



**PAMZ** | Parkland Airshed  
Management Zone

# **Parkland Airshed Management Zone**

## **Ambient Air Monitoring Network**

### **October 2013**

**Continuous Ambient Air Quality Monitoring Program  
Monthly Report**

**Operations and Maintenance:**



**Data Validation and Report:**





December 2<sup>nd</sup>, 2013

Alberta Environment and Sustainable Resource Development  
Enforcement and Monitoring Division  
11th Floor, Oxbridge Place  
9820-106 Street  
Edmonton, Alberta  
T6B 2X3

**RE: Parkland Airshed Management Zone – October 2013 – Ambient Air Quality Monitoring Report**

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Enclosed is the Parkland Airshed Management Zone (PAMZ) Ambient Air Monitoring Network Report for the month of **October 2013**. This report is submitted by PAMZ on behalf of the following Member Companies' Facilities, to satisfy the requirement contained in their Operating Approvals:

<b>Company</b>	<b>Facility</b>	<b>Approval No.</b>
BP Canada Energy Company	North Caroline	10158-01-00
BP Canada Energy Company	South Caroline	1071-01-00
Bonavista Petroleum Limited	Carstairs-Crossfield	351-02-00
Penn West Energy	West Gilby	11437-01-00
Conoco Phillips Canada Limited	Medicine River	381-01-00
Harmattan Gas Processing L.P.	Harmattan	10154-02-01
Husky Oil Operations Limited	Ram River	57-01-00
Imperial Oil Resources Limited	Wilson Creek	10264-01-00
Keyera Energy Limited	Gilby	1333-02-00
Keyera Energy Limited	Homeglen-Rimbey	865-01-00
Keyera Energy Limited	Nevis	261-01-00
Keyera Energy Limited	Strachan	1351-01-00
ExxonMobil Oil Canada Limited	Lone Pine	11341-02-00
NAL Resources	Sylvan Lake	249-01-00
Penn West Petroleum Limited	Wimborne	359-01-00
Shell Canada Limited	Burnt Timber	295-01-00
Shell Canada Limited	Shantz	11379-01-00
Shell Canada Limited	Caroline	11323-01-00
Suncor	East Gilby	1717-02-00

Included in this report is a summary of the monthly continuous monitoring that includes detailed hourly average reports and multipoint calibration reports of all instruments. Operations (which include calibrations and maintenance) of the PAMZ air monitoring network were performed by FOCUS Corporation. Operational summaries can be found on the "Continuous Air Quality Data Summary" and the "Continuous Equipment Summary" pages of the report.



The concentrations of the reported air quality parameters of SO<sub>2</sub>, H<sub>2</sub>S/TRS, NO<sub>2</sub>, CO, O<sub>3</sub> and PM<sub>2.5</sub> were within all applicable Provincial and National objectives for the Caroline, Red Deer Riverside, Lancaster and Eagle Hill continuous air monitoring sites.

Details of the PAMZ Ambient Air Monitoring site locations are as follows:

**Caroline Station:**

- ◆ Located on the Schmiemann dairy farm at 51° 56' 49" N and 114° 41' 51" W with an elevation of 1135 meters. The Caroline station is a stationary site and operates year round.

**Red Deer – Riverside:**

- ◆ Located in the city limits of Red Deer on Riverside Drive (52° 17' 56" N and 113° 47' 37" N) and an elevation of 868 meters. The Red Deer Riverside station is a stationary site and operates year round.

**Lancaster (Martha Station):**

- ◆ Located at 11 Lancaster Drive, in the city of Red Deer; (52° 14' 27.10" N and 113° 45' 55.26" W). The site is a mobile site and from July 11<sup>th</sup>, 2013 to the end of March, 2014; the Martha station will be at the Lancaster site.

**Eagle Hill (McCoy Station):**

- ◆ Located at the Bay residence on Range Road 34222, approximately 3 kms south of Highway 587 and 4 kms west of Highway 766: at 8-18-34-3 W5M; (51° 54' 55" N and 114° 24' 25" W). The site is a mobile site and from October 1<sup>st</sup> to November 5<sup>th</sup>, 2013 the McCoy station will be at the Eagle Hill site.

