



PAMZ | Parkland Airshed
Management Zone

Parkland Airshed Management Zone

Ambient Air Monitoring Network

November 2015

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

Operations and Maintenance:



AIR QUALITY MONITORING

Data Validation and Report:





January 4, 2016

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

**RE: Parkland Airshed Management Zone – November 2015 – Ambient Air
Quality Monitoring Report**

Enclosed is the Parkland Airshed Management Zone (PAMZ) Ambient Air Monitoring Network Report for the month of **November 2015**. This report is submitted by PAMZ on behalf of the following Member Companies' Facilities, to satisfy the requirement contained in their Operating Approvals:

Company	Facility	Approval No.
BP Canada Energy Company	North Caroline	10158-01-00
BP Canada Energy Company	South Caroline	1071-01-00
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 WSP Canada Inc. 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 **SO₂**, **H₂S/TRS**, **NO₂**, **CO**, **O₃** and **PM_{2.5}** were within all applicable Provincial and National objectives for the Caroline, Red Deer Riverside, Red Deer Lancaster and Eagle Hills South 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.

Red Deer - 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 Lancaster site has been designated a stationary site and will operate year round.

Eagle Hills South (McCoy Station):

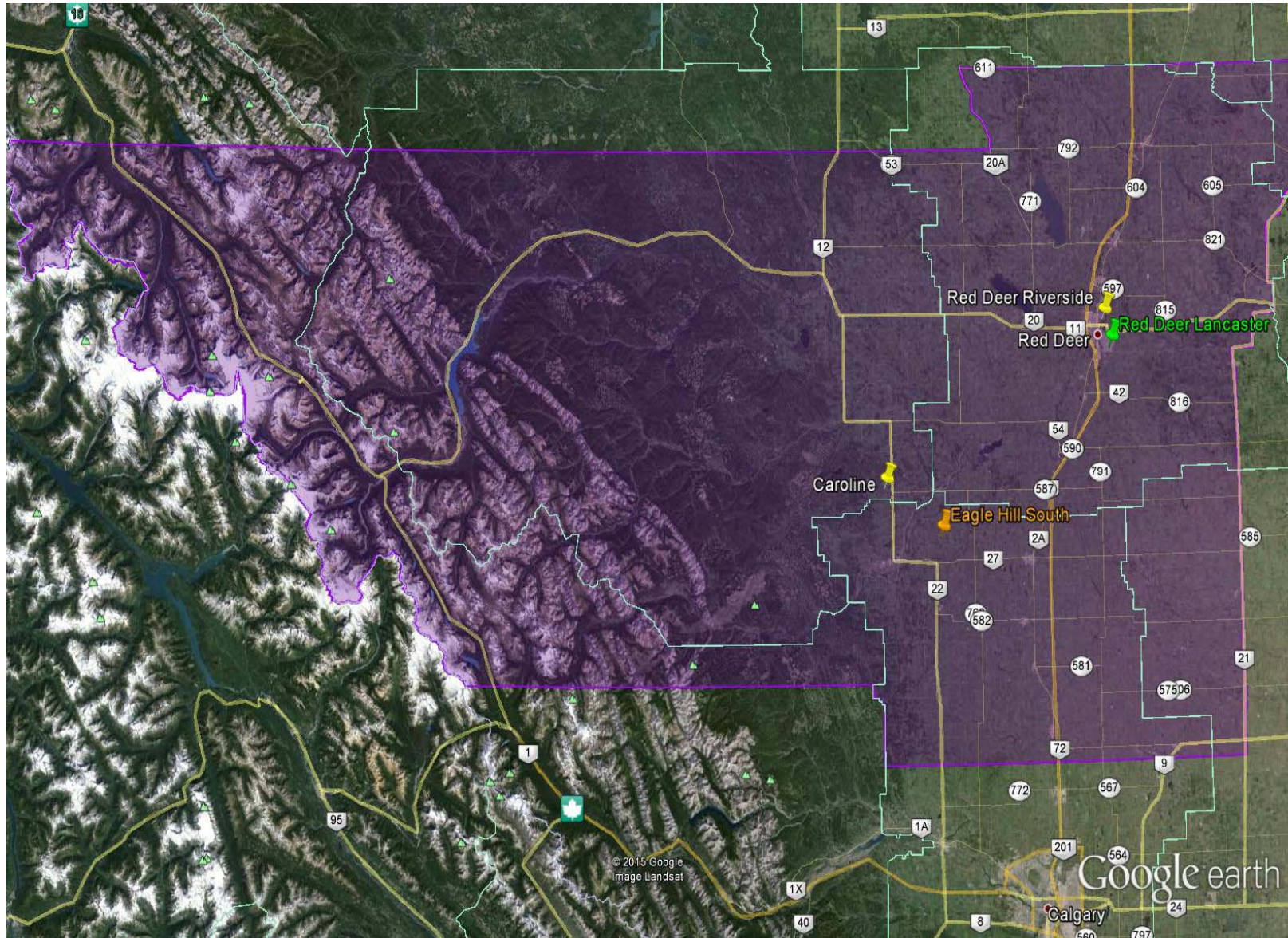
- ◆ Located approximately 1.2 km south of Township Road 334 and .3 km east of Range Road 42 at SW 23-33-4 W5M; (51° 50' 31.97" N and 114° 28' 11.52" W). The site is a mobile site and from November 4th 2015 to December 3rd; the McCoy station will be at the Eagle Hill South site.

