2017 ANNUAL AMBIENT AIR MONITORING REPORT

PEACE RIVER AREA MONITORING PROGRAM COMMITTEE

RENO STATION

JOB #: 196-2017-93-A

JANUARY - DECEMBER

2017

Attention: LILY LIN

Prepared For:

pramp
PEACE RIVER AREA MONITORING PROGRAM

Prepared By:

Maxxam
A Bureau Veritas Group Company

DATE: **March 14, 2018**

Prepared by:

Wunmi Adekanmbi, M.Sc., EPt.
Project Manager, Customer Service, Air Services

Reviewed by:

Cheri Sinclair, B.Sc.
Supervisor, Customer Service, Air Services

This page is intentionally blank for two-sided printing.

TABLE OF CONTENTS

List of Acronyms

AAAQO	Alberta Ambient Air Quality Objectives and Guidelines Summary
AEP	Alberta Environment and Parks
AMD	Air Monitoring Directive
AT	Ambient Temperature
BP	Barometric Pressure
CASA	Clean Air Strategic Alliance
CH_4	Methane
hr	Hour
hrs	Hours
inHg	inches of Mercury
kph	Kilometers per hour
mbar	Millibar
NMHC	Non-methane Hydrocarbon
ppb	Parts per billion
ppm	Parts per million
PRAMP	Peace River Area Monitoring Program
QA	Quality assurance
QC	Quality control
RH	Relative Humidity
s/n	Serial Number
SOP	Standard Operating Procedure
SO_2	Sulphur Dioxide
StnTPX	Station Temperature
THC	Total Hydrocarbons
TRS	Total Reduced Sulphur
UPS	Universal Power System
vs.	versus
WS	Wind Speed
WD	Wind Direction
°C	Degrees Celsius

SUMMARY

Between January and December 2017, Maxxam Analytics was contracted to manage the ambient air quality monitoring and maintenance activities at the Reno Station, near Peace River Oil Sands Area 1, Alberta. The monitoring station provides continuous meteorological measurements and air quality data for non-compliance parameters, as requested by the PRAMP Committee.

In accordance with the AMD, Chapter 6: Ambient Data Quality, section 4.6, data presented in this report has undergone the Post-Final Validation Procedures, which include a cursory inspection of annual charts. If errors or omissions in the data are suspected or discovered after the initial submittal of data (monthly report), the post-validation step serves to re-evaluate the affected data. Corrections were identified in the February and March monthly reports which required resubmission to Alberta's Ambient Air Quality Data Warehouse. Corrections were identified in the June monthly report; however, the dataset submitted to Alberta's Ambient Air Quality Data Warehouse was not impacted.

Annual summaries for monthly mean, maximum and minimum values, as well as comparisons to historical values from 2016 are presented on the following pages. In regards to 2016 data, the monitoring program was suspended in March 2016 and reinstated in June 2016; hence, no data is available for April and May 2016. The monitoring program was expanded to include data collection for station temperature and barometric pressure in June 2016.

There were no ambient concentrations in excess of the Alberta Ambient Air Quality Objectives and Guidelines. Two contraventions were reported to Alberta Parks and Environment as the operational uptime and data capture was below the 90% criterion, as required by the Alberta Air Monitoring Directive.

The canister monitoring program yielded five station triggered sample collections in 2017.

Any deviations or modifications made to the sampling or analytical methods during the monitoring period are outlined in Section 1.0 Discussion. On this basis, Maxxam is issuing this completed report to Peace River Area Monitoring Program Committee.

Should you have any questions concerning the results or if we can be of further assistance, please contact us at 403-219-3677 or toll-free at 1-800-386-7247.

1.0 Discussion

Included in this report are annual summary tables and charts for the 2017 PRAMP monitoring program at the Reno Station. Parameters that are monitored include: Sulphur Dioxide (SO_2), Total Reduced Sulphur (TRS), Total Hydrocarbon (THC), Methane (CH_4), Non-Methane Hydrocarbon (NMHC), Relative Humidity (RH), Barometric Pressure (BP), Ambient Temperature (AT), Station Temperature (STNTPX), Wind Speed (WS) and Wind Direction (WD).

The air monitoring trailer was located at Latitude 55°86'93.6"N and Longitude 117°05'73.9"W for the monitoring period.

In June 2017 a trailer upgrade was executed, as per client request. Following shut-down calibrations for gas parameters on May 31, analyzers and meteorological equipment were removed and transferred to a newly-installed upgraded trailer. Installation calibrations were completed on June 1 and June 2. Due to ongoing power supply issues, the trailer was replaced on June 29, following shut-down calibrations on June 28.

With the exception of the TRS analyzer in June and all gas analyzers in November, the equipment and meteorological systems met the 90% operational uptime requirements during the monthly monitoring period. Accordingly, two contraventions were reported to AEP in 2017.

In June 2017, the operational uptime for TRS was less than the 90% requirement. The TRS analyzer was particularly impacted during the June trailer upgrade. Maintenance/troubleshooting, analyzer replacement and quality activities all proved abortive. The Thermo 43i trace level analyzer (s/n: 1162460022) and the Thermo 43i analyzer (s/n: 1314057760) were interchanged during this time. 236 hours of downtime were incurred during this time, yielding an operational time of 65.0%. This was reported under **AEP reference number 325884**.

In November 2017, the operational uptime for all gas parameters was less than the 90% requirement. In response to a protracted elevation in SO_2 and TRS concentrations, a technician was dispatched on November 5 to assess the situation. On arrival, it was found that the sample manifold blower had failed. Analyzers were not receiving fresh ambient samples and the elevated readings were attributed to the instruments' exhausts. The manifold blower was replaced and regular ambient air monitoring was resumed. As the manifold feeds all gas analyzers, TRS, SO_2 and THC/CH_4/NMHC data collected from October 31, hour 06:00, to November 5, hour 17:00, were discarded. 114 hours of downtime were recorded due to this event, yielding an operational time of 84.2% . This was reported under **AEP reference number 331557**.

All data collected during the monitoring period were within the objectives outlined in the Alberta Ambient Air Quality Objectives and Guidelines Summary (AAAQOs).

There was no external station audit performed during the monitoring period.

1.0 Discussion continued…

As a monitoring method for identifying hydrocarbon, reduced sulphur and VOC compounds, a station triggered canister collection occurred five times in 2017.

NMHC Trigger Threshold (ppm)	Date	Time	Concentration (ppm)	Tested Y/N
5-min Average > 0.3	14-Feb	16:40	0.99	Y
	26-Mar	16:20	0.45	Y
	21-Jul	22:15	0.38	Y
	07-Sep	20:00	0.32	Y
	26-Oct	20:20	0.33	Y

• The NMHC concentration recorded on March 26 was not a valid event as it resulted from an isolated anomalous spike in minute data observed at that period. A concentration of 0.56 ppm was recorded on June 29, at 22:00; however, a sample was not collected as it occurred during the trailer replacement event when canister monitoring was not active. The canister sample on July 21 was analyzed past the laboratory's recommended hold time; due to an operator error, the canister was not identified for collection nor shipped in a timely manner.

Notification of Changes Made After Monthly Report Issuance

February 2017 Station Temperature: During annual review, an error was discovered in the discussion for station temperature. The report indicated the channel was placed in “maintenance" mode for two hours on February 7 while additional power supply features were being installed. This was added in error as station temperature was not impacted. Hourly data on February 7, at hour 13:00 and 14:00, was reported correctly on the monthly report and to Alberta's Ambient Air Quality Data Warehouse.

February 2017 Wind Speed: During annual review an error was discovered in the wind speed dataset. Following the wind system upgrade in February 2017, it was discovered that the supplier had not made necessary modifications to their indicated wind speed, resulting in data being under-reported by a factor of 4.5%. The wind system was calibrated on April 5, during which the wind speed gain was adjusted. This offset has been applied to data collected between February 15, hour 20:00 to February 28, hour 23:00. The monthly average did not change. The hourly averages have changed slightly from those originally reported. Accordingly, the revised wind data will be submitted to Alberta's Ambient Air Quality Data Warehouse by March 15, 2018.

March 2017 Wind Speed: During annual review an error was discovered in the wind speed dataset. Following the wind system upgrade in February 2017, it was discovered that the supplier had not made necessary modifications to their indicated wind speed, resulting in data being under-reported by a factor of 4.5%. The wind system was calibrated on April 5, during which the wind speed gain was adjusted. This offset has been applied to all data collected during the month of March. The monthly average did not change. The hourly averages have changed slightly from those originally reported. Accordingly, the revised wind data will be submitted to Alberta's Ambient Air Quality Data Warehouse, by March 15, 2018.

Notification of Changes Made After Monthly Report Issuance continued…

June 2017 TRS: During annual review, an error was discovered in the reporting precision for data collection between June 22, at hour 14:00 to June 28, at hour 09:00. The data was incorrectly reported with two, rather than zero decimal places, which was not reflective of the analyzer's measurement capability. During this time, the trace level TRS analyzer was removed from service and replaced with a non-trace level model during the trailer upgrade in June. Data submitted to Alberta's Ambient Air Quality Data Warehouse was not impacted.

June 2017 BP: During annual review, an error was discovered in the discussion for BP. The operational time was stated as 94.4% and forty hours of downtime. This was revised to 94.2% and forty-two hours of downtime. Data submitted to Alberta's Ambient Air Quality Data Warehouse was not impacted.

The summaries of the monthly maintenance reports for the monitoring period are presented below:

SULPHUR DIOXIDE (SO_2)	
January	• Operational time for the monitoring period was 99.6%, equivalent to three hours of downtime. • The analyzer spanned within 75% of the upper acceptance limit on January 17. An additional zero/span check, conducted on January 18, confirmed the drift. An as-found response check was completed on January 20 to assess analyzer performance; and the results met AMD, 2016 requirements. No data was discarded due this event, however, three hours of downtime were recorded due to the additional quality checks.
February	• Operational time for the monitoring period was 99.1%, equivalent to six hours of downtime. • The station temperature dropped significantly on February 21. It was discovered upon station visit that the trailer door was not properly secured. This impacted analyzer performance, causing the invalidation of six hours of data collected from hour 12:00 to hour 21:00 on February 21.
March	• Operational time for the monitoring period was 100%. No operational issues were identified this month.
April	• Operational time for the monitoring period was 99.4%, equivalent to four hours of downtime. • The routine monthly calibration was performed on April 6. The calibration was successful, however, the analyzer exhibited a moderate delayed response when tested at the high point. A repeat calibration was completed on April 7 to further assess the analyzer's performance and the results met AMD's calibration requirement. No further action was required. • As both calibrations were successful, no data was discarded due this event. However, four hours of downtime were recorded due to the additional quality check.
May	• Operational time for the monitoring period was 97.8%, equivalent to sixteen hours of downtime. • Following a successful shut-down calibration on May 31, the analyzer was removed for a trailer upgrade. Sixteen hours of downtime were recorded due to this event.
June	• Operational time for the monitoring period was 93.2%, equivalent to forty-nine hours of downtime. • Following a successful shut-down calibration on May 31, the analyzer was removed for a trailer upgrade. Installation calibration was completed on June 1. Sixteen hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply. A UPS was installed on June 17 to stabilize the power system, after which a zero/span check was completed, causing three hours of downtime. As the power problem persisted, the trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. Thirty hours of downtime were incurred due to this event.
July	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.

SULPHUR DIOXIDE (SO_2)	
August	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
September	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
October	• Operational time for the monitoring period was 97.6%, equivalent to eighteen hours of downtime. • The sample manifold blower failed on October 31, resulting in compromised samples not representative of ambient concentrations. Data was invalidated back to the point of failure, determined to be hour 06:00. Eighteen hours of downtime were recorded due to this event.
November	• Operational time for the monitoring period was 84.2%, equivalent to 114 hours of downtime. • The 90% operational time was not achieved during the monitoring period and was reported under **AEP reference number 331557**. • The sample manifold blower failed on October 31, resulting in compromised samples not representative of ambient concentrations. The blower was replaced on November 5. Data was invalidated back to the point of failure, determined to be October 31 at 06:00. 114 hours of downtime were recorded due to this event.
December	• Operational time for the monitoring period was 99.6%, equivalent to three hours of downtime. These were incurred on December 20 due to a power failure and the subsequent analyzer recovery period.

TOTAL REDUCED SULPHUR (TRS)	
January	• Operational time for the monitoring period was 99.6%, equivalent to three hours of downtime. • The analyzer spanned towards the lower acceptance limit on January 1. A repeat zero/span check was triggered on January 2 and the result was outside acceptance limits. This prompted a site visit on January 3, where a successful routine monthly calibration was performed. • The analyzer spanned within 75% of the upper acceptance limit on January 19. An as-found response check was conducted on January 20 to assess analyzer performance; and the results met AMD, 2016 requirements. • No data was discarded due to these events, however, three hours of downtime were recorded due to the additional quality checks.
February	• Operational time for the monitoring period was 98.2%, equivalent to twelve hours of downtime. • An analyzer upgrade was implemented this month. The Thermo 450i (s/n: 1226154721) was removed on February 7, following a shut-down calibration. A trace level model, Thermo 43i TL (s/n: 1162420022), was then installed. Response checks were performed and the installation calibration was subsequently completed. An as-found response check and a flow rate check were successfully conducted on February 8 to assess the new analyzer's performance after installation. An additional zero/span check was completed afterwards to provide a reference for updating the expected span value. Six hours of downtime were recorded due to this replacement event. • The station temperature dropped significantly on February 21. It was discovered upon station visit that the trailer door was not properly secured. This impacted analyzer performance, causing the invalidation of six hours of data collected from hour 12:00 to hour 21:00 on February 21.
March	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
April	• Operational time for the monitoring period was 98.8%, equivalent to nine hours of downtime. • The routine monthly calibration was performed on April 6. A repeat span check was triggered immediately after the calibration to assess the stability of the zero-span system and update the expected span value. One hour of downtime was recorded due to this event. • The analyzer began to span towards the lower acceptance limit on April 19. Three additional span checks were triggered between April 20 and April 21 to assess span response; the results exhibited the same trend. The span drifts were within acceptance limits, however, as a preventive action, a repeat calibration was successfully performed on April 24. The expected span value was subsequently updated. • As the span results were within acceptance limits and the repeat calibration met AMD requirements, no data was discarded due to this event. However, eight hours of downtime were attributed to the additional quality checks.

TOTAL REDUCED SULPHUR (TRS)	
May	• Operational time for the monitoring period was 98.1%, equivalent to fourteen hours of downtime. • Following a successful shut-down calibration on May 31, the analyzer was removed for a trailer upgrade. Fourteen hours of downtime were recorded due to this event.
June	• Operational time for the monitoring period was 65.0%, equivalent to 252 hours of downtime. • The 90% operational time was not achieved during the monitoring period and was reported under **AEP reference number 325884**. • Following a successful shut-down calibration on May 31, the analyzer was removed for a trailer upgrade. Installation calibration was completed on June 1. Sixteen hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply, which particularly impacted the performance of the TRS analyzer. The analyzer-to-datalogger communication was frozen on June 8, June 14, June 20 and June 26. Maintenance activities were performed and a UPS was installed on June 17 to stabilize the power system. The Thermo 43i trace level analyzer (s/n: 1162460022) was replaced with a Thermo 43i analyzer (s/n: 1314057760) on June 22 and six additional span checks were performed in the course of the month. However, the power problem persisted. The trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. The Thermo 43i analyzer (s/n: 13144057760) was removed on June 28. The Thermo 43i trace level analyzer (s/n: 1162460022) was installed on June 29 and allowed time to stabilize overnight. Installation calibration was completed on June 30. • 236 hours of downtime were incurred due to this power malfunction and the corrective actions performed to address the issue.
July	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
August	• Operational time for the monitoring period was 99.5%, equivalent to four hours of downtime. • The routine monthly calibration was performed on August 9. The analyzer showed slow response (within acceptable response period) during the calibration. It was suspected that the calibration equipment might have been the cause of the slow response. A repeat calibration was performed on August 11, using an alternate calibration equipment. No issues were identified. Four hours of downtime were incurred due to the additional calibration.
September	• Operational time for the monitoring period was 99.6%, equivalent to three hours of downtime. • The first attempt at the routine monthly calibration on September 19 was aborted due to an operator transcription error that yielded incorrect adjustments. The analyzer was restored to as-found settings, the calibration was subsequently restarted and completed successfully. Three hours of downtime were recorded due to the initial calibration attempt.