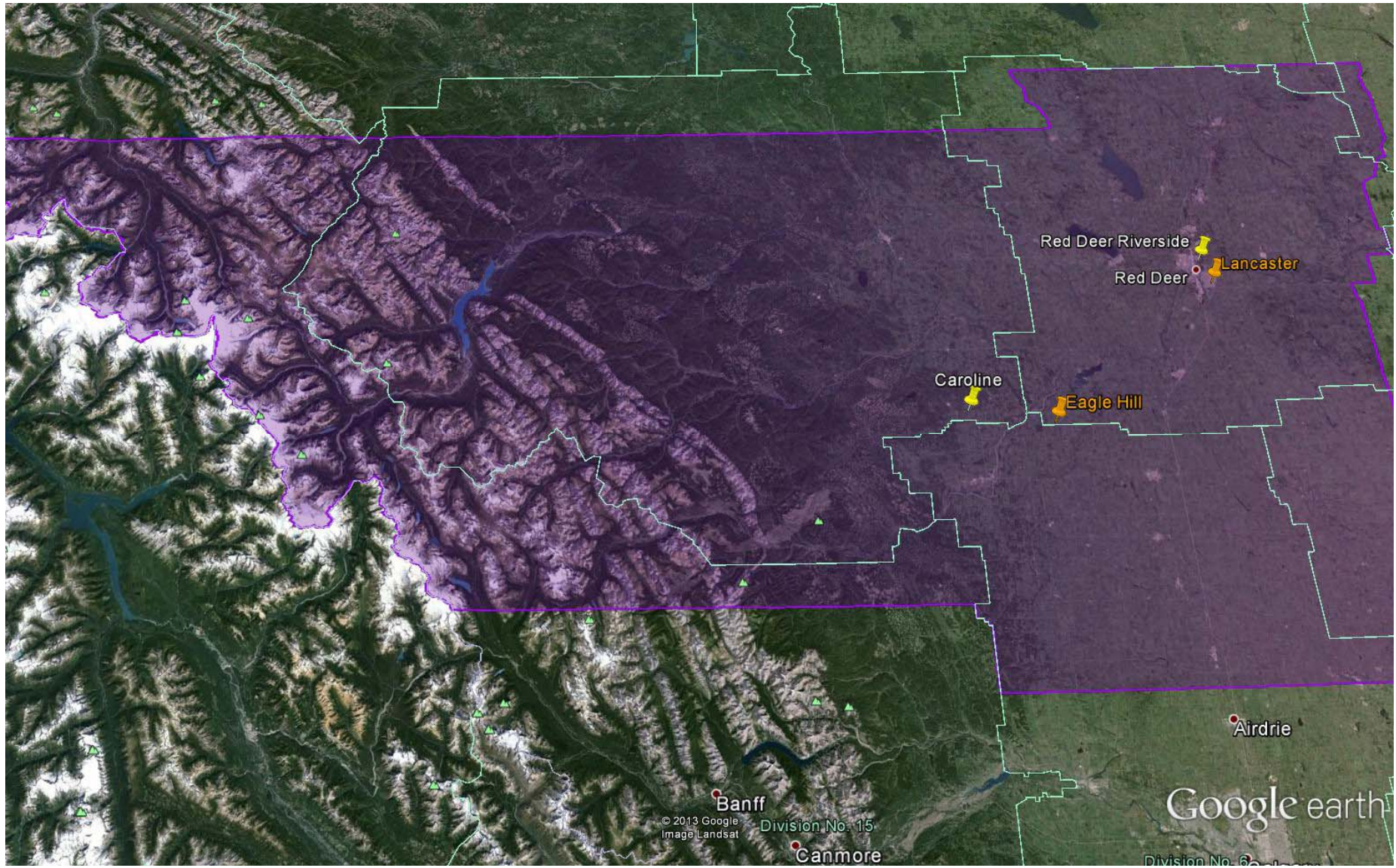
Enclosed are the summary results for the PAMZ Passive Monitoring Network. The samples were prepared and analysed by Maxxam Analytics Inc. at their facility in Edmonton, AB. The samples were installed and removed by Gene's Maintenance Services of Leduc, AB. There were no exceedences of the SO<sub>2</sub> 30-day AAAQO objective (11 ppb).