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 SO₂ 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 November 2015

PAMZ Continuous Air Quality Monitoring Data Summary

Ambient Air Quality Data Summary for the Month of November 2015																
Parkland Airshed Management Zone						Maximum Recorded Values									Operational Time (%)	
						1-hr				24-hr / 8-hr						
Pollutant (units)	Objectives			Station	Monthly Average	Conc	Day	WSPD (km/hr)	WDIR (Sector)	Conc	Day	Exceedence				
	1-hr	24-hr	30-day									1-hr	24-hr	30-day		
SO ₂ (ppb)	172	48	11	Caroline	0.9	5.1	Nov-21 22:00	25	WNW	1.5	Nov-17	0	0	0	100.0%	
SO ₂ (ppb)	172	48	11	Red Deer - Riverside	0.1	0.7	Nov-30 23:00	4	S	0.3	Nov-26	0	0	0	100.0%	
SO ₂ (ppb)	172	48	11	Red Deer - Lancaster	0.4	2.4	Nov-09 07:00	4	N	0.9	Nov-23	0	0	0	100.0%	
SO ₂ (ppb)	172	48	11	Eagle Hills South	0.2	2.5	Nov-04 15:00	4	WNW	0.7	Nov-23	0	0	0	100.0%	
TRS (ppb)	10	3	-	Caroline	0.5	2.3	Nov-21 22:00	25	WNW	0.8	Nov-21	0	0	-	99.7%	
TRS (ppb)	10	3	-	Red Deer - Lancaster	0.2	1.1	Nov-20 17:00	7	S	0.3	Nov-07	0	0	-	99.9%	
TRS (ppb)	10	3	-	Eagle Hills South	0.0	0.5	Nov-23 17:00	4	ENE	0.2	Nov-23	0	0	-	100.0%	
H ₂ S (ppb)	10	3	-	Red Deer - Riverside	0.3	4.2	Nov-07 23:00	3	N	0.8	Nov-08	0	0	-	100.0%	
NO ₂ (ppb)	159	106	-	Caroline	2.7	9.8	Nov-30 17:00	2	SSW	5.4	Nov-23	0	0	-	100.0%	
NO (ppb)	-	-	-	Caroline	0.4	3.4	Nov-24 12:00	14	N	0.9	Nov-25	-	-	-	100.0%	
NO _x (ppb)	-	-	-	Caroline	3.1	10.7	Nov-30 17:00	2	SSW	6.0	Nov-23	-	-	-	100.0%	
NO ₂ (ppb)	159	106	-	Red Deer - Riverside	15.0	39.7	Nov-26 18:00	4	S	31.7	Nov-30	0	0	-	100.0%	