TOTAL REDUCED SULPHUR (TRS)	
October	• Operational time for the monitoring period was 97.0%, equivalent to twenty-two hours of downtime. • The first attempt at the routine monthly calibration on October 5 was aborted due to an operator error. The analyzer was restored to as-found settings and the calibration was successfully completed on October 6. Four hours of downtime were recorded due to the initial calibration attempt. • The sample manifold blower failed on October 31, resulting in compromised samples not representative of ambient concentrations. Data was invalidated back to the point of failure, determined to be hour 06:00. Eighteen hours of downtime were recorded due to this event.
November	• Operational time for the monitoring period was 84.2%, equivalent to 114 hours of downtime. • The 90% operational time was not achieved during the monitoring period and was reported under **AEP reference number 331557**. • The sample manifold blower failed on October 31, resulting in compromised samples not representative of ambient concentrations. The blower was replaced on November 5. Data was invalidated back to the point of failure, determined to be October 31 at 06:00. 114 hours of downtime were recorded due to this event.
December	• Operational time for the monitoring period was 98.5%, equivalent to eleven hours of downtime. • Three hours of downtime were incurred on December 20 due to a power failure and the subsequent analyzer recovery period. • The analyzer spanned towards the lower acceptance limit on December 28. Two additional span verifications and the scheduled zero-span check, completed on December 29, revealed that span response was within acceptance limits and was not trending, though it was drifting low. As a precaution, a repeat calibration was completed on December 30. The calibration met AMD requirements. Seven hours of downtime were recorded due to these additional quality checks. • One hour of data collected on December 29 at hour 14:00, immediately after a span check, was invalidated as the concentration was elevated, likely because it was representative of span concentration.

TOTAL HYDROCARBONS (THC), METHANE (CH_4) & NON-METHANE HYDROCARBONS (NMHC)	
January	• Operational time for the monitoring period, was 100%. No operational issues were identified this month. • No canister event was recorded this month.
February	• The operational time was 98.5%, equivalent to eleven hours of downtime. • The channels were placed in "Maintenance" mode for two hours during the wind system upgrade on February 16. A zero/span check was triggered after the upgrade. Four hours of downtime were recorded due to this event. • The station temperature dropped significantly on February 21. It was discovered upon station visit that the trailer door was not properly secured. This impacted analyzer performance, causing the invalidation of six hours of data collected from hour 12:00 to hour 21:00 on February 21. • Maximum instantaneous data collected on February 8 at hour 12:00 was invalidated due to a brief power outage. • One canister event was recorded on February 14 at 16:40, at a concentration of 0.99 ppm.
March	• The operational time was 98.5%, equivalent to eleven hours of downtime. • Two hours of data collected on March 6, at hours 02:00 and 03:00, were invalidated as they were lower than historical. This prompted an immediate site visit where troubleshooting was performed. The gas pressures were checked and adjusted as necessary; and analyzer-to-datalogger cable connections were checked and tightened. • The analyzer started recording lower than historical readings again from hour 04:00 on March 9. It was discovered upon arrival at the station on the same day, that the output outlet of the zero air system was frozen due to weather conditions. Troubleshooting activities performed included output line reconnection, leak check, and restarting the analyzer. The analyzer was back online at hour 12:00. Eight hours of downtime were incurred due to this event. • One hour of data collected on March 26, at hour 16:00, was invalidated due to an anomalous spike in NMHC concentration. • No canister event was recorded this month. A 5-minute average concentration of 0.45 ppm was recorded on March 26 at 16:20. However, this was not considered to be a valid event as it resulted from the isolated anomalous spike in minute data observed at that period.
April	• Operational time for the monitoring period was 99.9%, equivalent to one hour of downtime. • Five minutes of data collected on April 19 at hour 15:00 were recorded at unusually low concentrations. The suspect data was invalidated and the hourly data was re-averaged. As more than 45 minutes of data were valid for this hour, the hourly data is considered valid. However, the data was invalidated as per client request. • No canister event was recorded this month.
May	• Operational time for the monitoring period was 97.8%, equivalent to sixteen hours of downtime. • Following a successful shut-down calibration on May 31, the analyzer was removed for a trailer upgrade. Sixteen hours of downtime were recorded due to this event. • No canister event was recorded this month

TOTAL HYDROCARBONS (THC), METHANE (CH_4) & NON-METHANE HYDROCARBONS (NMHC)	
June	• Operational time for the monitoring period was 90.7%, equivalent to sixty-seven hours of downtime. • Following a successful shut-down calibration on May 31, the analyzer was removed for a trailer upgrade. Installation calibration was completed on June 2. Thirty-two hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply. A UPS was installed on June 17 to stabilize the power system, after which a zero/span check was completed, causing three hours of downtime. As the power problem persisted, the trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. Thirty-two hours of downtime were incurred due to this event. • A canister event occurred on June 29, at 22:00 at a concentration of 0.56 ppm. However, a sample was not collected as it occurred during the trailer replacement event, when the canister trigger system had not been set up.
July	• Operational time for the monitoring period, was 100%. • A canister event occurred on July 21 at 22:15 at a concentration of 0.38 ppm. Due to an operator error, the canister was not promptly collected and replaced with a new canister. The sample was processed for analysis although hold time may have been compromised.
August	• Operational time for the monitoring period was 98.9%, equivalent to eight hours of downtime. • The carrier (nitrogen) gas pressure dropped on August 1, causing the analyzer to record lower than historical concentrations. This prompted an immediate site visit, where the cylinder was exchanged. A zero/span check was completed afterwards. Four hours of downtime were recorded due to this event. • A repeat calibration was completed on August 20 for precautionary reasons. This was to address an observed low concentration trend for THC, bordering on Maxxam's internal guidelines. The repeat calibration was successful and all data was considered valid. However, four hours of downtime were incurred due to the additional calibration. • No canister event was recorded this month
September	• Operational time for the monitoring period, was 100%. No operational issues were identified this month. • One canister event was recorded at a concentration of 0.32ppm on September 7, at hour 20:00.

TOTAL HYDROCARBONS (THC), METHANE (CH_4) & NON-METHANE HYDROCARBONS (NMHC)	
October	• Operational time for the monitoring period was 97.0%, equivalent to twenty-two hours of downtime. • Following a successful shut-down calibration on October 5, the sample pump was replaced. A successful post-repair calibration was subsequently completed. Two hours of downtime were recorded due to this maintenance event. • The span gas was changed out on October 19. A zero/span check was triggered after the replacement to provide a reference for the expected span value based on the concentration of the new gas. Two hours of downtime were incurred due to the additional quality check. • The sample manifold blower failed on October 31, resulting in compromised samples not representative of ambient concentrations. Data was invalidated back to the point of failure, determined to be hour 06:00. Eighteen hours of downtime were recorded due to this event. • One canister event was recorded at a concentration of 0.33 ppm on October 26, at 20:20.
November	• Operational time for the monitoring period was 84.2%, equivalent to 114 hours of downtime. • The 90% operational time was not achieved during the monitoring period and was reported under **AEP reference number 331557**. • The sample manifold blower failed on October 31, resulting in compromised samples not representative of ambient concentrations. The blower was replaced on November 5. Data was invalidated back to the point of failure, determined to be October 31 at 06:00. For the month of November, 114 hours of downtime were recorded due to this event. • No canister event was recorded this month
December	• Operational time for the monitoring period was 99.3%, equivalent to five hours of downtime. • Three hours of downtime were incurred on December 20 due to a power failure and the subsequent analyzer recovery period. • On December 30, the fuel (hydrogen) and carrier (nitrogen) gas cylinders were changed out. A zero-span verification was completed afterwards as a quality check, incurring two hours of downtime. • No canister event was recorded this month

WIND SPEED (WS) & WIND DIRECTION (WD)	
January	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
February	• Operational time for the monitoring period was 99.7%, equivalent to two hours of downtime. • The channel was placed in "maintenance' mode for two hours on February 7 while additional power supply features were being installed in the trailer. • The wind system was upgraded on February 16. The RM Young 05103VK (s/n: 110980) was removed following a successful shut-down calibration. Subsequently, an RM Young 05305VK (s/n: 149769) was installed and calibrated. • Following the wind system upgrade, it was discovered that the supplier had not made necessary modifications to their indicated wind speed, resulting in data being under-reported by a factor of 4.5%. The wind system was calibrated on April 5, during which the wind speed gain was adjusted. This offset has been applied to data collected between February 15, hour 20:00 to February 28, hour 23:00.
March	• Operational time for the monitoring period, was 100%. • Following the wind system upgrade in February 2017, it was discovered that the supplier had not made necessary modifications to their indicated wind speed, resulting in data being under-reported by a factor of 4.5%. The wind system was calibrated on April 5, during which the wind speed gain was adjusted. This offset has been applied to all data collected during the month of March.
April	• Operational time for the monitoring period was 100%. • Following the wind system upgrade in February 2017, it was discovered that the manufacturer had made an error in units that resulted in data being under-reported by 0.45%. The wind system was calibrated on April 6, during which the wind speed gain was adjusted. This offset was corrected for data collected between April 1 and April 6.
May	• Operational time for the monitoring period was 98.1%, equivalent to fourteen hours of downtime. These were incurred as the wind system was removed on May 31 for a trailer upgrade.
June	• Operational time for the monitoring period was 93.9%, equivalent to forty-four hours of downtime. • The wind system was removed on May 31 and re-installed on June 1, for a trailer upgrade. Sixteen hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply. A UPS was installed on June 17 to stabilize the power system, causing two hours of downtime. As the power problem persisted, the trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. Twenty-six hours of downtime were incurred due to this event.
July	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
August	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.

WIND SPEED (WS) & WIND DIRECTION (WD)	
September	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
October	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
November	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
December	• Operational time for the monitoring period was 99.7%, equivalent to two hours of downtime. These were incurred due to a power failure that occurred on December 20.

RELATIVE HUMIDITY (RH)	
January	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
February	• Operational time for the monitoring period was 99.6%, equivalent to three hours of downtime. • The channel was placed in "maintenance' mode for three hours on February 7 while additional power supply features were being installed in the trailer.
March	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
April	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
May	• Operational time for the monitoring period was 98.5%, equivalent to eleven hours of downtime. These were incurred as the humidity sensor was removed on May 31 for a trailer upgrade.
June	• Operational time for the monitoring period was 94.0%, equivalent to forty-three hours of downtime. • The humidity sensor was removed on May 31 and re-installed on June 1, for a trailer upgrade. Fifteen hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply. A UPS was installed on June 17 to stabilize the power system, causing two hours of downtime. As the power problem persisted, the trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. Twenty-six hours of downtime were incurred due to this event.
July	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
August	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
September	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
October	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
November	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
December	• Operational time for the monitoring period was 99.7%, equivalent to two hours of downtime. These were incurred due to a power failure that occurred on December 20.

BAROMETRIC PRESSURE (BP)	
January	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
February	• Operational time for the monitoring period was 99.7%, equivalent to two hours of downtime. • The channel was placed in "maintenance' mode for two hours on February 7 while additional power supply features were being installed in the trailer. • The reporting unit for Barometric Pressure was changed from inHg to millibar, as per client request.
March	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
April	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
May	• Operational time for the monitoring period was 98.1%, equivalent to fourteen hours of downtime. These were incurred as the wind system was removed on May 31 for a trailer upgrade.
June	• Operational time for the monitoring period was 94.2%, equivalent to forty-two hours of downtime. • The pressure sensor was removed on May 31 and re-installed on June 1, for a trailer upgrade. Sixteen hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply. A UPS was installed on June 17 to stabilize the power system, causing two hours of downtime. As the power problem persisted, the trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. Twenty-four hours of downtime were incurred due to this event.
July	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
August	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
September	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
October	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
November	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
December	• Operational time for the monitoring period was 99.7%, equivalent to two hours of downtime. These were incurred due to a power failure that occurred on December 20.

AMBIENT TEMPERATURE (AT)	
January	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
February	• Operational time for the monitoring period was 99.6%, equivalent to three hours of downtime. • The channel was placed in "maintenance' mode for three hours on February 7 while additional power supply features were being installed in the trailer.
March	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
April	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
May	• Operational time for the monitoring period was 98.1%, equivalent to fourteen hours of downtime. These were incurred as the wind system was removed on May 31 for a trailer upgrade.
June	• Operational time for the monitoring period was 93.9%, equivalent to forty-four hours of downtime. • The temperature sensor was removed on May 31 and re-installed on June 1, for a trailer upgrade. Sixteen hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply. A UPS was installed on June 17 to stabilize the power system, causing two hours of downtime. As the power problem persisted, the trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. Twenty-six hours of downtime were incurred due to this event.
July	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
August	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
September	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
October	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
November	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
December	• Operational time for the monitoring period was 99.7%, equivalent to two hours of downtime. These were incurred due to a power failure that occurred on December 20.

STATION TEMPERATURE (STNTPX)	
January	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
February	• Operational time for the monitoring period was 99.1%, equivalent to eight hours of downtime. • The channel was placed in "maintenance' mode for two hours on February 7 while additional power supply features were being installed. • The station temperature dropped significantly on February 21. It was discovered upon station visit that the trailer door was not properly secured. Six hours of data collected from hour 12:00 to hour 21:00 on February 21 were invalidated due to this event.
March	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
April	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
May	• Operational time for the monitoring period was 98.1%, equivalent to fourteen hours of downtime. These were incurred as the wind system was removed on May 31 for a trailer upgrade.
June	• Operational time for the monitoring period was 93.9%, equivalent to forty-four hours of downtime. • The temperature sensor was removed on May 31 and re-installed on June 1, for a trailer upgrade. Sixteen hours of downtime were recorded due to this event. • The new trailer exhibited some problems with the power supply. A UPS was installed on June 17 to stabilize the power system, causing two hours of downtime. As the power problem persisted, the trailer was subsequently replaced on June 29, following a shut-down calibration on June 28. Twenty-six hours of downtime were incurred due to this event.
July	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
August	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
September	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
October	• Operational time for the monitoring period, was 100%. No operational issues were identified this month.
November	• Operational time for the monitoring period, was 100%. • Low station temperatures were observed for a short period between November 8 and November 9. A technician checked the sensor onsite on November 9 and no issues were found. No further action was required. There was no apparent impact on gas analyzer data quality.
December	• Operational time for the monitoring period was 99.7%, equivalent to two hours of downtime. These were incurred due to a power failure that occurred on December 20.

2.0 Project Personnel

Mike Bisaga and Lily Lin were the contacts for Peace River Area Monitoring Program Committee and the Maxxam field operators were Christopher Wesson, Limin Li, Michael Espiritu and Raja Ashraf.