If you have any questions concerning the report please contact the undersigned at 403.862.7046.

Regards,

Kevin Warren  
PAMZ Executive Director





**PAMZ Air Monitoring Stations October 2013**

## PAMZ Continuous Air Quality Monitoring Data Summary

Ambient Air Quality Data Summary for the Month of October 2013																
Parkland Airshed Management Zone						Maximum Recorded Values										
						1-hr			24-hr / 8-hr							
Pollutant (units)	Objectives			Station	Monthly Average	Conc	Day	WSPD (km/hr )	WDIR (Sector)	Conc	Day	Exceedence			Operational Time (%)	
	1-hr	24-hr	30-day									1-hr	24-hr	30-day		
SO <sub>2</sub> (ppb)	172	48	11	Lancaster	0.5	4.5	Oct-15 19:00	9	N	1.1	Oct-25	0	0	0	100.0%	
SO <sub>2</sub> (ppb)	172	48	11	Caroline	0.8	4.8	Oct-26 22:00	6	N	1.3	Oct-26	0	0	0	100.0%	
SO <sub>2</sub> (ppb)	172	48	11	Red Deer - Riverside	0.1	1.0	Oct-25 14:00	2	SE	0.3	Oct-25	0	0	0	100.0%	
SO <sub>2</sub> (ppb)	172	48	11	Eagle Hill	0.3	5.4	Nov-04 00:00	8	S	0.9	Oct-25	0	0	0	99.8%	
TRS (ppb)	10	3	-	Lancaster	0.2	1.8	Oct-03 04:00	1	SSE	0.4	Oct-03	0	0	-	99.0%	
TRS (ppb)	10	3	-	Caroline	0.2	1.6	Oct-12 23:00	11	W	0.4	Oct-23	0	0	-	100.0%	
TRS (ppb)	10	3	-	Eagle Hill	0.1	0.6	Oct-31 12:00	19	WSW	0.2	Oct-24	0	0	-	99.5%	
H <sub>2</sub> S (ppb)	10	3	-	Red Deer - Riverside	0.3	5.9	Oct-22 22:00	5	N	0.8	Oct-22	0	0	-	100.0%	
NO <sub>2</sub> (ppb)	159	106	-	Lancaster	8.9	33.9	Oct-18 19:00	2	SW	17.3	Oct-30	0	0	-	100.0%	
NO (ppb)	-	-	-	Lancaster	5.6	61.6	Oct-25 08:00	2	NNW	18.5	Oct-30	-	-	-	100.0%	
NO <sub>x</sub> (ppb)	-	-	-	Lancaster	14.5	84.4	Oct-25 08:00	2	NNw	35.8	Oct-30	-	-	-	100.0%	
NO <sub>2</sub> (ppb)	159	106	-	Caroline	2.1	17.3	Oct-28 17:00	14	SE	4.8	Oct-23	0	0	-	100.0%	
NO (ppb)	-	-	-	Caroline	0.2	6.7	Oct-28 17:00	14	SE	0.9	Oct-28	-	-	-	100.0%	
NO <sub>x</sub> (ppb)	-	-	-	Caroline	2.3	24.0	Oct-28 17:00	14	SE	5.2	Oct-28	-	-	-	100.0%	
NO <sub>2</sub> (ppb)	159	106	-	Red Deer - Riverside	11.2	27.3	Oct-10 08:00	2	S	21.2	Oct-30	0	0	-	97.5%	
NO (ppb)	-	-	-	Red Deer - Riverside	5.4	80.2	Oct-30 10:00	5	S	24.0	Oct-30	-	-	-	97.5%	
NO <sub>x</sub> (ppb)	-	-	-	Red Deer - Riverside	16.5	106.1	Oct-30 10:00	5	S	45.2	Oct-30	-	-	-	97.5%	
NO <sub>2</sub> (ppb)	159	106	-	Eagle Hill	3.1	17.6	Oct-29 18:00	8	SSE	7.6	Oct-24	0	0	-	99.8%	
NO (ppb)	-	-	-	Eagle Hill	0.5	10.0	Oct-24 10:00	12	SSW	1.9	Oct-28	-	-	-	99.8%	
NO <sub>x</sub> (ppb)	-	-	-	Eagle Hill	3.6	22.5	Oct-24 10:00	12	SSW	9.3	Oct-24	-	-	-	99.8%	
O <sub>3</sub> (ppb)	82	-	-	Lancaster	15.6	43.1	Oct-07 13:00	19	W	25.3	Oct-19	0	0	-	97.7%	
O <sub>3</sub> (ppb) - 8-hr	0			Lancaster						38.0	Oct-07	-				
O <sub>3</sub> (ppb)	82	-	-	Caroline	28.0	46.7	Oct-07 15:00	26	SW	38.9	Oct-07	0	0	-	100.0%	
O <sub>3</sub> (ppb) - 8-hr	65			Caroline						45.0	Oct-07	-				
O <sub>3</sub> (ppb)	82	-	-	Red Deer - Riverside	13.9	39.2	Oct-14 16:00	4	WSW	23.6	Oct-19	0	-	-	97.0%	
O <sub>3</sub> (ppb) - 8-hr	65			Red Deer - Riverside						34.9	Oct-19	-				
O <sub>3</sub> (ppb)	82	-	-	Eagle Hill	23.7	43.3	Oct-07 13:00	30	WSW	35.3	Oct-07	0	0	-	99.8%	
O <sub>3</sub> (ppb) - 8-hr	65			Eagle Hill						40.8	Oct-07	-				
CO (ppm)	13	-		Red Deer - Riverside	0.1	0.7	Oct-30 10:00	5	S	0.2	Oct-30	0	0	-	100.0%	
CO (ppm) - 8-hr	5			Red Deer - Riverside						0.4	Oct-30	-				



