



June 30, 2011

Ms. Karen Spray
Colorado Oil and Gas Conservation Commission
P.O. Box 2651
Durango, Colorado 81302-2651

RE: 4M Operations and Maintenance Report September 2010 through June 2011

Dear Ms. Spray:

LT Environmental, Inc. (LTE) is pleased to submit this Operations and Maintenance (O&M) and System Expansion Report for the 4M Outcrop Mitigation Project in La Plata County, Colorado, to the Colorado Department of Natural Resources (DNR) Colorado Oil and Gas Conservation Commission (COGCC). This report includes the period of September 22, 2010 to June 27, 2011.

Background

The objective of the 4M methane mitigation system is to demonstrate the technical viability to recover and use the uncontrolled methane along the Fruitland Formation Outcrop. An additional goal of the mitigation system is to help protect the environment, which includes reducing carbon emissions and improving plant growth. To accomplish this objective, LTE designed and installed vapor collection and barrier systems for methane collection at the South Fork Texas Creek site (Figure 1) and Pine River site (Figure 2). At the South Fork Texas Creek site, the recovered methane is being used to fuel a turbine, which is generating electricity to operate the collection system. The turbine is returning the excess generated power to the local electrical grid for credit as a renewable energy resource. The initial design, installation, and startup of the 4M methane mitigation systems were completed in 2008 and 2009. Prior O&M operations beginning May 2009 are detailed in previous O&M reports completed by LTE.

During June 2010, the South Fork Texas Creek system was expanded in order to increase methane collection. A collection liner designed to direct vapors into the existing collection system was installed beneath the creek, and 32 diagonal well points were installed along the creek and piped into the existing manifold. In addition, gas from a COGCC monitoring well was piped to the collection system.

Mitigation System Operation and Maintenance

Routine system operations are conducted at both sites. O&M activities included maintaining the equipment per manufacturer instructions, collecting data used to evaluate system performance, and adjusting the operating parameters to optimize system effectiveness. Operational parameters were recorded and included methane and oxygen concentrations in the collected gas; operational hours for the blower and turbine generator; applied vacuum to the subsurface piping; and electrical generation of the turbine.



Activities conducted during the reporting period included:

- Routine O&M activities to monitor and adjust system performance;
- Field screening the inlet gas quality;
- Reviewing gas quality measurements stored in the data loggers and obtaining weather station data;
- Changing oil, oil filters, an oil separator and a coalescing filter in the gas compressor system;
- Changing the air filter on the turbine; and
- Conducting non-routine O&M services and troubleshooting as described below.

From November 2010 to January 2011, the South Fork Texas Creek system operation was intermittent, resulting from a combination of operational issues. The recovery of water increased with the addition of the methane recovery points along the creek. During the prior winter, minimal water recovery was experienced. As the ambient temperature decreased, the moisture dropped out in the piping resulting in water entering the gas compressor and the turbine inlet piping. The water was able to mix with the oil in the compressor, foul the coalescing filters, and travel to the moisture removal desiccant. The oil possibly fouled the desiccant and moisture ultimately reached the turbine inlet piping. LTE responded by accomplishing successive events to remove water from the lines, replacing the absorbent desiccant material, and replacing the oil coalescing filter and housing,

An additional problem was encountered subsequent to the moisture removal that resulted in scale buildup within the gas compressor after-cooler. The after-cooler and piping were plugged with the scale, which resulted in limited capability of the compressor to cool itself. The problem was initially identified by low gas volume reaching the turbine, which shut down due to insufficient gas supply. After the scaling problem was identified, successive cleaning of the tubing resulted in partially correcting the problem. After the compressor continued to experience overheating issues when the gas flow and electrical generation were increased, the after-cooler module on the gas compressor was replaced. Increased collection of hydrogen sulfide (H₂S) from the lines adjacent to the creek installed during June 2010 potentially contributed to the scaling problems. The well points adjacent to the creek were shut in during March 2011 and subsequently vented to decrease the potential for scale buildup and limit other possible problems potentially caused by H₂S. From April through June 2011, the system was operating with one of the three well point lines open to the collection system.

The gas compression issues described above contributed to decreased electrical generation. Other problems include faults from instantaneous electrical voltage changes related to the anti-islanding features of the turbine generator and interaction with the electronic phase converter system. These faults resulted in repetitive intermittent turbine shutdowns each day. Typically



the system restarts within several minutes of the shutdown occurrence. When turbine output is increased, the frequency of the intermittent shutdowns increases. Adjustments to the turbine have been made to increase the allowance for voltage variability; however the shutdowns have continued to occur. To optimize the turbine life expectancy, the system is operated to minimize these shutdowns by reducing the turbine output to 12 kilowatts (kW). This problem will be further investigated.

A control problem resulted in fault codes that required evaluation by the turbine manufacturer representative. The diagnosis indicated the main circuit board required replacement. This event was observed, and the circuit board was replaced during the last week of May 2011.

Operations Summary

During normal operation, gas composition and flow remained fairly consistent at both sites, with better gas quality recorded at the South Fork Texas Creek system. During the reporting period, methane concentrations remained relatively stable (approximately 70 percent [%]) at the South Fork Texas Creek site (Figure 3). At the Pine River site, methane concentrations remained near 3%. Fluctuations ranged from a low of 0.4% to a high of 9.5% (Figure 4). O&M data are provided in Table 1 for the South Fork Texas Creek site and in Table 2 for the Pine River site.

The percentage of methane gas recovered was measured at both sites from all four collection zones. A methane flow rate was calculated using the resultant methane concentrations. In Figure 5, the average flow rate and cumulative recovered methane are plotted over time for the South Fork Texas Creek site. Typical collected gas flow ranged from 135 cubic feet per hour (cfh) to 342 cfh. Collected methane gas flow ranged from 6 cfh to 149 cfh at the Pine River site. The Pine River site was previously collecting gas at a rate of approximately 500 cfh. The flow rate was decreased in an attempt to increase methane concentrations, but methane concentrations remained similar to previous readings.

The South Fork Texas Creek system produces the gas needed to operate the turbine, and excess gas is re-circulated within the compression system. The turbine generator was set at 20 kW output following system expansion. This setting was increased to attempt to optimize methane gas collection and use during the reporting period. The operational setting of 20 kW appears to be the optimum point at which sustained operation can be accomplished while maintaining high inlet gas quality. With optimum system operation utilizing approximately 6 kW of electrical power, the remaining 14 kW are distributed back into the electrical grid for a net gain. Subsequent to the optimum operation achieved July through mid-October 2010, operational difficulties were encountered, and net electrical output averaged 12 kW for remainder of the reporting period.

The system operation commenced with an electrical meter reading of 51,540 kilowatt-hours (kW-h). From startup to June 27, 2011, the electrical meter reading was reduced to zero then the meter rolled to 99,999 kW-h. On June 27, 2011, the reading was 88,943 kW-h. These readings indicate 62,596 kW-h have been returned to the grid since system operation commenced



(Figure 6). The value of the electricity generated to date has been used to offset electrical usage at the Pine River site and to pay for administrative fees associated with the electrical service. The remainder of the net generation is held as a credit for the electrical service to the two facilities.