3.0 Plant Monthly Required AMD Summary

There were no ambient concentrations in excess of the Alberta Ambient Air Quality Objectives and Guidelines. Two contraventions were reported to Alberta Parks and Environment as the operational uptime and data capture was below the 90% criterion, as required by the Alberta Air Monitoring Directive.

In June 2017, the operational uptime for TRS was less than the 90% requirement. The TRS analyzer was particularly impacted during the June trailer upgrade. Maintenance/troubleshooting, analyzer replacement and quality activities all proved abortive. The Thermo 43i trace level analyzer (s/n: 1162460022) and the Thermo 43i analyzer (s/n: 1314057760) were interchanged during this time. 236 hours of downtime were incurred during this time, yielding an operational time of 65.0%. This was reported under **AEP reference number 325884**.

In November 2017, the operational uptime for all gas parameters was less than the 90% requirement.
In response to a protracted elevation in SO2 and TRS concentrations, a technician was dispatched on November 5 to assess the situation. On arrival, it was found that the sample manifold blower had failed. Analyzers were not receiving fresh ambient samples and the elevated readings were attributed to the instruments' exhausts. The manifold blower was replaced and regular ambient air monitoring was resumed. As the manifold feeds all gas analyzers, TRS, SO2 and THC/CH4/NMHC data collected from October 31, hour 06:00, to November 5, hour 17:00, were discarded. 114 hours of downtime were recorded due to this event, yielding an operational time of 84.2% . This was reported under **AEP reference number 331557**.

As a monitoring method for identifying hydrocarbon, reduced sulphur and VOC compounds, a station triggered canister collection occurred five times in 2017.

4.0 Calculations and Results

All calculations and reporting of results follow the methods described in the Air Monitoring Directive (Alberta Environment and Parks, 2016).

In February, 2017 the reporting unit for Barometric Pressure was changed from inHg to mbar, as per client request. For the purposes of annual data comparison, data reported from June 2016 to January 2017 was been converted to mbar, using the conversion factor of 1 inHg is equivalent to 33.8639 mbar.

In February, 2017 the Thermo 450i TRS analyzer (s/n: 1226154721) was upgraded to a Thermo 43i TL (s/n: 1162420022). In April 2017, the reporting precision for PRAMP's TRS data was changed from one decimal place to two, to reflect the analyzer's measurement capability.

In April 2017, the reporting precision for SO_2 and TRS (non-trace level) data was changed from one decimal place to zero. Decimal resolution was revised to reflect the analyzer's actual measurement capability. Raw data will still be collected with several decimal places, but the reportable value will be based on the analyzer capability.

5.0 Methods and Procedures

The following methods and procedures were used to complete the test program:

Maxxam AIR SOP-00001 - Methane, Non-Methane Hydrocarbon Analyzer
Maxxam AIR SOP-00208: RM Young Wind Monitor Calibration
Maxxam AIR SOP-00209: Ambient Sulphur Monitoring

There were no deviations from the prescribed methods.

The following instruments were used to perform the test program:

Sulphur Dioxide - API 100A UV Fluorescent Analyzer
Total Reduced Sulphur - Thermo 450i & Thermo 43i TL UV Fluorescent Analyzer
Methane, Non-Methane Hydrocarbon - Thermo 55i FID Analyzer
Wind System - RM Young Unit
Relative Humidity - Met One Unit
Barometric Pressure - Met One Unit
Ambient Temperature - Met One Unit
Station Temperature - Maxxam Supplied Unit
Datalogger - ESC 8832

APPENDIX I
CONTINUOUS MONITORING DATA RESULTS

SULPHUR DIOXIDE

SULPHUR DIOXIDE (SO_2) 2017 Monthly Averages & Frequency Distributions of 1-Hr Readings

Month	Number of Readings*	Operational Time (%)	% Readings in Concentration Range (ppb SO_2)						AAAQO** (ppb)		EXCEEDANCES		MONTHLY AVERAGE (ppb)
			≤ 20	20 < C ≤ 60	60 < C ≤ 110	110 < C ≤ 170	170 < C ≤ 340	> 340	1-HR	24-HR	1-HR	24-HR	
January	706	99.6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0.0
February	633	99.1	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0.1
March	707	100.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0.2
April	682	99.4	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
May	692	97.8	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
June	637	93.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
July	709	100.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
August	707	100.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
September	686	100.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
October	690	97.6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
November	573	84.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
December	704	99.6	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	172	48.0	0	0	0
Annual	**8126**	**97.5**	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**			**0**	**0**	**0**

**# of readings excluding calibration hours*

***If Alberta Ambient Air Quality Objectives and Guidelines are not available '-' is used*

Alberta Ambient Air Quality Objectives Annual Average**	**8.0**	**ppb**
Annual Average for 2017	**0**	**ppb**

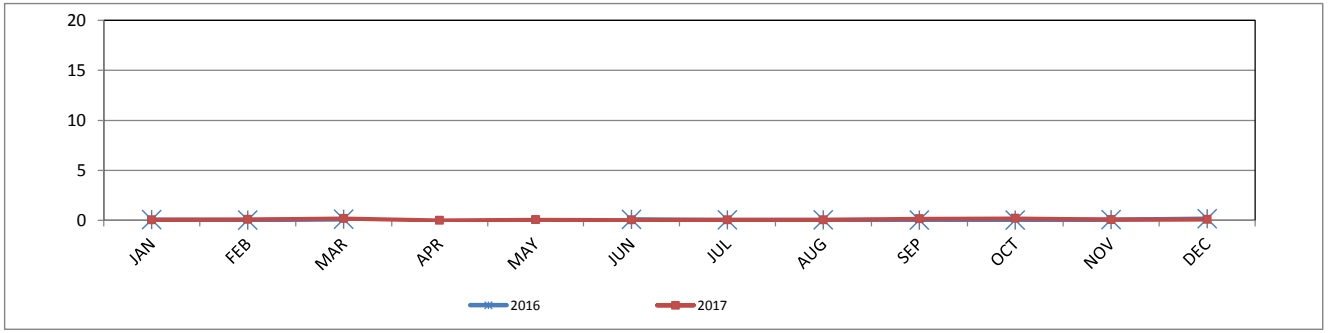
SULPHUR DIOXIDE (SO_2) 2017 vs. 2016 1-Hr Readings in ppb

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	0.1	0.0	2.6	0.0	0.0	0.9	0.0
FEB	0.0	0.0	2.1	0.1	0.0	1.3	0.1
MAR	0.1	0.0	2.8	0.2	0.0	1.8	0.1
APR	N/D	N/D	N/D	0	0	0	-
MAY	N/D	N/D	N/D	0	0	3	-
JUN	0.1	0.0	**3.5**	0	0	2	0
JUL	0.0	0.0	1.1	0	0	3	0
AUG	0.0	0.0	1.7	0	0	1	0
SEP	0.0	0.0	0.6	0	0	2	0
OCT	0.0	0.0	1.1	**0**	0	**9**	0
NOV	0.1	0.0	1.5	0	0	4	0
DEC	**0.2**	0.0	2.0	0	0	1	0

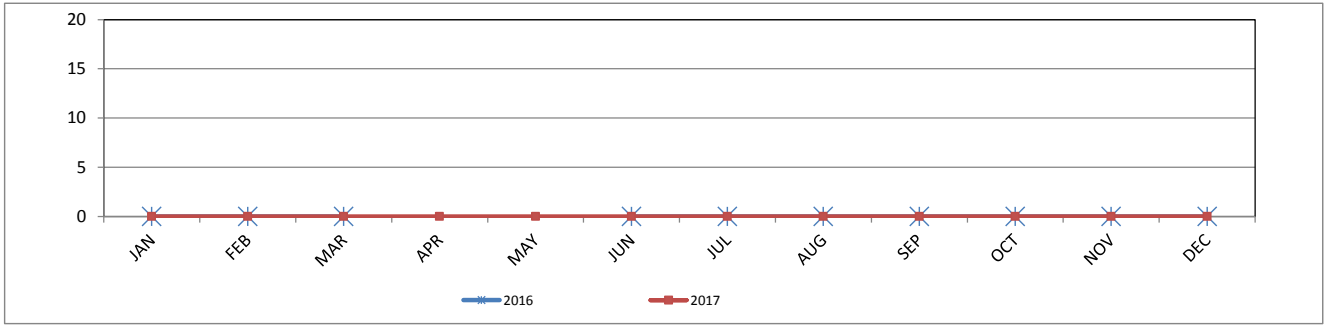
N/D - Valid Data Not Available

Annual peak

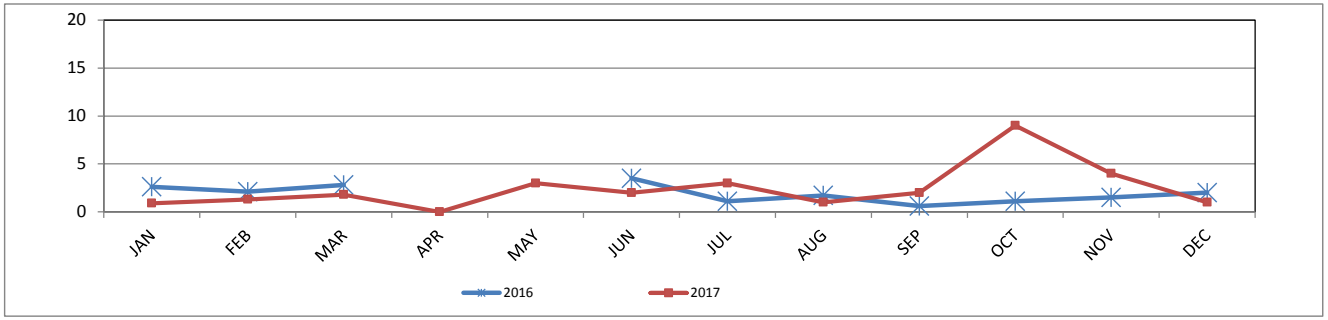
SULPHUR DIOXIDE (SO_2) 2017 vs. 2016 Monthly Mean in ppb



SULPHUR DIOXIDE (SO_2) 2017 vs. 2016 Monthly Minimum in ppb



SULPHUR DIOXIDE (SO_2) 2017 vs. 2016 Monthly Maximum in ppb



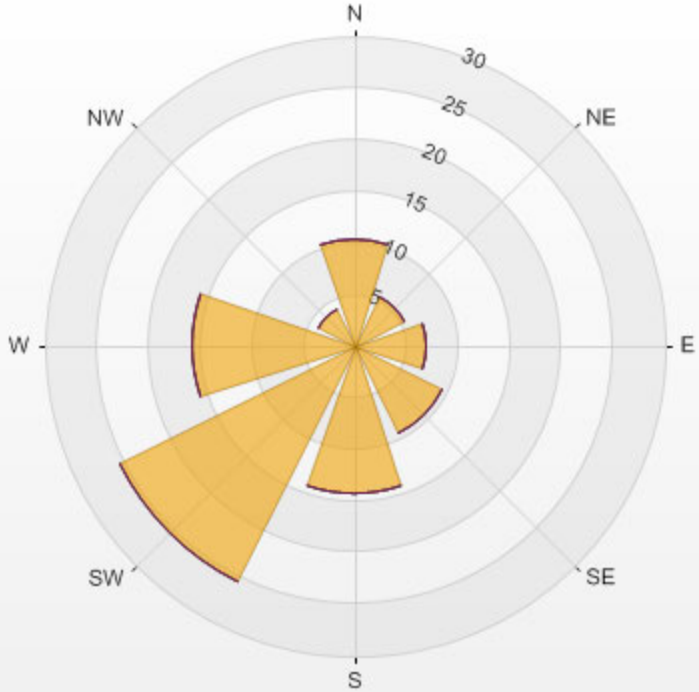
Wind: PRAMP_RENO
Poll.: PRAMP_RENO-SO_2 [ppb]
Periodically: 2017/01/01 00:00-2017/12/31 23:59
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 8.35% Calm Avg: 0.10 [ppb]

Direction	0-3	3-10	10-85	85-170	>170.0	Total
N	10.3	0.0	0.0	0.0	0.0	10.3
NE	5.4	0.0	0.0	0.0	0.0	5.4
E	6.9	0.0	0.0	0.0	0.0	6.9
SE	9.4	0.0	0.0	0.0	0.0	9.4
S	14.3	0.0	0.0	0.0	0.0	14.4
SW	25.5	0.0	0.0	0.0	0.0	25.5
W	15.7	0.0	0.0	0.0	0.0	15.7
NW	4.1	0.0	0.0	0.0	0.0	4.1
Summary	91.6	0.1	0.0	0.0	0.0	91.6

% Icon Classes (ppb)	92 0-3	0 3-10	0 10-85	0 85-170	0 >170.0

PRAMP_RENO Poll.: PRAMP_RENO-SO2[ppb] 2017/01/01 00:00 - 2017/12/31 23:59 Calm: 8.35% Calm Poll Avg: 0.10[ppb]



TOTAL REDUCED SULPHUR

TOTAL REDUCED SULPHUR (TRS) 2017 Monthly Averages & Frequency Distributions of 1-Hr Readings

Month	Number of Readings*	Operational Time (%)	% Readings in Concentration Range (ppb TRS)				AAAQO** (ppb)		EXCEEDANCES		MONTHLY AVERAGE (ppb)
			≤ 3	4 < C ≤ 10	11 < C ≤ 50	> 50	1-HR	24-HR	1-HR	24-HR	
January	704	99.6	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.2
February	624	98.2	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.3
March	705	100.0	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.4
April	676	98.8	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.40
May	693	98.1	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.41
June	442	65.0	99.5%	0.5%	0.0%	0.0%	-	-	-	-	0.47
July	708	100.0	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.46
August	703	99.5	98.9%	1.1%	0.0%	0.0%	-	-	-	-	0.56
September	682	99.6	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.51
October	687	97.0	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.43
November	574	84.2	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.39
December	696	98.5	100.0%	0.0%	0.0%	0.0%	-	-	-	-	0.38
Annual	**7894**	**94.9**	**99.9%**	**0.1%**	**0.0%**	**0.0%**					**0.41**

**# of readings excluding calibration hours*
***If Alberta Ambient Air Quality Objectives and Guidelines are not available '-' is used*

Alberta Ambient Air Quality Objectives Annual Average**	**-**	**ppb**
Annual Average for 2017	**0.41**	**ppb**

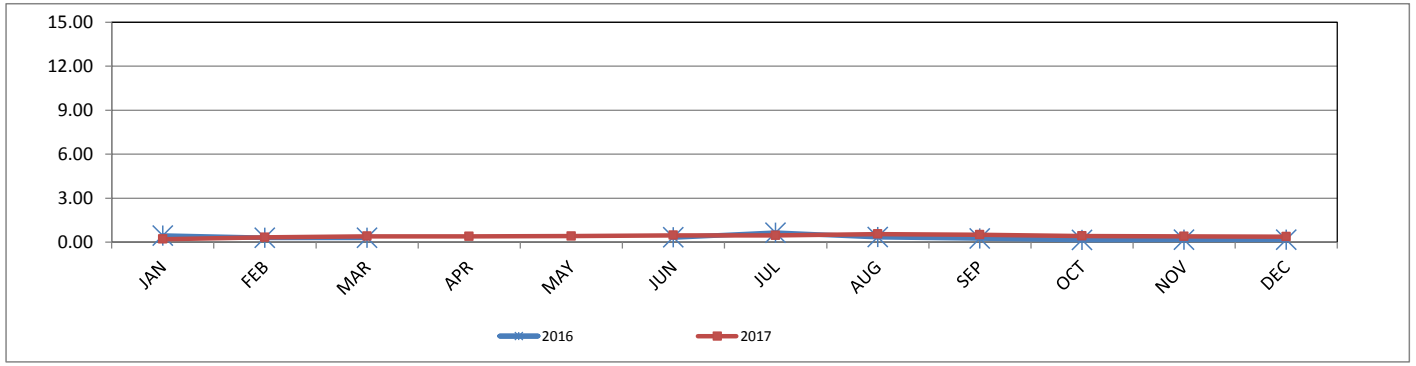
TOTAL REDUCED SULPHUR (TRS) 2017 vs. 2016 1-Hr Readings in ppb

