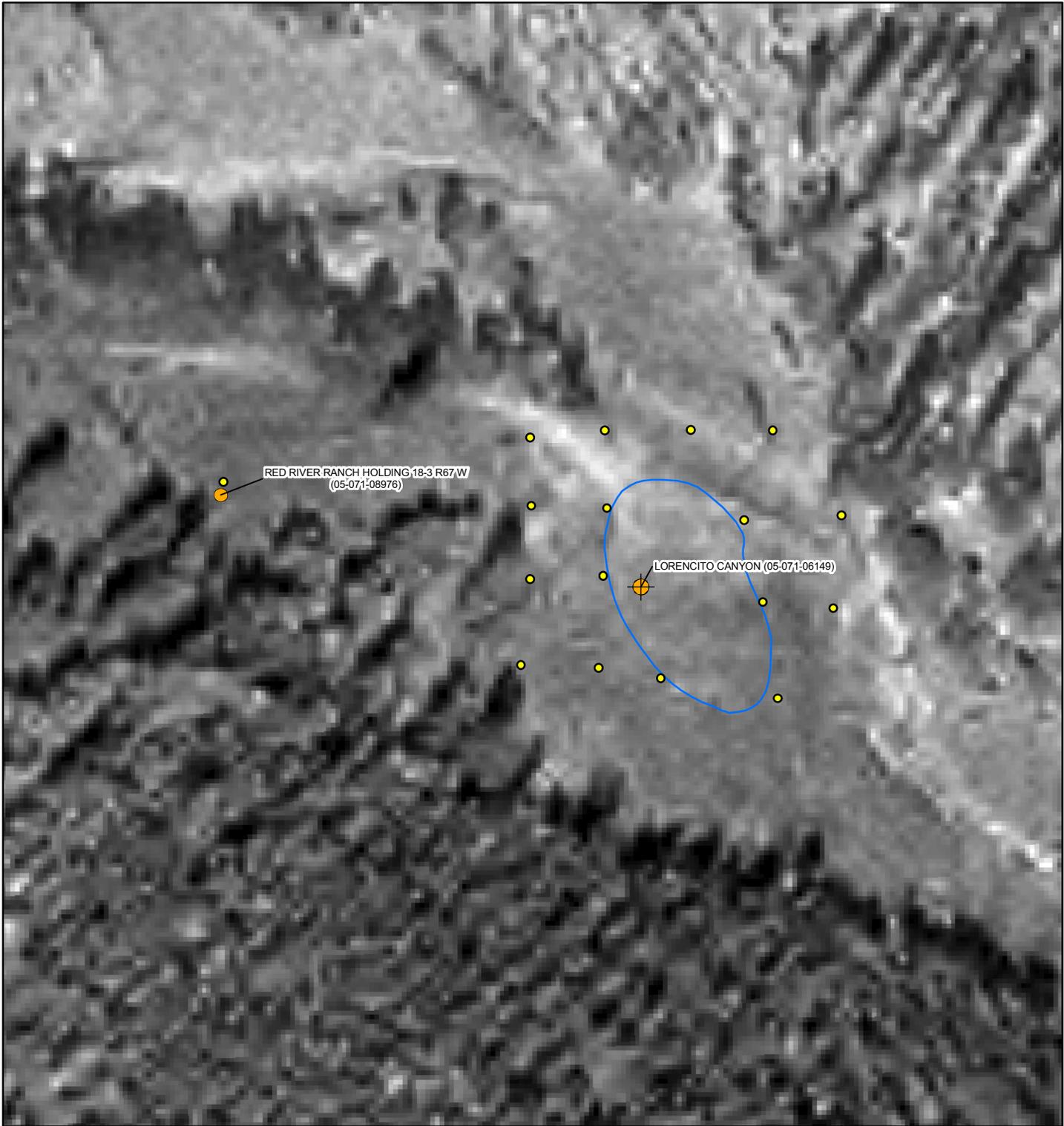


LEGEND

 SITE LOCATION

FIGURE 1
SITE LOCATION MAP
POND E
LAS ANIMAS COUNTY, COLORADO
RED RIVER RANCH HOLDINGS





LEGEND

Map Source: USGS/NRCS, 2005

SUBSURFACE METHANE MEASUREMENTS

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

- PRODUCING WELL
- ⊕ PLUGGED AND ABANDONED WELL
- PRODUCED WATER POND (POND E)



PPM - PARTS PER MILLION

FIGURE 2
SOIL GAS SURVEY RESULTS MAP
POND E
LAS ANIMAS COUNTY, COLORADO
RED RIVER RANCH HOLDINGS



TABLE 1
SOIL GAS SURVEY DATA
POND E
TRINIDAD, COLORADO
RED RIVER RANCH HOLDINGS

Point ID	GPS Coordinates*		Sample Date	Subsurface CH ₄ Conc. (%LEL)	Subsurface O ₂ Conc. (%)	Subsurface H ₂ S Conc. (ppm)	Subsurface CO Conc. (ppm)
	NORTHING	EASTING					
1	696408.967	3164742.634	12/11/2014	<1	20.7	<1	<1
2	696456.723	3164745.238	12/11/2014	<1	21.1	<1	<1
3	696448.373	3164841.873	12/11/2014	<1	21.6	<1	3
4	696322.128	3164865.483	12/11/2014	<1	21.7	<1	1
5	696336.689	3164783.339	12/11/2014	<1	22.1	<1	<1
6	696343.728	3164739.130	12/11/2014	<1	22.2	<1	<1
7	696346.007	3164684.571	12/11/2014	<1	22.1	<1	<1
8	696406.451	3164690.736	12/11/2014	<1	21.9	<1	<1
9	696458.435	3164691.786	12/11/2014	<1	22.0	<1	<1
10	696475.459	3164474.309	12/11/2014	<1	21.8	<1	<1
11	696506.691	3164690.656	12/11/2014	<1	21.9	<1	<1
12	696511.868	3164743.614	12/11/2014	<1	21.9	<1	<1
13	696512.122	3164804.079	12/11/2014	<1	21.7	<1	<1
14	696511.697	3164862.211	12/11/2014	<1	22.1	<1	<1
15	696451.839	3164910.575	12/11/2014	<1	21.9	<1	<1
16	696385.846	3164905.064	12/11/2014	<1	21.5	<1	<1
17	696390.207	3164855.210	12/11/2014	<1	22.0	<1	<1

Notes:

* GPS coordinates are in Colorado State Plan South, NAD83. Units are in Feet (ft.)

CH₄ - methane

O₂ - oxygen

H₂S - hydrogen sulfide

CO - carbon monoxide

Conc. - concentration

ppm - parts per million

% - percent

LEL - lower explosive limit

< - less than