## PAMZ Continuous Air Quality Monitoring Data Summary (continued)

THC (ppm)	-	-	-	Lancaster	2.0	3.7	Oct-21 21:00	4	SW	2.3	Oct-25	-	-	-	100.0%
THC (ppm)	-	-	-	Caroline	1.9	9.2	Oct-29 04:00	16	WSW	2.4	Oct-29	-	-	-	99.2%
THC (ppm)	-	-	-	Red Deer - Riverside	2.1	4.7	Oct-02 19:00	5	NNW	2.4	Oct-06	-	-	-	100.0%
THC (ppm)	-	-	-	Eagle Hill	2.1	4.2	Oct-23 05:00	4	NNE	2.4	Oct-29	-	-	-	99.8%
CH <sub>4</sub> (ppm)	-	-	-	Lancaster	2.0	3.0	Oct-29 15:00	2.0	SW	2.2	Oct-25	-	-	-	100.0%
CH <sub>4</sub> (ppm)	-	-	-	Red Deer - Riverside	2.1	3.7	Oct-02 19:00	5	NNW	2.3	Oct-14	-	-	-	100.0%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	-	Lancaster	6.0	35.1	Oct-15 12:00	2	SSW	10.7	Oct-26	0	0	-	98.4%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	-	Caroline	3.6	19.7	Oct-23 16:00	13	E	8.4	Oct-23	0	0	-	98.8%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	-	Red Deer - Riverside	5.2	21.0	Oct-19 00:00	4	NNW	9.1	Oct-14	0	0	-	100.0%
PM <sub>2.5</sub> (µg/m <sup>3</sup> )	80	30	-	Eagle Hill	2.3	45.4	Oct-29 15:00	11	SSE	7.0	Oct-24	0	0	-	99.5%
Temp (°C)				Lancaster	8.1	21.8	Oct-07 15:00			13.5	Oct-21				100.0%
Temp (°C)				Caroline	5.4	23.4	Oct-24 16:00			11.6	Oct-07				100.0%
Temp (°C)				Red Deer - Riverside	4.8	19.9	Oct-07 14:00			11.0	Oct-21				100.0%
Temp (°C)				Eagle Hill	3.8	21.9	Oct-24 15:00			12.0	Oct-07				99.8%
RH (%)				Lancaster	74.3	99.0	Oct-16 01:00			91.7	Oct-27				100.0%
RH (%)				Caroline	63.1	100.0	Oct-24 04:00			94.7	Oct-27				100.0%
RH (%)				Red Deer - Riverside	72.1	100.0	Oct-07 14:00			91.1	Oct-27				100.0%
RH (%)				Eagle Hill	70.9	99.3	Oct-24 05:00			94.7	Oct-27				99.8%
SR (W/m <sup>2</sup> )				Lancaster	119.3	716.9	Oct-01 13:00			192.0	Oct-04				100.0%
SR (W/m <sup>2</sup> )				Caroline	174.9	1010.1	Oct-04 13:00			280.3	Oct-04				100.0%
WSPD v (km/hr)				Lancaster	0.9	30.0	Oct-19 15:00			12.0	Oct-19				99.6%
WSPD v (km/hr)				Caroline	6.1	35.0	Oct-17 10:00			17.0	Oct-19				95.0%
WSPD v (km/hr)				Red Deer - Riverside	1.9	35.0	Oct-19 16:00			12.0	Oct-19				100.0%
WSPD v (km/hr)				Eagle Hill	6.0	44.0	Oct-17 11:00			22.0	Nov-03				99.6%
WDIR (sector)*				Lancaster	W										99.6%
WDIR (sector)*				Caroline	WNW										95.0%