Vegetation Observations

Considerable plant growth at both sites has occurred in areas previously prohibitive of vegetative growth. At the South Fork Texas Creek location, the liner affects moisture retention in the soil, which appears to delay, but not prevent spring time plant growth. A report detailing the work accomplished during the June 2010 system expansion was provided to the Army Corps of Engineers in December 2010, in accordance with the permit obtained to allow creek disturbance and installation of the methane barrier under the creek. During June 2011, less wetland vegetation within the creek was observed than previously measured prior to the June 2010 work. Due to the limited fringe wetlands adjacent to the creek, additional grading may be necessary to encourage plant growth and return the wetland area to conditions observed prior to system construction.

Weather Data

The weather station currently in use was installed in June 2010. The weather station was installed to monitor conditions that may affect methane recovery and system operation. Currently, the system operation does not appear to be limited by the volume of methane recovered. The daily maximum and minimum temperatures (Figure 7), monthly precipitation (Figure 8), and the daily barometric pressure values (Figure 9) are provided.

Planned Activities

The electrical generation results, along with visual observations of vegetation growth, suggest the methane mitigation system is operating successfully. During the next reporting period, the South Fork Texas Creek system will continue operation to optimize electrical generation. Closer monitoring of moisture buildup within the system and monitoring of H₂S concentrations are planned. Further investigation of ways to improve system performance will be accomplished. The Pine River site will be operated with the goal of optimizing methane recovery to reduce harm to plant growth. Additional evaluation of the venting system at Pine River may include shutting off the blower and observing plant growth changes with passive ventilation.



LTE appreciates the opportunity to provide these services to the COGCC. Please call us at 303-433-9788 if you have any questions or comments regarding this report.

Sincerely,

LT ENVIRONMENTAL, INC.

A handwritten signature in blue ink, appearing to read 'Gavin Casson'.

Gavin Casson, EIT
Staff Engineer

A handwritten signature in blue ink, appearing to read 'Chris Shephard', followed by the text 'for:'.

Christopher E. Shephard, P.E.
Project Manager

Attachments:

Figure 1 –Mitigation System Layout South Fork Texas Creek

Figure 2 – Mitigation System Layout Pine River

Figure 3 – South Fork Texas Creek Methane Concentrations

Figure 4 – Pine River Methane Concentrations

Figure 5 – South Fork Texas Creek Methane Gas Flow

Figure 6 – South Fork Texas Creek Surplus Electricity Generated

Figure 7 – Daily Minimum and Maximum Temperature

Figure 8 – Monthly Precipitation

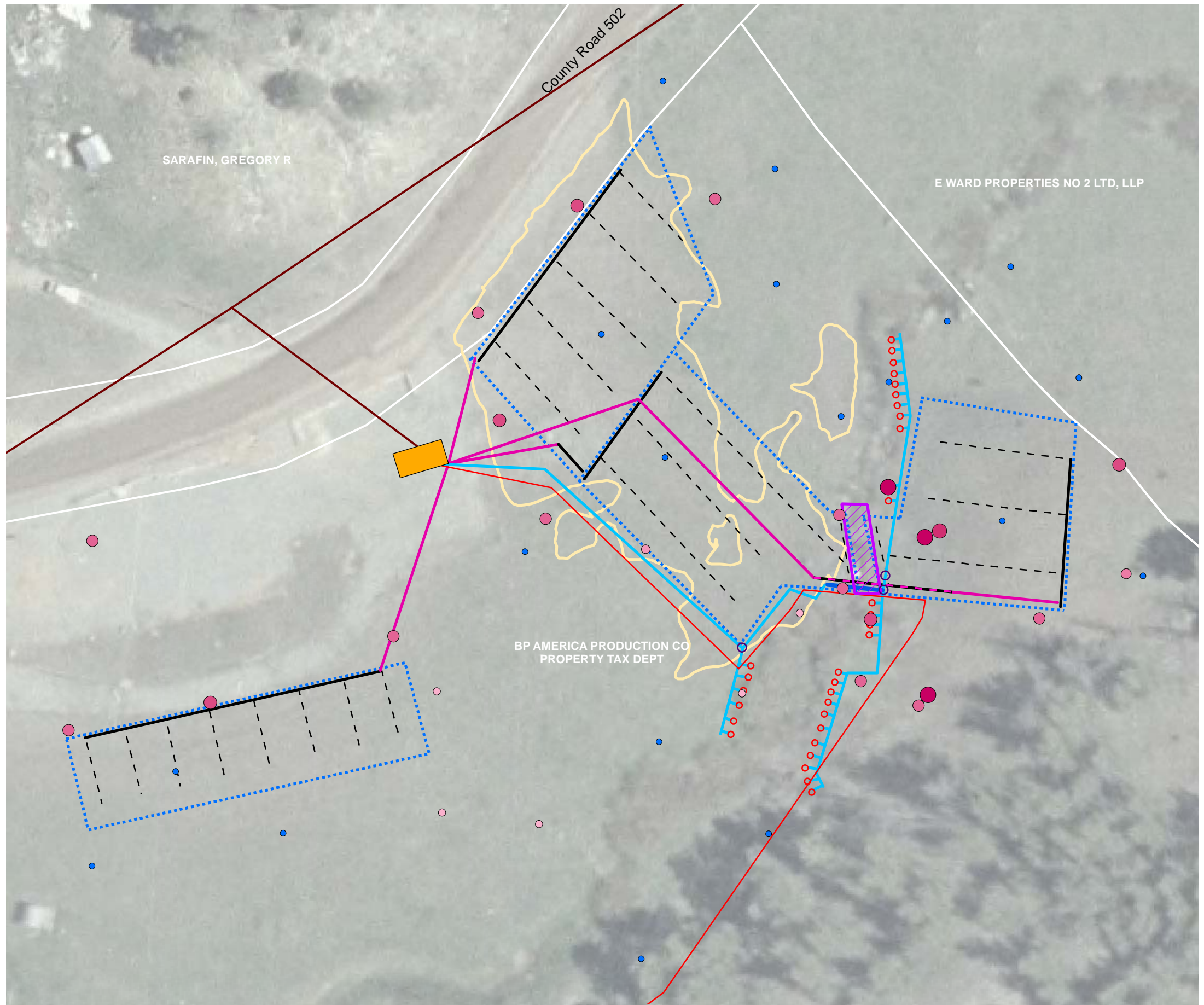
Figure 9 – Daily Barometric Pressure

Table 1 – Operation and Maintenance Data South Fork Texas Creek

Table 2 – Operation and Maintenance Data Pine River

FIGURES





- LEGEND**
- DIAGONAL COLLECTION WELL
 - VAULT
 - ▨ Extended Methane Collection (20 mil barrier)
 - Process Equipment Footprint
 - Overhead Electrical Line
- 2010 Methane Flux Results (mole/m²/day)**
- 0.00000
 - 0.00001 - 0.10000
 - 0.10001 - 0.50000
 - 0.50001 - 1.00000
 - 1.00001 - 10.00000
 - 10.00001 - 50.00000
 - 50.00001 - 100.00000
 - 100.00001 - 1175.00000
- ⋯ 20 mil Impervious Membrane
 - Parcel Boundary & Owner (white)
 - Stressed Vegetation
- Piping**
- 2" SCH 40 PVC
 - 2" SCH 80 PVC
 - 3" SCH 40 PVC
 - 3" SCH 80 PVC
 - - 4" ADS Corrugated Piping (Slotted)
 - 4" ADS Corrugated Piping (Solid)
 - 1" HDPE