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	0.4	0.0	1.5	0.2	0.0	1.5	-0.2
FEB	0.3	0.0	1.2	0.3	0.0	0.7	0.0
MAR	0.3	0.0	1.1	0.4	0.3	0.7	0.1
APR	N/D	N/D	N/D	0.40	0.23	1.19	-
MAY	N/D	N/D	N/D	0.41	0.28	1.43	-
JUN	0.3	0.1	4.3	0.47	0.25	3.75	0.1
JUL	**0.6**	0.0	**13.7**	0.46	0.29	2.51	-0.2
AUG	0.3	0.0	6.5	**0.56**	0.22	**5.10**	0.2
SEP	0.2	0.0	3.1	0.51	0.24	1.74	0.3
OCT	0.2	0.0	0.7	0.43	0.25	2.56	0.3
NOV	0.2	0.0	0.8	0.39	0.25	1.72	0.2
DEC	0.2	0.0	0.7	0.38	0.23	0.69	0.2

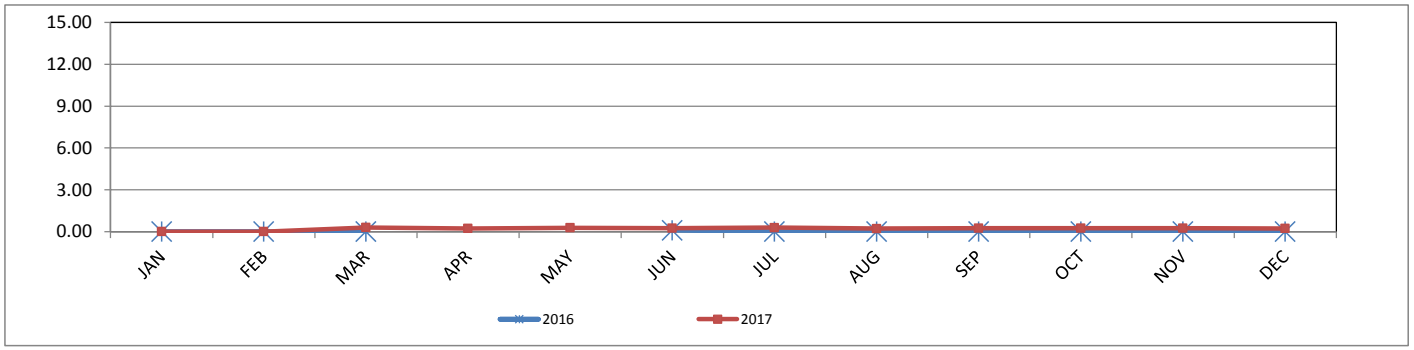
N/D - Valid Data Not Available

Annual peak

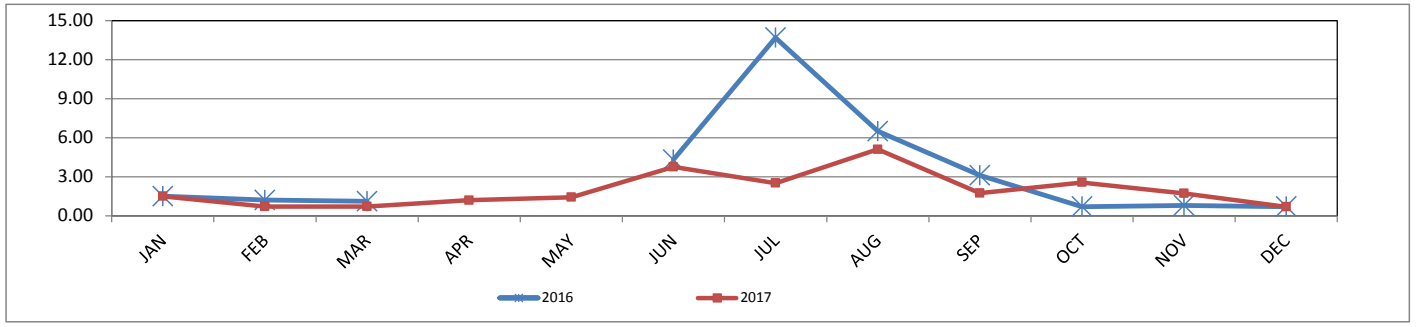
TOTAL REDUCED SULPHUR (TRS) 2017 vs. 2016 Monthly Mean in ppb



TOTAL REDUCED SULPHUR (TRS) 2017 vs. 2016 Monthly Minimum in ppb



TOTAL REDUCED SULPHUR (TRS) 2017 vs. 2016 Monthly Maximum in ppb



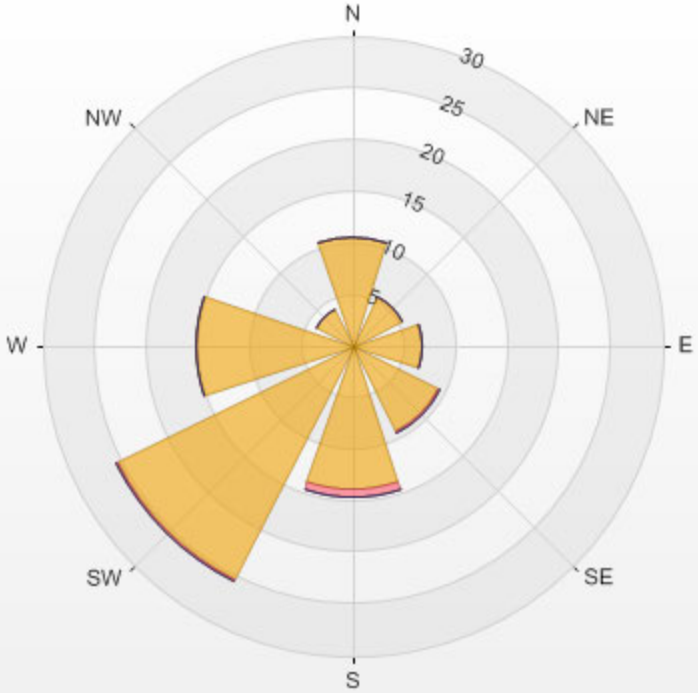
Wind: PRAMP_RENO
Poll.: PRAMP_RENO-TRS [ppb]
Periodically: 2017/01/01 00:00-2017/12/31 23:59
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 8.42% Calm Avg: 0.52 [ppb]

Direction	0-1	1-3	3-10	>10.0	Total
N	10.5	0.0	0.0	0.0	10.5
NE	5.3	0.0	0.0	0.0	5.3
E	6.8	0.0	0.0	0.0	6.8
SE	9.2	0.2	0.0	0.0	9.4
S	14.0	0.7	0.0	0.0	14.7
SW	25.4	0.2	0.0	0.0	25.6
W	15.3	0.0	0.0	0.0	15.3
NW	4.0	0.0	0.0	0.0	4.0
Summary	90.4	1.1	0.0	0.0	91.6

% Icon Classes (ppb)	90 0-1	1 1-3	0 3-10	0 >10.0

PRAMP_RENO Poll.: PRAMP_RENO-TRS[ppb] 2017/01/01 00:00 - 2017/12/31 23:59 Calm: 8.42% Calm Poll Avg: 0.52[ppb]



TOTAL HYDROCARBON

JOB # 196-2017-93-A

TOTAL HYDROCARBONS (THC) 2017 Monthly Averages & Frequency Distributions of 1-Hr Readings

Month	Number of Readings*	Operational Time (%)	% Readings in Concentration Range (ppm THC)				AAAQO** (ppm)		EXCEEDANCES		MONTHLY AVERAGE (ppm)
			≤ 3.0	3.1 < C ≤ 10.0	10.1 < C ≤ 50.0	> 50.0	1-HR	24-HR	1-HR	24-HR	
January	709	100.0	99.6%	0.4%	0.0%	0.0%	-	-	-	-	2.01
February	629	98.5	99.0%	1.0%	0.0%	0.0%	-	-	-	-	1.97
March	696	98.5	98.4%	1.6%	0.0%	0.0%	-	-	-	-	2.04
April	685	99.9	99.7%	0.3%	0.0%	0.0%	-	-	-	-	1.91
May	691	97.8	99.9%	0.1%	0.0%	0.0%	-	-	-	-	1.95
June	620	90.7	98.5%	1.5%	0.0%	0.0%	-	-	-	-	1.98
July	709	100.0	98.7%	1.3%	0.0%	0.0%	-	-	-	-	2.01
August	701	98.9	98.7%	1.3%	0.0%	0.0%	-	-	-	-	1.95
September	686	100.0	99.7%	0.3%	0.0%	0.0%	-	-	-	-	1.98
October	684	97.0	97.8%	2.2%	0.0%	0.0%	-	-	-	-	2.02
November	574	84.2	99.7%	0.3%	0.0%	0.0%	-	-	-	-	2.04
December	702	99.3	98.7%	1.3%	0.0%	0.0%	-	-	-	-	2.05
Annual	**8086**	**97.1**	**99.0%**	**1.0%**	**0.0%**	**0.0%**					**1.99**

**# of readings excluding calibration hours*
***If Alberta Ambient Air Quality Objectives and Guidelines are not available '-' is used*

Alberta Ambient Air Quality Objectives Annual Average**	**-**	**ppm**
Annual Average for 2017	**1.99**	**ppm**

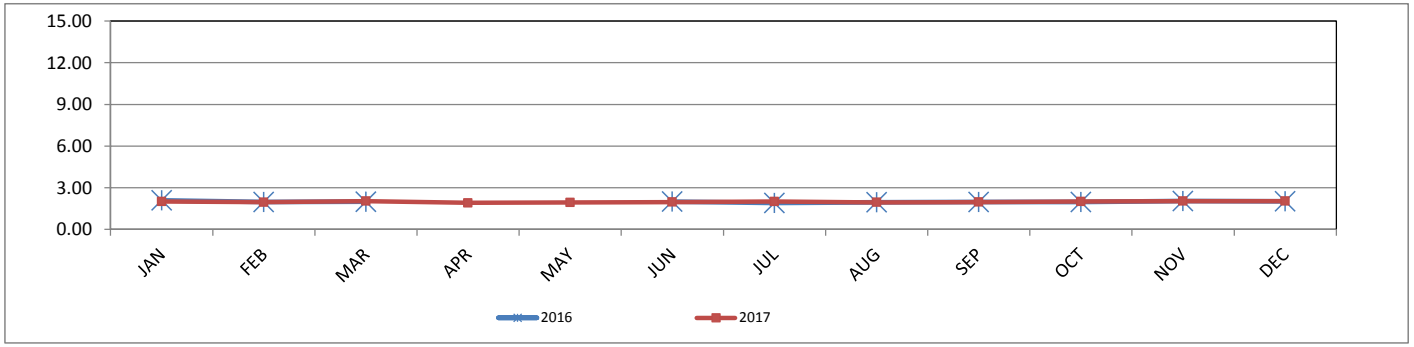
TOTAL HYDROCARBONS (THC) 2017 vs. 2016 1-Hr Readings in ppm

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	**2.10**	1.90	3.69	2.01	1.87	3.35	-0.09
FEB	1.97	1.91	2.10	1.97	1.82	3.71	0.00
MAR	2.00	1.93	2.08	2.04	1.87	3.65	0.05
APR	N/D	N/D	N/D	1.91	1.82	3.37	-
MAY	N/D	N/D	N/D	1.95	1.84	3.47	-
JUN	2.00	1.74	3.54	1.98	1.86	4.62	-0.03
JUL	1.91	1.65	3.63	2.01	1.90	3.74	0.10
AUG	1.96	1.78	**6.57**	1.95	1.77	3.90	-0.01
SEP	1.98	1.87	3.31	1.98	1.83	3.18	0.00
OCT	1.98	1.88	2.67	2.02	1.86	4.06	0.03
NOV	2.05	1.86	4.96	2.04	1.91	3.27	-0.01
DEC	2.03	1.92	4.19	**2.05**	1.91	**5.11**	0.02

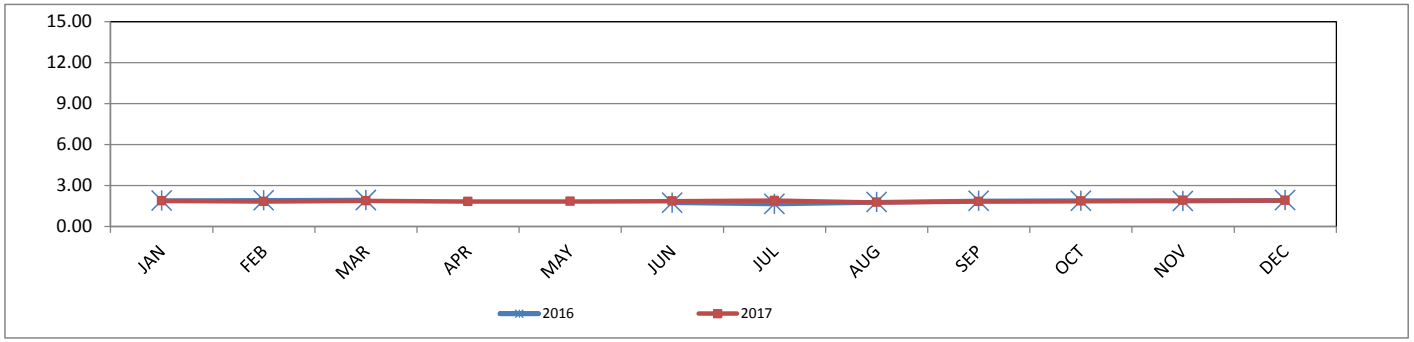
N/D - Valid Data Not Available

Annual peak

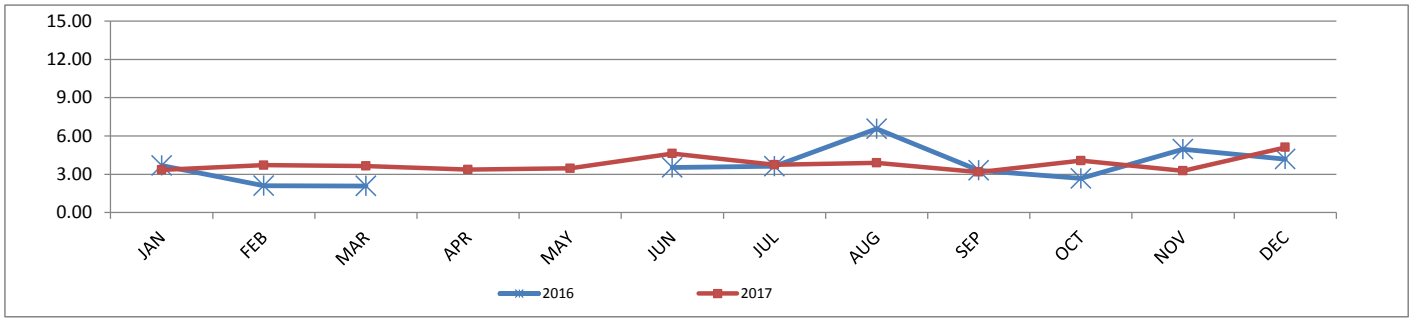
TOTAL HYDROCARBONS (THC) 2017 vs. 2016 Monthly Mean in ppm