WDIR (sector)*				Red Deer - Riverside	W										100.0%
WDIR (sector)*				Eagle Hill	WSW										99.6%
<b>Note:</b>	* Wind Direction is the predominate direction for the Month														



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# Caroline Station

Ambient Air Quality Monitoring  
Monthly Summary  
Tables, Graphs and Roses





# Caroline - Continuous Air Quality Monitoring Station & Equipment Summary

<b>Caroline</b>			
<b>General Station and Equipment Issues:</b>			
Routine monthly calibrations were performed on October 22 <sup>nd</sup> (SO <sub>2</sub> & NO <sub>x</sub> ) and October 23 <sup>rd</sup> (TRS, O <sub>3</sub> , THC & PM <sub>2.5</sub> ).			
Parameter	Make	Model	Notes
<b>SO<sub>2</sub></b>	API	100A	No operational issues observed.
<b>TRS</b>	API	100E	No operational issues observed.
<b>NO<sub>2</sub>/NO/NO<sub>x</sub></b>	API	200A	No operational issues observed.
<b>O<sub>3</sub></b>	API	400A	No operational issues observed.
<b>PM<sub>2.5</sub></b>	Met One	BAM 1020	On October 12 <sup>th</sup> (24:00) one (1) hour was flagged invalid due power glitch. Six (6) hours were flagged invalid on October 21 <sup>st</sup> due to the tape breaking and one (1) hour was flagged for maintenance - repaired on October 21 <sup>st</sup> . On October 31 <sup>st</sup> analyzer was flagged invalid for one (1) hour and seven hours for calibration (pump rebuild & flow calibrations).
<b>THC</b>	TEI	51i	On October 4 <sup>th</sup> one (1) hour was flagged for maintenance to replace valve in zero air system. Five (5) hours were flagged invalid on October 24 <sup>th</sup> due to drop in trace, trouble-shooting of the analyzer on October 25 <sup>th</sup> has determined it to be power related (UPS to be replaced).
<b>ET</b>	Met One	083D	No operational issues observed.
<b>RH</b>	Met One	083D	No operational issues observed.
<b>SR</b>	Licor	096-1	No operational issues observed.
<b>WS/WD</b>	Met One	014A/024A	Two (2) hours were flagged for maintenance on October 23 <sup>rd</sup> . A total of thirty-four hours (35) hours were flagged invalid due to system flatlining – seven (7) hours possibly due to freezing conditions, twenty-seven (27) hours are indeterminate (suspect moisture).