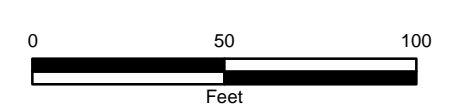


FIGURE 1
MITIGATION SYSTEM LAYOUT
SOUTH FORK TEXAS CREEK
4M OUTCROP MITIGATION PROJECT
DURANGO, COLORADO
COLORADO OIL AND GAS CONSERVATION COMMISSION





LEGEND

- Visible Methane Seeps in Surface Water
- +
- ⊘ Gas Monitoring Probes
- ⊘ Power Pole
- Process Equipment Footprint
- Stressed Vegetation
- Parcel Boundary & Owner (white)
- Power Line
- 2010 Methane Flux Results (mole/m²/day)**
- 0.00000
- 0.00001 - 0.10000
- 0.10001 - 0.50000
- 0.50001 - 1.00000
- 1.00001 - 10.00000
- 10.00001 - 50.00000
- 50.00001 - 100.00000
- 100.00001 - 1175.00000
- Piping**
- 3" SCH 40 PVC
- - 4" ADS Corrugated Piping (Slotted)
- 4" ADS Corrugated Piping (Solid)

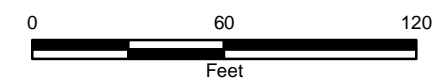


FIGURE 2
MITIGATION SYSTEM LAYOUT
PINE RIVER
4M OUTCROP MITIGATION PROJECT
DURANGO, COLORADO
COLORADO OIL AND GAS CONSERVATION COMMISSION