TOTAL HYDROCARBONS (THC) 2017 vs. 2016 Monthly Minimum in ppm



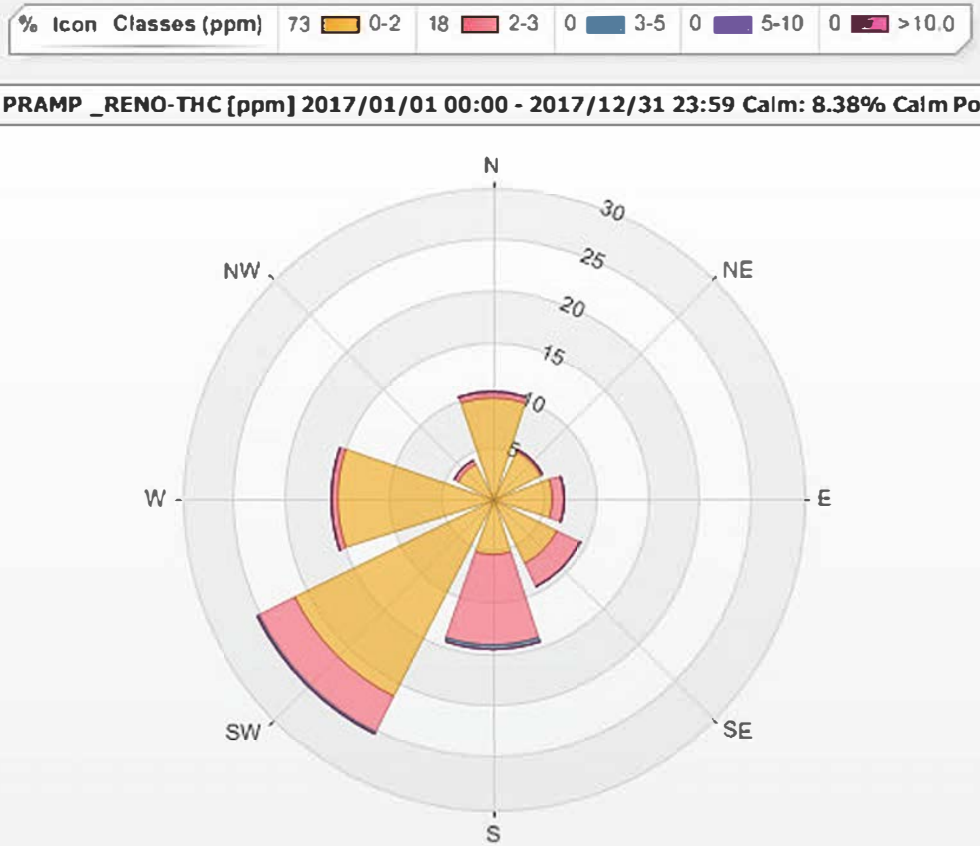
TOTAL HYDROCARBONS (THC) 2017 vs. 2016 Monthly Maximum in ppm



Wind: PRAMP_RENO
Poll.: PRAMP_RENO-THC [ppm]
Periodically: 2017/01/01 00:00-2017/12/31 23:59
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 8.38% Calm Avg: 2.18 [ppm]

Direction	0-2	2-3	3-5	5-10	>10.0	Total
N	9.8	0.5	0.0	0.0	0.0	10.3
NE	5.2	0.2	0.0	0.0	0.0	5.3
E	5.9	1.0	0.0	0.0	0.0	6.9
SE	6.9	2.6	0.0	0.0	0.0	9.5
S	5.4	8.8	0.3	0.0	0.0	14.5
SW	21.3	3.9	0.2	0.0	0.0	25.4
W	14.9	0.7	0.0	0.0	0.0	15.7
NW	3.8	0.3	0.0	0.0	0.0	4.1
Summary	73.2	17.9	0.5	0.0	0.0	91.6


% Icon Classes (ppm)
73 0-2
18 2-3
0 3-5
0 5-10
0 >10.0
PRAMP _RENO Poll.: PRAMP _RENO-THC [ppm] 2017/01/01 00:00 - 2017/12/31 23:59 Calm: 8.38% Calm Poll Avg: 2.18[ppm]
N
NE
E
SE
S
SW
W
NW
30
25
20
15
10
5

METHANE

METHANE (CH_4) 2017 Monthly Averages & Frequency Distributions of 1-Hr Readings

Month	Number of Readings*	Operational Time (%)	% Readings in Concentration Range (ppm CH_4)				AAAQO** (ppm)		EXCEEDANCES		MONTHLY AVERAGE (ppm)
			≤ 3.0	3.1 < C ≤ 10.0	10.1 < C ≤ 50.0	> 50.0	1-HR	24-HR	1-HR	24-HR	
January	709	100.0	99.6%	0.4%	0.0%	0.0%	-	-	-	-	2.01
February	629	98.5	99.0%	1.0%	0.0%	0.0%	-	-	-	-	1.97
March	696	98.5	98.4%	1.6%	0.0%	0.0%	-	-	-	-	2.04
April	685	99.9	99.7%	0.3%	0.0%	0.0%	-	-	-	-	1.91
May	691	97.8	99.9%	0.1%	0.0%	0.0%	-	-	-	-	1.95
June	620	90.7	98.5%	1.5%	0.0%	0.0%	-	-	-	-	1.98
July	709	100.0	98.7%	1.3%	0.0%	0.0%	-	-	-	-	2.01
August	701	98.9	98.7%	1.3%	0.0%	0.0%	-	-	-	-	1.95
September	686	100.0	99.7%	0.3%	0.0%	0.0%	-	-	-	-	1.98
October	684	97.0	98.0%	2.0%	0.0%	0.0%	-	-	-	-	2.02
November	574	84.2	99.7%	0.3%	0.0%	0.0%	-	-	-	-	2.04
December	702	99.3	98.7%	1.3%	0.0%	0.0%	-	-	-	-	2.05
Annual	**8086**	**97.1**	**99.1%**	**0.9%**	**0.0%**	**0.0%**					**1.99**

**# of readings excluding calibration hours*
***If Alberta Ambient Air Quality Objectives and Guidelines are not available '-' is used*

Alberta Ambient Air Quality Objectives Annual Average**	**-**	**ppm**
Annual Average for 2017	**1.99**	**ppm**

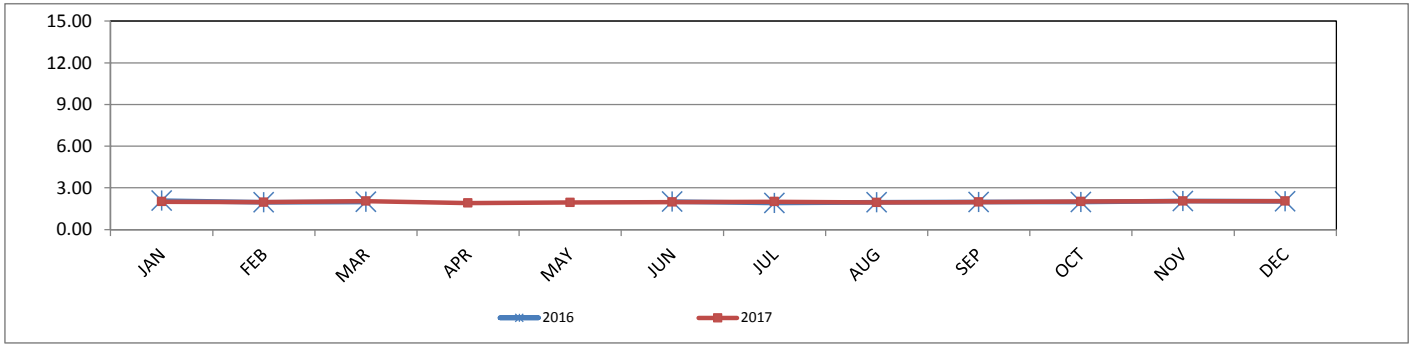
METHANE (CH_4) 2017 vs. 2016 1-Hr Readings in ppm

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	**2.09**	1.90	3.66	2.01	1.87	3.35	-0.08
FEB	1.96	1.90	2.10	1.97	1.82	3.70	0.00
MAR	1.99	1.93	2.08	2.04	1.87	3.65	0.05
APR	N/D	N/D	N/D	1.91	1.82	3.37	-
MAY	N/D	N/D	N/D	1.95	1.84	3.47	-
JUN	2.00	1.74	3.54	1.98	1.86	4.62	-0.03
JUL	1.91	1.65	3.62	2.01	1.90	3.74	0.10
AUG	1.96	1.78	**6.55**	1.95	1.77	3.89	-0.01
SEP	1.98	1.87	3.31	1.98	1.83	3.18	0.00
OCT	1.98	1.88	2.67	2.02	1.86	4.06	0.03
NOV	2.05	1.86	4.94	2.04	1.91	3.27	0.00
DEC	2.02	1.91	4.15	**2.05**	1.91	**5.11**	0.03

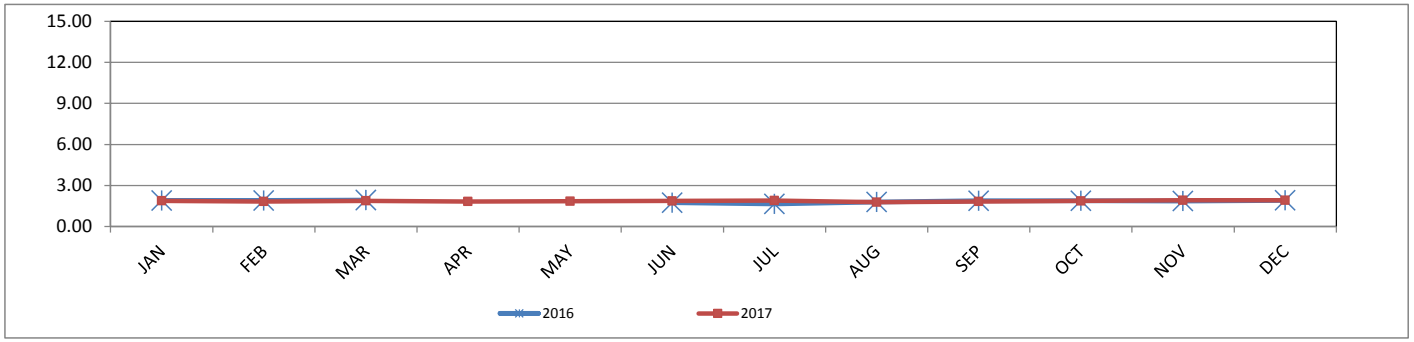
N/D - Valid Data Not Available

Annual peak

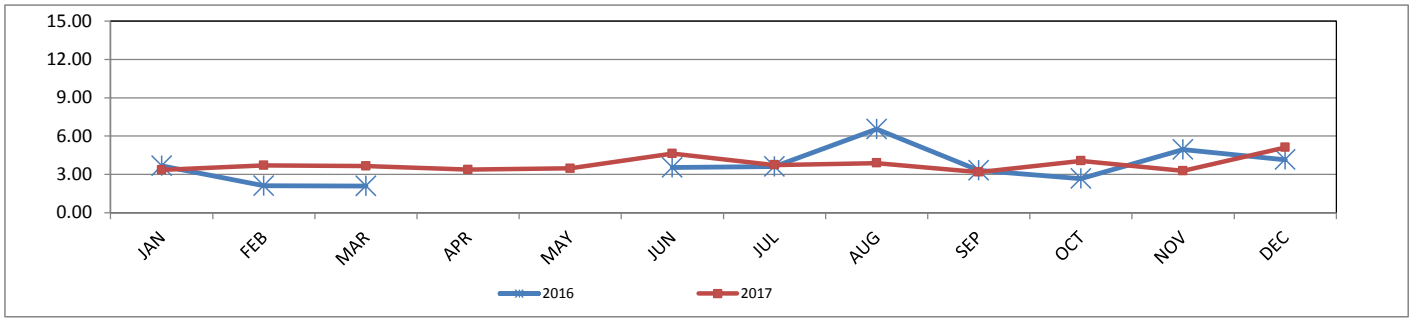
METHANE (CH_4) 2017 vs. 2016 Monthly Mean in ppm



METHANE (CH_4) 2017 vs. 2016 Monthly Minimum in ppm



METHANE (CH_4) 2017 vs. 2016 Monthly Maximum in ppm



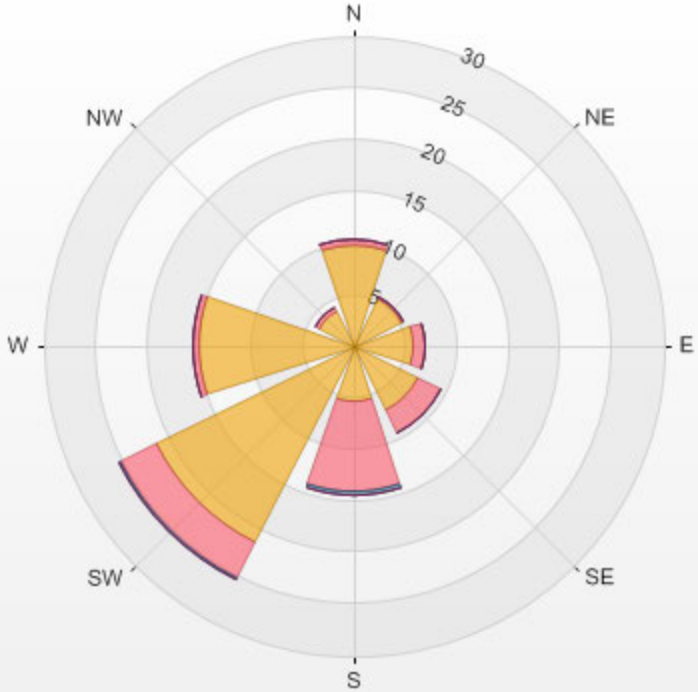
Wind: PRAMP_RENO
Poll.: PRAMP_RENO-CH_4 [ppm]
Periodically: 2017/01/01 00:00-2017/12/31 23:59
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 8.38% Calm Avg: 2.18 [ppm]

Direction	0-2	2-3	3-5	5-10	>10.0	Total
N	9.8	0.5	0.0	0.0	0.0	10.3
NE	5.2	0.2	0.0	0.0	0.0	5.3
E	5.9	1.0	0.0	0.0	0.0	6.9
SE	7.0	2.6	0.0	0.0	0.0	9.5
S	5.4	8.8	0.3	0.0	0.0	14.5
SW	21.3	3.9	0.2	0.0	0.0	25.4
W	14.9	0.7	0.0	0.0	0.0	15.7
NW	3.8	0.3	0.0	0.0	0.0	4.1
Summary	73.2	17.9	0.5	0.0	0.0	91.6

% Icon Classes (ppm)	73 0-2	18 2-3	0 3-5	0 5-10	0 >10.0

PRAMP_RENO Poll.: PRAMP_RENO-CH4[ppm] 2017/01/01 00:00 - 2017/12/31 23:59 Calm: 8.38% Calm Poll Avg: 2.18[ppm]



NON-METHANE HYDROCARBON

NON-METHANE HYDROCARBONS (NMHC) 2017 Monthly Averages & Frequency Distributions of 1-Hr Readings