NO (ppb)	-	-	-	Red Deer - Riverside	7.0	89.5	Nov-30 23:00	4	S	37.3	Nov-30	-	-	-	100.0%	
NO _x (ppb)	-	-	-	Red Deer - Riverside	21.9	122.4	Nov-30 23:00	4	S	69.0	Nov-30	-	-	-	100.0%	
NO ₂ (ppb)	159	106	-	Red Deer - Lancaster	12.2	40.4	Nov-27 19:00	3	S	23.2	Nov-26	0	0	-	100.0%	
NO (ppb)	-	-	-	Red Deer - Lancaster	5.3	69.2	Nov-23 08:00	1	SW	11.7	Nov-30	-	-	-	100.0%	
NO _x (ppb)	-	-	-	Red Deer - Lancaster	17.5	100.6	Nov-23 08:00	1	SW	34.6	Nov-30	-	-	-	100.0%	
NO ₂ (ppb)	159	106	-	Eagle Hills South	2.6	18.6	Nov-23 17:00	4	ENE	6.8	Nov-23	0	0	-	100.0%	
NO (ppb)	-	-	-	Eagle Hills South	0.3	11.7	Nov-23 17:00	4	ENE	1.2	Nov-23	-	-	-	100.0%	
NO _x (ppb)	-	-	-	Eagle Hills South	2.9	30.3	Nov-23 17:00	4	ENE	7.9	Nov-23	-	-	-	100.0%	
O ₃ (ppb)	82	-	-	Caroline	29.9	46.0	Nov-22 07:00	16	WNW	46.0	Nov-22	0	0	-	100.0%	
O ₃ (ppb) - 8-hr	0			Caroline						45.5	Nov-22	-				
O ₃ (ppb)	82	-	-	Red Deer - Riverside	10.8	29.5	Nov-20 15:00	9	SW	20.2	Nov-20	0	-	-	100.0%	
O ₃ (ppb) - 8-hr	65			Red Deer - Riverside						25.6	Nov-18	-				
O ₃ (ppb)	82	-	-	Red Deer - Lancaster	16.1	36.9	Nov-22 13:00	10	NNW	25.9	Nov-17	0	0	-	100.0%	
O ₃ (ppb) - 8-hr	65			Red Deer - Lancaster						31.8	Nov-24	-				
O ₃ (ppb)	82	-	-	Eagle Hills South	30.6	44.0	Nov-27 14:00	6	W	38.2	Nov-21	0	0	-	100.0%	
O ₃ (ppb) - 8-hr	65			Eagle Hills South						42.1	Nov-27	-				
CO (ppm)	13	-		Red Deer - Riverside	0.2	0.9	Nov-30 21:00	4	S	0.5	Nov-30	0	0	-	100.0%	
CO (ppm) - 8-hr	5			Red Deer - Riverside						0.7	Dec-01	-				

PAMZ Continuous Air Quality Monitoring Data Summary (continued)