FIGURE 3
SOUTH FORK TEXAS CREEK METHANE CONCENTRATIONS
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

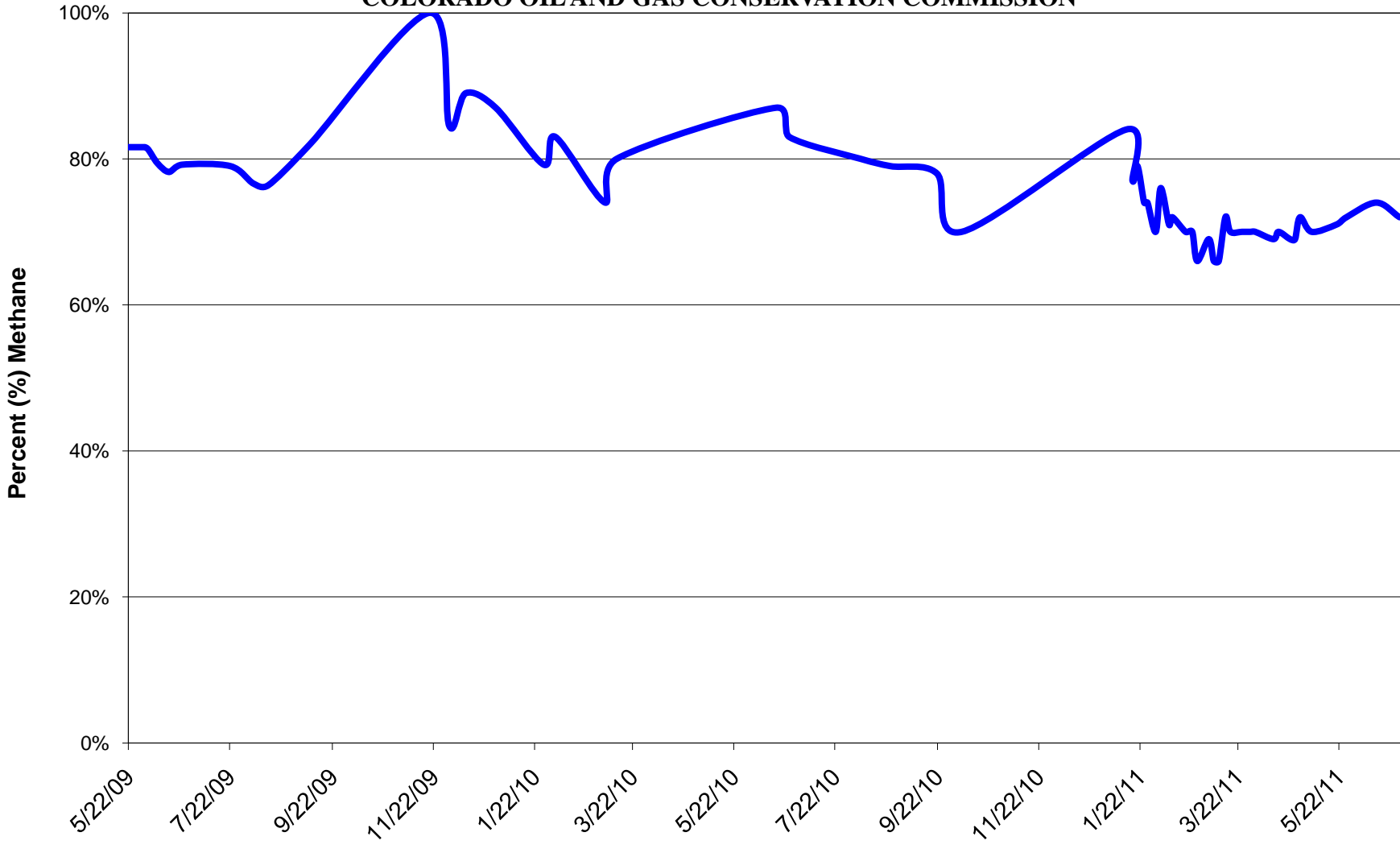


FIGURE 4
PINE RIVER METHANE CONCENTRATIONS
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

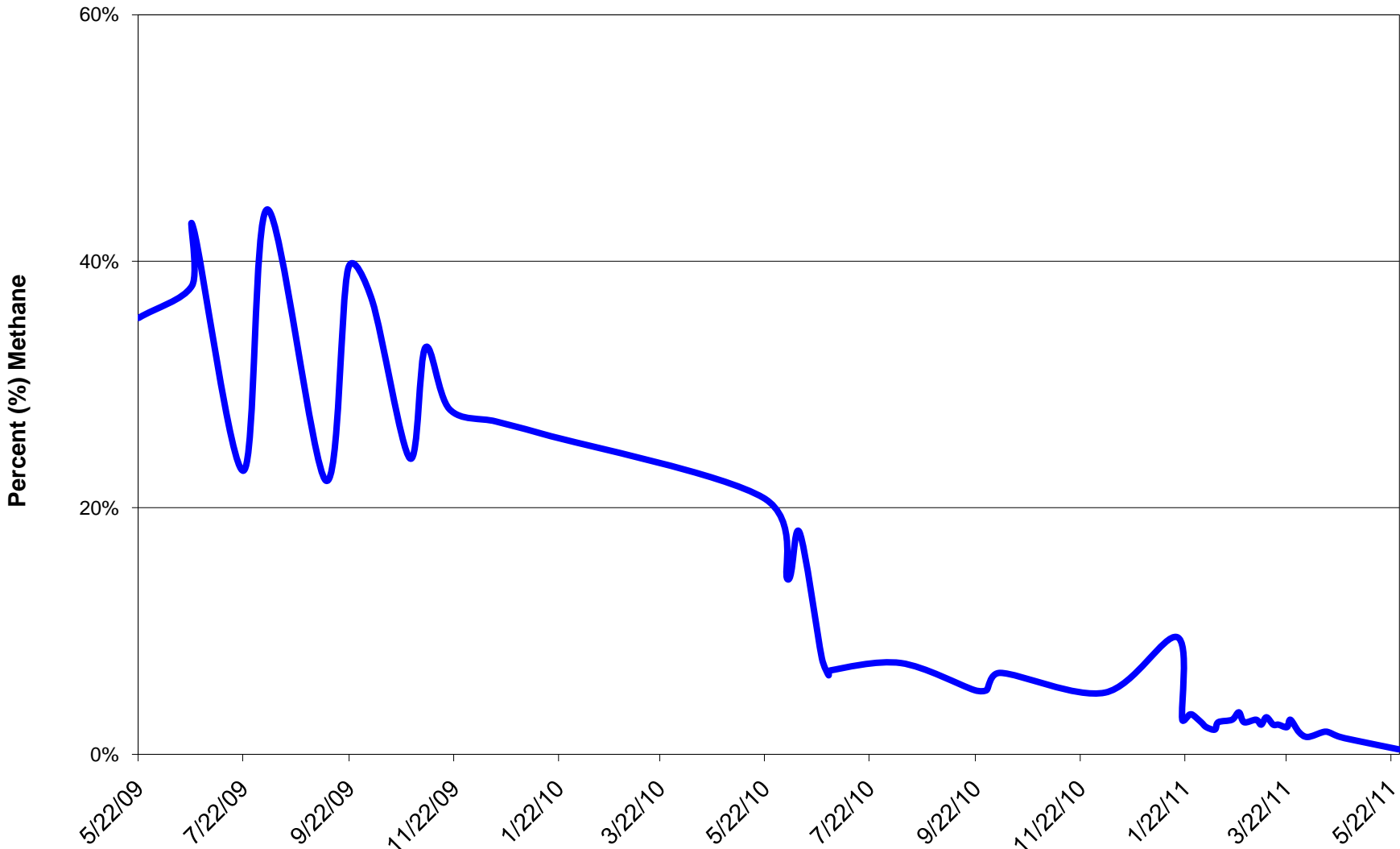
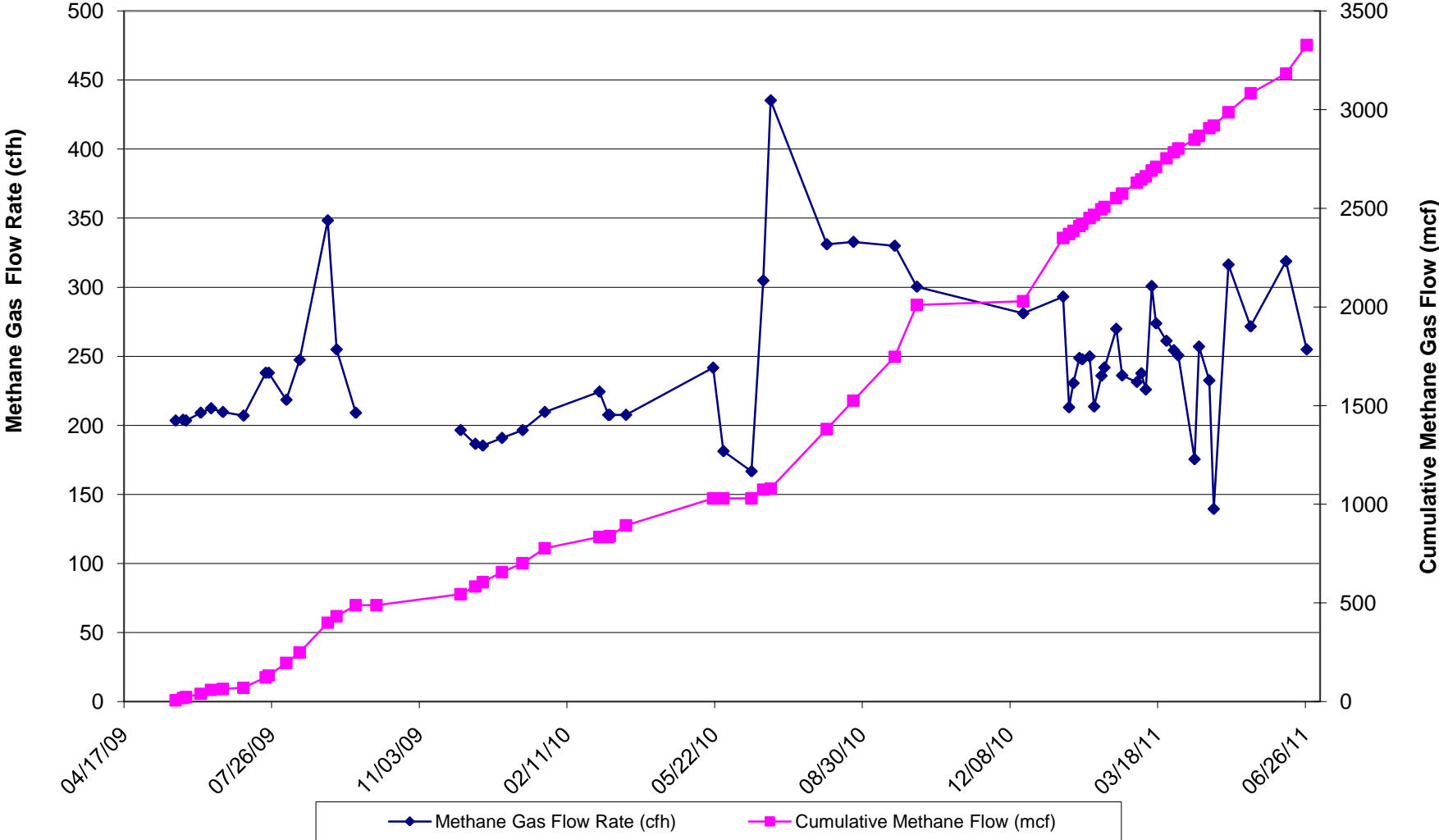