Month	Number of Readings*	Operational Time (%)	% Readings in Concentration Range (ppm NMHC)						AAAQO** (ppm)		EXCEEDANCES		MONTHLY AVERAGE (ppm)
			≤ 0.20	0.21 < C ≤ 0.50	0.51 < C ≤ 1.00	1.01 < C ≤ 2.00	2.01 < C ≤ 4.00	> 4.00	1-HR	24-HR	1-HR	24-HR	
January	709	100.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
February	629	98.5	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
March	696	98.5	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
April	685	99.9	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
May	691	97.8	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
June	620	90.7	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
July	709	100.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
August	701	98.9	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
September	686	100.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
October	684	97.0	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
November	574	84.2	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
December	702	99.3	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	-	-	-	-	0.00
Annual	**8086**	**97.1**	**100.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**	**0.0%**					**0.00**

**# of readings excluding calibration hours*
***If Alberta Ambient Air Quality Objectives and Guidelines are not available '-' is used*

Alberta Ambient Air Quality Objectives Annual Average**	**-**	**ppm**
Annual Average for 2017	**0.00**	**ppm**

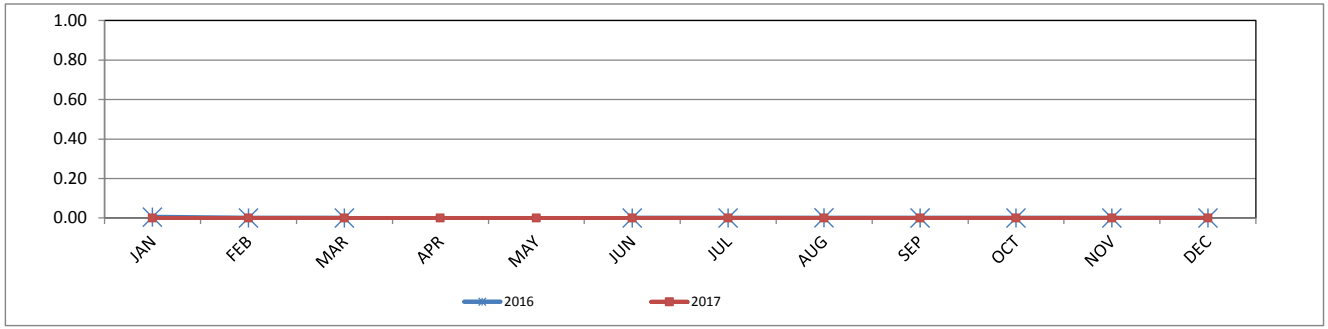
NON-METHANE HYDROCARBONS (NMHC) 2017 vs. 2016 1-Hr Readings in ppm

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	**0.00**	0.00	**0.23**	0.00	0.00	0.06	0.00
FEB	0.00	0.00	0.00	**0.00**	0.00	**0.14**	0.00
MAR	0.00	0.00	0.05	0.00	0.00	0.01	0.00
APR	N/D	N/D	N/D	0.00	0.00	0.03	-
MAY	N/D	N/D	N/D	0.00	0.00	0.00	-
JUN	0.00	0.00	0.01	0.00	0.00	0.10	0.00
JUL	0.00	0.00	0.02	0.00	0.00	0.10	0.00
AUG	0.00	0.00	0.12	0.00	0.00	0.03	0.00
SEP	0.00	0.00	0.03	0.00	0.00	0.12	0.00
OCT	0.00	0.00	0.00	0.00	0.00	0.10	0.00
NOV	0.00	0.00	0.04	0.00	0.00	0.02	0.00
DEC	0.00	0.00	0.05	0.00	0.00	0.03	0.00

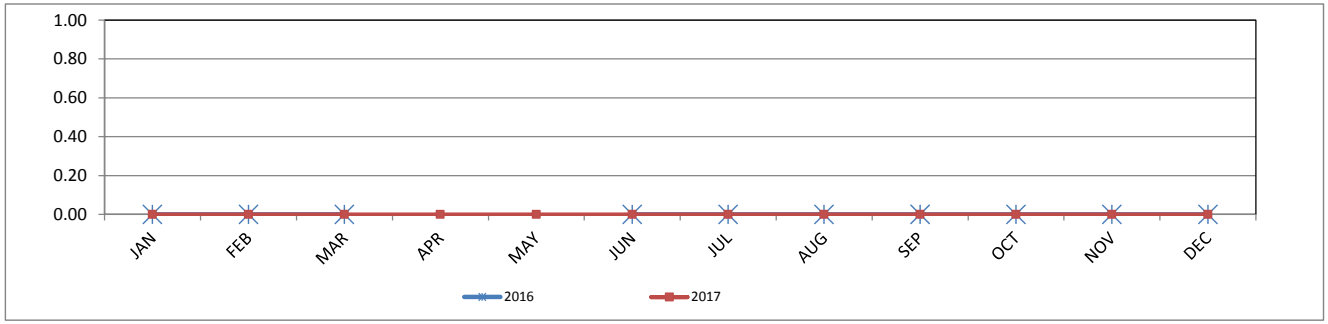
N/D - Valid Data Not Available

Annual peak

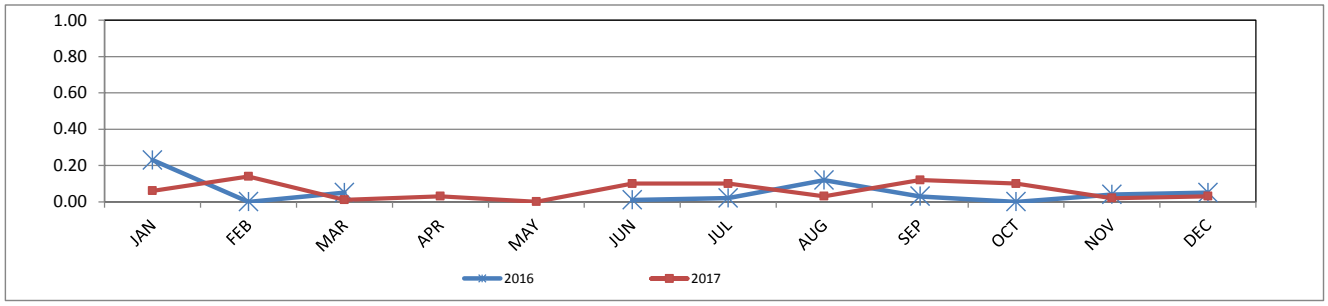
NON-METHANE HYDROCARBONS (NMHC) 2017 vs. 2016 Monthly Mean in ppm



NON-METHANE HYDROCARBONS (NMHC) 2017 vs. 2016 Monthly Minimum in ppm



NON-METHANE HYDROCARBONS (NMHC) 2017 vs. 2016 Monthly Maximum in ppm



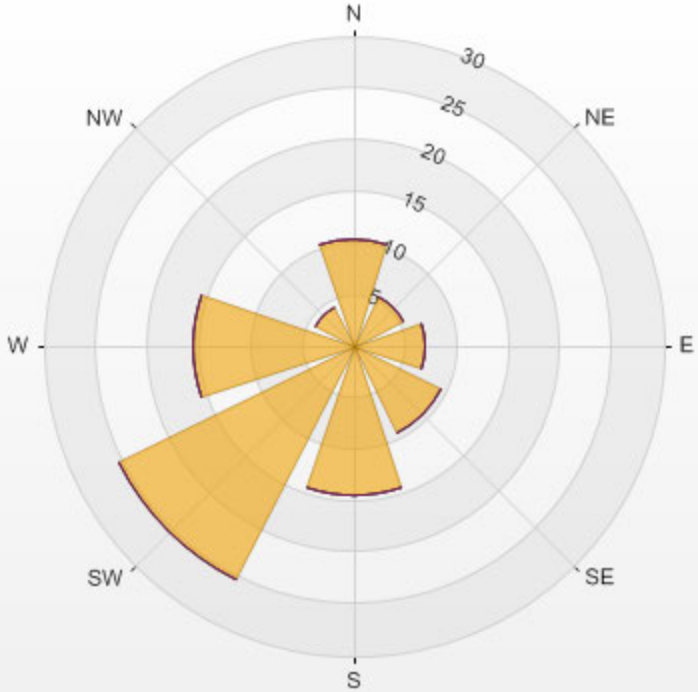
Wind: PRAMP_RENO
Poll.: PRAMP_RENO-NMHC [ppm]
Periodically: 2017/01/01 00:00-2017/12/31 23:59
Type: PollutionRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 8.37% Calm Avg: 0.00 [ppm]

Direction	0-0.1	0.1-0.3	0.3-1	1-2	>2.0	Total
N	10.3	0.0	0.0	0.0	0.0	10.3
NE	5.3	0.0	0.0	0.0	0.0	5.3
E	6.9	0.0	0.0	0.0	0.0	6.9
SE	9.5	0.0	0.0	0.0	0.0	9.5
S	14.5	0.0	0.0	0.0	0.0	14.5
SW	25.4	0.0	0.0	0.0	0.0	25.4
W	15.7	0.0	0.0	0.0	0.0	15.7
NW	4.1	0.0	0.0	0.0	0.0	4.1
Summary	91.6	0.0	0.0	0.0	0.0	91.6

% Icon Classes (ppm)	92 0-0.1	0 0.1-0.3	0 0.3-1	0 1-2	0 >2.0

PRAMP_RENO Poll.: PRAMP_RENO-NMHC[ppm] 2017/01/01 00:00 - 2017/12/31 23:59 Calm: 8.37% Calm Poll Avg: 0.00[ppm]



WIND SYSTEM

WIND SPEED (WS) 2017 Monthly Data Summary of 1-Hr & 24-Hr Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (kph)	Minimum 1-Hr Average (kph)	Maximum 1-Hr Average (kph)	Maximum 24-Hr Average (kph)
January	744	100.0	2.8	0.0	18.3	11.8
February	666	99.7	2.7	0.1	26.7	16.3
March	744	100.0	1.8	0.2	16.3	12.2
April	716	100.0	3.1	0.2	23.1	18.1
May	730	98.1	1.1	0.3	24.6	15.7
June	676	93.9	1.2	0.0	21.2	14.1
July	744	100.0	3.1	0.1	20.0	11.2
August	744	100.0	3.5	0.1	17.1	11.5
September	720	100.0	2.0	0.1	18.3	11.6
October	744	100.0	3.6	0.5	21.2	12.8
November	720	100.0	0.8	0.3	22.2	10.7
December	742	99.7	4.4	0.0	18.1	11.3
Annual	**8690**	**99.3**	**2.5**	**0.2**	**20.6**	**13.1**

**# of readings excluding calibration hours*

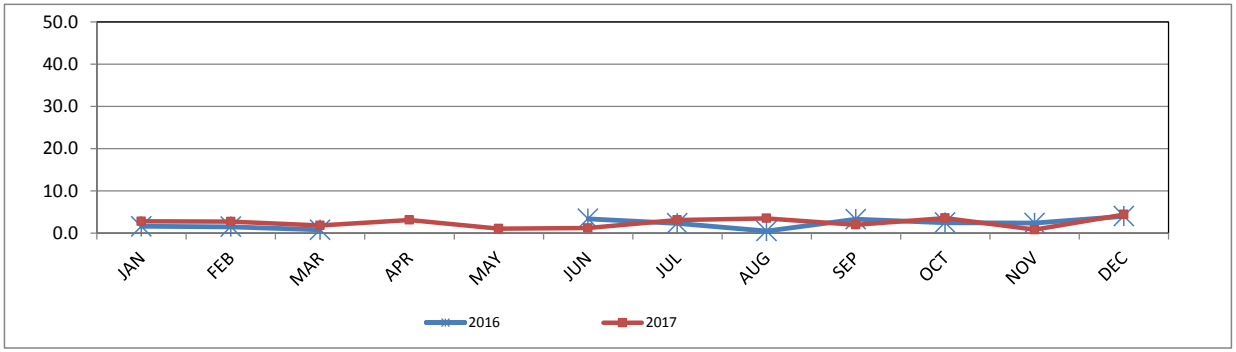
WIND SPEED (WS) 2017 vs. 2016 1-Hr Readings in kph

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	1.6	0.1	20.7	2.8	0.0	18.3	1.2
FEB	1.5	0.0	**23.2**	2.7	0.1	**26.7**	1.2
MAR	0.8	0.1	18.5	1.8	0.2	16.3	1.0
APR	N/D	N/D	N/D	3.1	0.2	23.1	-
MAY	N/D	N/D	N/D	1.1	0.3	24.6	-
JUN	3.4	0.0	21.4	1.2	0.0	21.2	-2.2
JUL	2.3	0.1	18.7	3.1	0.1	20.0	0.8
AUG	0.5	0.0	16.0	3.5	0.1	17.1	3.0
SEP	3.3	0.1	16.8	2.0	0.1	18.3	-1.3
OCT	2.5	0.1	20.5	3.6	0.5	21.2	1.1
NOV	2.4	0.0	15.0	0.8	0.3	22.2	-1.6
DEC	**4.0**	0.0	20.4	**4.4**	0.0	18.1	0.4

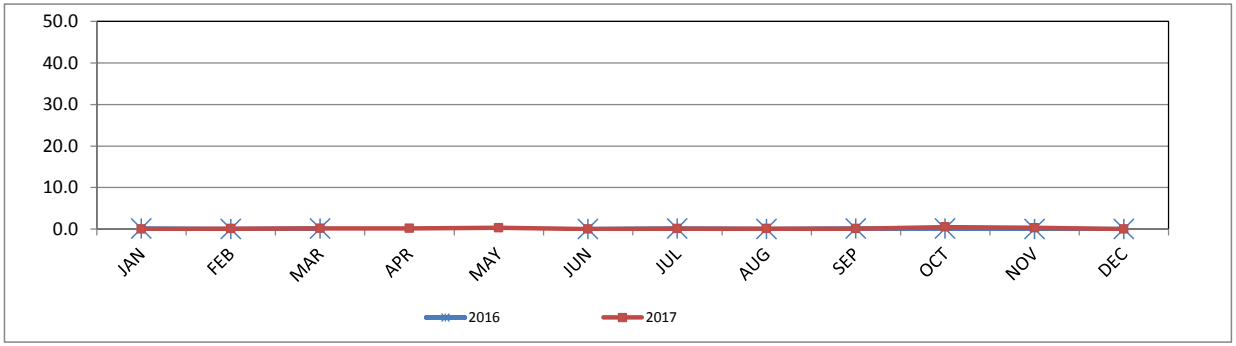
N/D - Valid Data Not Available

Annual peak

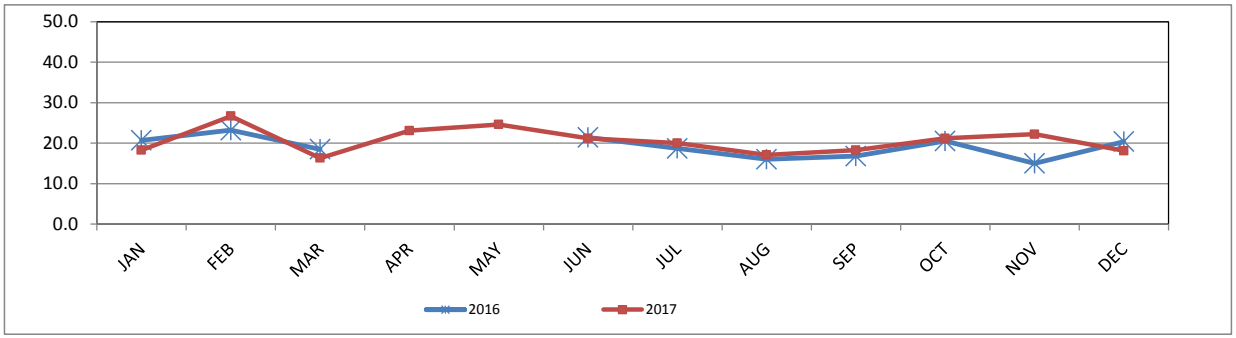
WIND SPEED (WS) 2017 vs. 2016 Monthly Mean in kph



WIND SPEED (WS) 2017 vs. 2016 Monthly Minimum in kph



WIND SPEED (WS) 2017 vs. 2016 Monthly Maximum in kph



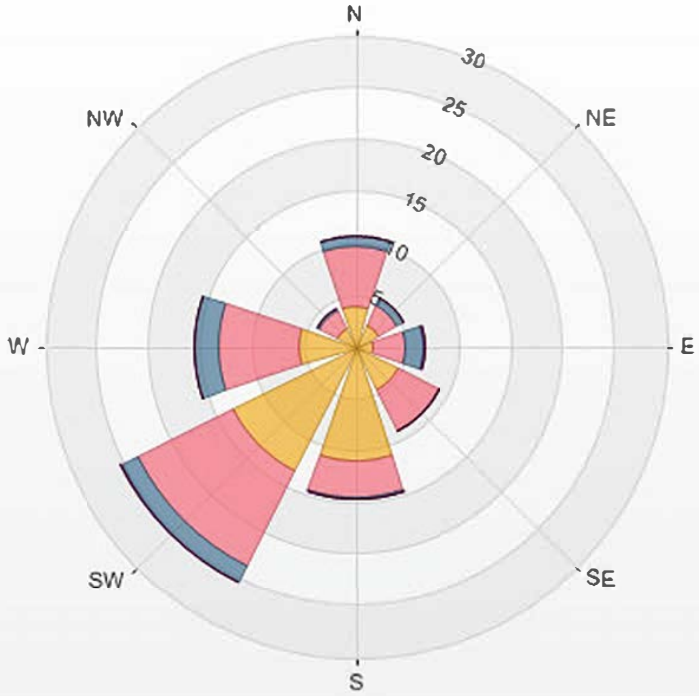
Wind: PRAMP_RENO
Monitor: WSP [kph]
Periodically: 2017/01/01 00:00-2017/12/31 23:59
Type: WindRose
Direction: Blowing From (Wind Frequency)
Based On 1 Hr.