THC (ppm)	-	-	-	Caroline	1.9	2.5	Nov-26 01:00	8	WNW	2.1	Nov-26	-	-	-	100.0%
THC (ppm)	-	-	-	Red Deer - Riverside	2.0	3.0	Nov-11 08:00	1	SE	2.6	Nov-29	-	-	-	100.0%
THC (ppm)	-	-	-	Red Deer - Lancaster	2.0	2.6	Nov-30 23:00	5	S	2.2	Nov-25	-	-	-	100.0%
THC (ppm)	-	-	-	Eagle Hills South	2.0	3.9	Nov-21 19:00	8	SW	2.2	Nov-30	-	-	-	100.0%
CH ₄ (ppm)	-	-	-	Red Deer - Riverside	2.0	2.7	Nov-11 08:00	1	SE	2.3	Nov-30	-	-	-	100.0%
CH ₄ (ppm)	-	-	-	Red Deer - Lancaster	2.0	2.6	Nov-30 23:00	5	S	2.2	Nov-25	-	-	-	100.0%
NMHC (ppm)	-	-	-	Red Deer - Riverside	0.1	0.4	Nov-27 21:00	5	S	0.3	Nov-29	-	-	-	100.0%
NMHC (ppm)	-	-	-	Red Deer - Lancaster	0.0	0.1	Nov-01 05:00	1	E	0.0	Nov-12	-	-	-	100.0%
PM _{2.5} (µg/m ³)	80	30	-	Caroline	4.2	54.3	Nov-25 12:00	10	W	22.6	Nov-25	0	0	-	100.0%
PM _{2.5} (µg/m ³)	80	30	-	Red Deer - Riverside	6.2	24.0	Nov-29 21:00	4	S	13.7	Nov-03	0	0	-	100.0%
PM _{2.5} (µg/m ³)	80	30	-	Red Deer - Lancaster	9.8	41.6	Nov-28 15:00	5	SSE	18.4	Nov-26	0	0	-	100.0%
PM _{2.5} (µg/m ³)	80	30	-	Eagle Hills South	10.4	37.9	Nov-07 12:00	14	WSW	17.2	Nov-08	0	0	-	100.0%
Temp (°C)				Caroline	4.2	54.3	Nov-25 12:00			22.6	Nov-25				100.0%
Temp (°C)				Red Deer - Riverside	-3.0	16.1	Nov-07 14:00			4.8	Nov-07				100.0%
Temp (°C)				Red Deer - Lancaster	-3.8	14.7	Nov-07 14:00			6.2	Nov-07				100.0%
Temp (°C)				Eagle Hills South	-0.8	14.6	Nov-25 13:00			9.3	Nov-07				100.0%
RH (%)				Caroline	62.9	99.6	Nov-15 08:00			93.2	Nov-03				100.0%
RH (%)				Red Deer - Riverside	78.9	99.9	Nov-08 08:00			95.6	Nov-14				100.0%
RH (%)				Red Deer - Lancaster	77.9	98.8	Nov-14 00:00			94.9	Nov-08				100.0%
RH (%)				Eagle Hills South	63.4	97.8	Nov-08 10:00			92.3	Nov-08				100.0%
SR (W/m ²)				Caroline	93.4	678.1	Nov-02 14:00			153.1	Nov-02				100.0%
SR (W/m ²)				Red Deer - Lancaster	86.6	676.8	Nov-02 13:00			154.1	Nov-04				100.0%
WSPD v (km/hr)				Caroline	7.0	34.0	Nov-13 13:00			16.0	Nov-18				99.3%
WSPD v (km/hr)				Red Deer - Riverside	1.4	26.0	Nov-18 01:00			12.0	Nov-18				100.0%
WSPD v (km/hr)				Red Deer - Lancaster	0.9	24.0	Nov-18 01:00			12.0	Nov-18				99.9%
WSPD v (km/hr)				Eagle Hills South	4.0	28.0	Nov-13 11:00			10.0	Nov-24				100.0%
WDIR (sector)*				Caroline	WNW										99.3%
WDIR (sector)*				Red Deer - Riverside	WSW										100.0%
WDIR (sector)*				Red Deer - Lancaster	S										99.9%
WDIR (sector)*				Eagle Hills South	WSW										100.0%
Note:	* 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

Caroline			
General Station and Equipment Issues:			
Routine monthly calibrations were performed on November 25 th (SO ₂ , NO _x & O ₃ & THC) and November 26 th (TRS & PM _{2.5}).			
Parameter	Make	Model	Notes
SO₂	API	100A	No operational issues observed.
TRS	API	100E	Two (2) hours were flagged for baseline drift. No other operational issues observed.
NO₂/NO/NO_x	API	200E	No operational issues observed.
O₃	API	400A	No operational issues observed.
PM_{2.5}	Sharp	5030	Sample head cleaned November 25 th . No operational issues observed.
THC	TEI	51i	No operational issues observed.
ET	Met One	083D	No operational issues observed.
RH	Met One	083D	No operational issues observed.
SR	Licor	096-1	No operational issues observed.
WS/WD	Met One	014A/024A	Total of five (5) hours of sensor flatlining; frost and/or freezing conditions.