FIGURE 5
SOUTH FORK TEXAS CREEK METHANE GAS FLOW
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION



cfh - cubic feet per hour
mcf - 1,000 cubic feet



FIGURE 6
SOUTH FORK TEXAS CREEK
SURPLUS ELECTRICITY GENERATED
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

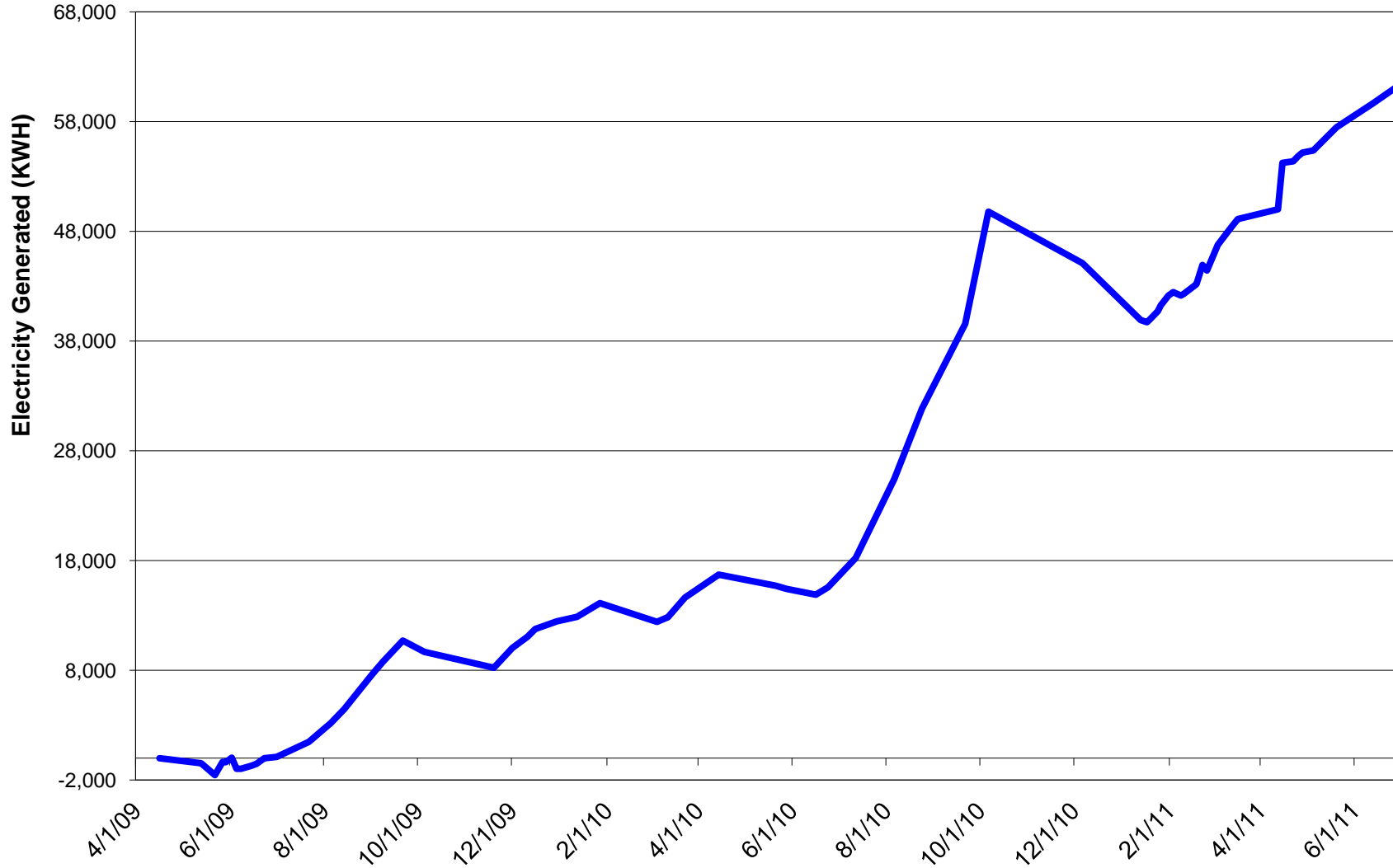


FIGURE 7
DAILY MINIMUM AND MAXIMUM TEMPERATURE
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

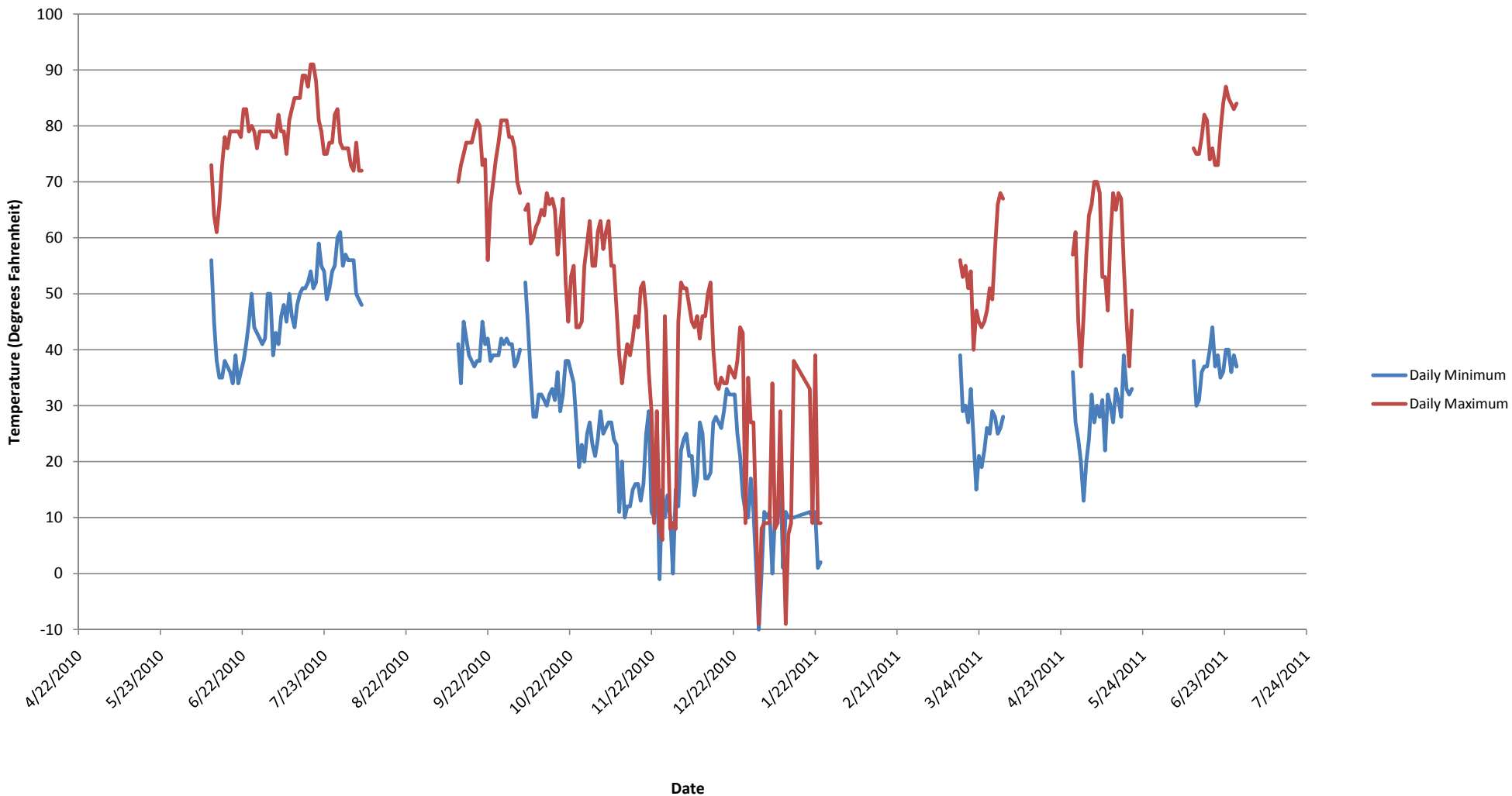


FIGURE 8
MONTHLY PRECIPITATION
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