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# Red Deer Riverside Station

Ambient Air Quality Monitoring

Monthly Summary

Tables, Graphs and Roses



# Red Deer Riverside - Continuous Air Quality Monitoring Station & Equipment Summary

Red Deer Riverside			
<b>General Station and Equipment Issues:</b>			
Routine monthly calibrations were performed on October 8 <sup>th</sup> (NO <sub>x</sub> , O <sub>3</sub> , CO & THC/CH <sub>4</sub> ), October 9 <sup>th</sup> (SO <sub>2</sub> , H <sub>2</sub> S, NO <sub>x</sub> & O <sub>3</sub> ,) and October 11 <sup>th</sup> (PM <sub>2.5</sub> ).			
<i>Parameter</i>	<i>Make</i>	<i>Model</i>	<i>Notes</i>
<b>SO<sub>2</sub></b>	TEI	43C	No operational issues noted.
<b>H<sub>2</sub>S</b>	TEI	45C	Spans were outside target range October 28 <sup>th</sup> & 29 <sup>th</sup> due to station temperature dropping (heater failure).
<b>NO<sub>2</sub>/NO/NO<sub>x</sub></b>	TEI	42i	Nineteen (19) hours were flagged maintenance from October 8 <sup>th</sup> to 9 <sup>th</sup> , as a new optical filter was installed in analyzer
<b>O<sub>3</sub></b>	TEI	49c TEI/49i	Twenty-two (22) hours were flagged for maintenance (October 8 <sup>th</sup> to 9 <sup>th</sup> ) due to a new analyzer installed on October 9 <sup>th</sup> . There were no spans October 9 <sup>th</sup> & 10 <sup>th</sup> due to an error in the setting in the new analyzer.
<b>PM<sub>2.5</sub></b>	Sharpe 5030	E-905	No operational issues noted.
<b>CO</b>	TEI	48C TL	A second calibration was performed on October 16 <sup>th</sup> to check on a low baseline.
<b>THC / CH<sub>4</sub></b>	TEI	55C	Spans were outside target range October 28 <sup>th</sup> & 29 <sup>th</sup> due to station temperature dropping (heater failure). Calibrations were performed on October 22 <sup>nd</sup> & 29 <sup>th</sup> to check span responses.
<b>ET</b>	Met One	064	No operational issues noted.
<b>RH</b>	Met One	064	No operational issues noted.
<b>WS/WD</b>	Ultrasonic Met One	50.5	No operational issues noted.