Calm: 8.22%

Direction	1.8-6.0	6.0-12.0	12.0-20.0	20.0-29.0	29.0-39.0	>39.0	Total
N	3.9	5.9	1.1	0.0	0.0	0.0	10.8
NE	2.5	2.0	0.8	0.1	0.0	0.0	5.3
E	1.7	3.1	1.8	0.2	0.0	0.0	6.8
SE	4.7	4.3	0.2	0.0	0.0	0.0	9.2
S	11.0	3.5	0.1	0.0	0.0	0.0	14.6
SW	13.3	10.4	1.7	0.0	0.0	0.0	25.4
W	5.4	7.8	2.4	0.0	0.0	0.0	15.6
NW	2.1	1.9	0.1	0.0	0.0	0.0	4.1
Summary	44.6	38.9	8.0	0.3	0.0	0.0	91.8

% Icon Classes (kph)	45 1.8-6.0	39 6.0-12.0	8 12.0-20.0	0 20.0-29.0	0 29.0-39.0	0 >39.0

PRAMP_RENO 2017/01/01 00:00 - 2017/12/31 23:59 Calm: 8.22% Calm Wind Avg Speed: 1.13(kph)



RELATIVE HUMIDITY

RELATIVE HUMIDITY (RH) 2017 Monthly Data Summary of 1-Hr & 24-Hr Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (%)	Minimum 1-Hr Average (%)	Maximum 1-Hr Average (%)	Maximum 24-Hr Average (%)
January	744	100.0	74	43	95	90
February	669	99.6	70	34	95	89
March	744	100.0	62	28	95	75
April	720	100.0	65	18	95	94
May	733	98.5	51	13	94	90
June	677	94.0	55	15	95	90
July	744	100.0	64	21	95	85
August	744	100.0	63	24	94	85
September	720	100.0	68	23	94	90
October	744	100.0	66	14	94	89
November	720	100.0	75	53	92	83
December	742	99.7	66	35	90	78
Annual	**8701**	**99.3**	**65**	**27**	**94**	**86**

**# of readings excluding calibration hours*

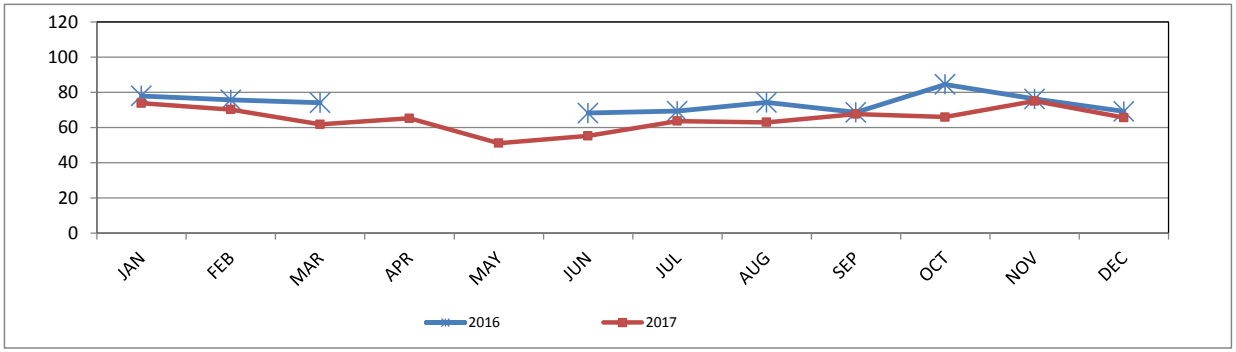
RELATIVE HUMIDITY (RH) 2017 vs. 2016 1-Hr Readings in %

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	78	49	96	74	43	**95**	-4
FEB	76	42	**98**	70	34	95	-5
MAR	74	28	98	62	28	95	-12
APR	N/D	N/D	N/D	65	18	95	-
MAY	N/D	N/D	N/D	51	13	94	-
JUN	68	29	98	55	15	95	-13
JUL	69	31	96	64	21	95	-6
AUG	74	30	96	63	24	94	-11
SEP	69	25	96	68	23	94	-1
OCT	**85**	32	96	66	14	94	-19
NOV	76	38	96	**75**	53	92	-1
DEC	69	51	89	66	35	90	-3

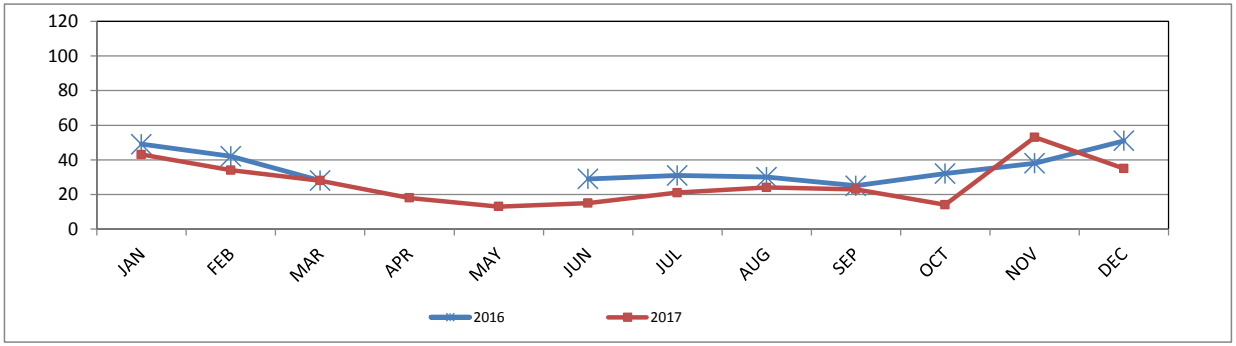
N/D - Valid Data Not Available

Annual peak

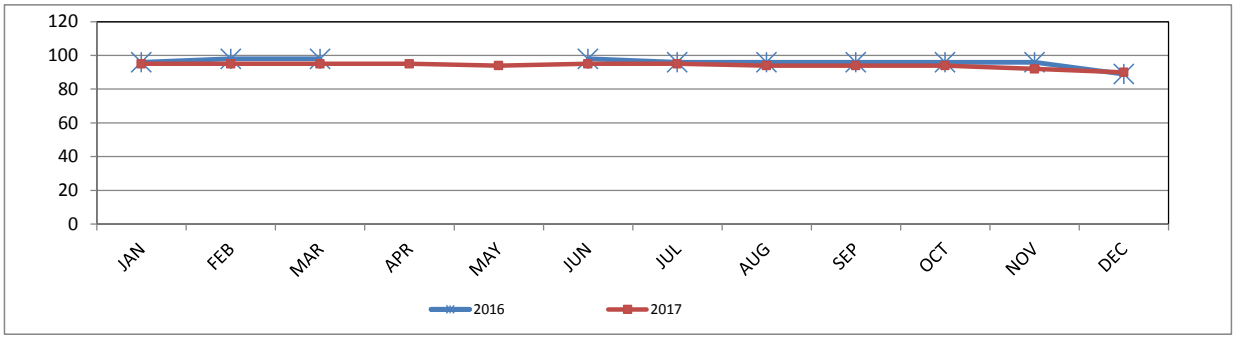
RELATIVE HUMIDITY (RH) 2017 vs. 2016 Monthly Mean in %



RELATIVE HUMIDITY (RH) 2017 vs. 2016 Monthly Minimum in %



RELATIVE HUMIDITY (RH) 2017 vs. 2016 Monthly Maximum in %



BAROMETRIC PRESSURE

BAROMETRIC PRESSURE (BP) 2017 Monthly Data Summary of 1-Hr & 24-Hr Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (millibar)	Minimum 1-Hr Average (millibar)	Maximum 1-Hr Average (millibar)	Maximum 24-Hr Average (millibar)
January	744	100.0	936	910	955	953
February	670	99.7	934	909	957	956
March	744	100.0	938	920	960	958
April	720	100.0	938	922	951	951
May	730	98.1	937	921	950	948
June	678	94.2	936	924	950	949
July	744	100.0	939	933	952	949
August	744	100.0	939	927	954	953
September	720	100.0	938	922	954	952
October	744	100.0	936	914	955	953
November	720	100.0	935	913	955	952
December	742	99.7	944	919	963	960
Annual	**8700**	**99.3**	**937**	**919**	**955**	**953**

**# of readings excluding calibration hours*

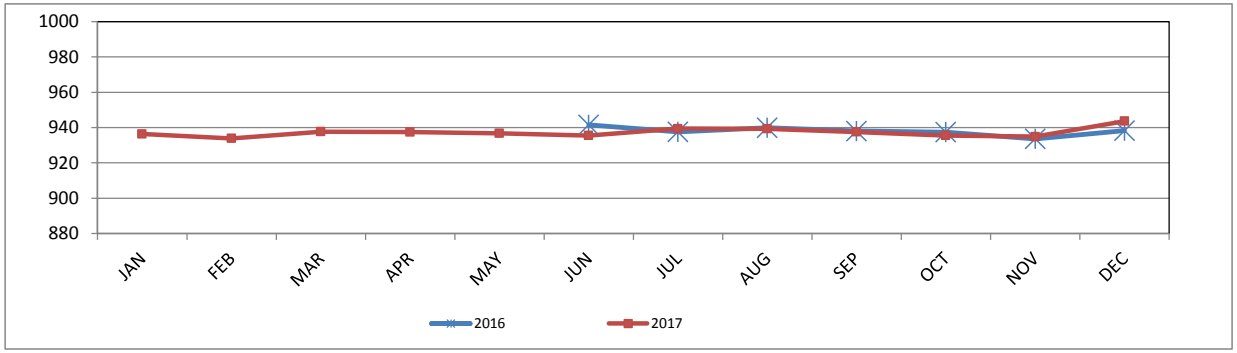
BAROMETRIC PRESSURE (BP) 2017 vs. 2016 1-Hr Readings in millibar

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	N/D	N/D	N/D	936	910	955	-
FEB	N/D	N/D	N/D	934	909	957	-
MAR	N/D	N/D	N/D	938	920	960	-
APR	N/D	N/D	N/D	938	922	951	-
MAY	N/D	N/D	N/D	937	921	950	-
JUN	**941**	934	947	936	924	950	-6
JUL	938	930	948	939	933	952	2
AUG	940	925	951	939	927	954	0
SEP	938	922	950	938	922	954	0
OCT	937	917	950	936	914	955	-2
NOV	934	920	953	935	913	955	1
DEC	938	914	**965**	**944**	919	**963**	5

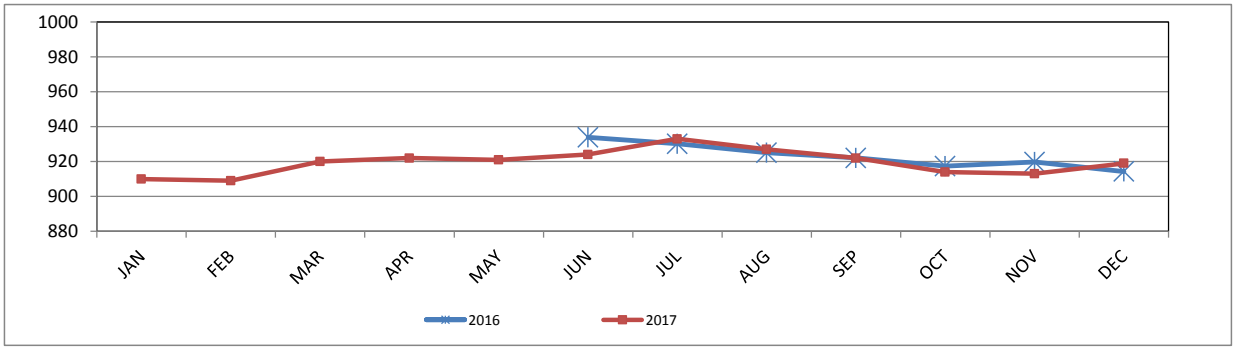
N/D - Valid Data Not Available

Annual peak

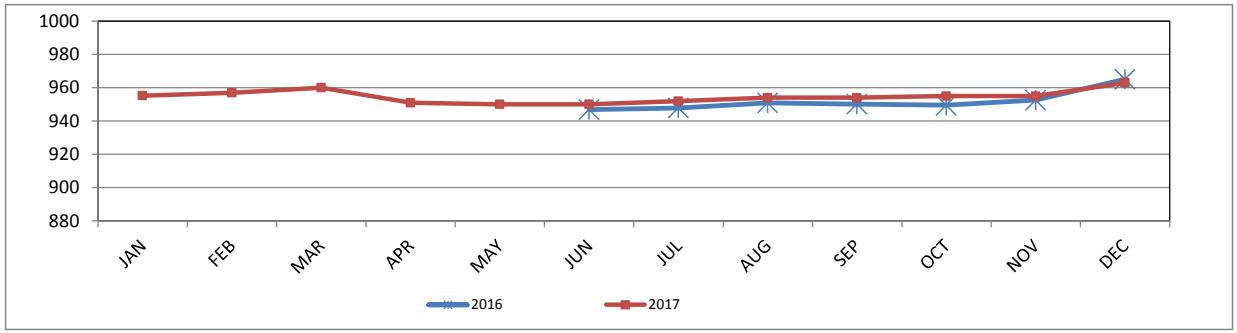
BAROMETRIC PRESSURE (BP) 2017 vs. 2016 Monthly Mean in millibar