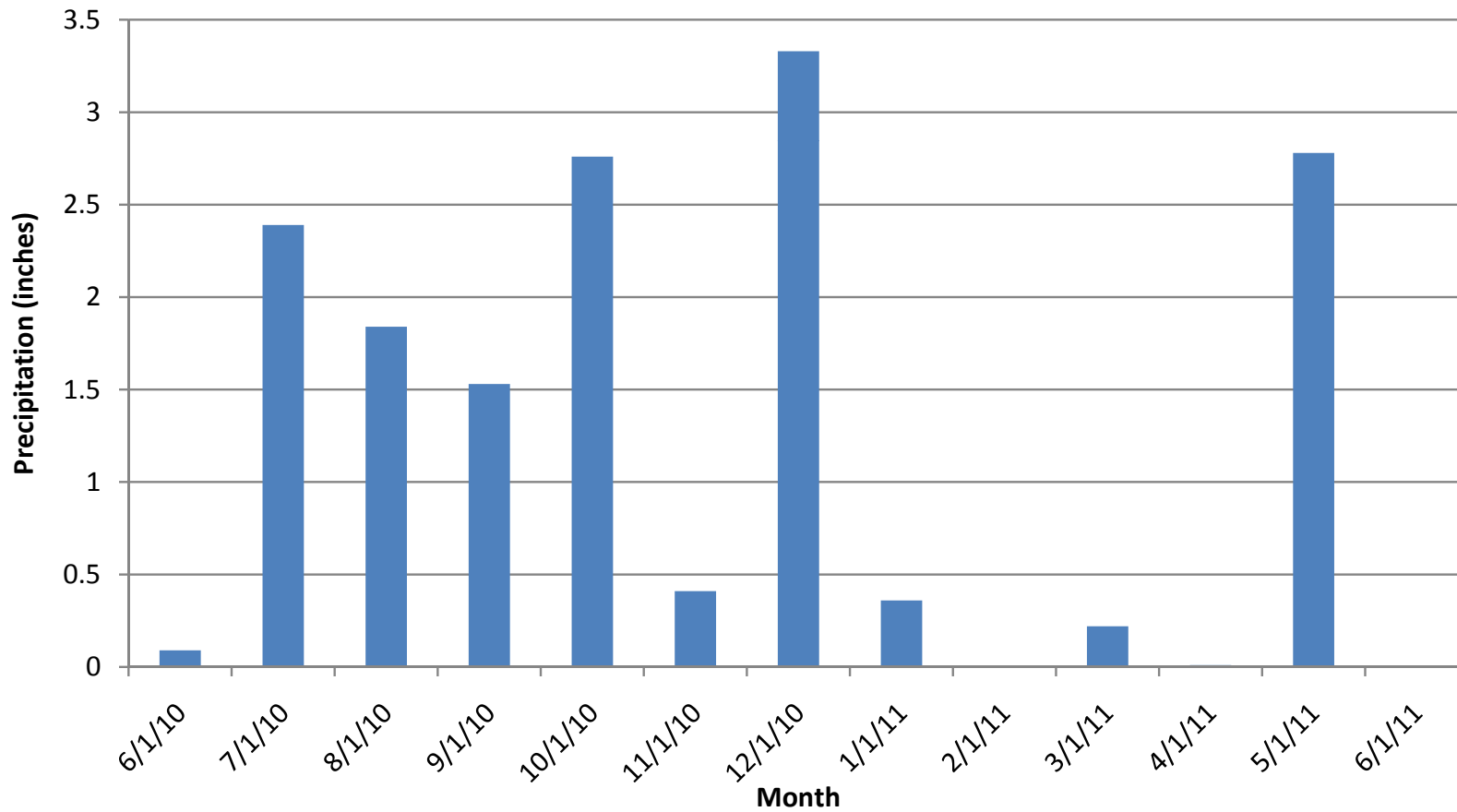
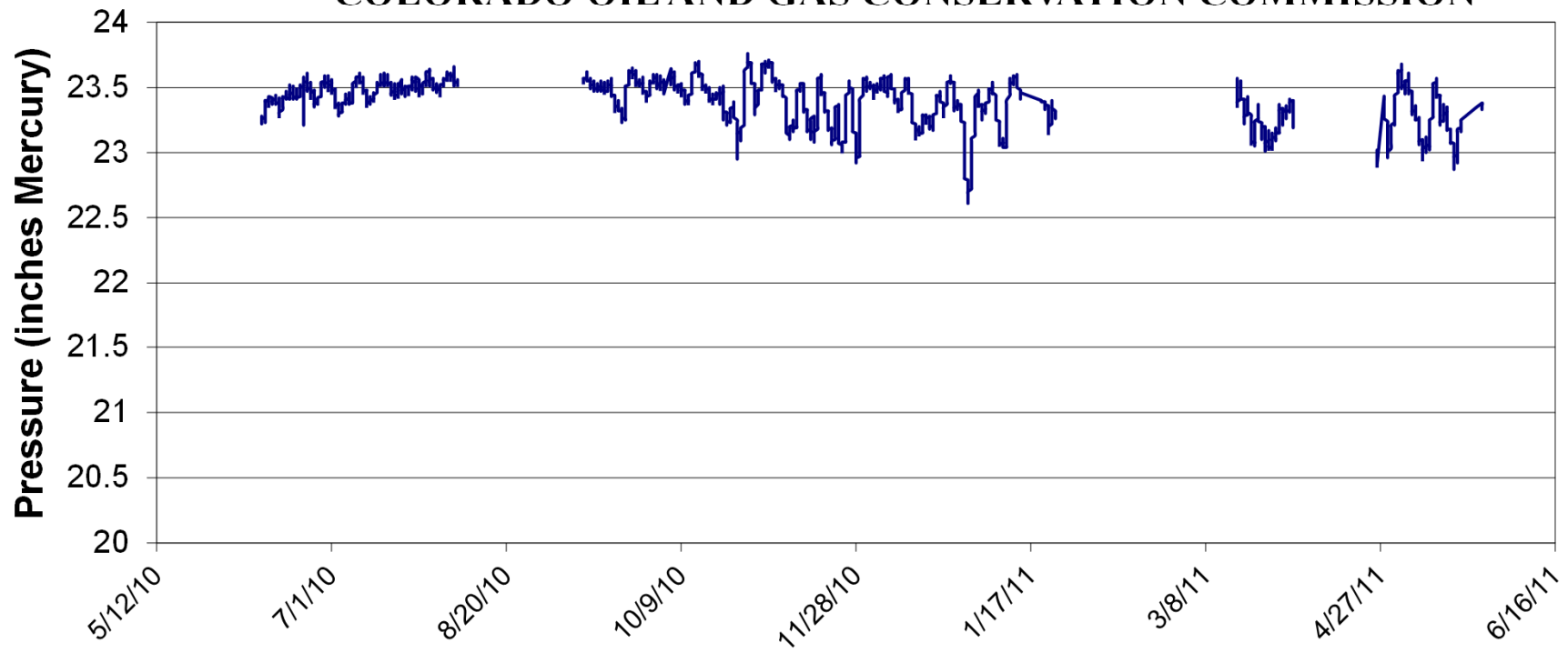


FIGURE 9
DAILY BAROMETRIC PRESSURE
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION