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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			
General Station and Equipment Issues:			
Routine monthly calibrations were performed on November 6 th (THC/CH ₄ /NMHC), November 10 th (SO ₂ , NO/NO ₂ /NO _x , O ₃ & CO) and November 12 th (H ₂ S & PM _{2.5}).			
<i>Parameter</i>	<i>Make</i>	<i>Model</i>	<i>Notes</i>
SO₂	TEI	43C	No operational issues observed.
H₂S	TEI	45C	No operational issues observed.
NO₂/NO/NO_x	TEI	42i	No operational issues observed.
O₃	TEI	49i	No operational issues observed.
PM_{2.5}	Sharp	5030	No operational issues observed. Sample head cleaned November 12 th .
CO	TEI	48C TL/48i	No operational issues observed.
THC/CH₄/NMHC	TEI	55C	Span outside target range November 6 th – calibration performed. No other operational issues observed.
ET	Met One	064	No operational issues observed.
RH	Met One	064	No operational issues observed.
WS/WD	Ultrasonic Met One	50.5	No operational issues observed.



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Red Deer Lancaster Martha Station

Ambient Air Quality Monitoring
Monthly Summary
Tables, Graphs and Roses

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

Red Deer Lancaster (Martha)			
General Station and Equipment Issues:			
Routine monthly calibrations were performed on November 19 th (TRS) and November 20 th (SO ₂ , NO _x , O ₃ , THC/CH ₄ /NMHC & PM _{2.5}).			
Parameter	Make	Model	Notes
SO₂	API	100A	No operational issues observed.
TRS	API	100A	One (1) hour was flagged invalid due to tech activity at the station. No other operational issues observed.
NO₂/NO/NO_x	API	200A	No operational issues observed.
O₃	API	400A	No operational issues observed.
PM_{2.5}	Met One	BAM 1020	Sample head cleaned November 20 th . No operational issues observed.
THC/CH₄/NMHC	TEI	55C	No operational issues observed.
ET	Met One	083D-1	No operational issues observed.
RH	Met One	083D-1	No operational issues observed.
SR	LICOR	096-1	No operational issues observed.
WS/WD	Met One	014 / 024	One (1) hour flagged invalid; sensor flatlining due to frost/freezing conditions.



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Eagle Hills South McCoy Portable Station

Ambient Air Quality Monitoring
Monthly Summary
Tables, Graphs and Roses

Eagle Hills South (McCoy) - Continuous Air Quality Monitoring Station & Equipment Summary

Eagle Hills South (McCoy)			
General Station and Equipment Issues: Installation calibrations were performed on November 4 th (SO ₂ , NO _x , O ₃ & THC) and November 5 th (TRS & PM _{2.5}). Removal calibrations were performed on December 1 st (SO ₂ , NO _x , O ₃ & THC) and December 2 nd (TRS & PM _{2.5}).			
Parameter	Make	Model	Notes
SO₂	API	100A	No operational issues observed.
TRS	API	T100	No operational issues observed.
NO₂/NO/NO_x	API	T200	No operational issues observed.
O₃	API	T400	No operational issues observed.
PM_{2.5}	Met One	BAM 1020	Sample head cleaned November 5 th . No operational issues observed.
THC	TEI	51C-LT	No operational issues observed.
ET	Met One	093	No operational issues observed.
RH	Met One	093	No operational issues observed.
WS/WD	Met One	010 / 020	No operational issues observed.



PAMZ Passive Network

Monthly Summary

Tables and Bubble Charts