BAROMETRIC PRESSURE (BP) 2017 vs. 2016 Monthly Minimum in millibar



BAROMETRIC PRESSURE (BP) 2017 vs. 2016 Monthly Maximum in millibar



AMBIENT TEMPERATURE

AMBIENT TEMPERATURE (AT) 2017 Monthly Data Summary of 1-Hr & 24-Hr Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (°C)	Minimum 1-Hr Average (°C)	Maximum 1-Hr Average (°C)	Maximum 24-Hr Average (°C)
January	744	100.0	-8.7	-26.5	8.6	3.7
February	669	99.6	-9.0	-30.3	11.1	5.8
March	744	100.0	-6.1	-27.2	11.8	5.2
April	720	100.0	2.7	-9.2	14.1	8.0
May	730	98.1	12.3	0.0	27.3	20.1
June	676	93.9	15.3	3.3	26.7	21.9
July	744	100.0	16.7	7.6	28.8	21.1
August	744	100.0	16.2	5.8	29.1	21.5
September	720	100.0	11.4	-1.2	28.9	18.8
October	744	100.0	3.5	-7.2	21.8	12.6
November	720	100.0	-10.2	-25.0	4.3	1.6
December	742	99.7	-9.5	-37.4	7.7	4.5
Annual	**8697**	**99.3**	**2.9**	**-12.3**	**18.4**	**12.0**

**# of readings excluding calibration hours*

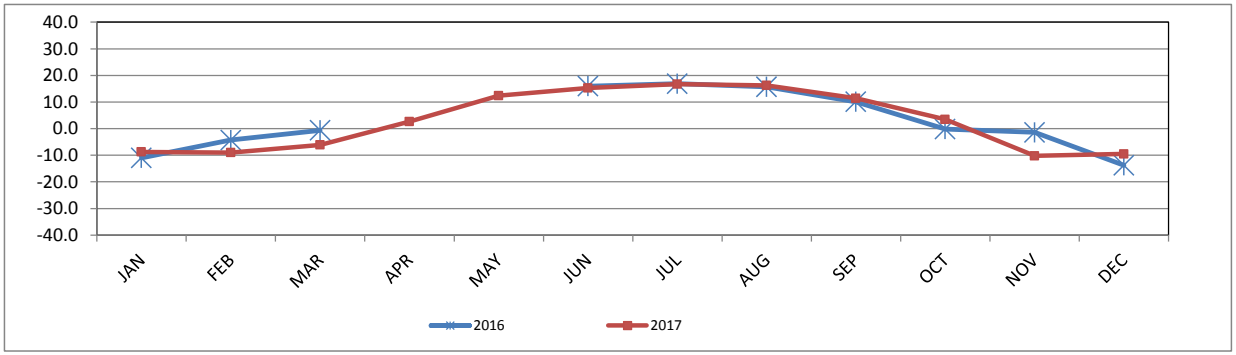
AMBIENT TEMPERATURE (AT) 2017 vs. 2016 1-Hr Readings in °C

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	-10.9	-25.6	7.2	-8.7	-26.5	8.6	2.2
FEB	-4.3	-16.4	9.0	-9.0	-30.3	11.1	-4.7
MAR	-0.6	-13.6	13.1	-6.1	-27.2	11.8	-5.5
APR	N/D	N/D	N/D	2.7	-9.2	14.1	-
MAY	N/D	N/D	N/D	12.3	0.0	27.3	-
JUN	16.0	5.7	**27.9**	15.3	3.3	26.7	-0.7
JUL	**16.9**	6.8	26.8	**16.7**	7.6	28.8	-0.2
AUG	15.7	4.5	26.1	16.2	5.8	**29.1**	0.5
SEP	10.1	-2.5	24.0	11.4	-1.2	28.9	1.3
OCT	-0.2	-6.3	10.2	3.5	-7.2	21.8	3.6
NOV	-1.4	-14.4	17.1	-10.2	-25.0	4.3	-8.8
DEC	-13.7	-34.3	2.5	-9.5	-37.4	7.7	4.2

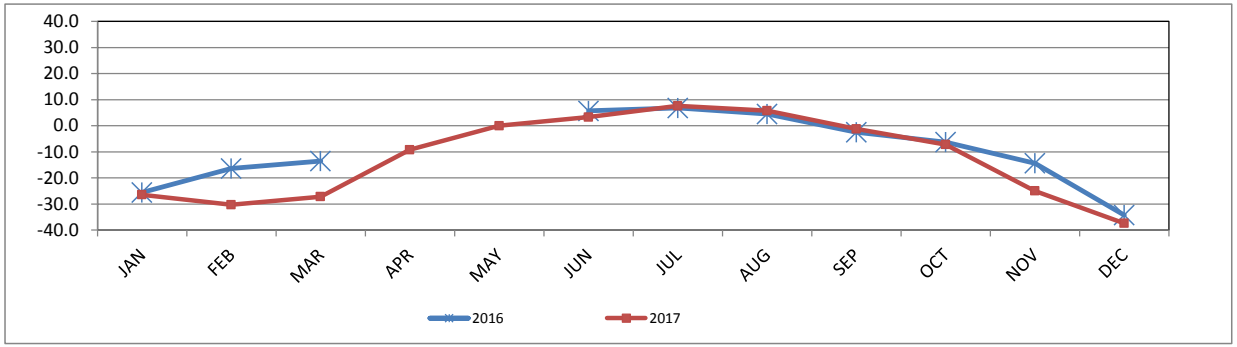
N/D - Valid Data Not Available

Annual peak

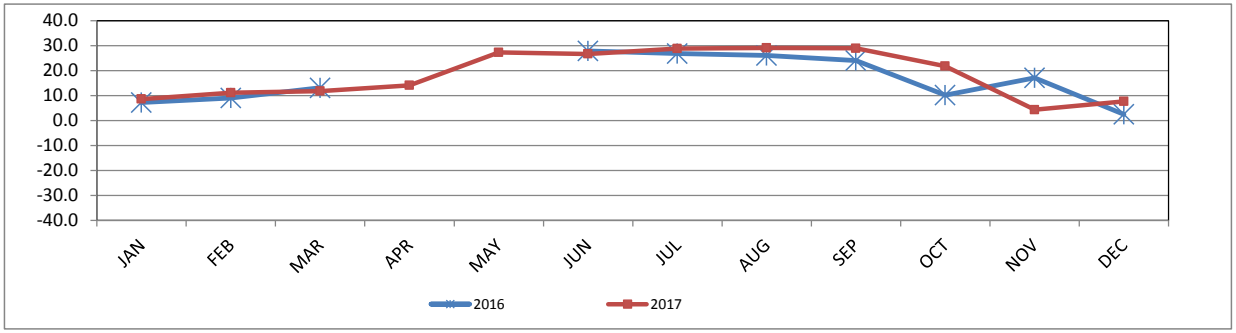
AMBIENT TEMPERATURE (AT) 2017 vs. 2016 Monthly Mean in °C



AMBIENT TEMPERATURE (AT) 2017 vs. 2016 Monthly Minimum in °C



AMBIENT TEMPERATURE (AT) 2017 vs. 2016 Monthly Maximum in °C



STATION TEMPERATURE

STATION TEMPERATURE (STNTPX) 2017 Monthly Data Summary of 1-Hr & 24-Hr Readings

Month	Number of Readings*	Operational Time (%)	Monthly Average (°C)	Minimum 1-Hr Average (°C)	Maximum 1-Hr Average (°C)	Maximum 24-Hr Average (°C)
January	744	100.0	21.1	16.5	22.5	22.0
February	666	99.1	21.7	19.0	23.4	22.5
March	744	100.0	22.3	19.4	24.0	23.1
April	720	100.0	22.6	21.8	23.8	22.8
May	730	98.1	22.2	20.8	24.6	23.0
June	676	93.9	21.1	19.3	31.2	25.8
July	744	100.0	21.4	20.8	23.6	21.9
August	744	100.0	21.4	20.8	24.9	22.3
September	720	100.0	21.2	18.8	22.9	21.4
October	744	100.0	20.2	18.6	23.0	21.2
November	720	100.0	21.0	1.0	22.1	21.9
December	742	99.7	21.7	17.7	22.1	22.0
Annual	**8694**	**99.2**	**21.5**	**17.9**	**24.0**	**22.5**

**# of readings excluding calibration hours*

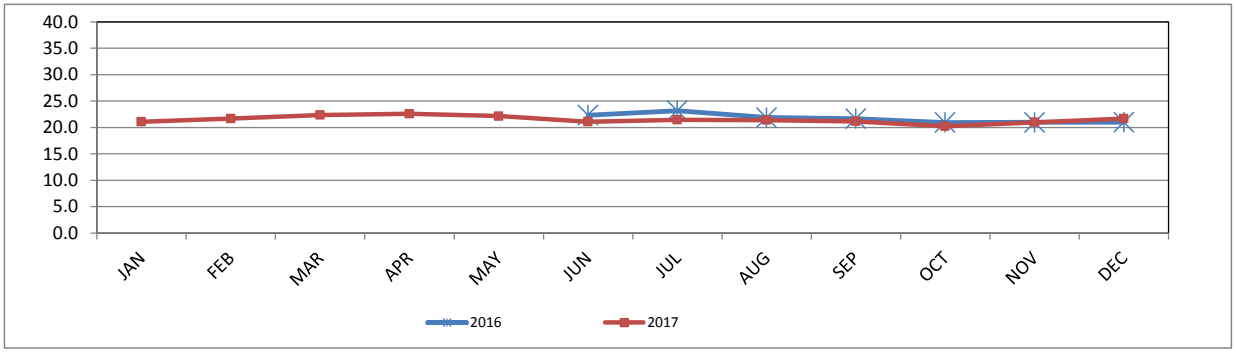
STATION TEMPERATURE (STNTPX) 2017 vs. 2016 1-Hr Readings in °C

	2016			2017			
MONTH	**MEAN**	**MINIMUM**	**MAXIMUM**	**MEAN**	**MINIMUM**	**MAXIMUM**	**DIFFERENCE**
JAN	N/D	N/D	N/D	21.1	16.5	22.5	-
FEB	N/D	N/D	N/D	21.7	19.0	23.4	-
MAR	N/D	N/D	N/D	22.3	19.4	24.0	-
APR	N/D	N/D	N/D	**22.6**	21.8	23.8	-
MAY	N/D	N/D	N/D	22.2	20.8	24.6	-
JUN	22.4	21.5	25.1	21.1	19.3	**31.2**	-1.3
JUL	**23.2**	20.5	**35.2**	21.4	20.8	23.6	-1.7
AUG	21.9	20.3	23.0	21.4	20.8	24.9	-0.5
SEP	21.7	17.6	24.9	21.2	18.8	22.9	-0.5
OCT	21.0	19.9	22.6	20.2	18.6	23.0	-0.7
NOV	21.0	18.6	23.3	21.0	1.0	22.1	0.0
DEC	21.0	19.2	22.9	21.7	17.7	22.1	0.7

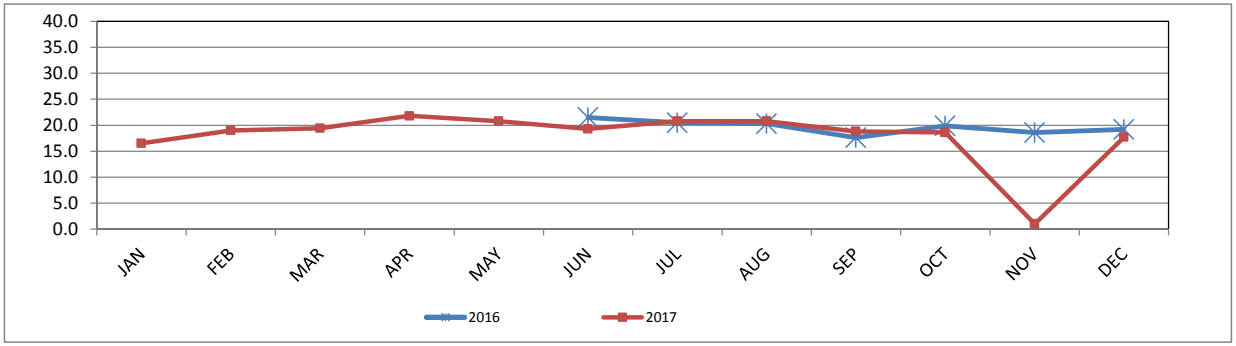
N/D - Valid Data Not Available

Annual peak

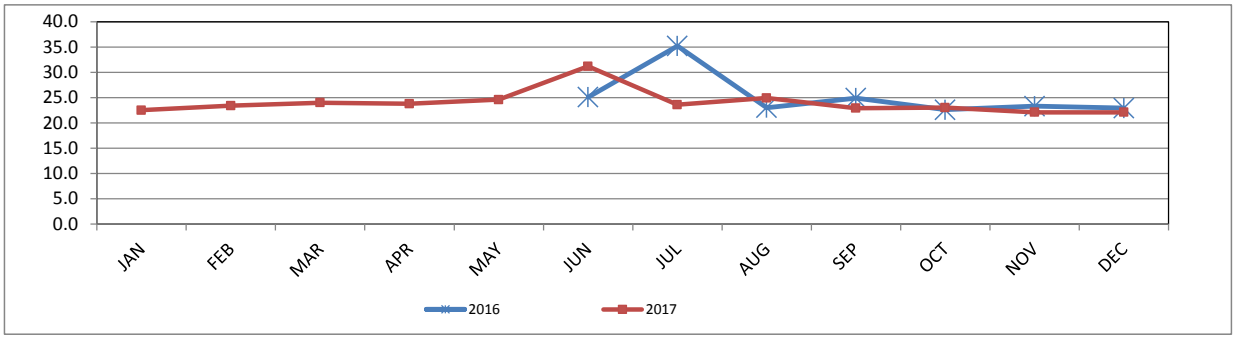
STATION TEMPERATURE (STNTPX) 2017 vs. 2016 Monthly Mean in °C



STATION TEMPERATURE (STNTPX) 2017 vs. 2016 Monthly Minimum in °C



STATION TEMPERATURE (STNTPX) 2017 vs. 2016 Monthly Maximum in °C

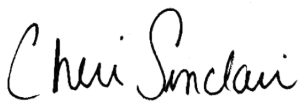


APPENDIX II
REPORT CERTIFICATION FORM

Report Certification Form

Alberta Airshed (if applicable)	**EPA Approval or Code of Practice Registration #** (if applicable)
YES	**NA**
Company Name (if applicable)	**Industrial Operation Name** (if applicable)
Peace River Area Monitoring Program	**Reno Station**
Name of the Representative of the Person Responsible	**Position / Title of the Representative of the Person Responsible**
Mike Bisaga / Lily Lin	**Technical Program Managers**
Is an External Party Certifying the Report?	
■ **Yes** ☐ **No**	
Name of External Person Certifying the Report	**Position / Title of External Person Certifying the Report**
Cheri Sinclair	**Supervisor, Customer Service, Air Services**
Company Name for External Person Certifying the Report	**Identification of Qualifications / Professional Designations of the External Person Certifying the Report**
Maxxam Analytics, A Bureau Veritas Group Company	**B.Sc.**

Maxxam Analytics is the designated contractor conducting monitoring and reporting activities. I certify that the submitted data has been (a) reviewed and validated as per the AMD Chapter 6: Ambient Data Quality. I certify that the submitted report (b) accurately reflects the monitoring results and reporting timeframe and (c) meets the specified analysis, summarization and reporting requirements as per the AMD Chapter 9: Reporting.



Signature of the External Person Certifying the Report

14-Mar-2018

Report Issued Date (dd-mon-yyyy)