TABLES



TABLE 1
OPERATIONS AND MAINTENANCE DATA
SOUTH FORK TEXAS CREEK
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

Date	System Status Upon Arrival	Electric Meter (kw)	Turbine (hours)	Turbine Demand (kw)	From Chart, Btu/hr needed	Compressor (hours)	Methane (%)	Oxygen (% or ppm)	Calculated Methane Flow (scfh)	Cumulative Calculated Methane Recovered (mcf)
5/22/2009	OFF	51,540	34	10	166,000	--	81.6	130	203	7
5/27/2009	OFF	50,355	90	10	166,000	--	81.4	33	204	18
5/29/2009	OFF	50,368	113	10	166,000	--	81.6	15.2	203	23
6/8/2009	OFF	50,967	192	10	166,000	--	79.4	14.9	209	40
6/15/2009	OFF	50,683	286	10	166,000	289	78.2	83	212	59
6/19/2009	OFF	50,510	305	10	166,000	308	79	19.8	210	63
6/23/2009	OFF	50,004	310	10	166,000	402	79.2	0.16	210	65
6/25/2009	OFF	--	318	10	166,000	411	--	--	--	--
7/7/2009	OFF	50,983	338	10	166,000	431	80.2	51.2	207	69
7/15/2009	ON	--	523	10 to 12	188,000	620	--	--	--	--
7/22/2009	OFF	50,519	558	12	188,000	659	79	48	238	121
7/24/2009	OFF	50,365	600	12	188,000	700	--	--	--	--
8/5/2009	ON	46,840	891	10	166,000	993	76	5.25	218	185
8/14/2009	ON	45,536	1,106	12	188,000	1,208	76	3.25	247	238
8/20/2009	ON	44,501	1,251	12	188,000	1,353	80	4.25	235	272
9/2/2009	OFF	42,246	1,538	14	209,000	1,602	60	0.39	348	372
9/8/2009	ON	41,236	1,666	14	209,000	1,779	82	0.1	255	404
9/21/2009	ON	39,298	1,934	14 to 16	209,000	2,101	104	0.1	201	458
10/5/2009	OFF	40,322	2,009	OFF	166,000	2,332	--	3	--	--
10/5/2009	SYSTEM OFF FOR REPAIRS		Reset	--	166,000	--	--	--	--	--
11/19/2009	ON	41,776	1	12	166,000	--	100	93 ppm	166	458
12/1/2009	ON	39,960	286	12	166,000	2,623	84.5	1.9 ppm	196	514
12/11/2009	OFF	38,941	495	12	166,000	2,866	89	2.0 ppm	187	553
12/16/2009	ON	38,235	615	12	166,000	2,986	89.6	1.8 ppm	185	576
12/29/2009	OFF	37,548	876	12	166,000	3,321	87	3.0 ppm	191	625
1/12/2010	OFF	37,127	1,109	12	166,000	3,632	84.5	3.25 ppm	196	671
1/27/2010	ON	35,875	1,469	12	166,000	3,993	79.2	0.1	210	747
3/5/2010	OFF	37,586	1,722	12	166,000	4,246	74	0.16	224	803
3/11/2010	OFF	37,217	1,723	12	166,000	4,247	64	130 ppm	259	804
3/12/2010	ON	37,172	1,747	12	166,000	4,271	80	23.2 ppm	208	809
3/23/2010	ON	35,364	2,009	12	166,000	4,533	59	0.1	281	882



TABLE 1
OPERATIONS AND MAINTENANCE DATA
SOUTH FORK TEXAS CREEK
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

Date	System Status Upon Arrival	Electric Meter (kw)	Turbine (hours)	Turbine Demand (kw)	From Chart, Btu/hr needed	Compressor (hours)	Methane (%)	Oxygen (% or ppm)	Calculated Methane Flow (scfh)	Cumulative Calculated Methane Recovered (mcf)
4/14/2010		33,275	2,379	12	166,000	4,900	51	52 ppm	325	1,003
5/21/2010	OFF	34,290	2,573	8	145,000	5,099	60	--	242	1,050
5/28/2010	OFF	34,589	2,573	8	145,000	5,099	80	--	181	1,050
6/16/2010	ON	35,119	2,574	8	145,000	5,101	87	0.1	167	1,050
6/24/2010	OFF *	34,436	2,720	18	253,000	5,249	83	0.1	305	1,094
6/29/2010	ON	34,412	2,733	20	274,000	5,262	82	0.1	450	1,100
7/12/2010	ON	31,780	3,035	20	274,000	5,576	80	0.1	349	1,205
8/6/2010	ON	24,587	3,613	19.2	265,000	6,171	79	0.1	341	1,402
8/24/2010	ON	18,172	4,035	19	265,000	6,605	79	0.1	342	1,547
9/21/2010	ON	10,437	4,690	18.1	253,000	7,279	78	0.1	340	1,769
10/1/2010	ON	8,260	4,900	18.0	253,000	8,154	70	0.1	1251	2,032
12/2/2010		3,290								
12/17/2010	OFF	4,901	5,246	12.0	166,000	8,364	70	0.1	281	2,129
1/3/2011		7,820								
1/13/2011	OFF	10,209	5,592	8.0	145,000	8,574	84	0.1	235	2,195
1/17/2011	ON	10,102	5,684	8.0	145,000	8,668	77	0.1	218	2,215
1/20/2011	ON	9,869	5,758	9.9	166,000	8,741	79	0.1	227	2,231
1/24/2011	ON	9,269	5,854	13.0	199,000	8,838	74	0.1	251	2,255
1/26/2011	ON	8,856	5,898	14.9	220,000	8,884	74	0.1	259	2,267
1/31/2011	ON	7,872	6,013	14.5	209,000	9,000	70	0.1	252	2,296
2/3/2011	OFF	7,549	6,075	12.9	199,000	9,079	76	0.1	272	2,313
2/8/2011	ON	6,846	6,191	12.9	199,000	9,194	71	0.1	234	2,340
2/10/2011	OFF	6,694	6,240	13.9	209,000	9,247	72	0.1	262	2,353
2/18/2011	OFF	5,712	6,386	13.9	209,000	9,412	70	0.1	305	2,397
2/22/2011	ON	5,157	6,476	14.0	209,000	9,506	70	0.1	247	2,419
2/25/2011	ON	4,581	6,550	13.0	199,000	9,580	66	0.1	216	2,435
3/4/2011	ON	3,243	6,707	13.0	199,000	9,747	66	0.1	238	2,473
3/7/2011	ON	--	6,776	13.0	199,000	9,817	66	0.1	241	2,489
3/10/2011	ON	2,138	6,846	12.3	188,000	9,888	66	0.1	229	2,505
3/14/2011	ON	1,397	6,941	13.0	199,000	9,984	72	0.1	304	2,534
3/17/2011	ON	873	7,008	12.9	199,000	10,051	70	0.1	274	2,553



TABLE 1
OPERATIONS AND MAINTENANCE DATA
SOUTH FORK TEXAS CREEK
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

Date	System Status Upon Arrival	Electric Meter (kw)	Turbine (hours)	Turbine Demand (kw)	From Chart, Btu/hr needed	Compressor (hours)	Methane (%)	Oxygen (% or ppm)	Calculated Methane Flow (scfh)	Cumulative Calculated Methane Recovered (mcf)
3/24/2011	ON	99,288	7,170	12.9	199,000	10,218	70	0.1	269	2,596
3/29/2011	ON	98,294	7,288	12.9	199,000	10,338	70	0.1	259	2,627
4/1/2011	ON	97,517	7,362	9.9	166,000	10,414	70	0.1	257	2,646
4/12/2011	ON	96,305	7,553	10.9	177,000	10,674	69	0.1	239	2,691
4/15/2011	ON	95,767	7,626	10.9	177,000	10,747	70	0.1	257	2,710
4/22/2011	ON	95,629	7,740	8.0	145,000	10,915	69	0.1	343	2,749
4/25/2011	ON	95,164	7,797	8.0	145,000	11,012	69	0.1	237	2,763
4/28/2011	ON	94,834	7,844	10.9	177,000	11,058	72	0.1	591	2,790
5/5/2011	ON	94,642	8,009	11.0	177,000	11,224	70	0.1	243	2,831
5/20/2011	ON	92,515	8,251	10.9	177,000	11,577	71	0.1	396	2,926
6/13/2011	ON	90,313	8,551	13.9	209,000	11,889	74	0.1	332	3,026
6/27/2011	ON	88,943	8,864	11.9	188,000	12,459	72	0.1	464	3,171

Notes:

kw - kilowatts

Btu/hr - British thermal units per hour

% - percent

ppm - parts per million

scfh - standard cubic feet per hour

mcf - 1,000 cubic feet

#NAME?