# Lancaster

## Martha Portable Station

Ambient Air Quality Monitoring  
Monthly Summary  
Tables, Graphs and Roses





# Lancaster (Martha) - Continuous Air Quality Monitoring Station & Equipment Summary

<b>Lancaster (Martha)</b>			
<b>General Station and Equipment Issues:</b>			
Routine monthly calibrations were performed on October 9 <sup>th</sup> (SO <sub>2</sub> , NO <sub>x</sub> & O <sub>3</sub> ) and October 10 <sup>th</sup> (TRS, PM <sub>2.5</sub> & THC/CH <sub>4</sub> ).			
Parameter	Make	Model	Notes
<b>SO<sub>2</sub></b>	API	100A	No operational issues observed.
<b>TRS</b>	API	100A	One (1) hour was flagged invalid due to baseline drift.
<b>NO<sub>2</sub>/NO/NO<sub>x</sub></b>	API	200A	A second calibration was performed on October 28 <sup>th</sup> for the O <sub>3</sub> troubleshooting.
<b>O<sub>3</sub></b>	API	400A	One (1) hour was flagged invalid due to power bump on October 26 <sup>th</sup> . Sixteen (16) hours were flagged for maintenance due to troubleshooting of O <sub>3</sub> analyzer from October 28 <sup>th</sup> to 29 <sup>th</sup> . New pump was installed on October 29 <sup>th</sup> . No spans on October 30 <sup>th</sup> & 31 <sup>st</sup> due to a wiring issue (corrected October 31 <sup>st</sup> ).
<b>PM<sub>2.5</sub></b>	Met One	BAM 1020	Sample head cleaned October 10 <sup>th</sup> . On October 4 <sup>th</sup> to 5 <sup>th</sup> analyzer was flagged seven (7) hours maintenance due to a reference error in analyzer, and troubleshooting tried to resolve the issue. On October 23 <sup>rd</sup> the tape was replaced.
<b>THC/CH<sub>4</sub></b>	TEI	55C	Spans were outside the target range on October 7 <sup>th</sup> , 8 <sup>th</sup> & 10 <sup>th</sup> reason unknown. Calibration on October 24 <sup>th</sup> due to pump replacement.
<b>ET</b>	Met One	083D-1	No operational issues observed.
<b>RH</b>	Met One	083D-1	No operational issues observed.
<b>SR</b>	LICOR	096-1	No operational issues observed.
<b>WS/WD</b>	Met One	014 / 024	Three (3) hours were flagged invalid due to flatlining – reason inknown.



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# Eagle Hill

## McCoy Portable Station

Ambient Air Quality Monitoring  
Monthly Summary  
Tables, Graphs and Roses



# Eagle Hill (McCoy) - Continuous Air Quality Monitoring Station & Equipment Summary

<b>Eagle Hill (McCoy)</b>			
<p><b>General Station and Equipment Issues:</b>                      Installation calibrations were performed on October 1<sup>st</sup> (THC), October 2<sup>nd</sup> (SO<sub>2</sub>, TRS, NO<sub>x</sub> &amp; PM<sub>2.5</sub>) and October 3<sup>rd</sup> (O<sub>3</sub>). Removal calibrations were performed on November 4<sup>th</sup> (SO<sub>2</sub>, NO<sub>x</sub> &amp; THC) and November 5<sup>th</sup> (TRS &amp; O<sub>3</sub>). A power failure on October 19<sup>th</sup> resulted in at least two (2) hours of invalid data for all parameters.</p>			
Parameter	Make	Model	Notes
<b>SO<sub>2</sub></b>	API	100A	A single point calibration was performed on October 10 <sup>th</sup> . Spans from October 10 <sup>th</sup> to 16 <sup>th</sup> were outside target – calibration was performed on October 16 <sup>th</sup> (pump was rebuilt). Two (2) hours were flagged for above noted power failure.
<b>TRS</b>	API	T100	Three (3) hours were flagged for above noted power failure. One (1) hour was flagged for baseline drift.
<b>NO<sub>2</sub>/NO/NO<sub>x</sub></b>	API	T200	Two (2) hours were flagged for above noted power failure.
<b>O<sub>3</sub></b>	API	T400	Two (2) hours were flagged for above noted power failure.
<b>PM<sub>2.5</sub></b>	Met One	BAM 1020	Sample head cleaned October 2 <sup>nd</sup> . Three (3) hours flagged for above noted power failure. On October 24 <sup>th</sup> one (1) was flagged invalid due to power spike.
<b>THC</b>	TEI	51C-LT	Two (2) hours were flagged for above noted power failure.
<b>ET</b>	Met One	093	Two (2) hours were flagged for above noted power failure.
<b>RH</b>	Met One	093	Two (2) hours were flagged for above noted power failure.
<b>WS/WD</b>	Met One	010 / 020	Two (2) hours were flagged for above noted power failure. One (1) hour was flagged invalid due to flatlining – possibly due to freezing temperatures.





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# PAMZ Passive Network

Monthly Summary  
Tables and Bubble Charts