* - new flow meter was installed



TABLE 2
OPERATIONS AND MAINTENANCE DATA
PINE RIVER
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

Date	System Status Upon Arrival	Blower (hours)	Differential (hours)	Blower Inlet Vacuum (" wc)	Calculated Methane Flow Rate (cfh)	Calculated Cumulative Methane Recovered (mcf)	Electric Meter (kW-h)	Methane (%)	Oxygen (%)
5/22/2009	OFF	--	0	1	807	--	16	35	OFF
5/27/2009	OFF	11.2	11	1	1,015	11	17	44	OFF
5/29/2009	ON	60.0	49	1	600	40	39	26	OFF
6/15/2009	OFF	440.0	380	1	807	347	293	35	3.21
6/23/2009	ON	627.0	187	1	992	533	372	43	5.67
7/7/2009	ON	963.0	336	1	969	858	425	42	3.86
7/22/2009	OFF	1,306.0	343	1	530	1,040	662	23	2.76
7/24/2009	--	1,354.0	48	1	--	--	--	--	--
8/5/2009	OFF	1,363.0	9	1	1,015	1,049	686	44	7.57
8/14/2009	OFF	1,368.0	5	1	738	1,053	698	32	3.98
9/2/2009	OFF	1,500.0	132	1	258	1,087	1,056	11.2	3.35
9/8/2009	ON	1,539.9	40	1	512	1,107	1,064	22.2	2.81
9/21/2009	OFF	1,556.0	16	1	909	1,122	1,071	39.4	3.52
10/5/2009	OFF	1,567.2	11	1	849	1,131	1,092	36.8	4
10/23/2009	--	1,568.0	1	1	567	1,132	--	24.6	6.18
10/27/2009	OFF	--	0	1	553	1,132	--	24	5.8
11/5/2009	ON	1,775.0	207	1	392	1,213	--	17	6.54
11/5/2009	ON	1,777.0	2	7	700	1,214	--	33	11
11/6/2009	ON	1,797.0	20	7	603	1,226	--	28.4	4
11/12/2009	ON	1,941.6	145	7	577	1,310	1,142	27.2	2.42
11/19/2009	ON	1,988.3	47	7	594	1,338	1,188	28	3.56
12/1/2009	OFF	2,167.3	179	7	441	1,417	1,522	20.8	5.61
12/16/2009	OFF	2,223.7	56	7	815	1,463	2,104	38.4	4.6
12/29/2009	OFF	2,245.0	21	1	--	--	2,641	--	--
1/12/2010	OFF	2,245.0	0	8	986	1,463	3,120	48.6	4.3
1/27/2010	OFF	2,267.3	22	1	--	--	3,610	--	--
5/21/2010	RESTART	2,375.3	108	30	20	1,465	3,701	20.8	7.06
5/28/2010	ON	2,648.3	273	26	8	1,467	3,768	10	10.4
6/4/2010	ON	2,816.0	168	27	11	1,469	3,836	14.2	4.35
6/11/2010	ON	3,504.4	688	25	26	1,487	3,904	18	1.67
6/24/2010	ON	4,425.9	922	25	3	1,489	--	7.8	2.01
6/28/2010	ON	5,445.4	1,020	25	11	1,500	4,073	6.4	1.82
6/29/2010	ON	5,863.9	419	25	3	1,501	--	6.8	1.8
8/9/2010	ON	6,373.9	510	25	11	1,507	4,455	7.4	1.12
9/21/2010	OFF	6,619.9	246	20	82	1,527	--	5.2	--
9/28/2010	ON	2,218.4	2,218	20	82	1,707	--	5.2	--
10/1/2010	OFF	2218.7	0	25	91	1,708	--	6.6	--



TABLE 2
OPERATIONS AND MAINTENANCE DATA
PINE RIVER
4M OUTCROP MITIGATION PROJECT
COLORADO OIL AND GAS CONSERVATION COMMISSION

Date	System Status Upon Arrival	Blower (hours)	Differential (hours)	Blower Inlet Vacuum (" wc)	Calculated Methane Rate (cfh)	Calculated Cumulative Methane Recovered (mcf)	Electric Meter (kW-h)	Methane (%)	Oxygen (%)
1/17/2011	OFF	3,577.2	1,359	20	149	1,910	7,585	9.5	--
1/20/2011	ON	3,647.4	70	20	44	1,913	7,616	2.8	4.44
1/24/2011	ON	3,729.9	83	20	50	1,917	7,809	3.2	5.12
1/26/2011	ON	3,776.2	46	20	50	1,919	7,901	3.2	4.95
1/31/2011	ON	3,887.0	111	20	41	1,924	8,216	2.6	4.82
2/3/2011	ON	3934.1	47	20	34	1,926	8,444	2.2	5.15
2/8/2011	ON	4029.2	95	20	31	1,929	8,682	2	4.61
2/10/2011	ON	4065.6	36	20	41	1,930	8,797	2.6	5.53
2/15/2011	OFF	4107.5	42	20	0	1,930	8,876	0	3.78
2/18/2011	ON	4,180	73	20	44	1,933	9,091	2.8	5.32
2/22/2011	ON	4260.6	81	20	53	1,938	9,277	3.4	5.77
2/25/2011	ON	4,328.5	68	20	41	1,940	9,395	2.6	4.87
2/28/2011	ON	4,396.3	68	20	44	1,943	9,431	2.8	5.78
3/4/2011	ON	4,488.5	92	20	38	1,947	9,678	2.4	5.67
3/10/2011	ON	4,606.3	118	20	47	1,952	9,813	3.0	5.44
3/14/2011	ON	4,696.0	90	20	38	1,956	9,939	2.4	5.61
3/17/2011	ON	4,739.3	133	20	38	1,961	10,028	2.4	4.67
3/22/2011	ON	4,806.3	67	20	34	1,963	10,139	2.2	4.05
3/24/2011	ON	4,827.9	22	20	44	1,964	10,217	2.8	3.95
3/29/2011	ON	4,941.0	113	20	28	1,967	10,491	1.8	4.82
4/3/2011	ON	5,088.8	148	20	22	1,970	10,535	1.4	4.71
4/12/2011	ON	5,265.4	177	20	28	1,975	10,783	1.8	4.31
4/15/2011	ON	5,337.9	73	20	28	1,977	10,858	1.8	4.30
4/22/2011	ON	5,503.1	165	20	22	1,981	11,092	1.4	3.82
5/5/2011	ON	5,799.5	296	20	16	1,986	11,371	1.0	3.43
5/26/2011	ON	6,269.6	470	20	6	1,989	11,768	0.4	-

Notes:

" wc - inches water column
cfh - cubic feet per hour
mcf - 1,000 cubic feet
kW-h - kilowatt-hours
% - percent
< - less than

